

**THE LEGAL REGIME IN UGANDA'S PETROLEUM INDUSTRY: AN ANALYSIS OF
THE LAW ON RISK MANAGEMENT IN ENSURING FIRE SAFETY**

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**A DISSERTATION SUBMITTED TO THE FACULTY OF LAW IN PARTIAL
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DECLARATION

I, Ahumuza Christiana hereby declare that this dissertation is my work and it has not been submitted before to any other institution of higher learning for fulfillment of any academic award.

Signed.....

Date.....

APPROVAL

This is to certify that, this dissertation entitled “**The Legal Regime in Uganda’s Petroleum Industry: An analysis of the Law on Risk Management in ensuring Fire Safety**” has been done under my supervision and now it is ready for submission.

Signature.....

Isaac Christopher Lubogo

(Academic supervisor).

Date.....

DEDICATION

This research report is dedicated to God, without whom I wouldn't be in existence, my wonderful Dad the late Mr. Mwesigye Charles Ruyema, who inspired me to pursue my studies wholeheartedly and was there for me till his final days and to my beautiful mother Mrs. Mwesigye Winfred, who has been and still is my refuge.

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ACRONYMS

CNOOC	Chinese National Overseas Oil Corporation
OPRC	Oil Pollution Preparedness Response and Cooperation
UNCED	United Nations Conference on Environment and Development
EIA	Environmental Impact Assessment
UNFCCC	United Nations Framework Convention on Climate Change
ECT	Energy Charter Treaty
EAC	East African Community
BAT	Best Available Techniques
BEP	Best Environmental Practices
BBL	Barrels
BP	British Petroleum company
GOU	Government of Uganda
IOCs	International Oil Companies
NEMA	National Environment Management Authority
MFNP	Murchison Falls National Park
UNOC	Uganda National Oil Company
NEA	National Environment Act
EIS	Environmental Impact Statement
PAU	Petroleum Authority of Uganda
NEMC	National Environmental Management Council

NEP	National Environmental Policy
OSH	Occupational Safety and Health
MGLSD	Ministry of Gender, Labour and Social Development
ILO	International Labour Organisation
OECD	Organization for Economic Co-operation and Development
EEC	European Economic Community
ESIA	Environmental Social Impact Assessment

ABSTRACT

The study aimed at analyzed and assessed the efficacy of the laws, on risk management, that have been adopted to ensure fire safety in Uganda's Oil and Gas/ petroleum industry. The study had five objectives: to identify the possible causes of fire accidents in Uganda's petroleum industry; to ascertain the legal framework for prevention and control of fire hazards; to analyze the efficacy of the law in preventing and controlling fire hazards; to identify challenges in the implementation of the law; and to make recommendations that can be helpful to the stakeholders in ensuring fire safety.

The study used a qualitative research design. Data was collected using interviews and during the data collection, purposive sampling was used which helped to achieve better results.

Results show that fire and explosions are the major accidents in the petroleum industry. They are a result of combustible gasses reacting with air mostly during the process of drilling. These are usually caused by negligent or improperly trained workers. However, there is a regulatory framework that has been put in place to control fire hazards which is ideal but has not been effective in ensuring fire safety due to lack of proper implementation and enforcement.

There is a need for the law makers and other stakeholders in the industry to sensitize workers about their rights and duties, the safety and health laws adopted for protection against fire accidents during oil and gas operations. It is essential for the law makers and enforcers to effectively implement the laws on occupational safety and health hazards, by holding those found in breach of the law accountable.

CHAPTER ONE

1.0 INTRODUCTION

Commercial accumulations of oil were first discovered in Uganda in 2006 within the Albertine Graben and the current estimate of the country's petroleum oil in place is 6.5 billion stock tank oil initially in place barrels of oil (bbl), of which 1 billion bbl is estimated as recoverable.¹

The Government of Uganda (GOU) has plans for commercialization of the discovered resources, which includes the development of a refinery, use of crude oil to generate electricity, export of crude oil to international markets by pipeline via Tanzania. GOU also expects that the development of the oil and gas industry will stimulate accelerated economic growth, job creation, contribute towards poverty reduction and general prosperity to the people of Uganda.²

The industry is one of the riskiest when it comes to health and safety of employees considering the presence of inherent flash fire hazards which are associated with oil and gas well drilling, servicing, refining and production-related operations.³

Oil and gas development projects come with a number of risks throughout the processes of exploration, development and production which ought to be managed or mitigated. These include, political, operational and economic risks but the main focus in this study are the operational risks associated with fire safety in the Uganda's petroleum industry. In carrying out the petroleum activities, the workplace environment can be a hazardous place to work because workers are exposed to numerous potential hazards. These, largely, include physical hazards such as fire, flying

¹ Tilenga Environmental Social Impact Assessment vol.1.13.09.2018 Available at [nema.go.ug>all>nema>docspdf](http://nema.go.ug/all/nema/docspdf). Accessed on 26th July, 2019.

² Ibid

³ Noopur Sonee, et al. Oil and Gas industry: Review on fire hazards and protective textiles. International journal of Advance Research in Science and Engineering Vol. No.6, Issue No.01, January 2017. Available at [https://ijarse.com>fullpdf](https://ijarse.com/fullpdf) Accessed on 28th February, 2019

sparks, electrical, and radiant heat, which are responsible for a wide range of injuries, severe burns and respiratory diseases.⁴

The potential for fire is present in most of the operations due to vapour or product leaks which in most cases result into fire explosions. These severely affect the health of the workers and the surrounding environment, hence the need to carefully manage and operate petroleum activities by ensuring safety from fire and heat related hazards.⁵

While it's a fact that oil and gas activities have the potential of becoming dangerous to life, property, and the environment, the host governments have to put into consideration all the risks associated with oil and gas projects.⁶ There should be an effective legal frame work to regulate the oil and gas projects and avoid fire explosion disasters that may occur at any time if the activity is not controlled and regulated appropriately.⁷

1.1 Historical background

1.1.1 Brief history of risk management

The first two academic books on risk management were published in 1963 and 1964 by Mehr, Hedges, Williams and Hems respectively and the main scope of these books were however limited to pure risk management.⁸ Later, engineers developed the technological risk management models and subsequently broadened their scope to operational risk.⁹ Other writers argue that risk

⁴ CEN-EHS039, Fire and Explosion Hazard Management Practice • Ver. 2.1 • July 2010

⁵ Noopur Sonee, et al. Oil and Gas industry: Review on fire hazards and protective textiles. International journal of Advance Research in Science and Engineering Vol. No.6, Issue No.01, January 2017. Available at <https://ijarse.com/fullpdf> Accessed on 28th February, 2019

⁶ N N Rodhi, N Anwar, I P A Wiguna, 'A review on Disaster Risk Mitigation in the Oil and Gas Project' (IOP Conf. Series: Earth and Environment Science 106 (2018) 01 209.<<http://iopscience.iop.org/article/pdf>> Accessed on 5th November 2018.

⁷ Ibid

⁸ CEN-EHS039, Fire and Explosion Hazard Management Practice • Ver. 2.1 • July 2010

⁹ Dionne, G. (2013). Risk Management: History, Definition and Critique. Interuniversity Research Center on Enterprise Networks, Logistics and Transportation. Available at: <https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2013-17>. Accessed on 12th May, 2019

management has for a long time been structured around the use of market insurance for the protection of individuals and companies from various losses associated with accidents.¹⁰

The mid 1950s saw the emergence of new forms of pure risk management which served as alternatives to the different costly and incomplete insurance packages that were common during that period as several businesses found it expensive or impossible to insure risks related to their operations (Dionne, 2013).¹¹

In the 80s, companies began to give consideration to financial management or risk portfolios and this period also saw financial institutions such as banks and insurance companies intensify their market and credit risk management activities.¹² Operational liquidity risk management was introduced in the 1990s.¹³

Another development that occurred in the 90s was the international regulation of risk. Several financial institutions created risk management models for use within the institution where they were created, and capital calculation formulas to shield themselves from risks that were not anticipated and reduce regulatory capital.¹⁴ This further resulted in the introduction of integrated risk management, giving room for the creation of the first risk manager position.¹⁵

Risk management cuts across all aspects of life, every form of business and from the very simple business set-ups to the complex ones. However, the level of risk varies across business set-ups

¹⁰ Harrington, S. and Niehaus, G. (2004). Risk management and insurance. Boston, Mass.: McGraw-Hill.

¹¹ Dionne, G. (2013). Risk Management: History, Definition and Critique. Interuniversity Research Center on Enterprise Networks, Logistics and Transportation. Available at: <https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2013-17>. Accessed on 12th May, 2019.

¹²Ibid.

¹³Ibid

¹⁴Dionne, G. (2013). Risk Management: History, Definition and Critique. Interuniversity Research Center on Enterprise Networks, Logistics and Transportation. Available at: <https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2013-17>. Accessed on 12th May, 2019

¹⁵Ibid

with the capital-intensive businesses facing a higher level of risk while the less capital-intensive ones tend to experience lower risk levels.¹⁶

During its introduction to the oil and gas sector, the objective of risk management was, as it is today, to provide a strategy to minimize the exposure of petroleum projects to risk and uncertainty in petroleum exploration activities. Since then, the concept has become an important aspect of business strategy within the oil and gas industry.¹⁷

1.1.2 Theoretical framework

The theory behind risk management is the Stakeholder theory, developed by Freeman (1984) as a managerial instrument, and has since evolved into a theory of the firm with high explanatory potential focusing explicitly on an equilibrium of stakeholder interests as the main determinant of corporate policy.¹⁸

Stakeholder management theory therefore, conceives an organization as a complex, dynamic and interdependent network of multidimensional relationships with a wide variety of stakeholders.¹⁹ Performance and competitiveness depend on how well firms manage and nurture these relationships strategically in order to achieve corporate objectives and how they are perceived to manage them by the stakeholders, in their interests.²⁰ From a risk management perspective the benefits of consulting with these stakeholders are said to be numerous and include higher levels of

¹⁶Ezuma Okoronkwo. Risk Management Techniques in Oil and Gas. A focus on the risk of Oil Price Volatility. Available at <https://www.academia.edu>. Accessed on 3rd June, 2019.

¹⁷Suslick, S. and Schiozer, D. (2004). Risk analysis applied to petroleum exploration and production: an overview. *Journal of Petroleum Science and Engineering*, 44(1-2), pp.1-9

¹⁸Freeman, R. E. (1984), *Strategic management: A stakeholder approach*, Prentice-Hall, Englewood Cliffs, NJ.

Geczy, C., Minton, B.A., Schrand, C. (1997), "Why Firms Use Derivatives", *The Journal of Finance*, Vol. 52, No. 4, pp. 1323-1354.

¹⁹Loosemore, M, Raftery, J, Reilly, C and Higgon, D (2005) *Risk Management in Projects*, Taylor and Francis, London, UK.

²⁰Ibid

trust with stakeholder groups whereby stakeholders are able to contribute to decisions affecting their future, avail higher quality information for making business decisions, provide a wider understanding in the community of constraints upon firms and provide greater collective responsibility in managing risks.²¹

In essence, the stakeholder paradigm is based on the premise that people are not rational when thinking about risk but are influenced by cultural and social networks in which they are imbedded. This means that people form their own subjective perceptions of risk which often differ from the objective assessments made by managers, experts and scientists and their behaviour reflects these perceptions.²² Ultimately, it is argued that there is no other way for managers to interpret risks other than in terms of human values, emotions and networks and this position is supported by Barnes. Barnes points out that while risk managers have become more scientifically and technologically sophisticated in their approach to managing and measuring risk, the majority of the public continue to rely on cultural and social explanations of risk events. This leads to significant perceptual differences between the community and the private business sector.²³ Therefore, it is likely that in many companies there may remain significant institutional “blind spots” which ignore the contextual experience of risk and the perceptual issues that are relevant to public concern²⁴ like the environmental issues (fire safety) in the oil and gas industry.

²¹Loosemore, M, Raftery, J, Reilly, C and Higgon, D (2005) Risk Management in Projects, Taylor and Francis, London, UK.

²²Berry, D (2004) Risk, communication and health psychology, Open University Press, Maidenhead, UK

²³Barnes, P (2002) Approaches to community safety; risk perception and social meaning, Australian Journal of Emergency Management, 15 (3), 15-23.

²⁴Loosemore, M, Raftery, J, Reilly, C and Higgon, D (2005) Risk Management in Projects, Taylor and Francis, London, UK.

1.1.3 Conceptual frame work

Risk management refers to an interactive process consisting of steps, which when undertaken in sequence, enable continual improvement in decision making. This helps the different parties to understand and agree on what the risks really are and how they will be managed to improve safety, performance, and reduce financial distress.²⁵

The importance of risk management in the oil and gas sector cannot be under looked as petroleum operations/activities take place in fire prone environments. The complex nature of this industry makes it highly prone to fire explosions that are extremely dangerous to the surrounding environment.²⁶ The workplace environment can be hazardous because workers are exposed to fire hazards which are responsible for a wide range of injuries, severe burns, respiratory diseases and death. Thus most of the oil and gas industries all over the world have mechanisms for reducing the risk of fire incidents.²⁷

Considering the fact that Uganda's oil and gas industry is in its nascent stage, questions arise about the probable causes of fire accidents; the legal framework/regulations adopted to ensure fire safety; effectiveness of the laws in preventing, and controlling fire accidents; and what challenges are faced in the implementation of these laws. These issues formed the main lines of enquiry of the research.

²⁵ Osabutey, D, Obro- Adibo,G, Agbodohu, and Kumi, P. Analysis of Risk Management Practices in the Oil and Gas Industry in Ghana. European Journal of Business and Management www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.5, No.29, 2013 Accessed on Accessed on 20th May 2019)

²⁶ Noopur Sonee, et al. Oil and Gas industry: Review on fire hazards and protective textiles. International journal of Advance Research in Science and Engineering Vol. No.6, Issue No.01, January 2017. Available at <https://ijarse.com/fullpdf> Accessed on 28th February, 2019

²⁷ Ibid

1.2 Problem statement

The oil and gas activities in Uganda expose the environment to potential fire hazards. For example from 2010 to 2013, Uganda was beset with a series of fuel tanker fires that claimed 60 lives and at least 79 were severely injured²⁸. Thus it is evident that cases of oil spills resulting into fire explosions are still occurring and causing destruction of property and deaths. Such incidents raise concern on the effectiveness of the existing laws. If the laws enacted are not effective in ensuring fire safety during petroleum operations, fire and explosions will continue to occur.

1.3 Purpose of the study

The purpose of the study was to analyse the efficacy of the law in ensuring fire safety in order to contribute to the prevention and control of fire and explosions in Uganda's oil and gas sector. This would contribute to the protection of the surrounding environment in line with the GOU national oil and gas policy objectives of promoting environmental sustainability.

1.4 Significance of the study

The goal of the study was to enable the public to have knowledge of the legal framework used to ensure fire safety in Uganda's oil and gas industry, since fire explosions are the most common hazards that can adversely affect the surrounding environment. It also analyzed and assessed how effective the law has been in preventing and managing fire risks.

²⁸ Fuel fire: 33 and more burnt by a New Vision Reporter Available at https://www.newvision.co.ug/new_vision/news/1325028/fuel-burnt-death Accessed on 30th July, 2019.

It was envisaged that the findings of this research might be of value to legislators and officers of the Petroleum Authority of Uganda. Since the Petroleum Authority of Uganda has the mandate to monitor and regulate the petroleum industry, it would offer a guide on how best to monitor the works of the operators in the prevention and control of fire and explosions.

In addition the study would provide baseline information for scholars and academicians for purposes of future research and reading purposes.

1.5 Aims/ Objectives

1.5.1 General Objective

The general objective of the study was to analyse and assess the efficacy of the legal framework on risk management that has been adopted to ensure fire safety in Uganda's Oil and Gas industry.

1.5.2 Specific Objectives

- i. To identify the possible causes of fire and explosions in the Uganda's petroleum industry.
- ii. To ascertain the legal/regulatory framework adopted to prevent and control the fire hazards.
- iii. To analyze the efficacy of law in preventing and controlling the fire hazards.
- iv. To identify the challenges faced in the implementation of the law in ensuring fire safety.
- v. To make recommendations that can be helpful to the stakeholders in ensuring fire safety.

1.5.3 Research Questions

The overall research question, therefore, focused on whether the law on risk management for fire safety has been effective in preventing and controlling fire explosions during the field operations. Specifically, the following research questions were posed:

- i. What are the possible causes of fire accidents in the oil and gas industry?

- ii. What legal framework has been adopted to prevent and control the fire hazards?
- iii. How effective has the law been in preventing and controlling fire accidents?
- iv. What challenges are faced in the implementation of the law on risk management in ensuring fire safety?
- v. What recommendations may be adopted to prevent and control fire hazards?

1.6 Scope of the study

1.6.1 Conceptual scope

Conceptually this study was located within the discipline of contract law, specifically analyzing the laws and bearing in mind the rights of the contracting parties. This study focused on the regulatory framework employed in the oil and gas industry particularly analyzing the effectiveness of the law on risk management in ensuring fire safety during the field operations. In addition, the study also looked at what measures have been adopted and how the law has been implemented.

1.6.2 Geographical scope

This was a case study of Uganda's oil and gas industry, a country located within the East African region.

1.6.3 Time scope

The study considered on data regarding oil and gas fire explosions available from 2010 to 2018 in Uganda.

1.7 Chapter Synopsis

Chapter one presents the background to the research topic and the prevailing factors that motivated the researcher to conduct research on the particular topic. The chapter enabled the researcher to

concentrate on the objectives and the significance of the entire research. The content of the chapter includes: the background of the research problem which explains what the topic is all about to enable the reader appreciate the topic; and the statement of the problem that guided the researcher in the study. The chapter also bears the objectives of the study, research questions, scope of the study, and significance of the study; definition of terms, chapter synopsis and conclusion. Chapter Two presents the literature review. Chapter Three presents the research methodology for the study. Chapter Four discusses the international, regional and legal framework on risk management to ensure fire safety. Chapter five presents discussion of findings, conclusion, recommendation and demographic indicators of the respondents.

1.8. Definition of terms used in the study

Risk has quite a number of different meanings. For example, in technology and economics, risk is defined as an expected value that an event will be accompanied by undesirable consequences and this is measured by both the probability of the event and the seriousness of the consequences.²⁹

Conceptually, a risk can also be defined as a product of the probability of an undesired outcome multiplied by the severity of the outcome, summed over the range of possible undesired outcomes.³⁰ This definition of risk applies in insurance calculations, economic analysis, health risk assessment or ecological risk assessment.³¹ Under this definition, the probability of the outcome is a probability distribution.³²

²⁹ Osabutey, D, Obro- Adibo,G, Agbodohu, and Kumi, P. Analysis of Risk Management Practices in the Oil and Gas Industry in Ghana. European Journal of Business and Management www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.5, No.29, 2013. Accessed on 20th May, 2019.

³⁰ M A Wilson, R Crouch, E.A.C, 'Risk Benefit Analysis Cambridge' (1982) M A Ballinger 218.

³¹ S Wang, M Dulaimim and M Aguirra, 'Risk Management and Economies' (2004), Vol. 22, pp 237-252.

³² Ibid.

The spread of the distribution represents the uncertainty as to which outcome actually will occur. The probabilities from this distribution are multiplied by measures of severity of outcome, and then summed to calculate the total risk; the uncertainty is part of the risk.³³In case the outcomes were not uncertain we would not call it risk, we would just call the analysis a predication.³⁴

Risk management includes both risk (assessment and control) and integrity management aspects and covers the key areas.³⁵ These are: Risk Assessment, Risk Control and Decision Support, and Performance Monitoring and Feedback.³⁶

1.9 Conclusion

In order for the Ugandan government to achieve its goal of using the country's oil and gas resources to contribute to early achievement of poverty eradication, creation of lasting value to society, and ensuring environmental sustainability; laws and policies must be adopted and employed effectively in order to properly achieve the desired goals in the industry.

The significance of the risk management in ensuring fire safety in the Oil and Gas industry of a developing country like Uganda cannot go unnoticed. While International oil companies may have more advantages in investing in a developing country like Uganda, concerns for environmental health and sustainability are not on their priority list and thus must be addressed and the only ways to ensure this is by adopting and employing effective laws, policies and strategies on risk management to help in achieving the national Oil and Gas policy objectives which include environmental health and sustainability.

³³ Ibid.

³⁴ Ibid.

³⁵F Amir, 'Measuring the Impact of Office Environment on Performance Level of Employee' (2010) 2 (2) Asian Journal of Empirical Research <<http://acssweb.com/journal-dwtc/il.php?=>> accessed on 21st August 2018

³⁶ Ibid

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This section is a review of books, papers and other scholarly materials relating to the legal regime on fires and explosions in the oil and gas sector. The literature has been reviewed in four sections responding to the major objectives of the study.

The chapter therefore reviews what other writers have written on this topic revealing the gaps left that this study seeks to address.

2.2 Literature Review

The oil industry has seen more fatalities from explosions than any other private industry, according to an Environment & Energy Daily article on WyoFile.³⁷ More than 10 percent of all job-related fatalities can be directly attributed to oil industry explosions and fires. The potential for fire is present in most of the operations due to vapour or product leaks which in most cases result into fire explosions. These severely affect the health of the workers and the surrounding environment hence the need to carefully manage, operate petroleum activities by ensuring safety from fire and heat related hazards.³⁸

³⁷ Oil Industry has most explosions of any industry. Post by Kristopher Rodrigues on 10th April, 2017. Available at <https://www.herrmanandherrman.com/blog/oil-industry-explosions-industry/>. Accessed on 30th July, 2019

³⁸ Noopur Sonee, et al. Oil and Gas industry: Review on fire hazards and protective textiles. International journal of Advance Research in Science and Engineering Vol. No.6, Issue No.01, January 2017. Available at <https://ijarse.com>fullpdf> Accessed on 28th February, 2019

Bigliani notes, that risk management is an integral part of day-to-day business activities in the energy industry.³⁹ Oil and gas companies face risks ranging from global socio economic factors, to increased health, safety, and environmental pressures. These result into major accidents which negatively impact the environment.⁴⁰ Risk is related to asset damage, pollution, explosions that injure people, and damage to properties. These are intrinsic in normal oil and gas activities⁴¹ but nevertheless have to be managed.

A recent International Labour Organization monograph summarizes the health and safety legal framework in seven African countries including Kenya, Mozambique, Angola, South Africa, Nigeria, Cameroon and Cote d'Ivoire.⁴² The laws in these disparate countries are consistently short specifically on details for effective prevention and control of fires and explosions in their Oil and Gas industries.

A comprehensive assessment of the oil and gas sector in Kenya had a cursory look at the legal framework for preventing and controlling fires and explosions. It had a lot of emphasis on highly technical issues such as Environmental Impact Assessments, Environmental Health Assessments. It talked about gas flaring rather than fires and explosions.⁴³ It would appear, then, that the issue of the effectiveness of the legal framework in the prevention and control of fires and explosions in sub Saharan countries such as Uganda has really not received the attention it deserves.

³⁹ IDC Energy Insight, Reducing Risk in Oil and Gas Operations (Cmd, 2013) 10V<<https://www.emc.com/collateral/analyst-reports/minimizing-operational-risk-in-oil-gas-industry.pdf>> accessed on 3rd November 2018.

⁴⁰ Ibid

⁴¹ Ibid.

⁴² Occupational safety and health in the oil and gas industry in selected sub-Saharan African countries Issues paper for discussion at the Sub-Saharan African Tripartite Workshop. Available https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---ector/documents/meetingdocument/wcms .Accessed on 30th July, 2019.

⁴³ Ibid

On the global stage a number of interesting reviews have been published. For example, Yuan Yang has made a comprehensive review of the ‘regulatory regimes for preventing major accidents in offshore operations in China and the US, and found that both the US and China relied heavily on “prescriptive command-and-control regulation” with disastrous consequences.⁴⁴ They argue that “a combination of prescriptive, performance-based, and management-based approaches is the preferred option for offshore operations.”⁴⁵

While the oil and gas sector is prone to getting fires and explosions and other occupational hazards, several countries have accumulated over 40 years of experience in the prevention and control of these hazards. For example, from the time Norway started oil and Gas operations, it put in place a comprehensive regulatory framework which is command and performance based. This has greatly minimized the number of fires and explosions in the oil and gas sector compared with USA where responsibility was left to private companies to develop standard operating procedures.⁴⁶

One would expect Challenges in the implementation of the legal framework for prevention and control of fires and explosions. A literature search on this subject yielded only a handful of publications in the United States America.⁴⁷ In the BMP project the challenges included a dearth of inspectors to conduct thorough and regular inspections, and very low penalties for those in breach of the law and regulations.⁴⁸

⁴⁴ YUAN YANG*Regulatory Regimes for Preventing Major Accidents in Offshore Operations: Evolution of Approaches in the United States and China. Available at <https://www.law.georgetown.edu/environmental-law-review/wp-content/uploads/sites/18/2019/04/GT-GELR190003.pdf>. Accessed on 30th July, 2019

⁴⁵ Ibid

⁴⁶ https://ccrm.berkeley.edu/pdfs_papers/DHSGWorkingPapersFeb16-2011/PreventingAccidents-in-OffshoreOil-and-GasOperations-MB_DHSG-Jan2011.pdf. Accessed on 30th July, 2019.

⁴⁷ Kathryn Mutz. CHALLENGES OF FEDERAL AND STATE MONITORING AND COMPLIANCE. Available at http://www.oilandgasbmps.org/resources/compliance_enforcement.php. Accessed on 30th July, 2019.

⁴⁸ Ibid

Looking at the Deep Water Horizon (Macondo case), 11 workers were killed, 17 injured by the explosion on the oil rig, massive harm done to wild life in around the Gulf of Mexico including deaths of an estimated 800,000 birds and 65,000 turtles.⁴⁹ It has been argued by some commentators that the failure of the deep water horizon was the inevitable result of years of deregulation of the oil industry and BP's own laissez-faire approach to safety.⁵⁰

One would expect a host of other challenges especially in resource limited countries such as Uganda.

2.3 Conclusion

The literature review shows the myriad of scholarly work from some of the countries around the world in countries like the United Kingdom, the United States, Canada and Ghana within the broader theme of the law on risk management in ensuring fire safety in the oil and gas industry. Oil and gas activities have caused negative impacts to the environment due to fire explosions hence the need for an effective legal framework to manage fire risk hazards.

It should be noted that the literature reviewed have been, largely, of countries with offshore operations unlike Uganda with commercial deposits which are on shore. The country is therefore required to have an effective legal framework in place to prevent and control fire risk hazards which are common with the oil and gas industry considering it's at a nascent stage.

⁴⁹ Available at <https://www.britania.com>event> Accessed on 12th July, 2019.

⁵⁰ Available at www.the-guardian.com Accessed on 12th July, 2019.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This bore the research methods which were employed while carrying out the research. They include interviews, documentary reviews primary and secondary methods of data collection, methods of data analysis, and the research design used, legal context, ethical considerations while carrying the research, and the methodological limitations of the study.

The qualitative design research was also effective in attempting to describe events or phenomena and to understand the nature, characteristics or behaviors of individuals or groups of individuals as they were.⁵¹The researcher was also able to focus on the experiences of people as well as observe their individual uniqueness in responding to the questions put to them.⁵² The researcher was able to focus on the experience and knowledge from the interviewees. The interviewees were given the floor to talk about their experience and views on the matter.⁵³This is so because qualitative design adopts a person- centered holistic and humanistic perspective to understand human experiences without focusing on the specific concepts.⁵⁴

3.2 Legal context and research setting

This entailed the legal frame work of the oil and gas industry in Uganda i.e. environmental policies, safety laws and regulations from which the research is to be derived, the areas from which the

⁵¹ F Amir, 'Measuring the Impact of Office Environment on Performance Level of Employee' (2010) 2 (2) Asian Journal of Empirical Research <<http://acssweb.com/journal-dwtcilphp?=>> Accessed on 29th August 2018

⁵² N Burns and S Grove, 'The Practice of Nursing Research Conduct, Critique and Utilization', (2003) (4th Ed). W.B. Saunders: Philadelphia, Pennsylvania. USA.

⁵³ J Hox & H R Boeije, 'Data collection Primary Verses Secondary.'http://www.joophox.net/publist/ESM_DCOL05.pdf Accessed on 27th 07 2019.

⁵⁴ J M Morse and P A, 'Qualitative Research Methods for Health Professionals', (2nd ed. London: Sage, 1995).

interviews was carried out and where data were collected from i.e. the Uganda National Oil company, Chinese National Offshore Oil Company, Total, Tullow oil, and the petroleum Authority of Uganda.

3.3 Study/Research design

A social research study requires any researcher to map out strategies that are used as guiding tools to help get the most valid results for the problem/issue under investigation, and these are referred to as study design.⁵⁵

A research design as a logical plan where there are the initial set of questions to be answered by the participants and some set of conclusions derived from the findings.⁵⁶ Berg refers to a research design as a road map used for planning when undertaking a research study.⁵⁷ The researcher was able to visualize and imagine how the research will be undertaken, the type of data to be collected, how it will be collected and how much it will cost the researcher. This enabled the researcher to obtain relevant data from which she is able to draw conclusions.

This research basically employed qualitative research design in which primary and secondary sources of data were analyzed especially interviews, laws, books, document reviews, articles and journals. Not only are these techniques chosen for their minimal resource costing in terms of time, money and convenience, but also suitable for this kind of research and its nature.

3.4 Area of study

The area of study was in Uganda.

⁵⁵J Mouton, 'How to Succeed in Your Master's and Doctoral Studies' (Van Schaik Publishers 2001).

⁵⁶ R K Yin, 'Case Study Research. Design and Methods' (3rd edn.)Applied Social Research Methods Series.SAGE Publications. Thousand Oaks. London. New Delhi. (1994).

⁵⁷ B Berg, 'Qualitative Research Methods for the Social Sciences' (Boston Allyn& Bacon 2009)101-157

3.5 Population and sample size

The population size was a total of 20 respondents which involved the management of the institutions and companies operating in the petroleum industry in Uganda which included; Uganda National Oil Company, Petroleum Authority of Uganda, CNOOC, Total E & P Uganda and Vivo Energy Uganda/ Shell. However, a sample size of 10 respondents who were top management from the five selected institutions and companies involved in the petroleum industry was used in the study. This was due to time and financial constraints, hence took a sample of the population understudy.

3.6 Sampling method and technique

The study adopted the non-probability sampling procedure employing the purposive sampling technique⁵⁸ in which not all respondents in the study area was given a chance to participate in the research. The selection of individual participants/ respondents was done using purposive sampling technique. This technique was used because it helps in selection of respondents who have more knowledge about the subject matter and are a few in numbers. Hence a reasonable number of people was considered taking into account the nature of the study.

3.7 Data collection methods

3.7.1 Interviews

The study relied on key informant interviews which provided primary data with some of the employees and the relevant officials in the Uganda National Oil Company, the Petroleum

⁵⁸ (Baridam, 2008)

Authority of Uganda, CNNOC, Total and Shell Oil companies which involved getting direct information from the source and secondary data which was obtained through document reviews.

3.7.2 Documentary review

Firstly, laws, books, and peer reviewed journals, were used.

Secondly, online materials from the different oil and gas websites on the internet were also used and preference was for current literature on the Oil and Gas industry

3.7.3 Data analysis plan

Data analysis is systematic process involving working with data, organizing them and dividing them into small manageable parts.⁵⁹After the data was collected, it was processed, categorized, and analyzed according to the themes developed out of the study objectives. The analysis involved identifying themes, sub-themes; scrutinizing; selecting; describing; theorizing; interpreting, discussing and making a minimal comparison of the petroleum regulations of Uganda with that of Ghana.

The researcher collected raw data, and later checked for errors and inconsistencies in the collected data. This was done by processing data on papers, relevant data was then sorted from the rest of the data that was found not needed or useful. This process involved three stages which included data reduction, data interpretation and data analysis. Data was reduced from chunks and data interpretation involved establishment of meaning for recorded data to be able to answer research

⁵⁹E G Guba & V S Lincoln, Competing paradigms in qualitative research (1994) as cited in S K Shah &K G Corley, Building better theory by bridging the quantitative-qualitative divide, Journal of management studies, (2006) p. 1823.

questions. Data analysis and presentation involved thematic analysis of the data from which conclusions were generated⁶⁰

Lastly, quotations were employed in the research and there was corroboration to all responses to check the correctness of the information received. Finally, conclusions were drawn from the study and recommendations were made that are meant to be helpful to the stakeholders.

3.8 Ethical Considerations

Ethical considerations are norms or standards for conduct that distinguish between right and wrong.⁶¹ Considering this study, it was ensured that all sources of information are acknowledged and where it is required to obtain permission to get the information, all measures were undertaken to do so.

There was no plagiarism of any work, all work was properly cited and referenced accordingly.

The researcher also ensured voluntary participation of the respondents in the case of interviews so that the participants may not participate half-heartedly, by informing them in full about the whole purpose of the research in advance. The researcher therefore obtained informed consent and the requisite cooperation of the participants prior to the interviews and also stuck to the principle of confidentiality of information and protection of identities of the participants.

The face to face interviews were conducted in open public areas unless otherwise requested by the interviewees. Use of recording devices was consented to and all informants and they were assured that the data will be permanently erased as soon as the research is concluded and names of the

⁶⁰North East Educational Research Association Education, 'Qualitative Data Analysis; Nera Webinars Presentation<www.Nera-Education.org/.../FINAL_NERA_Webinar_Version_For_4.23.14_Fdb.Pptx accessed on the 16th June 2019.

⁶¹ Chapter 4, Ethical Consideration in research. Available <www.wiley.com/samplechapters> accessed on 14th July, 2019.

respondents have not been included or indicated in the research report but pseudo names have been used. I had to share the study findings with the respondents to prove that their names were not included anywhere in the study.

3.9 Methodological Limitations of the study

The study was limited to employees that are directly involved in the oil and gas operations only.

Some of the intended department officials and relevant officers were not readily available for interviews due to busy schedules which limited the number of respondents planned for interviews.

However efforts were made to access a few of them.

It was anticipated that some of the questionnaires used in the study might not be returned, or even be completely answered, due to unavoidable circumstance surrounding the respondents like travels and sickness. The researcher remedied this by calling and reminding the respondents to try their best to complete the questionnaires and endeavor to return them on time.

3.10 Conclusion

Research methodology entailed the study design that the research took, the specific area of study from which I gathered respondents for interviews, data collection techniques that I employed when carrying the research, data analysis methods which I used to analyze the data collected from the field. All this was organized in a chronological way for the better presentation of the research.

CHAPTER FOUR

4.0 LEGAL FRAMEWORK ADOPTED TO PREVENT AND CONTROL FIRE HAZARDS

4.1. International legal frame work/Instruments

It should be noted that there are no specific international or regional environmental agreements addressing specifically fire and explosions. However, there are a number of international and regional treaties that are relevant for safety and environment aspects associated with the oil and gas industry. These include, the International Convention on Oil Pollution Preparedness, Response and Cooperation 1990; Convention on Biological Diversity, 1992, the United Nations Framework Convention on Climate Change 1992(UNFCCC).

A number of these instruments have a more general character in addressing environmental health and safety in the petroleum industry. However, some provisions can also be extended to prevention and control of fire explosions in Uganda. The country ratified them and hence is bound by the principles therein.

4.1.2 The International Convention on Oil Pollution, Preparedness, Response and Cooperation 1990

Adopted under the auspices of the International Maritime Organization, the 1990 International Convention on Oil pollution Preparedness, Response and Cooperation, is the only global international instrument of this kind and⁶² Uganda became a member of the International Maritime Organization in 2009 hence bond by it.⁶³

⁶²International Maritime Organization www.imo.org Accessed on 4th March 2019.

⁶³ Ibid

Under the convention, States subject to their capabilities and availability of relevant resources, are required to cooperate and to render assistance to parties that request such assistance in cases of pollution incidents.⁶⁴ The Convention requires parties to establish national systems for responding to oil pollution incidents, including, as a basic minimum: a national contingent plans, designated national authorities; and operational contact points in charge of oil pollution response.⁶⁵ Parties either individually or through cooperation with other states and, as appropriate, other relevant entities, including the oil industry are required to establish among others: A minimum level of pre-positioned oil spill combating equipment proportionate to the risk involved and programme of exercises for oil pollution response organizations and training of relevant personnel. In addition, detailed plans, communication capabilities for responding to oil pollution incidents and a mechanism or arrangement to coordinate the response to oil pollution incidents like fire explosions are required to be in place.

The Convention provides guidelines to oil producing countries like Uganda on how to ensure that there are response systems and effective oil spill preparedness in place that will mitigate risks that may be associated with the industry. The oil projects, like the King Fisher, Tilenga and ECOP projects have possibilities of oil spillages which can result into fire explosions, thus the convention requires response systems to depend on multilateral cooperative framework that include governments, industries and companies.⁶⁶ In other words, parties involved are required to take necessary steps to ensure that the oil projects meet the internationally accepted standards in terms of risk preparedness.⁶⁷ In the same vein, parties must ensure the risk response equipment is

⁶⁴Z GAO, (editor), 'Environmental Regulation of Oil and Gas' (London-den Haag-Boston, Kluwer 1998).

⁶⁵ Ibid

⁶⁶ A Lexis, M Julian, T Lieb, R Pond and D Salt, ' Global Challenges to Preparedness and Response Regimes', (international Oil Spillage Conference , December 2002).

⁶⁷ Ibid

properly maintained, personnel are adequately trained and their response mechanisms that ensure domestic and regional obligations are properly allocated just in case of any risk.⁶⁸

4.1.3 Convention on Biological Diversity, 1992

This convention was ratified by Uganda on 08th /09/1993. It has three main objectives all of which are closely associated with EIA, these include: to conserve biological diversity, the use of biological diversity in a sustainable manner, to share the benefits of biological diversity fairly and equitably⁶⁹. It also requires, that EIA be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.⁷⁰

Furthermore, under Article 14, the convention gives examples of circumstances which require parties carry out EIA i.e., where there is need to avoid or minimize significant adverse impacts on biodiversity.⁷¹

In other words, party states must consult on activities that are likely to significantly affect biodiversity of areas beyond the limits of national jurisdiction by encouraging the conclusion of bilateral, regional or multilateral arrangements. It also introduces the strategic environmental assessment which facilitates the assessment of environmental policies and programmes particularly those with major implications for natural resource use⁷². The proposed East African Crude Oil Pipeline project falls within the ambit of such programmes. The Albertine region is considered one of the most important areas for conservation in Africa harboring more different

⁶⁸ Ibid

⁶⁹ The Convention on Biological Diversity (1992), Art. 1.

⁷⁰ Principle 17

⁷¹ Art. 14

⁷² AFIEGO, Promoting Environmental Conservation amidst Oil Activities in Uganda, (2009) <https://www.afiego.org/publications/files> accessed 25th July 2019.

and endemic vertebrate species than any other region on the African continent.⁷³ It also harbors Queen Elizabeth national park, Bwindi Impenetrable, Kibaale national parks and has forests which include; Bodongo and Maramagambo national forests,⁷⁴ all of which need protection from possible fire explosions that might result from any of the petroleum operations around the areas.

4.1.4 The United Nations Framework Convention on Climate Change 1992(UNFCCC)

Oil spills especially during transportation through tankers & pipelines are inevitable; and when they occur, the spilled petroleum causes an increased amount of carbon dioxide emission as well as other greenhouse gases which negatively cause climate change.⁷⁵ Crude oil is most dangerous because it contains more than 1000 chemicals which in the right circumstances, can cause fires as most of them are very flammable and hazardous to humans.

The convention's most profound objective is to ensure that member states embrace safe practices geared towards promotion of stabilizing in greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate system.⁷⁶ Human activities, such as fossil fuel, drilling, combustion and land use change, lead to increased concentrations of greenhouse gases in the atmosphere.⁷⁷ This causes global warming which could culminate into fire outbreaks leading to physical effects damaging ecosystems, and with grave consequences for human life.⁷⁸ In consideration of the modes of transport used in the downstream phase, which include oil tankers and pipelines, these are prone to accidents and failures which pose

⁷³ A J Plumtre, T R. Davenport, M Bahangana, R kityo, G Eilu, P Ssegawa, C Ewango, D Meirte, C Kahinodo and M Hamp, 'The Biodiversity of the Albertine Rift', (2007), Vol. 134(2).(Journal of Biological Conservation), 178-194.

⁷⁴ Ibid.

⁷⁵ Oil Pipeline Spills: Keystone XL Pipeline Available at <https://cla.auburn.edu/ces/energy/oil-pipelines-and-spills/>. Accessed on 27th May 2019.

⁷⁶ United Nations Framework Convention on Climate Change:resolution/adoptedby the General Assembly,20 January 1994,A/RES/48/189. Available at:<https://www.reworld.org/docid/3b00f2770.html> Accessed 5th March 2019

⁷⁷ H Harmsen, 'Effectiveness of UNFCCC in addressing climate change', (2018), Technical Report. Available at <https://www.researchgate.net/publication/323906120>. Accessed on 5th June 2019.

⁷⁸ Ibid.

significant negative environmental effects especially with leaking or exploding pipelines and oil tankers. These lead to spillage of the petroleum products which may result into fire hazards, by a mere spark.⁷⁹ Thus the convention places an obligation on member states like Uganda, Ghana, Nigeria and others that are involved in Oil and Gas projects which pose potential fire risks to the environment to ensure that effective measures are taken to prevent and control fire hazards from occurring.

4.1.5 Labour Inspection Convention, 1947 (No. 81) (Excluding Part II)

International Labour Organisation (ILO) Convention concerning labour inspection in industry and commerce was ratified by Uganda on 04/06/1963. The Occupational Safety and Health Act, of 2006 operationalises Uganda's commitments to the convention, and has the requirements which shall apply to the oil projects in the Albertine region (Kingfisher and Tilenga projects).⁸⁰ The Projects are mandated to also engage the Department of Occupational Safety and Health under the MGLSD – the lead Ministry responsible for labour administration.⁸¹

The oil projects in Uganda are going to be labour intensive with local, foreign/expatriate, skilled, semi-skilled and unskilled employees all of whose rights for safety against bodily injuries from any fire occurrences during the operations, need to be effectively protected during the life of the projects to completion.

⁷⁹ D Furchtgott, 'Pipeline are Safest for Transportation of Oil and Gas', (2013), MANHATTAN INST FOR POL'Y RES, 1, http://www.manhattan-institute.org/html/lib_23.htm#u_3ffrywkh0; accessed on 28th July, 2019 2019.

⁸⁰ Tilenga Project, Environmental and Social Impact Assessment. Available at [nema.go.ug>all>Nema>docs pdf](http://nema.go.ug/all/Nema/docs/pdf). accessed on 26th July, 2019.

⁸¹ Ibid

4.1.6 The Energy Charter Treaty 1994

The Energy Charter Treaty is an international Instrument which focuses specifically on the energy sector.⁸² Even though Uganda initially was not a member due to geographical scope, in principle, it is open for accession of other states regardless of their geographical location.⁸³ And thus later, its geographical scope expanded to African countries after the adoption of the International Energy Charter in 2015.⁸⁴ It pays attention to energy-related environmental issues by encouraging application of the precautionary principle and of the ‘polluter pays’ principle and sustainable development among others.⁸⁵ It also advocates for the minimization of harmful impacts from all operations within the energy cycle.⁸⁶

The Charter recognizes the importance of Environmental Impact Assessment as an instrument for evaluating the adverse impacts of any given energy related activities before embarking on it.⁸⁷

There are model agreements prepared by the energy charter secretariat with aimed at facilitating the complex Oil and Gas pipeline activities⁸⁸ and these are referred to as intergovernmental agreements having the effect of an international treaty under international law, even though the contents within these model agreements are not in any way binding to the parties.⁸⁹

The standards contained in the agreements do not contain very precise prescription concerning the technical features which cross-border pipelines should comply with.⁹⁰ It is a recommendation, that

⁸²The Energy Charter Treaty< <https://energycharter.org/process/energy-charter-treaty-1994/energy-charter-treaty/>> accessed on 5th 3 2019.

⁸³ R A. Leal, ‘Energy Transit Activities Collection of Intergovernmental Agreement on Oil and Gas Transit Pipeline and Commentary’, (The Energy Charter Secretariat 2015).

⁸⁴ Ibid

⁸⁵ The Energy Charter Treaty 1994, Article 19.

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ C Redgwell, ‘Contractual and treaty Arrangements Supporting large European Trans-boundary Pipeline Projects: Can Adequate Human Rights and Environmental Protection Be Secured?’, IN ENERGY NET WORKS AND THE LAW: INNOVATIVE SOLUTIONS IN CHANGING MARKET,(2012), pp102-10, (Martha M. Roggenkamp et al, eds).

⁸⁹ Ibid.

⁹⁰ Environmental Health and Safety Guidelines in Oil and Gas Distribution Systems; INTERNATIONAL FINANCE CORPORATION: WORLD BANK GROUP<https://www.ifc.org/wps/wcm/connect>. Accessed on 20th June, 2019.

each State establishes safety and environmental standards that are internationally compatible and acceptable under the World Bank Group Environmental, Health and Safety Standards Guidelines⁹¹

A duty is also placed on the investors to ensure that the technical aspects of the pipelines are well handled because they are deemed to be experienced and best equipped to handle such aspects.⁹²

Considering that Uganda is carrying on negotiations with Tanzania to build the East African Crude Oil Pipeline, adoption of these model agreements would be of great help both states to maximally benefit from the project. This will ensure that the liabilities of the investors are clearly stipulated given the fact that most oil companies have a tendency of externalizing their costs to the local communities when the costs of compensating the victims are much lower the cost of complying with safety regulations. These agreements will also ensure that the pipeline is of the required standards to avoid any incidents of leakage which may lead a fire explosion if the states and the international oil companies adhere to follow what is agreed upon in the agreements.

In conclusion, there is profound international legal frame work on the general environmental, health and safety from which Uganda incorporated the domestic laws and policies on prevention and control of fire hazards. Now the only work that needs to be done is by the government of Uganda is to ensure that the laws are effectively enforced and implemented the same in order to ensure fire safety during oil and gas operations in the upstream, midstream and downstream phases of development.

⁹¹ Energy Charter Secretariat, Model Intergovernmental and Host Government Agreements for Cross-Border pipelines art. 10 (2007) Available at <https://www.encharter.org/fileadmin/userupload/document/ma-enpdf> Accessed on 28th April, 2019.

⁹² Ibid

4.2 Regional legal frame work

4.2.1 East African Community Treaty 1999

East Africa Community was established in 1999, with Kenya, Uganda and the United Republic of Tanzania as founding members.⁹³

One of the objectives of the East African Community under Article 5 of the treaty is to develop policies and programmes aimed at widening and deepening co-operation among partner states in political, social, and cultural field, technology, defense security, legal and judicial for the mutual benefit of the Community.⁹⁴

Just as the Treaty encourages member States to carry out development activities together, it also urges them to be cautious of the negative impacts development projects can have on their states generally.⁹⁵ As partner states are also required to adopt effective laws and policies to promote the exploitation, development and utilization of various energy resources like fossil fuels.⁹⁶

4.2.2 Protocol on Environment and Natural Resources

The Protocol on Environment and Natural Resources Management was signed by three East African countries Kenya, Uganda and Tanzania on 3rd April 2006.⁹⁷

However, it is currently not in force thus not a legally binding pending ratification by all Partner States.⁹⁸

⁹³F Nhunyingi, 'The Geopolitics of Access to Oil Resources: The Case of Uganda' (Master Thesis, L-Universita' ta' Malta 2016) p 1 <<https://www.um.ed.mt>> accessed on 15th February 2019.

⁹⁴ The Treaty Establishing the East African Community, accessed on 26th May 2019.

⁹⁵ Ibid.

⁹⁶Ibid. 207, Article 101.

⁹⁷ Accessed at <https://www.eac.int/environment/natural-resources-management/protocol-on-environment-and-natural-resource-management>> on 24th June, 2019.

⁹⁸ Ibid.

The EAC Protocol on Environment and Natural Resources creates a sound foundation for disaster risk reduction by addressing the underlying risk factors in developing and planning of the environment and natural resources for socio economic development. The preamble recognizes a clean and healthy environment as a prerequisite for sustainable development.⁹⁹ It recognizes development activities petroleum operations with adverse impacts on the environment leading to fire explosions and degradation.¹⁰⁰

The protocol provides a proactive way of reducing risk and vulnerability thus increasing the resilience of the communities. Training communities and project developers to live in harmony with nature is currently being promoted as an ecosystem based approach in disaster risk management¹⁰¹ which encompasses fire and explosions associated with petroleum development projects.

Article 19 of the protocol requires that when member States like Uganda and Tanzania decide to carry out a development project such as the EACOP, these must ensure they take appropriate measures within their competence, including adopting laws, regulations, measures and enforcement compliance with the Protocol.

The applicability of this Protocol is likely to be with difficulty because Tanzania has not yet ratified the Protocol and it's not in force because other East African countries have not yet ratified it, but it addresses the environmental management aspects of Trans-boundary projects like the East African Crude Oil Pipeline. Nevertheless, it's likely to achieve its intended purpose as long as it is ratified by the member states which are committed to implementing it and ensuring that the environment is well protected from fire hazards during the operation of such oil projects.

⁹⁹The EAC Protocol on Environmental and National Resource Management, 2006.

¹⁰⁰ Ibid.

¹⁰¹ Ibid. Article 34.

4.3 National legal framework

The discovery and confirmation of commercial petroleum resources in the Albertine Graben poses new opportunities and challenges for the country. Petroleum is a resource that, if managed well, has the potential to turn-around the economy of the country.¹⁰² Oil and gas projects have the potential of becoming dangerous to life, property, and the environment if the activity is not controlled and regulated appropriately.¹⁰³ Infact, fuel and gas leakages that frequently occur in this industry lead to social, economic, political, environmental negative impacts.¹⁰⁴ In addition, risks and hazards have the potency of turning into disasters like fire and explosions.¹⁰⁵ Much as it is not possible to avoid fire explosion disasters which may occur at any time, the circumstances can be anticipated by assessing the risks and the level of the likely impacts.¹⁰⁶

Putting into consideration all the risks associated with oil and gas projects, there should be an effective legal frame work to regulate the oil and gas projects and manage fire explosion disasters.

4.3.1 National Oil and Gas policy 2008

The National Oil and Gas Policy for Uganda was approved by Cabinet on 31st January, 2008 to guide the development of the country's emerging oil and gas sector following the discovery of commercial petroleum resources in 2006. It addresses the entire spectrum of exploration, development, production and utilisation of the country's oil and gas resources.¹⁰⁷

¹⁰² National oil and gas policy for Uganda 2008

¹⁰³ N N Rodhi, N Anwar, I P A Wiguna, 'A review on Disaster Risk Mitigation in the Oil and Gas Project' (IOP Conf. Series: Earth and Environment Science 106 (2018) 01 209.<<http://iopscience.iop.org/article/pdf>> accessed on 5th November 2018.

¹⁰⁴ Ibid.

¹⁰⁵ B Lee and K Dupuy, 'Petro-Governance in Tanzania: Opportunities and Challenges' (2016) Vol 15, (no14) www.cmi.no/publications/5972-petro-governance-tanzania-opportunitie accessed on 21st August 2018.

¹⁰⁶ M Boles, B Pelletier & W Lynch, 'The Relationship between Health Risks and Work Productivity' (2004) 46(7)737-745 *Journal of Occupational and Environment Medicine* <www.ncbi.nlm.nih.gov/pubmed/15247814> accessed on 26th August 2018.

¹⁰⁷ Ibid

It further seeks to establish and efficiently manage the country's oil and gas resources. One of its objectives is to ensure that oil and gas activities are undertaken in a manner that conserves the environment and biodiversity by ensuring the availability of the necessary institutional and regulatory framework to address environment and biodiversity issues relevant to oil and gas activities.¹⁰⁸

Guiding principle of the policy on the environment is the protection of the natural environment and biodiversity, due to the fact that oil and gas projects in the Albertine region have potential impacts on the same. Thus the ESIA identifies the significance of potential impacts of the projects and mitigation measures to be implemented, to ensure that the activities are undertaken in a manner that conserves the environment and biodiversity; in line with legislation.

4.3.2 The 1995 Constitution of Uganda

The Constitution, as the supreme law, provides the legal and regulatory framework in the country and provides for all aspects pertaining to land, to the environment and other related aspects.¹⁰⁹

Article 245 emphasizes the need to protect the environment and use it for sustainable development.¹¹⁰ The Government has a duty to ensure public awareness on the protection of the environment, even though there is still a lot to be done to ensure this is effective as regards fire safety in the petroleum industry.

The constitution also guarantees the right to a clean and healthy environment which places a duty on the government to ensure the clean environment including the restriction and regulation of the

¹⁰⁸ National oil and gas policy for Uganda 2008

¹⁰⁹ The constitution of Uganda 1995 as amended in 2005

¹¹⁰ See National objective xxvii.

oil and gas industry.¹¹¹ The breach of the right entitles any person or responsible body to bring an action in furtherance of the right.

Generally, the Ugandan Constitution recognises the importance of improving and protecting the environment and one of the objectives of the state is protect, improve and sustain the environment, safeguarding the air, land, water, forest and wildlife of Uganda.¹¹²

Similarly, Article 40(1) (a) imposes a duty on parliament to enact laws to provide for the right of persons to work under satisfactory, safe and healthy conditions can also arguably be linked to the need for a healthy and safe environment to give these rights effect. By virtue of these provisions, the ultimate responsibility for managing risks to human safety and the environment especially from downstream activities, is that of the Ugandan government¹¹³ which has enacted several legislations through parliament for the safety of the people against fires and explosions during the petroleum operations.

The Constitution further provides that any person whose right to clean and healthy environment is violated due to oil exploration and production with the capacity to go to court to seek redress. In *Environmental Action Network v British American Tobacco*, the applicant brought an application under article 50(2) of the 1995 Constitution and rule 3 of the Fundamental Rights and Freedoms (Enforcement Procedure) Rules.¹¹⁴ A court order was sought by the applicant to compel the respondent, a manufacturer of dangerous products (cigarettes), to adequately warn consumers of the health risks associated with its products. Even though the order was ultimately denied, the court did confirm the *locus standi* of the applicant, as article 50(2) enabled individuals to bring

¹¹¹ Article 39

¹¹² Objective xxi

¹¹³ Article 40(1) (a) of the 1995 Constitution of the Republic of Uganda

¹¹⁴ The Fundamental Rights and Freedoms (Enforcement Procedure) Rules, SI No. 26 of 1992.

public interest matters to court on behalf of those who were not in a position to do so¹¹⁵ as long as the matter has to do with human rights violations. When fire explosions are not prevented or controlled, the air is polluted and this violates Article 39 of the constitution.¹¹⁶

4.3.3 Petroleum (exploration, Development and production) (health, safety and environment Regulations 2016

The above regulations specifically provide for fire and explosion protection in facilities during petroleum activities¹¹⁷ in Uganda. Thus fire prevention and control practices within a facility or during a petroleum activity are governed by the regulations, standards approved by the PAU, and best petroleum industry practices.¹¹⁸

The licensee is required to ensure observance of fire and safety precautions within the restricted area, provide adequate means designed to extinguish fire, effectively control the spread of fire and explosions and provide a central fire station with suitable equipment and maintained by trained employees in putting out fire or explosion.¹¹⁹

The licensee is also required to put in place measures to control fire and explosion hazards generated by process operations including accidental release of syngas containing carbon monoxide, hydrogen, oxygen, methanol or other gases.¹²⁰ Such measures include the design, construction and operation of a facility according to standards approved by the Authority and best petroleum industry practices for the prevention and control of fire and explosion hazards, provision

¹¹⁵ High Court Civil Suit No. 27 of 2003(Arising from Msisc. Applic. No. 70of 2002).

¹¹⁶ Article 29 of the 1995 Constitution of the Republic of Uganda.

¹¹⁷Part VII of the P(EDP) (HSE) Regulations 2016.This part provides for fire and explosion safety in Uganda's Oil and Gas sector

¹¹⁸ Regulation 93; See also Oil and Gas Standards Catalogue approved as at 31st December, 2017

¹¹⁹ Regulation 104(1)

¹²⁰ Regulation 105(1)

of early release detection including pressure monitoring of gas, liquid conveyance systems, smoke and heat detection for fires and many others¹²¹

In addition, the law provides that where a passive fire protection unit is used at a facility or during a petroleum activity, the unit shall be designed to provide relevant structures and equipment with sufficient fire resistance in regard to load capacity, integrity and isolation properties during a design fire load¹²² which is another risk mitigation mechanism aimed at ensuring fire safety during Oil and Gas operations. The licensee is under obligation to ensure that living quarters are designed and protected to ensure that the functions they are designed for can be maintained during a dimensioning fire.¹²³

The operator is required to ensure that spaces with key functions and equipment and a high fire risk, are separated from the surroundings by means of fire divisions¹²⁴ and these shall be designed to resist a dimensioning fire, to prevent fire from spreading to the adjacent areas or cause equipment in those areas to become inoperative for a minimum period of one hour.¹²⁵

4.3.4 Petroleum (Exploration, Development and Act 3 Production) Act 2013

This is the principal legislation governing the oil sector. Its preamble states that it is to give effect to Article 244 of the constitution, regulate the petroleum production, the licensing of companies, the revenue, promotion of oil exploration, set a safe environment for the operations and plan for the decommissioning.¹²⁶ It's also is the main legislation on the exploration, production, refining

¹²¹ See Regulation 105 (2 (a)-(i)) for more fire & explosion control measures. Also See also regulations 94,95,96,97, 98, 99, 100,102, 103, 106, 108, 110,112 for the duties of a licensee in ensuring fire safety.

¹²² Regulation 101

¹²³ Regulation 102(1)

¹²⁴ Regulation 103(2)

¹²⁵ Regulation 103(3)

¹²⁶ Petroleum (Exploration, Development and Production) Act 2013

and distribution of petroleum resources in Nigeria and Ghana containing provisions with respect to safety and environmental protection.

The purpose of the Act to establish an effective legal framework and institutional structures to ensure that the exploration, development and production of petroleum resources of Uganda is carried out in a sustainable manner that guarantees optimum benefits for all Ugandans, both the present and future generations.¹²⁷ It is important to note that the principle of sustainable development is emphasized in the act, this entails environmental protection and section 1 (e) is principally to the insurance of public safety, public health and environment in the activities.¹²⁸

The act also requires compliance with the environmental principles and safeguards stipulated under National Environment Act and other applicable laws.¹²⁹ NEMA has the mandate to monitor and supervise the activities so as to protect the environment as provided for under section 17.¹³⁰ This requirement covers the upstream and downstream protection of the environment in accordance with the license, which also requires carrying out of environmental impact assessment before the opening of the new site section 47 and in the operation and work section 88 which should be environmentally sensitive.¹³¹

In addition, the petroleum operations are required to be conducted in a healthy and safe way in accordance with Occupational Health and Safety Act, 2006¹³², section 141 provides for safety precautions and 142 for emergency preparedness, the safety zones provided under section 144; these are all aimed at ensuring fire and general safety during oil and gas operations.

¹²⁷ Section 1 (a) Petroleum (Exploration, Development and Production) Act 2013

¹²⁸ Section 1 (e)

¹²⁹ Section 3

¹³⁰ Section 17 Petroleum (Exploration, Development and Production) Act 2013

¹³¹ The Petroleum (Exploration, Development and Production) Act 2013

¹³² Occupational Health and Safety Act, Act No. 9 of 2006

The act also establishes the authority Petroleum Authority of Uganda, whose main function is to monitor and regulate upstream and downstream petroleum and gas processing in Uganda.¹³³ The authority is also enjoined to enforce compliance with health, safety and environmental standards set out in the act during the execution of petroleum activities.¹³⁴

4.3.5 National Environment Act (NEA), Cap 153

The act was enacted provide for the sustainable management of the environment and natural resources and it is known as the principal legislation for the protection of the environment in Uganda. It creates the NEMA which is principal agency in Uganda for the management of the environment and shall coordinate, monitor and supervise all activities in the field of the environment¹³⁵ and is required to ensure Occupational Safety and Health issues are identified and addressed before approving any Environmental Impact Assessment.

Under section 2(2), the principles of environmental management include ensuring all people of Uganda the fundamental right to an adequate standard of health and wellbeing, encouraging maximum participation by the people of Uganda in the development of policies, plans and processes for environment management, using and conserving the environment and natural resources of Uganda equitably for the present and future use, establishing adequate environmental protection standards and to monitor changes in environmental quality, and ensuring that the entire and total costs of environmental pollution are borne by the polluter.¹³⁶

The act covers environmental impact assessment as mentioned above in the section of environmental impact assessment which requires any operator or licensee to determine the likely

¹³³ Section 9 the Petroleum (Exploration, Development and Production) Act 2013

¹³⁴ The Legal Regime and Environmental Dimensions of Oil and Gas Exploration and Production in Uganda

¹³⁵ Section 4 National Environment Act (NEA), Cap 153

¹³⁶ Section 2(2) of the NEA Cap 153

impacts of the intended activity on the environment which includes fire accidents that are commonly associated with Oil and Gas operations.¹³⁷

Environmental impact assessment is a preventative regulatory tool which systematically investigates the long and short term impacts (both positive and negative) of proposed development projects on the natural and human environment.¹³⁸ An EIA ensures that potential impacts are assessed, identified and mitigation measures implemented where possible. In appropriate cases, the regulator, which in this case is the Petroleum Authority of Uganda may refuse permission for the project on environmental and safety grounds.

4.3.6 Occupational Safety and Health Act No. 9 of 2006

The Occupational Safety and Health Act was enacted to consolidate, harmonise and update the law relating to occupational safety and health, to repeal the Factories Act, Cap 220 and to provide for related matters. The Act legislates on safety and health measures of employers thus an employer is required to:

- prepare, and as often as may be appropriate, revise a written statement of policy with respect to the safety and health of employees while at work;
- make arrangements for carrying out the statement of policy; and
- bring the statement of policy and revision of it to the notice of all employees.¹³⁹

This law is aimed to regulate health and safety standards for the health, safety, welfare and appropriate training of persons employed in workplaces and the act provides for fire prevention

¹³⁷ Section 19 of the NEA Cap 153

¹³⁸ Eneh, 2011.

¹³⁹ Section 14 of the Occupational Safety and Health Act 2006

which is to the effect that all stocks of highly inflammable substances shall be kept either in a fire-resisting store or in a safe place outside any occupied building, provided that no such store shall be so situated as to endanger the means of escape from the workplace or from any part thereof in the event of a fire occurring in the store.¹⁴⁰

The act also provides in subsection 2 that where highly flammable liquids are to be conveyed within a workplace they shall, where it is practicable so to do, be conveyed through a totally enclosed system incorporating pipe-lines and pumps or similar appliances and that where conveyance of highly flammable liquids within a workplace through such a totally enclosed system is not practicable, they shall be conveyed in vessels which are so designed and constructed as to avoid so far as practicable, the risk of spilling.¹⁴¹ This would really be best applied in the East African Crude Oil Pipeline project which is yet to be started after proper negotiations are made by the parties.

Subsection 3 is to the effect that where in any process or operation any highly flammable liquid (which in this case is petrol/diesel) is liable to be spilled or to leak, all reasonably practicable steps shall be taken to ensure that any highly flammable liquid, which is spilt, or leaks shall be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe.¹⁴²

Subsection 4 prohibits any means likely to ignite vapours from highly flammable liquids from being present where a dangerous concentration of vapours from flammable liquids may reasonably be expected to be present.¹⁴³

¹⁴⁰ Section 78(1) Occupational Safety and Health Act 2006

¹⁴¹ Section 78(2) OSH Act 2006

¹⁴² Section 78(3)

¹⁴³ Section 78(4)

The act also prohibits persons from smoking, lighting or carrying matches, lighters or other flame producing articles, or smoking materials, in any place in which explosive, highly flammable or highly combustible substances, are manufactured, used, handled or stored¹⁴⁴ and places a duty on the occupier to take all practicable steps to ensure compliance with the foregoing provisions including the display at or as near as possible to every place a clear and bold notice indicating that smoking is prohibited in that place.¹⁴⁵

4.3.7 The Petroleum (Refining, Conversion, Transmission and Midstream Storage) (Health, Safety and Environment) Regulations, 2016.

These regulations have been developed to implement the OSH Act of 2006. They provide for the Safety document which bears “safety functions” meaning the physical measures that reduce the probability of an incident, hazard and accident situation occurring or that limit the consequences of the incident, hazard or accident.¹⁴⁶

According regulation 14(1) the licensee has a duty prepare a safety document for the purposes of:

- (a) Demonstrating that a major accident prevention policy and a safety management system for implementing it have been put into effect;
- (b) Demonstrating that the major accident, hazards and possible major accident scenarios in relation to a midstream operation or a facility have been identified and that the necessary measures have been taken to prevent such accidents and to limit their consequences to human health and the environment;

¹⁴⁴ Section 78(5)

¹⁴⁵ Ibid

¹⁴⁶ Definition of “Safety Functions” in regulation 3 of the P(RCTMS(HSE)Regulations 2016

(c) Demonstrating that adequate safety and reliability have been taken into account in the design, construction, operation and maintenance of any installation, storage facility, equipment and infrastructure connected with the facility's operation which are linked to major incidents, hazards or accidents inside the facility;

(d) Demonstrating that an emergency plan has been prepared and

(e) Providing sufficient information to the Authority to enable decisions to be made regarding the siting of new operations or developments around the facility.¹⁴⁷

It should be noted that this safety document is prepared by the licensee and contains a minimum the data and information specified in Form 2 set out in Schedule 1¹⁴⁸. The licensee is required to send a safety document to the Authority¹⁴⁹ and shall not start construction or operation of a facility or make any alteration or substantial modifications to a facility before the Authority approves the safety documents submitted.¹⁵⁰

In addition, the licensee is required by law to review or revise the safety document every five years under normal circumstances¹⁵¹ and this is all aimed at ensuring the safety of the workers against any potential work hazards that may come up and must be addressed or else, the safety of the people and the environment is put at risk.

¹⁴⁷ Regulation 14 (1) of the P(RCRMS) Regulations 2016

¹⁴⁸ Regulation 14(2)

¹⁴⁹ Regulation 14(3). And the Authority in this case is the Petroleum Authority of Uganda

¹⁵⁰ Regulation 14(5)

¹⁵¹ Regulation 15(1)

The primary purpose of a safety document is to provide the licensee with the information required to enable safe management of the facility or activity in question thus it should be understandable to and useable by those with direct responsibility for safety.¹⁵²

The safety assessment principles provide that;” the process for producing safety cases should take into account the needs of those who will use the safety case to ensure safe operations. It is essential that the safety case documentation is clear and logically structured so that the information is easily accessible to those who need to use it this includes designers, operations and maintenance staff, technical personnel and managers who are accountable for safety...”¹⁵³ This principle cuts across in all operations that pose a huge threat to the safety of the workers in most of the world industries inclusive of the oil and gas industry in Uganda. However, the challenge with this provision in Uganda is that whereas it is ideal that the licensee should have the accident prevention policy, the practical implementation of the same is difficult to achieve in that a question arises as to what happens if the likely risks assessed are not the actual risks that occur in the estimated proportion in reality?

All these provisions are intended to help safe guard the environment against fire risk disasters in Uganda, which are very common with the oil and gas industry.

4.4 International legal principles on risk management

These are general principles of international environmental law that have emerged from international treaties, customs that have been endorsed in numerous global and regional

¹⁵² Office for Nuclear regulation available at www.onr.org.uk/operational/tech-asst-guides/ns-tast-gd-051.pdf, accessed on 1st/12/2018

¹⁵³ Safety Assessment Principles for Nuclear Facilities. 2014 Edition Revision 0. November 2014 available at <http://www.onr.org.uk/saps/index.htm> accessed on 1st/12/2018

agreements and accepted at the national level.¹⁵⁴ These principles provide legal foundation that a country like Uganda and any International Oil company has to follow while enacting, enforcing or complying with relevant national legislation. The polluter pays principle, is incorporated in the Ugandan Constitution and the Environment Act.¹⁵⁵ These concepts have crystallized into a set of legal principles that are governing the petroleum industry's operations worldwide.¹⁵⁶ Thus when strictly followed, they ensure that fire risks associated with oil projects are mitigated and the affected parties are duly compensated in case of any injuries to human bodies and property during the petroleum operations.

4.4.1 The Principle of Prevention

Under this principle, any state is under duty to prevent damage within its jurisdiction.¹⁵⁷

Protection of the environment is better achieved by preventing environmental harm than remedying or compensating for such harm.¹⁵⁸ The effect or harm caused by fires in the petroleum industry is irreversible, but if preventive measures are used during operations like the downstream activities which involve transportation of petroleum products, these are usually effective and less costly. They are most efficient in protection of the environment, better achieved by preventing environmental harm than remedying or compensating for such harm.¹⁵⁹ For example, the government of Uganda through the Petroleum Authority has to make sure that the King fisher project managed by CNOOC in the Albertine region strictly follows the set legislations, mechanisms, enforce and implement them thoroughly, with the aim of preventing any negative

¹⁵⁴ Statute of the International Court of Justice, 1945 ICJ. Acts & Doc Article .38(1).

¹⁵⁵ K Kakuru, I Ssekyaana(eds), HANDBOOK FOR ENVIRONMENTAL LAW IN UGANDA,(Second Edition, 2009)

¹⁵⁶ Environmental Protection in the Petroleum Industry' Encyclopedia of Hydrocarbons, Vol 4, p. 509.

¹⁵⁷ Mapping the Oil and Gas industry to the Sustainable Development Goals. Available at

<https://www.undp.org/.../sustainable%20Development/.../for%20commentmapping...> Accessed on 15th July 2019.

¹⁵⁸ E Brown Weiss, "Our Rights and Obligations to the Future Generation for Environment," (1990), vol 84, (J INT'L L. pp. 198).

¹⁵⁹ Ibid

impacts of the project. This principle however, does not require the prevention of all possible harm, but rather imposes an obligation to minimize detrimental consequences of permissible activities through regulation. The principle of prevention is implemented by means of application of minimum standards or use of the Best Available Techniques (BATs) or Best Environmental Practices (BEPs). BAT is understood as the latest stage of development of processes, facilities or methods of operation, which indicate the practical suitability of a particular measure for limiting emissions and waste.¹⁶⁰ Techniques include, the technology used, the way in which the installation is designed, built, maintained, operated and dismantled. BEP refers to the application of the most appropriate combination of environmental control measures and strategies.¹⁶¹ Environmental impact assessments are also widely employed to identify potential threats to the environment so that preventive measures can be taken.¹⁶²

4.4.2 Sustainable Development

The world Commission on Environment and Development defined ‘sustainable development’ as development that meets needs of the present without compromising the ability of future generations to meet their own.¹⁶³ It should be noted that more than 7 billion human alive today are collectively consuming the earth’s resources at higher rates and intensities that surpass the capacity of its systems to sustainably absorb and neutralize the adverse effects on the environment.¹⁶⁴ Looking at such a rate of consumption, the future generations might be left with no resources hence the 2030 Agenda encourages states to embrace sustainable development and treat it as a critical

¹⁶⁰ ‘Environmental Protection in the Petroleum Industry’ Encyclopedia of Hydrocarbons, Vol 4, p509.

¹⁶¹ Ibid.

¹⁶² S Max Valverde, ‘General Principles of International Environmental Law.’ Available at <<https://core.ac.uk/download/pdf/51089370.pdf>> accessed on 17th April 2019.

¹⁶³ Sustainable Development Goals: United Nations Environment Assembly of UNEP. Submission to the HLPE 2016. Available at <https://sustainabledevelopment.un.org/index.php?page=view&type=30022&nr=243&menu=3170>. Accessed on 15th 4, 2019.

¹⁶⁴ Ibid

link between development, environment, wellbeing and the basis of full enjoyment of a wide range of human rights.¹⁶⁵

This principle has three elements; the intergenerational equity in which every generation has responsibility to leave an inheritance of wealth no less than what they themselves have inherited.¹⁶⁶ This means that the present generation holds the natural resource in trust for the future generation. The second element is the use of natural resources calls for wise use, judicious exploitation and sound environmental management.¹⁶⁷ Third, is the integration of environment and development.¹⁶⁸ These elements imply that natural resources should be exploited in optimal manner if they are to be used for present and future generations. Economic development and environmental conservation should be supportive and pursued nationally and internationally.¹⁶⁹

It can therefore be argued that the international principle of sustainable development requires countries and companies involved in oil projects to promote sustainable development. Host States and project developers can achieve this by ensuring that they match their regulations, management systems, standards and strategies to address the potential negative effects of the project on areas like the environment, social, economic and political of the host communities of such projects.¹⁷⁰ Project developers and host countries have to ensure that risks associated with any project they undertake can be mitigated by conducting risk assessment, to identify and predict potential risks

¹⁶⁵ Ibid.

¹⁶⁶E Brown Weiss, "Our Rights and Obligations to the Future Generation for Environment," (1990), Vol 84, (J INT'L'L. pp. 198.)

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

¹⁶⁹The Rio Declaration on Environment and Development.

¹⁷⁰Mapping the Oil and Gas industry to the Sustainable Development Goals <https://www.undp.org/.../sustainable%20Development/.../for%20commentmapping...> accessed on 18th April 2019.

implementing preventive measures. This aims to averting risks which could prevent the project from being beneficial to future generations.¹⁷¹

Proactive engagement and consultation with stakeholders, including local communities, indigenous people, local and national governments, and civil society are vital by establishing how the project is beneficial to present and future generations.¹⁷²

4.4.3 The Precautionary Principle

The precautionary principle addresses problems of environmental decision-making under conditions of scientific uncertainty.¹⁷³ The first treaty to embody this principle was the 1985 Vienna Convention for the protection of Ozone Layer.¹⁷⁴ It was further reflected in principle fifteen of the Rio Declaration, which states that where there are warnings of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.¹⁷⁵ Thus the principle requires taking appropriate action, to anticipate, prevent and monitor the risks of potentially serious or irreversible environmental harm from human activities, even without scientific certainty.¹⁷⁶ Traditionally, protective measures have to prove beyond doubt the hazard and the urgency of the desired action. The introduction of the precautionary principle brought about reversing of the burden of proof hence a state no longer needs to prove harm before taking up preventive measures.¹⁷⁷ The precautionary approach is linked to principle of prevention, but is designed to apply to a situation of scientific uncertainty by reversing the traditional burden of proof.¹⁷⁸ It advocates for action even when there is no full

¹⁷¹ Ibid.

¹⁷² Ibid.

¹⁷³ Kakuru pg 13.

¹⁷⁴ Convention for protection of the Ozone Layer, March, 22, 1985.

¹⁷⁵ United Nations Convention on the Rio Declaration of Environment and Development, June 15, 1992, Principle 15.

¹⁷⁶ Ibid.

¹⁷⁷ E Brown Weiss, "Our Rights and Obligations to the Future Generation for Environment," (1990), vol 84, (J INT'L L. pg. 198).

¹⁷⁸ Organization of African Unity: Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa, Jan. 29, 1991, 30 I.L.M. 773.

scientific knowledge about the precise degree of risk or irreversible environmental damage. The precautionary principle's relevance to the petroleum activities is obvious, given the fact that oil and gas related pollution are largely irreversible and can be very costly to clear. Like, in 1998 at Jesse in the Niger delta in Nigeria a petroleum pipeline exploded, resulted into a fire killing over five hundred villagers. In March 2019 spillage following blaze sparked stampede in Nembe kingdom, Bayelsa state Nigeria was reported to have claimed over fifty lives.¹⁷⁹

Given the magnitudes of damage associated with oil spills from oil and gas pipelines, it can be adopted that the precautionary principle needs to be effectively applied or used to protect the environment especially the communities living around such oil projects from such fire disasters. The Supreme Court of Uganda added to the jurisprudence of Uganda, the fundamental environmental law principle of the Precautionary Principle to mean environmental measures. This means that the government needs to foresee the environmental degradation and prevent it by attacking the action, without waiting for scientific proof to show that there will be irreparable damage, and take measures to protect the environment and that the burden of proof lies on the respondent.¹⁸⁰

In the Indian case of Orissa Mining, it was held that the precautionary principle was the only principle available to check the irreversible damage to the environment.¹⁸¹ It, therefore, follows that since the oil or gas spills are known to cause fires and the damage on the environment is irreversible, the Precautionary principle should be effectively used and implemented used by the

¹⁷⁹ The Guardian, 2nd March 2019 available at <https://www.theguardian.com> accessed on 17th June 2019.

¹⁸⁰ Godfrey Nyakana -vs.- National Environment Management Authority (NEMA) and Others (Constitutional Appeal No. 5 of 2011).

¹⁸¹ A. Poddar, Indian Supreme Court Precautionary, p.6. a available at <<http://jurip.org/wp-content/uploads/2017/03/Arup-Poddar.pdf>> accessed on 27th May 2019.

government of Uganda and the International Oil Companies with the aim of safeguarding the environment.

4.4.4 The ‘Polluter Pays’ Principle

The polluter pays principle was developed in the 1970s as an economic principle within the frameworks of the Organization for Economic Co-operation and Development (OECD) and the then European Economic Community (EEC).¹⁸²

The costs of preventing, controlling and reducing harm to the environment are to be borne by those responsible for causing such harm and the consequential costs. The principle is primarily an economic one aimed at internalizing the costs of pollution control, clean-up and protection measures.¹⁸³ Principle 16 of the Rio Declaration provides that national authorities should endeavor to promote the internalization of environmental costs and the uses of economic instruments, taking into account the approach that the polluter should in principle, bear the cost of pollution.¹⁸⁴ Implementation of the ‘polluter pays’ principle is usually achieved at the national level through the use of various economic instruments, such as taxation, charges, insurance, civil liability and compensation.¹⁸⁵

The above principles imply that oil exploration and production has to be carried out within the conservation principles, and any failure to comply with the principles can be challenged in court by any concerned citizen. This principle is extremely relevant in oil and gas projects because there is a tendency for polluters especially the international oil companies (IOCs) to externalize their costs to local communities when the costs of compensating the victims are lower than the costs of

¹⁸²Kakuru pg 12.

¹⁸³The Rio Declaration on Environment and Development.

¹⁸⁴Principle 16, Declaration of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, UN Doc. NCON151126 (Vol. I).

¹⁸⁵ Ibid. pg 258.

complying with safety regulations.¹⁸⁶ This kind of practice can however be averted where the polluter pays principle is integrated into the laws that govern the sector. The choice of standards and enforcement mechanism will play a role in minimizing oil and gas related accidents and at the same time, ensure that those who greatly contribute to the pollution do not escape liability.

4.5 Minimal comparison of Uganda's petroleum regulations with those of Ghana

Uganda just like Ghana has oil deposits that are being developed and as such, Ghana adopted the *Petroleum (exploration, Development and production) (health, safety and environment Regulations 2017 L.I 2257*. This *legal* instrument provides for safety and regulation 10(1) requires the operator to prepare and submit a safety case to the commission before the commencement of an operation of a petroleum facility .The safety case shall ensure the management system, enhance health and safety performance in compliance with the relevant enactments.¹⁸⁷

Under regulation 51(1), a contractor, subcontractor, licensee, the corporation or any other person engaged in petroleum activity is required to ensure that a passive fire protection is designed to ensure that in event of a fire load, it provides efficient fire resistance to the relevant structures and equipment with regards to the load capacity, integrity and insulation properties.¹⁸⁸

A fire load according to the law means the maximum degree a fire system is designed to handle or accommodate; and passive fire protection means a group of systems that compartmentalises structures and equipment through the use of fire resistant related walls or floors.¹⁸⁹

The regulations also provide for fire divisions where the operator/contactor is required to ensure that the main area on a petroleum facility is separated by a fire wall that has the capacity to

¹⁸⁶Principle 16, Declaration of the United Nations Conference on Environment and Development,

¹⁸⁷ Regulation 10(4)

¹⁸⁸ Regulation 51(1)

¹⁸⁹ Regulation 51(2)

withstand the designed fire load and explosion load, satisfying the fire rating standards if exposed to hydrocarbon fires.¹⁹⁰

The above regulations are similar with Uganda's *Petroleum (exploration, Development and production) (health, safety and environment Regulations 2016* and both emphasise fire and health safety.

In addition both countries employ the internationally recognised environmental principles in their legislations.

However, in both countries educational campaigns and sensitization on safety are recommended for workers to understand the relevance of risk management in a bid to reduce the bad attitude of workers towards risk management¹⁹¹ and these have been proven to be highly effective in ensuring environmental health and safety during and after the operations in Ghana's oil refinery project.

The governments have very good fire safety laws but they have a duty to make sure that such laws are brought to the attention of the workers and fully enforced which will help to achieve maximum efficiency in ensuring fire safety.

¹⁹⁰ Regulation 52(1a)

¹⁹¹ Osabutey, D, Obro- Adibo,G, Agbodohu, and Kumi, P. Analysis of Risk Management Practices in the Oil and Gas Industry in Ghana. European Journal of Business and Management www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.5, No.29, 2013

CHAPTER FIVE

5.0 DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on presentation, analysis and discussion of the findings of the research based on the questionnaires, interviews and secondary data. The presentation has been made according to the specific research objectives.

5.2 Causes of fire accidents in the oil and gas industry

Fire and explosions are the major accidents in the petroleum industry. The research revealed that these come as a result of combustible gasses which react with air mostly during the process of drilling. It was further revealed that fire accidents also include burns which are as a result of the extremely flammable nature of oil and gas. However, the study found that some respondents were not conversant with the fire accidents in the petroleum industry since these have never happened from the period they have been employed by the petroleum companies.

The findings from the study are in line with the literature by Noopur Sonee, et al. who pointed out that during the production of oil and gas, risk of fire is very high. The potential for fire is present in most of the operations due to vapour or product leaks which in most cases result into fire explosions which severely affect the health of the workers and the surrounding environment hence the need to carefully manage, operate petroleum activities by ensuring safety from fire and heat related hazards.¹⁹²

¹⁹² Noopur Sonee, et al. Oil and Gas industry: Review on fire hazards and protective textiles. International journal of Advance Research in Science and Engineering Vol. No.6, Issue No.01, January 2017. Available at <https://ijarse.com/fullpdf> Accessed on 28th February, 2019.

In addition, the study found out that high pressure in oil drilling wells can lead to fire accidents. Also improperly stored chemicals or substances, gas leaks cable or block breaks and negligent or improperly trained workers are sometimes the cause of fire accidents in the petroleum industry.

The findings correspond with the literature by Zongzhi Wu & Rujun Wang who pointed out that human errors are the major root causes of any industrial accidents. It is also truly applicable for Oil & Gas Industry¹⁹³. Unsafe practices such as unsafe conditions and actions are basic causes of most accidents. Frank Bird's accident causation theory which was accepted worldwide describes that there are number of underlining causes for any accident to occur. Scientific analysis and interpretation of root causes of accidents reveals that human errors are the weakest link.

5.3. Legal framework adopted

The study revealed that, international and national laws play an increasingly important role in determining the response to the energy related environment problems by government, industry and institutions. Uganda is a signatory and has ratified some of these conventions.¹⁹⁴ These include The Convention on Pollution Preparedness, Response and Cooperation, the United Nations Convention on Climate Change, the convention on biological diversity and others. These international Conventions seek to promote sustainable development, by encouraging the member States like Uganda to promote development but take care of the environment at the same time. The study further found out that Uganda, even after ratifying these conventions, does not implement the principles enshrined in these Conventions fully.

¹⁹³ Zongzhi Wu, Rujun Wang (2014). Concern with the safety management of oil and gas pipelines--Status. Chinese Safety News, 6, p. 1

¹⁹⁴ Convention on Environmental Impact Assessment in a Trans boundary Context, Feb. 5, 1991, 30 I.L.M. 800 (1991)

It further revealed that the national laws that govern the oil and gas industry are fully in existence, for instance the Occupational Health and Safety Act, No 9, 2006, the petroleum act of 2013, and the National Environment Act cap 153. However, these do not specifically address the prevention and control of fires and explosions in the industry. Nonetheless, there are regulations like the Petroleum Regulations, 2016 which address the prevention and control of fires and explosions. The study found that some of the employees are not aware of petroleum regulations hence the need for sensitization.

5.4 Extent of effectiveness of the legal framework

The study showed that these laws have been effective to a low extent and the respondents gave an insight into the reasons for this. For example, some respondents believed that most of the petroleum companies do not follow these laws. That these laws have not been effective since most of the workers are ignorant about them, and the implementation of these laws is still low as the government has often failed to punish some of the top management in the Oil companies who have failed to adhere to these laws and policies. One of the legal officers in one of the companies had this to say:

“ my honest opinion is that these safety laws have been effective to a low extent because there are few petroleum companies that have tried to adhere to these laws since their major aim in this business is profit making. To make matters worse, the government has failed to effectively implement these laws because when big people like the management of these companies are caught in breach of these laws, they are not apprehended by the long arm of the law which is sometimes so disappointing and this explains why there are still cases of occupational hazards like fire accidents in the industry, even though they are not brought to public attention ”

On the other hand, some respondents intimated that the laws have been effective. They argued that this was because some of the government organizations like NEMA and PAU have tried to implement some of the requirements talked about in the laws; and that the government, according to one respondent, *“is trying to make sure that environmental impact assessments are effectively carried out with the major aim of reducing occupational hazards like fire accidents before carrying out petroleum operations in the country.”*

Overall, it would appear that these laws and regulations have not been effective. In fact, there has been a catalogue of fire and explosions especially of fuel tankers carrying petroleum products.¹⁹⁵ These have led to deaths and a large number of people sustaining serious injuries.

5.5 Challenges faced in the implementation of the legal framework

The study further revealed that the implementation of the set laws by the government is weak as some of the people caught in breach of the laws are not held accountable. Also, some respondents noted that there are still flaws in the laws especially the Occupational Safety and Health Act 2006 which does not effectively stress what the compensations are once an employee has gotten into an accident at work. One of the managers in one of the companies said:

“ I think the greatest challenge we have in Uganda is implementation of the set laws in all sectors, we really have good laws for example on occupation health and safety and the Petroleum (exploration, Development and production) (health, safety and environment Regulations 2016, but the people supposed to implement these laws are corrupt and do not do their job. In fact, most of our people (workers) are ignorant about the laws as most of

¹⁹⁵ Fuel fire: 33 and others burnt to death, past fuel fire related accidents by a New Vision Reporter. Available at https://www.newvision.co.ug/new_vision/news/1325028/fuel-burnt-death .Accessed on 30th July, 2019.

these workers who do activities like drilling are usually uneducated and do not understand the laws and the importance of these laws.....”

5.6 Other risk management mechanisms adopted to prevent and control the fire hazards

From the interviews, some respondents noted that they have tried to implement risk assessment and planning of the operations. They do this by forecasting the fire risks that are likely to occur in the business, and assessing their impact on the company once they occur.

Some noted that they have employed risk control mechanisms to check the magnitude of the fire risks and make a decision. This involves deciding on whether to treat the risk, transfer it to other service providers, or tolerate the risk if it's not of much damage to the company operations or terminate the risk for good.

In addition, the other risk management strategy adopted to control fire accidents is monitoring the fire risk operations that have been identified by the company.

Furthermore, the study also revealed that IOCs have tried to put in place fire controlling tools like functional fire extinguishers in all corners of the companies and training workers on how to use them.

The IOCs like CNOOC, have also endeavored to provide personal protective equipment for all their employees so that they do not get injuries in case of a fire accident. They have tried to offer effective monitoring by hiring people to always keep watch. Sometimes they outsource companies specialized in prevention and control of fire outbreaks in the petroleum industry. The following quote of a manager in one of the companies attests to this:

“.....as a petroleum company, who know that fire accidents are a time bomb in our operations, we have been able to put in place different risk management strategies to try

and prevent or control fire accidents in our work place. For example, the major thing we have done is to train our employees on a regular basis on how to prevent the occurrence of fire outbreaks or how to control fire. We also majorly employ people with skills and specialty in handling fire outbreaks and also we put in place equipment like fire extinguishers in place to put out fire outbreaks quickly when they occur.....”

The findings are in line with work by Suslick and Schiozer who revealed that during the introduction of the concept of risk management to the oil and gas sector, the objective was to provide a strategy to minimize the exposure of petroleum projects to risk and uncertainty in exploration activities. Since then the concept has become an important aspect of business strategy within the oil and gas industry¹⁹⁶ and has been fully embraced by a number of oil companies.

The findings also correspond with a paper by Badiru and Osisanya who assert that risk management must be a core component of a company’s project management portfolio in the oil and gas industry. They contended that risks can be mitigated, but not eliminated. They add that in spite of government regulations designed to prevent and reduce accident risks in the energy industry, accidents will occasionally occur. Thus they emphasize the need for government regulators to work with the licensees to monitor petroleum operations as this will only pre-empt a fraction of potential risks.¹⁹⁷ For this reason, regulators must work with operators to ensure that adequate precautions are taken in all operating scenarios and this can be done in a risk-mitigation partnership, rather than in an adversarial “lording” relationship.¹⁹⁸

¹⁹⁶Suslick, S. and Schiozer, D. (2004). Risk analysis applied to petroleum exploration and production: an overview. Journal of Petroleum Science and Engineering, 44(1-2), pp.1-9

¹⁹⁷ Badiru, A. B., and Osisanya, S. O., (2013) Project Management for the Oil and Gas Industry. CRC Press

¹⁹⁸ ibid

In addressing the effectiveness of these other measures, the study found that the risk management measures employed have been effective since the occurrence of fire accidents have been minimized to a great extent.

It was also revealed that the measures put in place by the oil companies have been effective since they have the capacity to address these risks themselves. This is largely due to the fact that they have the human expertise in place to do the job and finances to deal with these risks as exemplified by one of the managers:

“ to a great extent I think that these risk management strategies have been effective in ensuring safety in the petroleum industry since the company has the right personnel with the right expertise and enough resources to help in the process of risk management by treating and terminating these risks by ourselves ”

However, some of the respondents noted that the measures put in place by the companies have not been effective since there is still occurrence of these risks especially the fire accidents during transportation. They also noted that the companies have failed to involve all stakeholders in the process of risk management yet this is a very important aspect of the process.

This corresponds to Baccarini's work which indicates that the efficiency of an oil and gas industry is highly dependent on the success or the completion of several small projects.¹⁹⁹ The success of a project depends on the ability of the management to manage risk-prone changing environments within the framework of the project. Thus project managers usually try to minimize the uncertainty

¹⁹⁹ D. Baccarini, Understanding project cost contingency: A survey in Sidwell," A.C. (ed), Proceedings of the Queensland University of Technology Research Week 2005, 4-5 Jul 2005. Brisbane, Qld: Queensland University of Technology, 2005.

and risk. During the process, however, project managers either underestimate or overestimate risks²⁰⁰ as it is not easy to appropriately assess the magnitude of potential fire risks that may occur.

5.7 Challenges faced in implementing other risk management mechanisms

The study revealed that lack of interest, from top management in the organizations, to carry out the risk management process was a major challenge. In addition, inadequate finances and lack of skilled people to carry out risk assessment and management processes has been a hindrance.

It was also pointed out that most petroleum companies have failed to use the right metrics to effectively evaluate the risks that occur in the petroleum industry.

Finally, there have been challenges of the ever changing environment where the companies have to always bring up new ideas and ways of dealing with some of these risks occurring several times. These, ultimately, lead to failure to effectively complete the whole process of risk assessment in the organizations.

These study findings are in line with Hopkin's arguments. He argues that petroleum companies have limited access to formal credit which hinders their ability to carry out proper risk assessments. He further contends that it is important to note that finances are a prerequisite for any business that wants to carry out effective risk assessment, more so given the fact that the petroleum industry is by nature highly capital intensive. Yet, some petroleum companies operate on limited finances, so they find themselves unable to effectively engage in the proper process of risk assessment and risk mitigation²⁰¹ which proves a challenge especially during the risk assessment process.

²⁰⁰ D. D. Fiberesima, and N. S. A. Rani, "An Evaluation of Critical Success Factors in Oil and Gas Project Portfolio in Nigeria," *African Journal of Business Management*, vol. 5, no. 6, pp. 2378 – 2385, 2011.

²⁰¹ Hopkin, P, (2014). *Fundamentals of Risk Management*, 3rd Edition. London: Kogan Page.123

5.8 Ways of reducing the challenges in implementation of the law on risk management mechanisms

The study found that the petroleum companies need to involve all the stakeholders in the process of risk management and also avail enough resources both financial and human resource with expertise knowledge to help in the effective implementation of risk management. There is also a need for effective enforcement of the laws on the occupational safety and health hazards by making sure that the culprits are arrested and asked to pay for the damages caused to the environment. One of the managers in one of the companies had this to say;

“ there is great need for the enforcement of the law in Uganda because am sure if these laws on occupational safety and health hazards are effectively implemented, then the fire risks will be reduced in the businesses. Also, most of these companies need to have a specialized department for risk management where people with expertise in this field sit and formulate the best policies and strategies that enable the company to reduce the occurrence of risks like fire accidents in the operations of their businesses ”

5.8.1 Training on fire safety in the oil and gas industry

The study revealed that employees and safety managers are required to have trainings on health and safety in the oil and gas industry. It is further pointed out that during these trainings, workers are taught how to prevent and control fire accidents during petroleum operations by educating them about the health and safety laws, safety measures to employ before and during Oil and Gas operations. One of the managers was quoted;

“ I have the necessary training and knowledge on health and safety which encompasses fire safety in the oil and gas industry because it's mandatory in the company that when you are to join this petroleum company, it's advantageous to have these skills. Given that am

in a management position, it's my responsibility to see that the fire risks are controlled and prevented, which makes that training is a necessity.....”

It was further discovered that without proper risk mitigating mechanisms, communities and wildlife are likely to be adversely affected by oil spills posing a serious threat to biodiversity and rare endangered species because most of the oil projects involve a lot of environmental issues that have to be adequately dealt with.

5.9 Conclusion

A number of conclusions arise from this study:

Fire and explosions are the major accidents in the petroleum industry, and are usually caused by negligent or poorly trained workers and ignorance of the safety laws and regulations.

Regarding the legal framework, there is a good number of laws and regulations in place to govern the oil and gas industry in Uganda. Specifically, there are two regulations that address the issue of the prevention and control of fire and explosions in the sector. In addition, there is a need a regulation or law to regulate the activities of the intended East African Crude Oil Pipeline project as currently, there is none.

Considering the effectiveness, these laws and regulations have not been effective in preventing and controlling fire and explosions. In fact numerous fatal fire accidents still occur, mostly during the transportation of the petroleum products by the fuel tankers.

Despite the laws and regulations in place, their effective implementation has been a challenge, largely due to ignorance of the law and lack of skilled workers and financial resources.

Furthermore, in as much as the international Conventions advocate for sustainable development, preservation and protection of the environment, these Conventions do not provide for punitive action against states that infringe on the principles enshrined there.

5.10 Recommendations

Based on the results of the study, the following recommendations are provided;

From the study findings, it was revealed that most of the workers in the companies are ignorant about the laws on occupational safety and health hazards like fire accidents. The study findings therefore recommend that there is need for the law makers and other stakeholders to provide sensitization to the workers about their rights and the occupational safety and health laws available to protect them.

Furthermore, the study findings revealed that the implementation of the laws on the occupational safety and health hazards like fire accidents is weak. The study therefore recommend that there is need for the law makers and enforcers to effectively implement the laws on occupational safety and health hazards by holding accountable those found in breach of the law.

More so, the study findings revealed that most petroleum companies fail to implement risk management strategies in their operations due to limited resources both financial and human. The study therefore recommend the companies to employ the right people with the right expertise in risk management implementation and setting aside a budget meant for risk assessment and implementation of the risk management mechanisms..

Finally, from the study findings, it was revealed that there is a challenge of reluctance and negative attitudes towards implementation of risk management mechanisms by the top management in the

petroleum companies. The study therefore recommends the need to change the attitudes of top management and encourage collective decision making from all stakeholders in the process of implementation of risk management strategies.

The study further recommends the use of oil dispersants which are chemicals used to spray on a surface oil slick to break down the oil into smaller droplets that can readily mix with the water and ultimately biodegraded.²⁰² Dispersants can rapidly and effectively minimize pollution damage to sensitive shore resources such as mangroves²⁰³ and also minimizes the possibilities fire explosions from occurring due to the dilution of the oil spills.

5.10.1 Recommendations for further research

Since this study explored the efficacy of the law on risk management that have been adopted to ensure fire safety in Uganda's Oil and Gas industry, the study recommends that further research be done on the following areas.

The researcher recommends that more research needs to be done on the flaws within the legal framework in the fire safety risk management strategies in the oil and gas/ petroleum industry

The researcher also recommends that more research needs to be done to analyse the law on risk management for the different oil and gas projects adopted to ensure the general health safety in Uganda's Oil and Gas industry.

Finally, the study also recommends that more research be done on the benefits and costs of implementation of the laws on risk management in Uganda's Oil and Gas industry.

²⁰² Use of oil dispersants to treat oil spills available at <https://www.itopf.org>data> accessed on 18th January 2020.

²⁰³ Ibid

5.11 Demographic indicators of respondents

The study involved the use of interviews. There were 10 interviews carried out with different respondents from different institutions and petroleum companies in Uganda which included; Uganda National Oil Company, Petroleum Authority of Uganda, CNOOC, Total E & P Uganda and Vivo Energy Uganda/ Shell and their demographic characteristics are presented below.

Table 1: Summary of the background data of key informants (N=10)

ITEM	DETAIL	FREQUENCY	PERCENTAGE
Level of education	Master's degree	6	60.0%
	Post graduate studies	4	40.0%
	Total	10	100.0%
Company/Institution	Uganda National Oil Company	2	20.0%
	Petroleum Authority of Uganda	2	20.0%
	CNOOC	2	20.0%
	Total E & P Uganda	2	20.0%
	Tullow Oil (U)	2	20.0%
	Total	10	100.0%
Profession/ current job	Manager	2	20.0%
	Assistant Manager	4	40.0%
	Supervisor	3	30.0%
	Legal Officer	1	10%
	Total	10	100.0%
Period spent working in this job	1-5 years	6	60.0%
	6-10 years	4	40.0%
	Total	10	100.0%

Source: Primary Data

From the table above, majority off the respondents hold master's degrees represented by 60% whereas the rest hold post graduate diplomas in different studies represented by 40%. This implies that the respondents are qualified enough and are able to understand the questions and respond to them with ease since they have attained different levels of education in their studies. This also helped the researcher in getting reliable and valid information from well educated people.

From the table above, 20% each of the respondents were from the five selected institutions and petroleum companies which included; Uganda National Oil Company, Petroleum Authority of Uganda, CNOOC, Total E & P Uganda, Tullow Oil and Vivo Energy Uganda/ Shell. This therefore

implies that information was got from a variety of respondents from different organizations which helped in getting a variety of views from different people which further helped in avoiding bias.

The table further shows that 20% of the respondents are managers, 40% of the respondents are assistant managers in their respective companies, followed by 30% who are supervisors in their respective companies whereas 10% of the respondents noted that they are legal officers in their respective companies. This implies that information was gotten from high ranking people in the petroleum companies who helped in providing in-depth information about the topic under study and these were interviewed face-to-face by the researcher.

Finally from the table above, respondents were asked about the period they have spent working in their respective companies, majority of the respondents represented by 60% noted that they have spent 1-5 years working in their respective companies whereas 40% of the respondents noted that they have spent 6-10 years working in their respective companies. This implies that most of the employees have spent a reasonable period of time working in their respective companies, meaning that they have vast knowledge about the topic under study.

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Appendices

Appendix 1: Interview Guide

PETROLEUM INSTITUTE

Dear Sir/Madam;

I am Ahumuza Christiana, an LLM student of Uganda Christian University-Mukono(Institute of Petroleum Studies Kampala). I am conducting a study on “analysis of the efficacy of the law on risk management in ensuring fire safety in Uganda’s Oil and Gas industry.” You have been selected to participate in this study and the information collected shall be purely for academic purpose and treated with the highest level of confidentiality. The success of this study shall greatly dependent on your response, you are kindly requested to spare some time and answer these questions. Your cooperation will be highly appreciated.

Section A: General information

1. What is your level of education?

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2. Which company do you work with?

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3. What is your profession?

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4. What is your current job?

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5. Have you had any training on fire safety in the Oil and Gas industry?If yes,please give details.

6. For how long have you been in this job?

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Section B:

7. As a person who has been working in the petroleum industry, are there any fire accidents that you have heard of? If yes, please tell me more

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8. In your opinion, what are the possible causes of fire accidents in Uganda's Petroleum Industry?

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9. As an organisation, have you adopted any risk management strategies to prevent and control the fire hazards?

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10. What legal framework has been adopted to prevent and control the fire hazards in the petroleum industry?

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11. To what extent have these laws been effective in ensuring that fire safety in the petroleum industry is achieved?

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12. What other risk management strategies you have adopted as a company to prevent and control the fire hazards?

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13. In your opinion, how have these risk management strategies been effective in ensuring that fire safety in the petroleum industry is achieved?

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14. What challenges have you faced as an organisation in the implementation of these risks management strategies;

a)with the legal framework

b)with the policy frame work

c)with other risk management strategies

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15. As an organisation, what have you done to counter or reduce on these challenges faced in the implementation of risk management strategies?

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13. What would you recommend to ensure fire safety in this industry which is susceptible to fires?

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Thank you for your cooperation