MANAGING ENVIRONMENTAL RISKS IN THE OIL AND GAS INDUSTRY
A CASE STUDY OF UGANDA'S OIL EXPLORATION AND PRODUCTION BY OIL AND GAS COMPANIES IN THE ALBERTINE GRABEN REGION, UGANDA

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RJ20M23/013

A DISSERTATION SUBMITTED TO THE FACULTY OF LAW IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF LAWS OF OIL AND GAS AT THE INSTITUTE OF PETROLEUM STUDIES KAMPALA WITH AFFLIATION TO UCU.

AUGUST 2021

DECLARATION

I, **WAZEMWA WABUYI AGNES,** declare that this research 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 research paper entitled *"**Managing Environmental Risks in the Oil and Gas Industry A Case Study of Uganda's Oil Exploration and Production by Oil and Gas Companies in the Albertine Graben Region, Uganda**"* has been done under my supervision and now it is ready for submission.

Signature:…….....……

ISAAC CHRISTOPHER LUBOGO
(DOCTOR OF LAWS FELLOW)

Date:…….....……

DEDICATION

I dedicate this work to my children Ian Natala, Shawn Elisha Natala and my husband Isaac Natala. You allowed me to ration your time for me to pursue my academic career. I am grateful for your encouragement, financial and moral support throughout the entire course.

ACKNOWLEDGEMENT

I am thankful to God for the good health, wisdom and provision for Tuition that enabled me complete the course as scheduled. I acknowledge and appreciate the efforts of my supervisor Dr. Isaac Christopher Lubogo for the tireless wise counsel and guidance throughout the research.

Appreciations to all the staff and management of the Institute of Petroleum Studies Kampala for their kindness and guidance during my entire stay at the Institute. In a special way, I thank Mr. Paul Barigye from IPSK who made endless calls and encouraged me to enroll for the course. Mr. James Mugerwa, Ms. Lydia, Ivona, Jonath and Marvin for their technical assistance whenever I needed help.

Completion of this work would not have been possible without the help and guidance of my colleagues from the class of LLM Oil & Gas 2020 under the leadership of Mr. Alaka Caleb; you will always remain a special family. The **CLEVERS** discussion group comprised of among others myself, Mr. Alaka Caleb, Mr. Himbaza, Mr. Kauma, Gathuoy, Kolping Francis, Mercy Munduru was instrumental in generously sharing knowledge and guidance that enable me to successfully complete this research.

I acknowledge and appreciate the professional assistance of the following persons whom I endlessly consulted and availed data that made the research possible. Ms. Christine A. Echookit of NEMA, Mr. Ali Ssekatawa of PAU, and Prof. Emmanuel Kasimbazi of Makerere University School of Law.

The staff and management of CNOOC, NOC, Total E & P, Vivo energy who willingly responded to questions and availed data that informed the findings of this research.

Finally, special thanks to both the internal and external examiners who took time to read my report and guided on the final work. May God bless each one of you in a special way.

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LIST OF 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
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

Following discovery of oil and gas in the Albertine Graben Region, Uganda is excited about the revenue that shall be generated to boost the economy. However, by its nature, the oil and gas activities are associated with enormous environmental risks and if not well managed becomes fatal to the lives and environment surrounding the area.

Based on the primary and secondary data obtained from the oil rich Albertine Graben Region in Uganda, this research paper assesses how oil companies are prepared in managing environmental risks associated with oil and gas exploration, development and production in the region.

The paper further examines the efficacy of laws and the state of petroleum exploration activities and policies with a view to identify their impacts on the environment and the willingness of licensed oil companies to comply with the laws.

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Findings show that the activities of the oil companies licensed to operate in the region will have enormous impacts on the human health, ecosystems and biodiversity of the region when production commences.

A comparative analysis of environmental incidents arising as a result of oil and gas accidents such as the Alpha Piper, Deep Water Horizon and Niger delta out of oil and gas production in the UK, US and Nigeria was made and best practices were recommended in the research.

Environmental risks of oil and gas are sometimes investable and can be as a result of a simple mistake in design or the workmanship. To effectively control and prevent risks, it is recommended that environmental laws and policies be embedded in the oil company's daily operations.

In addition, the paper notes that whereas, there are adequate International and National laws regarding preservation of the environment amidst oil production, compliance with the laws by the oil companies and enforcement by the agencies requires the concerted effort of all players.

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Implicit from the findings, the paper makes some recommendations for the protection of the Albertine region, environment, prevention of loss of crude oil as well as lives and livelihoods in the region.

List of Laws, Policies, Instruments and Case Law

National Laws

The 1995 Constitution of the Republic of Uganda.

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

The Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013.

The Occupational Health and Safety Act No 9, 2006.

National Environment Act (NEA), Cap 153.

The Environmental (Waste Management) Regulations, No. 3 of 2019

The Petroleum (Exploration, Development and Production) (Health, Safety and Environment Regulations, 2016

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

Policies

National Oil and Gas policy 2008.

Statutory instruments

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

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

The Petroleum (Waste Management) Regulations, 2019

The National Environment (Strategic Environmental Assessment) Regulations, 2020

The National Environment (Waste Management) Regulations, 2020

International Legal instruments

The Energy Charter Treaty 1994.

The international Convention on Oil Pollution Preparedness, Response and Cooperation 1990

Convention on Biodiversity, 1992.

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

Labour inspection Convention, 1947 (No. 81) (Excluding PartiI)

The Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997

The Rio Declaration on Environment and Development, 1992

Stockholm Declaration (1972)

Johannesburg Declaration (2002)

Regional Legal instruments

East African Community Treaty 1999

Protocol on Environment and Natural Resources 2006

The African Convention on Conservation of Nature and Natural Resources of Maputo, 2004

The Protocol for Sustainable Development of Lake Victoria Basin, 2003

The East African Community Memorandum of Understanding on the Environment

Case Law

Orissa Mining Corporation v. Ministry of Environment & Forest & Others, Supreme Court of India, WP (Civil) No. 180 of 2011.

The case of Environmental Action Network vs. British American Tobacco, Application No.444 of 2001(Unreported)

High Court Civil Suit No. 27 of 2003 (Arising from Miscellaneous Application. No. 70 of 2002). Godfrey Nyakana vs. National Environment Management Authority (NEMA) and Others (Constitutional Appeal No. 5 of 2011)

CHAPTER ONE: INTRODUCTION

1.0 Background

Oil discovery in Uganda dates back to pre-independence, to as early as the 1920s by Wayland, a Geologist who documented about 52 seeps of hydrocarbons in the Albertine Graben.[1] However, international conflicts of the 1940s and political instabilities of the 1960s to 70s disrupted the solemnization of activities until the 1980s when resumption culminated in validation of presence of oil in sizeable reserves[2]. Today, established reserves don't just put Uganda on the top 50 oil producing nations as hitherto predicted[3] but ranks her 40th among global oil producing economies.[4]

Whereas heavy exploration in the Albertine Rift began in 2003, and boomed in 2006 when the National Environmental Management Authority of Uganda (NEMA) confirmed the presence of commercially viable amounts of oil in the Albertine area,[5] Uganda's Oil industry has since transitioned from having only exploration, to new exploration, to preparation of discovered oil fields for production, and to putting in place infrastructure to both commercialize the discovered 6.5 billion barrels of oil and gas resources[6], and facilitate sectoral developments.[7]

New explorations are occurring in Kanywataba Exploration Area, Ntoroko district by Armour Energy Ltd, and in the Ngassa Exploration Area, Hoima district by Oranto Petroleum Ltd. Meanwhile the Tilenga and King Fisher projects-are each preparing discovered oil fields in Bulisa, Nwoya, Hoima and Kikuube districts. Construction of the 1443 km pipeline from Uganda to Tanzania by East African Crude Oil Pipeline (EACOP) is on-going.

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[1] Kasimbazi, E,. "Environmental Regulation of Oil and Gas Exploration and Production in Uganda" in Journal of Energy and Natural Resources Law Vol. 30 No.2 of 2010 at p.189

[2] Terrell G. Manyak (2015). Oil and Governance in Uganda. Journal of Public Administration and Governance. ISSN 2161-7104 2015, Vol. 5, No. 1

[3] Kathman, J., & Megan Shannon "Oil Extraction and the Potential for Domestic Instability in Uganda" African Studies Quarterly, Vol. 12. Issue 3 (Summer 2011)

[4] Shepherd, B., (2013) Oil in Uganda: International Lessons for Success

[5] Ericson, Kristina, "A Crude Awakening: The Relationship Between Petroleum Exploration and Environmental Conservation in Western Uganda" (2014). Independent Study Project (ISP) Collection. 1924. https://digitalcollections.sit.edu/isp_collection/1924

[6] Kwesiga Pascal, Work on Buliisa oil industrial area begins. New Vision, 20th August 2017. Visited on 20th October, 2020

[7] Brief by the three key institutions at the helm of the institutional framework for Uganda's oil and gas sector, The Ministry of Energy and Mineral Development (MEMD), The Petroleum Authority of Uganda (PAU) and The Uganda National Oil Company (UNOC).

Oil exploration, development and production however, poses numerous environmental risks associated with nearly all activities at every stages. For instance, comprehensive and branch systems of underwater pipelines pumping oil, gas and condensate are major environmental risk factors that are posed by offshore field for pipes. Moreover, the oil industry focuses on management of Oil Revenues as opposed to environmental health, and activities undertaken by oil companies are usually directed at intensive extraction of oil, with minimum investment.[8] Broad environmental issues – habitat protection and biodiversity, air emissions, marine and freshwater discharges, incidents and oil spills, and soil and ground water contamination – faced by the oil and gas exploration and production industry are manifested at both local and global levels.[9]

In Uganda, all of these are potential risks. The Albertine Graben is the country's most diverse region and one of Africa's most naturally rich regions, and subsequently on planet earth. It represents nearly 30% of Africa's total mammal species, 51% of its bird species, 19% of its amphibian species and 14% of the continent's plant and reptile species.[10]it also houses 10 of Uganda's 22 national parks and protected game reserves, as well as 60% of Uganda's water bodies, and numerous archaeological sites, establishing the Albertine region as Uganda's largest pull for tourism.[11] As of however, there is no evidence of comprehensive planning on how oil will impact wildlife inhabiting this primeval area or its expansive forest reserves.[12]

As well, with regard to environmental preservation, Uganda's oil and gas exploration has already faced various issues that are predicted to exacerbate with extraction processes,[13] with impacts depending on the process stage, project magnitude, its nature and response from the neibouring community. These factors can inform the kind of planning, effectiveness and control measures to prevent pollution and in the event that it occurs, the best way to deal with it.[14] Emerging issues

[8] Gidudu Ivan, Assessment of National Regulatory Compliance With International and Regional Obligations Relating to Environmental Health and Safety Standards: A Case Study Of The Oil And Gas Industry Of Uganda, 2017. (Dissertation, Uganda Christian University)
[9] UNEP IE/PAC Technical Report, 2007. Environmental Management in Oil and Gas Exploration and Production.
[10] International Alert. 2011. Oil and Gas Laws in Uganda: a legislators' Guide. Kampala, Uganda.
[11] Governance and Livelihoods in Uganda's Oil-Rich Albertine Graben. (2013). Kampala: International Alert.
[12] National Environmental Management Authority (NEMA). (2009). Environmental sensitivity atlas for the Albertine Graben. Kampala: Republic of Uganda.
[13] Ericson, Kristina, "A Crude Awakening: The Relationship Between Petroleum Exploration and Environmental Conservation in Western Uganda" (2014).Independent Study Project (ISP) Collection. 1924. https://digitalcollections.sit.edu/isp_collection/1924
[14] Kasimbazi, E. B., op cit, at 1

surround balancing petroleum production with conservation – of different exploration areas' unique bio-diversities, and wider environmental wellbeing.[15]

The institutional framework for Uganda's oil and gas sector has three key institutions at the helm: The Ministry of Energy and Mineral Development (MEMD), The Petroleum Authority of Uganda (PAU) and the Uganda National Oil Company (UNOC). Oil companies currently licensed to undertake petroleum exploration, development and production in the country are five, including Armour Energy Limited (AEL), CNOOC Uganda Limited (CUL), Oranto Petroleum Limited (OPL), Total E&P Uganda B.V. (TEPU)[16]

It is expected that Oil and gas companies develop risk management systems and operational practices to minimize harmful environmental impacts,[17] the primary goal being to reduce corporate environmental impacts by limiting the number and severity of incidents that occur from the exploration, production and refining of oil and gas.

Otherwise, the highly integrated nature of societal health and safety with the environment poses dangerous consequences to humanity as whole. To decrease the negative effects of these operations on Uganda's society and the environment, oil and gas companies need to improve their practices and objectives to incorporate all of the costs associated with the environmental risks.

[15] International Alert, Oil and Gas Laws in Uganda: A Legislators' Guide, (2011).
[16] Brief by the three key institutions at the helm of the institutional framework for Uganda's oil and gas sector, The Ministry of Energy and Mineral Development (MEMD), The Petroleum Authority of Uganda (PAU) and The Uganda National Oil Company (UNOC).
[17] Conner, Haley, "Managing Environmental Risk in the Oil and Gas Industry" (2015). *CMC Senior Theses.* Paper 1121. http://scholarship.claremont.edu/cmc_theses/1121

1.1 Statement of the problem

Oil discovery, exploration, development and productions associated with numerous benefits, but also comes with major environmental risks associated with nearly all activities at each phase. Several policy and legal instruments have been formulated to regulate oil and gas activities, and minimize risks. The 1995 Constitution, article 39, provides for freedom from pollution and environmental degradation and establishes the right to a clean and healthy environment. Several legal instruments and regulations, including the NEA, 2019, Petroleum (Exploration, Development and Production) Act, 2013, National Oil and Gas Policy 2008, and other Subsequent Regulations operationalize Article 39. Uganda also subscribes to regional and international legal instruments and agreements.[18]

Despite these, oil exploration, development and production are a new venture in Uganda. The available laws and Regulations governing management of environmental risks in the industry have not yet been tested by the OCs in the Albertine Graben.[19] As well, although existing environmental audits are laudable, risks from oil and petroleum exploration and production are upon commencement of extraction.[20] It is not known if the OCs licensed to operate in the Albertine Graben such as Heritage, Total E&P, Oranto among others are compliant[21] with the regulatory environmental laws or simply struggle to align their short-term financial goals with long-term environmental risks.[22]

Meanwhile, in a species rich Albertine Graben eco-region where oil development poses categorical ecological impacts,[23] environmental risks are common and raise key legal implications.[24] Thus far little comprehensive planning has gone into how oil will impact wildlife

[18] Rio Declaration (2012); Stockholm Declaration (1972); Johannesburg Declaration (2002) which advocate for environmental health and safety principles.
[19] Gidudu Ivan, Assessment of National Regulatory Compliance With International and Regional Obligations Relating to Environmental Health and Safety Standards: A Case Study Of The Oil And Gas Industry Of Uganda, 2017. (Dissertation, Uganda Christian University)
[20] Kristina Ericson (2014). A Crude Awakening: The Relationship Between Petroleum Exploration and Environmental Conservation in Western Uganda. Independent Study Project (ISP) Collection. 1924.
[21] Kimuli Balikuddembe Joseph, (2015) Disaster Risk Management and Oil Production In Uganda: Need For a Win To Win Approach
[22] United Nations Environment Programme (2011), 'Environment Assessment of Ogoni land' Nairobi - Kenya
[23] Terrell Manyak, Oil and Governance in Uganda. Journal of Public Administration and Governance. Vol. 5, No. 1 of 2015
[24] Shepherd and Wedderburn (2007), Legal risks in the oil industry. UK. *Oil, Gas & Energy Law intelligence service (OGEL).* *https://www.lexology.com/library/detail.aspx?g=85feffbf-779c-49cd-9e83-7fd99f52652f*

inhabiting this primeval area and its expansive forest reserves.[25] Waste disposal from oil production activities could also gravely contaminate fishing areas and underground aquifers.[26] However, by embedding environmental concerns into all aspects of daily operations, oil companies can achieve socially beneficial outcomes, while avoiding potential disasters and more stringent legislation. This research is necessary to establish the level of compliance, preparedness and mitigating factors by OCs in managing the anticipated environmental risks.

1.2 Purpose of the study

The purpose of this study was to analyze the level of compliance, preparedness and mitigating factors by OCs in managing the anticipated environmental risks in the oil and gas industry in the oil rich Albertine Graben region, Uganda.

1.3 Significance

Existing literature shows little or no research done in analyzing compliance, preparedness and mitigating factors in management of environmental risks in the oil and gas industry in the Albertine Graben. Available studies in the region have explored Governance,[27] Livelihoods,[28] and socio-economic effects on people.[29] The 2017 study[30] by Gidudu although it was on environmental health, focused on compliance with international and regional obligations. Presently, several projects are on-going in the oil and gas sector, including new explorations, surveying and constructing the oil refinery, and construction on the oil pipe line from Uganda to Tanzania.

This research will hence fill the gap in existing research by analyzing the level of compliance and preparedness in management of environmental risks in the oil and gas industry in the oil rich

[25] National Environmental Management Authority (NEMA), (2009), Environmental sensitivity atlas for the Albertine Graben, Kampala, Republic of Uganda.
[26] Governance. (2013, March). Governance and livelihoods in Uganda's oil-rich Albertine Graben, International Alert. Retrieved from http://www.commercialpressuresonland.org
[27] Terrell Manyak, Oil and Governance in Uganda. Journal of Public Administration and Governance. Vol. 5, No. 1 of 2015
[28] Governance. (n1) 7
[29] Kyomugasho, Miriam, "Oil Industry in Uganda: The Socio-economic Effects on the People of Kabaale Village, Hoima, and Bunyoro Region in Uganda" (2016). Dissertations - https://surface.syr.edu/etd/613
[30] Gidudu Ivan, Assessment of National Regulatory Compliance With International and Regional Obligations Relating to Environmental Health and Safety Standards: A Case Study Of The Oil And Gas Industry Of Uganda, 2017. (Dissertation, Uganda Christian University)

Albertine Graben. Findings will be significant to all key stakeholders in Uganda's oil as spelt out in the National Oil and Gas Policy, including; i) the central Government; ii) the oil exploration/extraction companies; iii) the district local governments of areas where oil has been discovered; and iv) the owners of land where oil has been discovered. Oil and gas discovery in Uganda meanwhile, presents a unique opening for legislators to provide critical input in leading the country towards transparent management of these resources. This study can be very informative on environmental discussions.

1.4 Justification

Oil and gas companies, whilst meeting the world's growing energy demands, are challenged to minimize negative externalities associated with these operations.[31] International and national regulations regarding best practices exist, but many of the risks oil corporations face are site specific, requiring detailed background research and precautionary measures that cannot be solved using a generalized framework.[32] Meanwhile, the Albertine Grabenis found in a seismically prone area of Uganda due to the active earthquake epicenters in Lake Albert forming the Great East African Rift valley[33].its therefore an area of interest for environmental risk studies.

In addition, studies on the Albertine Graben's environment equally promotes awareness and conservation efforts in the area, from the grassroots to governing bodies. Moreover, Oil exploration near Lake Albert largely occurs in protected land areas and national parks, potentially threatening biodiversity, I including human life, in the community.

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 safety in Uganda's Oil and Gas industry.

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[31] Conner, Haley (2015) "Managing Environmental Risk in the Oil and Gas Industry". *CMC Senior Theses.* Paper 1121

[32] Haley (n 1) 6

[33]UNEP, Environmental Management in Oil and Gas Exploration and Production (2008).

1.5.2 Specific Objectives

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

1.5.3 Research Questions

The overall research question, therefore, focused on whether the law on risk management in preventing and controlling plausible dangers during the field operations. Specifically, the following research questions will be posed:

i. What are the possible causes of risk in the oil and gas industry and the legal framework adopted to prevent and control risk in oil exploration?

ii. How effective has the law been in preventing and controlling plausible risk in oil exploration?

iii. What challenges are faced in the implementation of the law on risk management in ensuring environmental safety?
iv. What recommendations may be adopted to prevent and control environmental risks?

1.6.0 Theoretical and Conceptual frameworks

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.[34]

Stakeholder management theory therefore, conceives an organization as a complex, dynamic and interdependent network of multidimensional relationships with a wide variety of stakeholders.[35] 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.[36] From a risk management perspective the benefits of consulting with these stakeholders are said to be numerous and include higher levels of 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.[37]

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.[38] Ultimately, it's 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.[39] Therefore, it's likely that in many companies there may remain significant institutional

[34]Freeman, 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.
[35]Loosemore, M., Raftery, J, Reilly, C and Higgon, D (2005) Risk Management in Projects, Taylor and Francis, London, UK.
[36]Ibid
[37]Supra
[38]Berry, D (2004) Risk, communication and health psychology, Open University Press, Maidenhead, UK
[39]Barnes, P (2002) Approaches to community safety; Risk Perception and Social meaning, Australian Journal of Emergency Management, 15 (3), 15-23.

"blind spots" which ignore the contextual experience of risk and the perceptual issues that are relevant to public concern [40] like the environmental issues in the oil and gas industry.

1.6.1 Conceptual framework

A conceptual framework is a logical structure of related concepts that provide a picture or display of how ideas in the story relate to each other. It is one way in which a researcher brings out his/her own understanding and approach to the topic of study. It helps the researcher to identify concepts in the research problem[41]

This demonstrates what is expected to be found by the readers in the entire research. It defines the relevant variables for the study and maps out how they might relate to each other and in the process, a conceptual framework is constructed before collecting data using serial variations, contexts and empirical data.

A conceptual framework represents the researcher's the synthesis of literature on how to explain a given phenomenon. It highlights boundaries of the actions required in the course of the study give his/her previous understanding of other researchers' arguments and the researcher's observation and understanding of the previous literature review on the same topic of research[42].

This therefore, means that the conceptual framework is the researcher's knowledge of the applicability of different variables and concepts identified in his/her research operate within themselves. Following the conceptual framework, the researcher identifies the variables and relates them meaningfully towards the anticipated outcome of his research. It prepares the platform for display of specific research questions that forms the basis of an investigation which are linked to the problem statement because the problem statement is the gist of the entire research[43].

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

[41] Cynthia Grant and Azadeh Osanloo, 'Integrating a theoretical framework in a desertion', (Administrative issue Journal), [2014], Vol. 2

[42] Ibid

[43]McGaghie, W.C., Bordage, G., & Shea, J.A. (2001). The Problem Statement, Conceptual framework and research question. Academic Medicine, 76(9),923-924

Whereas the conceptual framework is an alternative in research, it is best applied under circumstances which the researcher will work under many Respondents using one or more theories.

This research relied on the theoretical framework because, a few Respondents were targeted based on the chosen topic and employed more desk top research by reviewing the available measures set out under the law and their efficacy.

1.7 Scope of the study

1.7.1 Content scope

This study was limited to analyzing the management of environmental risks in the oil and gas industry. It focused on identifying those risks, establishing potential impacts, describing existing approaches to risk management and compliance with standards.

1.7.2 Geographic scope

The study was carried out in the Albertine Graben. This is Uganda's oil rich region where 40% of the explored area was discovered to contain 6.5 billion barrels of oil resources. With new exploration and infrastructural development currently occurring, it is prone to environmental risks.

1.7.3 Time scope

This study was conducted between December 2020 to January, 2021. This period was selected on the assumption that the weather conditions would be favorable without any predictable rain interruptions. It was also projected that during this period, oil companies were organizationally more prepared as they ended the year.

1.9 Summary

This chapter has logically presented the facts that have given rise to the problem the study seeks to address in the background. The problem has also been clearly stated to make a strong case for the gravity of the study subject and subsequently the purpose of the study, including the significance, justification and objectives that the study will seek to achieve. The scope of the study has also been set to keep it within feasible limits.

1.10 Conclusion

Issues of risk management by Uganda's oil and gas companies, and potential impacts-local, national and trans-boundary; that key stakeholders of Uganda's nascent oil and gas industry must deal with remain obscure. This study is the first scholarly work dedicated to analyzing the management of environmental risks in the oil and gas industry in the oil rich Albertine Graben. A critical analysis of scholarly works related to the major issues of risk management as guided by the objectives of this study, is therefore undertaken in the next chapter of literature review. The ideas to build on the works of previous scholars while adding original views and interpretations.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter details a critical analysis of scholarly works relevant and related to the major issues of risk management, presented in themes following the objectives of the study. Underlying differences between this study and reviewed text books, articles and reports are emphasized. Works of previous scholars are largely built upon while adding original views and interpretations.

Despite the existence of literature on risk management aspects of environmental health, there is little on the specific area of oil and gas exploration and production, and even so little in the local context. Indeed, the little literature presented not very comprehensible due to the novelty of its substance on environmental risks in oil and gas exploration and production. Its mostly full of research gaps on risk management aspects of oil exploration and production which need to be filled. Nevertheless, the following are vital:[44]

2.1 Risk factors which affect oil and gas exploration and production

Wawryk[45], affirms that emerging economies hold the majority of verified oil reserves worldwide, and account for the majority of crude oil in the world.[46]

Kasimbazi[47], raises two main concerns relating to oil exploration and production in the Albertine Graben region. The first relates to the environment and the risks to arise during oil exploration

[44] Notwithstanding several scholarly works written in the field of oil and gas exploration and production, most of the works are foreign based and focusing on already established oil economies. AS such their information does not explicitly capture Uganda's context without localization. Moreover, most of the available works are conducted on already advanced oil producing countries while Uganda is still largely at the exploration level and has only just started o production. This therefore creates the need to review literature, identify prevailing gaps and guide on the relevance of reviewed literature *mutatis mutandis.* The literature review thus proceeds in themes following the research objectives, including risk factors which affect oil and gas exploration and production; potential environmental impacts and approaches to environmental risk management.

[45]Wawryk Alexandra, S., "International Environmental Standards in The Oil industry: Improving the Operations of Transnational Oil Companies in Emerging Economies**"** http://www.ugandaoilandgas.com/linked/international_environmental_standards_in_the_oil_industry.pdf (accessed 3 May 2017)

[46] As a general guide, at the end of 2000 the OECD countries held 8.1% of the world's proven reserves of oil and accounted for 28.1% of world production of oil: BP Amoco, *Statistical Review of World Energy 2001*, www.bpamoco.com

[47]Kasimbazi, E. B., "Environmental Regulation of Oil and Gas Exploration and Production in Uganda"

and production and the second relates to current policy and legal framework and whether or not it addresses those environmental concerns

Otherwise, oil and gas exploration often pose significant risks to habitats, causes loss of biodiversity[48] and produces harmful air emissions.[49] Most underdeveloped oil producing countries are prone to the mining causing environmental and human inhalation risk due to desecration from air pollutants of oil wastes and gas flares affluent. One of the reasons being that that, it's quite hard to regulate foreign multinational corporations in the oil production activities.[50] This is a potential risk for Uganda whose oil exploration and production is entirely by foreign companies.

Subsequently, incidents arising from oil operations of multinational companies threaten more than just environmental quality, causing dramatic changes in the condition of the exploited habitat, but exploration of these resources impend to alter patterns of land use patterns in fishing, agriculture, hunting and logging.[51] Essentially, people's livelihoods for a country like Uganda where communities survive on tilling land is gravely affected making the issue of oil environmental risks serious.

Indeed, early indicators in pre-oil production phase show that Uganda faces various similar other oil risks. Lake Albert, a major source of drinking water to communities living in the Albertine Graben region risks contamination in the course of oil production, it is worse that Uganda has a history of negligible patterns of protecting water catchment areas. This carries the serious risk that it will not effectively regulate incineration of oil seepages to be generated from the oil reserves.[52] This is even riskier because Albertine Graben is one of Uganda's rain-prone regions, which puts its underground water table and its aquifers at the risk of infiltration by oil spills carried by gaseous and liquid creeks oxidized in space and water.

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[48] Ericson, Kristina, "A Crude Awakening: The Relationship between Petroleum Exploration and Environmental Conservation in Western Uganda" (2014) .Independent Study Project (ISP) Collection. 1924. https://digitalcollections.sit.edu/isp_collection/1924

[49]Corporate Sustainability Report. (2014). Retrieved October 8, 2015, from http://www.chevron.com/documents/Pdf/CorporateResponsibility/Chevron_CR_Report_2013.pdf

[50] United Nations Environment Programme (2011), 'Environment Assessment of Ogonil and' Nairobi - Kenya

[51] Reducing the Risk of Incidents. (2012, April 1). Retrieved October 12, 2020, from http://www.chevron.com/about/operationalexcellence/managementsystem/reducingincidents/

[52] Kimuli Balikuddembe, Ali Ardalan. 2015. Disaster Risk Management and Oil Production in Uganda: Need for a Win To Win Approach (INPUT PAPER).

Water pollutions a primary environmental risk where oil and gas drilling procedures occur near primary water sources. The first environmental risk regards oil spills. It occurs into a primary body of water, such as Lake Albert, it affects the health of the lake and its biodiversity. Oil spills can further result in soil and groundwater contamination, including marine and freshwater discharges. Generally, water pollution from petroleum exploration activities is a poignant risk in many communities in the Albertine region.[53]

Generally, Oil and gas exploration and production has the potential to cause severe environmental degradation, not only to the physical environment, but also to the health, culture, and economic and social structure of local and indigenous communities.[54] However, environmental laws in emerging economies are often ineffective because they are substantively inadequate and/or because they are inadequately enforced. Scholars, legal and policy minds as well as environmental activists accordingly urge transnational oil companies to be proactive and voluntarily improve their environmental performance in oil countries where environmental laws are inadequate.

2.2 Potential environmental impacts of soil and gas exploration and production

Oil and gas exploration and production operations can significantly impact on the environment, depending on the stage of the process, the size and complexity of the project, the nature and sensitivity of the surrounding environment and the effectiveness of planning, pollution prevention, mitigation and control techniques. They are often connected with environmental degradation due to oil spills and leakages, pollution of water sources, gas flaring, destruction of forested and protected areas, and rapid mass physical developments which encroach upon natural areas.[55]

The UNEP asserts that oil and gas exploration and production never goes without ecological effects. It adds that the matrix of activities that are undertaken during exploration and production eventually expose the environment to many deleterious incidents that range from oil spills,

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[53] Kristina Ericson, personal interview, 2014.

[54] In some cases, the impact of environmental degradation on the culture and traditional lifestyle of the indigenous community is so devastating that a breach of human rights occurs. Inter-American Commission on Human Rights, *Report on the Situation of Human Rights In Ecuador*, OAS Doc OEA/Serv.L/V.II.96, doc 10, rev 1, 24 April 1997, Inter-American Commission on Human Rights www.cidh.oas.org/country.htm

[55] Ericson, Kristina, "A Crude Awakening: The Relationship Between Petroleum Exploration and Environmental Conservation in Western Uganda" (2014). Independent Study Project (ISP) Collection. 1924. https://digitalcollections.sit.edu/isp_collection/1924

damage to land (terrestrial), accidents and environmental concerns, and incidents of water and air pollution.[56] These environmental impacts can broadly be categorized into human, socio-economic and cultural impacts; atmospheric impacts; aquatic impacts; terrestrial impacts and eco-system impacts. Activities are equally associated with several potential emergencies.[57]

It is further observed that although various governments have taken some steps towards sound environmental oil and gas exploration and production through enacting policy and legislative frameworks, more remain need particularly in practice.[58] Otherwise, in assessing potential impacts, It is essential to consider the geographic scale (global, regional local), over which they occur.[59] Similarly, it's vital to consider the perception and the magnitude of the potential impacts, to the extent that they frequently depend on the subjective interpretation of acceptability/ significance.

Kaweesi,[60] cites with approval the National Oil and Gas Policy for Uganda, and it, recognizes that if the country's Oil and Gas resources are mismanaged, the petroleum sector portends negative impact on society. This so called "resource curse" according to the policy is the negative effect of oil and gas resource utilization that eventually leads to among others environmental degradation.

2.2.1 Atmospheric impacts

Potential atmospheric impacts arising from exploration and production of oil and gas are increasingly attracting global concern. The primary sources of atmospheric emissions from oil and gas operations arise from among others, flaring, venting and purging gases, combustion processes from diesel and gas turbines for instance, and fugitive gases from loading and tankage. In addition, air pollution is expected as a result of smoke and toxins being released from gas flaring.

[56] UNEP (1997) Environmental Management in Oil and Gas Exploration and Production: An Overview of Issues and Management Approaches, at 2-3
[57] Ibid, at pp 16-18
[58] Ibid
[59]UNEP, 2008. "Environmental Management in Oil and Gas Exploration and Production".
[60] Kaweesi Emmanuel, "Environmental Law Compliance and its Implications for Oil and Gas Exploration in Uganda" at Page 13.

Flaring of natural gas associated with oil extraction is a major problem in Nigeria. Gas flares, also known as flare stacks, are gas combustion devices that are used in oil and gas production sites for the purpose of burning off excess flammable gas. The principal emission gasses include carbon dioxide, carbon monoxide, methane, volatile organic carbons and nitrogen oxides. Majority of these are known to exacerbate asthma and other respiratory problems.[61] Flaring of produced gas is the most significant source of air emissions, particularly where there is no infrastructure or market available for the gas. In Nigeria, gas flaring affected a large percentage of crops, forests and water bodies, swamps within a radius of 1km away from the gas stations and some forests and swamps resulted into fire outbreaks. This can be said as true for Uganda where gas consumptions are low and limited to urban settings. It is likely that natural gas associated with oil in the Albertine Graben will be flared. Companies and government must prepare such environmental dangers.

It is notable however, that the potential for emissions from oil exploration to cause atmospheric impacts generally considered low. During production however, with activities more intense, emissions are increased in the immediate vicinity of operations. As Uganda therefore gears more into production, emissions are expected to increase to yield atmospheric impacts within the Albertine Graben region.

2.2.2 Aquatic impacts

The primary aqueous waste streams that result from exploration and production operations include among others, produced water; drilling fluids, cuttings and well treatment chemicals; process, wash and drainage water; sewerage, sanitary and domestic wastes; spills and leakage; and cooling water. However, volumes of waste produced depend on the particular stage of exploration and production. For instance, during seismic operations, waste volumes are marginal and relate mostly vessel or camp activities.

However most environmental impacts are posed by high pH and salt content of some drilling fluids and cuttings, those especially discharged into fresh water sources such as Lake Albert the River Nile flowing Lake Albert to parts of northern Africa.) Additional aqueous waste streams, including leakage and discharge of drainage waters result in the pollution of ground and surface

[61] Beychok, Milton, R., 2005, Fundamentals of Stack Gas Dispersion (Fourth ed.) Self- published. ISBN 0-9644588-0-2. (See Chapter 11, Flare Stack Plume Rise).

waters. Impacts result mainly where ground and surface waters are utilized for among others, fisheries or in ecologically essential areas. It's indeed predicted that waste disposal from oil production activities could seriously contaminate underground aquifers and fishing areas.[62]

In the Albertine Graben, fisheries are already at risk. Conflicts between fishing communities of the DRC and Uganda hitherto, have since oil exploration activities commenced across Lake Albert Lake, increased. A 2013 study[63] points out that, the crisis is exacerbated by the discovery of hydrocarbons across Lake Albert. If the oil activities are properly managed and such factors seriously considered, any environmental incident like the oil spill will not only affect the Ugandan community but also the fishing industry in DRC.

2.2.3 Terrestrial impacts

These include impacts to soil quality and land structure. According to UNEP,[64] potential impacts on soils within areas of oil exploration and production usually arise from three basic sources, namely: physical disturbance due to construction, contamination due to spillage and leakage, and indirect impacts from opening access and social change.

In the Albertine region, rapid developments fueled by the oil industry could potentially cause impacts to local forested areas and agricultural lands. Indeed, Uganda's National Oil and Gas policy[65] notes that increases in oil and gas development will likely deplete forested areas in the Albertine region.

Soil contamination may also arise from oil spills and leakage of chemicals, causing possible impact on both flora and fauna. Construction of a crude oil refineries in the region, and the subsequent mass displacements, could also affect the agricultural environment and economy. Proposed sites for oil refineries in the district of Hoima for instance, lie directly amidst an agricultural area.[66]

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[62] Governance, (2013, March), Governance and livelihoods in Uganda's oil-rich Albertine Graben. International Alert. Retrieved from http://www.commercialpressuresonland.org

[63] Moss Kim, 2013, Leaders call for the Democratic Republic of Congo and Uganda to Re- Demarcate their Border on Lake Albert. Future Directions International. Nedlands, Australia Museveni

[64] UNEP, 2008. "Environmental Management in Oil and Gas Exploration and Production".

[65] The National Oil and Gas Policy, (2008), Kampala: The Republic of Uganda.

[66] Ericson, Kristina, "A Crude Awakening: The Relationship Between Petroleum Exploration and Environmental Conservation in Western Uganda" (2014).Independent Study Project (ISP) Collection. 1924. https://digitalcollections.sit.edu/isp_collection/1924

Other impacts could arise from poor design and construction, including soil erosion due to soil structure, slope or rainfall. Usually without being disturbed and without their vegetation being removed, soils maintain firmness and stability. The removal of vegetation and disturbance however predisposes them to agents of erosion as well as secondary ecological problems.

2.2.4 Eco-system impacts

Plant and animal communities may also be directly affected by changes in their environment through variations in water, air and soil/sediment quality and noise disturbance, and vegetation change Within the Albertine Graben, most oil wells are located within national protected areas including national parks and wildlife reserves. Changes in oil development in these protected areas could lead to profound changes in wildlife characteristics and populations in the region.[67]

Migrations of animal populations retreating from oil development are already prevalent issues in many areas across the Albertine Graben. Wildlife experts in the country believe that these migrations are due to excessive noise and vibrations from oil development, and may lead to disruptions in human settlements, crop growth, and more.[68] Animal species are also affected by contaminated water sources from well runoffs and rapid road construction. Elephants in particular, will be forced to migrate out of their natural habitat and create serious crop destruction.

All factors considered, this impact is more likely to occur in the Albertine Rift which is home to internationally important numbers of water birds, game reserves, the Alberta Delta Wetland System and 53 fish species.[69]

2.3. Major International environmental risk incidences in the oil and gas sector.

2.3.1 The Piper Alpha incident.

This occurred on 6th July, 1988 on the UK's North Sea oil platform and it was one of the worst incidents in the oil and gas industry in the world. This incident was as a result of poor

[67] Governance and Livelihoods in Uganda's Oil-Rich Albertine Graben. (2013). Kampala: International Alert.
[68]Governance and Livelihoods in Uganda's Oil-Rich Albertine Graben. (2013). Kampala: International Alert.
[69]I. Amani ga Ruhanga, Manyindo J and Jordahl,(2009) *Maintaining the Conservation and Tourism Value of Protected Areas in Petroleum Development Zones of the Albertine Rift, Oil and Gas Series No.2 of Uganda Wildlife Society.*

management and maintenance of the oil platform which culminated into a fire and explosion. It lasted for a short time but there was enormous damage. A total of 167 oil and rescue workers died and 61 were injured while unidentified number could not be accounted for. The outbreak was attributed to the sloppy engineering and the poor safety procedures put in place by the American operator, Occidental Petroleum.[70] But further investigations revealed that there was a lacuna in the laws and regulations put in place by the by the UK government.[71] This outbreak, had a significant impact on the environment, public health and financial costs incurred by the operators and oil company generally. The sea water was contaminated by the pollution and affected all the species that live and survive in water. The responsible companies spent over 2 billion pounds in compensation of victims and clean-up.[72] Whereas it is clear from the reports that the incident was as a result of serious design flaws, it is argued that even perfectly engineered platforms may not guarantee absence of any spill if the same is incorrectly operated. Therefore, as far as technical preventive measures are essential for safety, they can never be sufficient with poor management structures. There is need to maintain the structure and standards throughout the whole life of a project from design to decommissioning to prevent incidences.

2.3.2 The 2010 Deep Water Horizon Spill

This was another major international environmental and safety risk incident that left lives of 11 workers lost and several were injured. This incident which lasted close the 3 months resulted into a spill of 4.9 million barrels of oil into the Gulf of Mexico and affected the water and fish Market in the U.S. Reports indicate that the deep-water horizon incident would have been avoided if the BP lead engineer and workers had paid attention to the warning signs.[73] BP and Transocean were penalized in the fine of over $40 billion. It was characterized as one of the largest in the U.S oil and gas sector. The spill contaminated the water bodies around the platform, third party body injuries, property damages, environmental damages which culminated into high costs of pollution clean-up and compensation of disaster victims, preventive measures, response and

[70] Cullen, W.D.: The Public Inquiry into the Piper Alpha Disaster, HMSO, London, 1990
[71] ibid
[72] Article by Fiona Macleod CEng FIChemE and Stephen Richardson available at https://www.thechemicalengineer.com/features/piper-alpha-the-disaster-in-detail/
[73] *Michael A G Bunter, geologist, B and R Co, petroleum consultants, and Honorary Lecturer, Centre for Energy, Petroleum, Mineral Law and Policy, CEPMLP, University of Dundee* available at www.ogel.org/article.asp?key=3028

recovery. Notably, U.S has earlier experienced oil spills and put in places laws such as the Oil Pollution Act of 1990 which established a comprehensive prevention, response, liability, and compensation regime to deal with oil pollution caused by vessels and offshore energy exploration and production facilities within U.S. navigable waters. The law strengthened the safety and environmental practices in the offshore energy exploration and production business, created a system of so-called "financial responsibility" requirements and compulsory liability insurance combined with strict liability.

standards, and placed limitations on liability.[74] Similarly, Uganda has copied best practices from such incidences and countries that have experienced environmental risks in the oil and gas industry.

Various good laws, policies and regulations as shall be discussed in the following chapters have been enacted. The question is whether oil and gas companies licensed to exploit and produce oil shall comply and are prepared to prevent and manage the anticipated risks. If UK and USA, the largest economies in the world have experienced fatal environmental disasters arising from oil activities, is Uganda an exception?

2.3.3 The Niger Delta Spill in Nigeria.

There had been various spills in the Niger Delta but the outstanding incident occurred on 1st May 2010 when a ruptured ExxonMobil pipeline in Ibeno in the state of Akwa Ibom spilled a total of 25,000 barrels of crude into the delta for over seven days before it was stopped. The spill affected the swamps and peoples' gardens within the proximity of the platform. There was air pollution caused by the heavy smoke which erupted from the explosion. [75]

Natural forests and farmland were covered with the sheen of greasy oil. Drinking wells were polluted and people were distraught. Fishermen lost their fishing nets and pots, fish in the nearby water bodies died and Shell which was responsible for the environmental risk was slow in averting the damage. It so happened that the Niger Delta incident occurred at the same time with the Deep-Water Horizon and much attention was paid to the Gulf of Mexico than the Niger

[74] ibid

[75] Adejoh F. Ogwu, Salihat B., & Cornelius J., *Environmental Risk Assessment of Petroleum Industry in Nigeria*, *International Journal of Scientific Research and Innovative Technology ISSN: 2313-3759 Vol. 2 No. 4; April 2015* http://scholarship.claremont.edu/cmc_theses/1121

Delta. People demonstrated against the companies' laxity and demanded payment of $1 billion. In January, 2021, the Netherland Court held that Shell Nigeria and the parent Shell Royal Dutch were responsible for to compensate farmers and environmental activists for the environmental oil spills that caused enormous environmental damage to the environment and peoples' property.[76] The implications are that Shell is an old oil company and has participated in the industry in several countries but has still failed to prevent environmental spills and damage. It is one of the companies licensed to conduct the oil and gas activities in the Albertine Graben region.

2.4 Approaches to environmental risk management within oil and gas industry

Oil and gas development activities are anticipated to grow in order to meet the needs of rapidly industrializing countries. They can however, be undertaken safely with minimum adverse environment impact, only through a strong company commitment to environmental protection.[77] Multinational companies are increasingly facing pressure to coordinate their responses to global environmental issues.[78] Some have had to adjust their management styles to environmental concerns and to public health outcries.[79]

Combating environmental issues through foreign and domestic legislation has however, been met with limited success, indicating that, it is easy for energy corporations to ignore environmental risks unless they are explicitly embedded into daily operations. However, Chevron, one of the world's largest producers of energy which started out as a highly profit motivated corporation with little regard for the environment or associated operational risks, but adopted an entirely new set of internal risk management policies marrying environmental concerns with business objectives, successfully transitioned from purely an oil and gas company to the industry leader in environmental initiatives.[80]

The oil and gas industry, is ultimately challenged to align short-term financial goals with long-term environmental risks. Even so, Chevron's transition demonstrated that adopting advanced risk management approaches likely resolves corporate oil and gas operating concerns. To this

[76] https://www.business-humanrights.org/en/latest-news/shell-lawsuit-re-oil-pollution-in-nigeria/
[77]UNEP, 2008. "Environmental Management in Oil and Gas Exploration and Production".
[78] David L. Levy and Ans Kolk, 2002, ''Strategic Responses to Global Climate Change: Conflicting Pressures on Multinationals in the Oil Industry', Business and Politics 4 (3):275-300; Kolk and Lecy, 'Winds of Change'.
[79] Miguel San Sebastián and Anna-Karin Hurtig, 2004, 'Oil exploitation in the Amazon basin of Ecuador: a public health emergency', Pan Am J Public Health 15(3):205-2011
[80]Corporate sustainability report. 2014. Retrieved October 12, 2020 from http://www.chevron.com/documents/Pdf/CorporateResponsibility/Chevron_CR_Report_2013.pdf

extent, combining national and international regulations with internal risk management approaches proves to alleviate the negative externalities that are associated with oil and gas activities.[81]

Internalizing environmental risks helps to reduce corporate environmental impacts by limiting the number and the severity of incidents that occur during oil and gas exploration, production and refinement. Singly, approaches may not prove stringent enough but combining environmental risk management frameworks may be sufficient. Generally, integrating risk management practices into all aspects of business should be an industry-wide objective as improving environmental performance has proven to create a competitive advantage for oil and gas corporations.

One way to address environmental business risks is through traditional approaches such as a cost-benefit analysis. It is a fairly ridged method, but adopting company specific valuation measures and considerations can improve this framework's flexibility.[82] The challenge however is that the quality of information provided to corporations for assessment renders impacts and probabilities of events occurring, uncertain. Thus, oil and gas companies aiming to address environmental challenges are better served to integrate less traditional approaches to risk management systems.

In addition, companies in order to embed environmental considerations into their daily operations, can exhort company employees to comply with management strategies of corporate risk. Alternatively, oil and gas companies can use incentive-based approaches, say by evaluating employees' abilities to both adhere to and advance corporate environmental initiatives. If for example job retention and promotion is made to depend on environmental performance, it is more likely that individuals will adhere to the company's environmental risk management framework.

Furthermore, companies can emphasize the importance of considering environmental risks before initiating operations by placing a monetary value on environmental good works through bonus-based incentives, companies for employees.

[81] Conner, Haley, "Managing Environmental Risk in the Oil and Gas Industry" (2015). *CMC Senior Theses.* Paper 1121. http://scholarship.claremont.edu/cmc_theses/1121

[82]UNEP, 2008. "Environmental Management in Oil and Gas Exploration and Production".

2.5. Summary

A critical review of the available literature reveals a paucity of literature on management of oil exploration and production risks in Uganda because of the sector's infancy. Nonetheless, risks and potential impacts abound as the industry emerges. There are various research gaps within the ambit of approaches to environmental risk management within the oil and gas industry. Traditional approaches dominate but yet cannot be guaranteed to suit the profit drive of developing economies such as Uganda where oil discovery and production occurs within a not so well legal and policy framework, and where oil governance is therefore still wanting.

The UNEP publication[83], is actually very comprehensive and offers key guidance to this research. However, it is also very generalized likely because it was intended for use by the entire United Nations international Community. To this extent therefore, it is less focused on specific environmental approaches for protection of the Albertine Graben in relation to the environment. As well, information in this UNEP publication is mostly technical and is difficult to digest by non-experts yet the concerns of environmental risks largely relate to the ambit of those without specific technical expertise in areas of oil and gas exploration and production.

As well, considering that transnational companies dominate oil exploration and production in Uganda as in most developing countries where oil is discovered, regard for environmental health might not be a priority and impacts consequent to their reluctance to adhere to domestic laws remains obscure. Would local companies, if they explored and produced oil and gas, fare any better in terms of environmental health and mitigate risk any better than their transnational counterparts? Do similar approaches to managing risk suit for companies in established oil economies as well as emerging oil countries? To these questions, several research gaps were found.

In light of the foregoing review therefore, it is clear that if oil exploration and production activities are mismanaged Uganda may just like other African countries, suffer from adverse environmental impacts and subsequently economic retrogression. The oil and gas industry has just entered the production phase, which is the phase where environmental risk and impacts are most prevalent, but the question regarding the risk types, the potential impacts and the

[83] UNEP, 1997. Environmental Management in Oil and Gas Exploration and Production: An Overview of Issues and Management Approaches, at 2-3

approaches to risk management in the Albertine Graben remains unanswered. This question guides this study throughout subsequent chapters, and especially lays the broad basis against which the methods for study are chosen.

2.6 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 environmental concerns 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.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In the process of conducting this research, the researcher employed various methods which involved documentary review of both primary and secondary data, data analysis methods, use of research designs, legal and ethical considerations and the methodological limitations of the study.

The researcher engaged the qualitative design research which was be effective in describing events or phenomena and to understand the nature, characteristics or behaviors of individuals or groups of individuals as they were.[84] The researcher was also able to focus on the experiences of people as well as observation of their individual uniqueness in responding to the questions put to them.[85] The researcher focused on the experience and knowledge from the interviewees. The interviewees were given the opportunity to share views about their experience on the area of research.[86] This was vital since the qualitative design adopts a person-centered holistic and humanistic perspective to understand human experiences without focusing on the specific concepts.[87]

3.2 Legal context and research setting

This entailed the legal frame work of the oil and gas industry in Uganda in the area of laws, regulations and policies put in place on environmental safety and management during oil production, exploration and refining from which this research was derived.

It also covered the areas from which the interviews were conducted and from where data were was collected i.e. the Uganda National Oil company, Chinese National Offshore Oil Company, Total, and the petroleum Authority of Uganda. This technique helped the researcher to identify relevant offices and institutions responsible for the oil and gas exploration and production by reading the available laws that enabled a restricted research.

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[84]Amir, F., '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

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

[86]Hox, J., & Boeije, H. R., 'Data collection Primary Verses Secondary. 'http Accessed on 27th 07 2019.

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

3.3 Study/Research design

The researcher developed a roadmap with strategies as tools that guided in arriving at valid results for the problem under research.[88]
The research drew a logical plan which involved the initial set of questions which were to be answered by the respondents which informed the conclusions in the findings of this research.[89] This Roadmap assisted the researcher to plan during the study.[90]

The roadmap was developed through the hypothetical imaginations by the researcher on how to carry out the study, the nature of data and materials needed, the method of how to collect the data, costs involved among others. The findings and conclusions in this research and are based on that roadmap.

This research essentially engaged the qualitative research design in which primary and secondary sources of data were examined 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. This method helped the researcher to draw a timetable and allocate time to every activity that was conducted during the research.

3.4 Area of study

This research was conducted in the area of oil and gas production in Uganda but restricted the scope to the Albertine Graben. This is because active oil exploration and preparations are taking place in this area. The likely impact of environmental risks will affect the environment and people living around the region. This helped the researcher to select respondents by concentrating on only people with knowledge of the projects taking place in the region and those with the relevant information on the problem under study.

[88]Mouton, J., 'How to Succeed in Your Master's and Doctoral Studies' (Van Schaik Publishers 2001).
[89] Yin, B. K., 'Case Study Research. Design and Methods' (3rd edn.)Applied Social Research Methods Series. SAGE Publications. Thousand Oaks. London. New Delhi. (1994).
[90] Berg, B., 'Qualitative Research Methods for the Social Sciences' (Boston Allyn& Bacon 2009)101-157

3.5 Population and sample size

The population size focused on key managers of the institutions and oil companies involved 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 totaling to a population of 20 respondents. However, a sample size of 10 respondents who were in 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. Small population size helped the researcher to concentrate on key areas of investigation and conclude the research on time leading to the findings of this research and informed the recommendations.

3.6 Sampling method and technique

The study adopted the non-probability sampling procedure employing the purposive sampling technique[91] in which not all intended respondents in the study area were 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. This method helped the researcher to fulfill the workplan and concluded the research as scheduled.

3.7 Data collection methods

3.7.1nterviews

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 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. This was through use of the pre pared interview guide that enabled the researcher to obtain concise and precise answers to the problem under investigation to avoid irrelevancies.

[91] (Baridam, 2008)

3.7.2 Documentary review

Firstly, laws of Uganda, International and regional instruments, books, and peer reviewed journals, previous studies conducted by other scholars were used. Secondly, online materials from the different oil and gas websites, reports from PAU, NEMA and Ministry of energy and Mineral Development were also used and preference was for current literature on the environmental aspects of Oil and Gas industry. This method helped the research to obtain the relevant literature that relate to the problem under study and also identify areas that needed further research and recommendations. The researcher read the laws and texts by earlier researchers and was able to identify gasp that made this research relevant.

3.7.3 Data analysis plan

Data collected was systematically analyzed by organizing and separating data into small practicable fragments.[92] Data 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 data with 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 chucks and data interpretation involved establishment of meaning for recorded data to be able to answer research questions. Data analysis and presentation involved thematic analysis of the data from which conclusions were generated.[93]

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.

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[92]Guba E. G., & Lincoln, V. S., 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.

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

3.8 Ethical Considerations

Ethical considerations are norms or standards for conduct that distinguish between right and wrong.[94] 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 respondents have not been included or indicated in the research report but pseudo names have been used 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

[94] Chapter 4, Ethical Consideration in research. Available www.wiley.com sample Chapters accessed on 14th July, 2019.

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 Limitations

Several limitations were expected, during the data collection phase of the study. Specifically, the current state of Uganda's oil and gas production sector being new proved the biggest limitation in terms of getting concrete data. Most of the data available on the topic is from different jurisdictions where production commenced and environmental risks dealt with. Oil production has not started, and the industry is still at infancy stage, and the risks may not yet have manifested. Nonetheless, the researcher focused on potential risks.

Data collection was also conducted at a time when the 2021 general elections were conducted as many people were involved in political activities. This limited data collection as some respondents were skeptical and reserved their comments on some questions and were treating the study suspiciously as an attempt to collect sensitive political information. These limitations were however, overcome by getting permission to conduct the study from the relevant government authorities, and during the interview, properly explaining to respondents that the study is purely for academic purposes.

The major hitch was the corona virus pandemic that limited face-t-face interviews with some of the official so strict on accessing their offices. Most officials preferred telephone interview unfortunately some could not answer calls and others had limited time to respond to all the questions. This however, was countered by observing all the SOPs and complying with the time schedules offered by the respondents.

3.11 Conclusion

Research methodology entailed the study design that the research took, the specific area of study from which will gather respondents for interviews, data collection techniques that will employ when carrying the research, data analysis methods which will use to analyze the data collected from the field. All this will be organized in a chronological way for the better presentation of the research.

CHAPTER FOUR: LEGAL FRAMEWORK ADOPTED TO PREVENT AND CONTROL ENVIRONMENTAL CONCERNS

4.1. International legal frame work/Instruments

It should be noted that there are no specific international or regional environmental agreements addressing specifically environmental concerns. However, there are a number of international and regional treaties that are relevant for safety and environmental 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), The Stockholm Declaration, 1972, the Rio Declaration, 1992 among others.

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 environmental concerns explosions in Uganda. The country ratified them and hence is bound by the principles therein.

4.1.1 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 and.[95] Uganda became a member of the international Maritime Organization in 2009 hence bond by it.

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.[96] 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

[95]International Maritime Organization www.imo.org Accessed on 4th March 2019.
[96]Z GAO, (editor), 'Environmental Regulation of Oil and Gas' (London-den Haag-Boston, Kluwer 1998).

response.[97] 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 environmental concerns 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 environmental concerns, thus the convention requires response systems to depend on multilateral cooperative framework that include governments, industries and companies.[98] 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.[99] in the same vein, parties must ensure the risk response equipment is 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.[100]

4.1.2 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 equitably[101]. It also requires, that EIA be undertaken for proposed activities that are likely to

[97] Ibid
[98] A Lexis, M Julian, T Lieb, R Pond and D Salt, ' Global Challenges to Preparedness and Response Regimes',(international Oil Spillage Conference , December 2002).
[99]Ibid
[100] Ibid
[101] The Convention on Biological Diversity (1992), Art. 1.

have a significant adverse impact on the environment and are subject to a decision of a competent national authority.[102]

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.[103]

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 use[104].The proposed East African Crude Oil Pipeline project falls within the ambits of such programmes. The Albertine region is considered one of the most important areas for conservation in Africa harboring more different and endemic vertebrate species than any other region on the African continent.[105]It also harbors Queen Elizabeth national park, Bwindi impenetrable, Kibaale national parks and has forests which include; Bodongo and Maramagambo national forests,[106] all of which need protection from possible environmental concerns explosions that might result from any of the petroleum operations around the areas.

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

Oil spills especially during transportation through tanker & 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.[107] Crude oil is most dangerous because it contains more than 1000 chemicals which in the right circumstances, can cause environmental concerns almost all of them are very flammable and hazardous to humans.

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[102]Principle 17
[103] Art.14
[104]AFIEGO, Promoting Environmental Conservation a midst Oil Activities in Uganda, (2009) https://www .afiego.org publications>files<accessed 25th[th] July 2019.
[105] A J Plumptre, 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.
[106] Ibid.
[107] Oil Pipeline Spills: Keystone XL Pipeline Available at https://cla.auburn.edu/ces/energy/oil-pipelines-and-spills/. Accessed on 27[th] May 2019.

The convention's most profound objectives 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.[108] Human activities, such as fossil fuel, drilling, combustion and land use change, lead to increased concentrations of greenhouse gases in the atmosphere.[109] This causes global warming which could culminate into environmental concerns outbreaks leading to physical effects damaging ecosystems, and with grave consequences for human life.[110]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 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 environmental concerns hazards, by a mere spark.[111]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 environmental concerns risks to the environment to ensure that effective measures are taken to prevent and control environmental concerns hazards from occurring.

4.1.4 Labor inspection Convention, 1947 (No. 81) (Excluding Part I)

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 operationalize 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).[112] The Projects are mandated to also engage the Department of Occupational Safety and Health under the MGLSD – the lead Ministry responsible for labour administration.[113]

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

[109] 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.

[110] Ibid.

[111] *D Furchtgott, 'Pipeline are Safest for Transportation of Oil and Gas', (2013), MANHANTTAN INST FOR POL'Y RES ,1, 1*http://www.manhattan-institute.org/htm/lib_23_htm#u_3ffrywkho; *accessed on 28th July, 2019 2019.*

[112]*Tilenga Project, Environmental and Social Impact Assessment. Available at nema.go.ug>all>Nema>docs pdf.accessed on 26th July, 2019.*

[113] *Ibid*

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 environmental concern's occurrences during the operations, need to be effectively protected during the life of the projects to completion.

4.1.5. The Rio Declaration on Environment and Development, 1992

The declaration was adopted at the UN conference of 3rd to 14th June, 1992 while rreaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, which was seeking to build upon it.

The declaration was adopted to establish an equity and new partnership among states, societies and people generally. It was intended to reach an international agreement on respect of interests and protect the global environmental and developmental systems.

The most important principle of the Declaration is that Human beings are at the centre of concerns for sustainable development, they are therefore entitled to a healthy and productive life in harmony with nature. This Declaration fosters sustainable development in that activities such as oil and gas are of high economic value but should be exploited putting into consideration the lives of people who shall enjoy the economic benefits. In essence, having oil money with poor healthy is useless.

Thus, under principle 15, the Declaration provides that in order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats 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.

And Principle 16 emphasizes that ***"National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into***

account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment"[114].

4.1.6. The Stockholm Declaration, 1972

This Declaration is a backbone of major environmental law principles such as; the polluter pays principle, the precautionary principle, the principle of state sovereignty, preventive principle, principle of sustainable development, common and differentiated principle, principle of good neighborliness and international cooperation among others. It addresses issues of environmental rights and obligations of citizens and governments in regard to preservation and improvement of the human enviro .....nment[115]. These environmental principles were meant to offer protection to the natural world given that they at times act as guidance for judicial decisions by giving the different laws put in place shape and meaning[116]. Much as the declaration is not binding, it gives guidelines to state parties in developing national laws and incorporating environmental principles.

4.1.7. The Energy Charter Treaty 1994

The Energy Charter Treaty is an international instrument which focuses specifically on the energy sector.[117] Even though Uganda is not a member due to geographical scope, I in principle, it is open for accession of other states regardless of their geographical location.[118]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.[119]it also advocates for the minimization of harmful impacts from all operations within the energy cycle.[120]

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[114] Rio Declaration on Environment and Development 1992 ; United Nations (UN); https://www.jus.uio.no/lm/environmental.development.rio.declaration.1992/index.html. Last viewed on 23rd June 2020 at 2:45pm.
[115]Stockholm Declaration 1972
[116]Client earth; what are environmental principles; https://www.clientearth.org/what-are-environmental-principles-brexit/. Last viewed on 23rd June 2020 at 10:17 am.
[117]The Energy Charter Treaty< https://energycharter.org/process/energy-charter-treaty-1994/energy-charter-treaty/> accessed on 5th 3 2019.
[118] R A. Leal, 'Energy Transit Activities Collection of Intergovernmental Agreement on Oil and Gas Transit Pipeline and Commentary', (The Energy Charter Secretariat 2015).
[119] The Energy Charter Treaty 1994, Article 19.
[120] Ibid.

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.[121]
There are model agreements prepared by the energy charter secretariat with aimed at facilitating the complex Oil and Gas pipeline activities[122] 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.[123]
The standards contained in the agreements do not contain very precise prescription concerning the technical features which cross-border pipelines should comply with.[124] it is a recommendation, that each State establishes safety and environmental standards that are internationally compatible and acceptable under the World Bank Group Environmental, Health and Safety Standards Guidelines[125]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.[126]

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 to environmental concerns if the states and the international oil companies adhere to follow what is agreed upon in the agreements.

[121] Ibid.
[122]Redgwell, C., '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).
[123] Ibid.
[124]Environmental Health and Safety Guidelines in Oil and Gas Distribution Systems; International Finance Corporation: World Bank Group https://www.ifc.orgwps>wcm>connect Accessed on 20th June, 2019.
[125] 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.
[126]Ibid

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 environmental concerns. 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 environmental concerns safety during oil and gas operations in the upstream, midstream and downstream phases of development.

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.[127]

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.[128]

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.[129] 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.[130]

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.[131]

However, it is currently not in force thus not a legally binding pending ratification by all Partner States.[132]

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[127]Nhunyingi, F., '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.
[128] The Treaty Establishing the East African Community, accessed on 26th May 2019.
[129] Ibid.
[130]Ibid. 207, Article 101.
[131] Accessed at https://www.eac.int/environment/natural-resources-management/protocol-on-environment-and-natural-resource-management Accessed on 24th June, 2019.

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.[133] It recognizes development activities petroleum operations with adverse impacts on the environment leading to environmental concerns and degradation.[134]

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 management[135] which encompasses environmental concerns 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 environmental concerns during the operation of such oil projects.

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

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[132] Ibid.
[133]The EAC Protocol on Environmental and National Resource Management, 2006.
[134] Ibid.
[135] Supra. Article 34.

well, has the potential to turn-around the economy of the country.[136]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.[137] In fact, fuel and gas leakages that frequently occurring this industry lead to social, economic, political, environmental negative impacts.[138] In addition, risks and hazards have the potency of turning into disasters like environmental concerns and explosions.[139] Much as it is not possible to avoid environmental concerns explosion disasters which may occur at any time, the circumstances can be anticipated by assessing the risks and the level of the likely impacts.[140]

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 environmental concerns.

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.[141]

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.[142]

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[136]National oil and gas policy for Uganda 2008

[137]N NRodhi, N Anwar, I P AWiguna, '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.

[138] Ibid.

[139] B Lee and K Dupuy, 'Petro-Governance in Tanzania: Opportunities and Challenges' (2016) Vol 15, (no14) 4www.cmi.no/publications/5972-petro-governance-tanzania-opportunities accessed on 21st August 2018.

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

[141] Ibid

[142] National oil and gas policy for Uganda 2008

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.[143] Article 245 emphasizes the need to protect the environment and use it for sustainable development.[144] 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 environmental concerns 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 oil and gas industry.[145] 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.[146]

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 government[147] which has enacted several legislations through parliament for the safety of the people against environmental concerns and explosions during the petroleum operations.

[143]The constitution of Uganda 1995 as amended in 2005
[144]See National objective xxvii.
[145]Article 39
[146]Objective xxi
[147] Article 40(1) (a) of the 1995 Constitution of the Republic of Uganda

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.[148] 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 public interest matters to court on behalf of those who were not in a position to do so[149] as long as the matter has to do with human rights violations. When environmental concerns explosions are not prevented or controlled, the air is polluted and this violates Article 39 of the constitution.[150]

4.3.3 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.[151] It's also is the main legislation on the exploration, production, refining 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.[152] 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.[153]

[148] The Fundamental Rights and Freedoms (Enforcement Procedure) Rules, SI No. 26 of 1992.
[149] High Court Civil Suit No. 27 of 2003(Arising from Msisc. Applic. No. 70of 2002).
[150]Article 29 of the 1995 Constitution of the Republic of Uganda.
[151]Petroleum (Exploration, Development and Production) Act 2013
[152]Section 1 (a) Petroleum (Exploration, Development and Production) Act 2013
[153]Section 1 (e)

The act also requires compliance with the environmental principles and safeguards stipulated under National Environment Act and other applicable laws.[154] NEMA has the mandate to monitor and supervise the activities so as to protect the environment as provided for under section 17.[155] 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.[156]

In addition, the petroleum operations are required to be conducted in a healthy and safe way in accordance with Occupational Health and Safety Act, 2006[157], section 141 provides for safety precautions and 142 for emergency preparedness, the safety zones provided under section 144; these are all aimed at ensuring environmental concerns and general safety during oil and gas operations.

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.[158] 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.[159]

4.3.4 National Environment Act (NEA), 2019

The Act was enacted in 2019 and repealed the NEA Cap 153. The Act is comprehensive and addresses all issues relating to environmental management and has reformed the law relating to environmental management in Uganda. The Act provides for environmental management which is intended to achieve sustainable development. It maintained NEMA which is a lead agency in environmental management in Uganda and is empowered with responsibility to ensure there is proper environmental management for sustainable development. In so doing, NEMA is expected to coordinate, monitor, Regulate and supervise all activities that may have an adverse impact on the environment. This includes addressing environmental concerns that may arise from

[154]Section 3
[155]Section 17 Petroleum (Exploration, Development and Production) Act 2013
[156]The Petroleum (Exploration, Development and Production) Act 2013
[157]Occupational Health and Safety Act, Act No. 9 of 2006
[158]Section 9 the Petroleum (Exploration, Development and Production) Act 2013
[159]The Legal Regime and Environmental Dimensions of Oil and Gas Exploration and Production in Uganda

petroleum exploration, development and production, ensuring that Environmental and Social impact assessments are conducted before activities are carried out.[160]
Section 3 of the Act safeguards the right to a clean and healthy environment at enshrined in the Constitution.

The NEA, 2019, focuses on ensuring that all the people of Uganda enjoy 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.[161]

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 impacts of the intended activity on the environment which includes environmental concerns accidents that are commonly associated with Oil and Gas operations.[162]

S.110 provides for the purpose of conducting environmental and social assessments which must be done to correspond with the environmental principles set out in S. 5(2) of the Act. This also corresponds with the provisions of S. 47 (1) of the Act.

In 2020, the Regulations were also enacted to operationalize the Act and under Reg. 3 the strategic environmental assessment is intended to identify and describe the environmental, health and social objectives to be achieved by the policy, plan or programme; identify potential impacts of a policy, plan or programme on human health and the environment; identify public interests; determine the cost effectiveness of the policy, plan or programme; and determine any other strategic goals[163].

[160] Sections 8 and of the NEA, 2019
[161]Section 5(2) of the NEA, 2019
[162]Section 2 for definition of environment impact assessment
[163] Reg. 3 of the National Environment (Strategic environmental assessment) Regulations, 2020

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.[164] 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.

Sections 90 to 95 of the Act is comprehensive and requires the licensees to put in place preparedness measures to ensure that in case of an oil spill, there are concerted efforts to clear the same without causing fatalities.

S.93 of the Act requires the Prime Minister to initiate and a draw the National oil spill contingency plan that can be followed by all agencies in order to avert any environmental risk that may arise in the process of oil production. This must be guided by the Regulations.

The National Oil Spill Contingency Plan is vital in that it puts is place measures to ensure that each agency such as the Department of disaster preparedness in the Prime Minister's office, police fire brigade, NEMA, PAU and the oil companies have a role to play in case of any emergency.

4.3.5 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.[165]

[164]Eneh, 2011.
[165]Section 14 of the Occupational Safety and Health Act2006

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 environmental concerns prevention which is to the effect that all stocks of highly inflammable substances shall be kept either in a environmental concerns-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 environmental concerns occurring in the store.[166]

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.[167]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 3is to the effect that wherein 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.[168]

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.[169]

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 stored[170] and

[166]Section 78(1) Occupational Safety and Health Act 2006
[167] Section 78(2) OSH Act 2006
[168]Section 78(3)
[169]Section 78(4)
[170]Section 78(5)

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.[171]

4.3.6 Petroleum (Exploration, Development and Production) (health, safety and environment Regulations 2016

The above regulations specifically provide for environmental concerns and explosion protection in facilities during petroleum activities[172] in Uganda. Thus, environmental concerns 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.[173]

The licensee is required to ensure observance of environmental concerns and safety precautions within the restricted area, provide adequate means designed to extinguish environmental concerns, effectively control the spread of environmental concerns and explosions and provide a central environmental concerns station with suitable equipment and maintained by trained employees in putting out environmental concerns.[174]

The licensee is also required to put in place measures to control environmental concerns and explosion hazards generated by process operations including accidental release of syngas containing carbon monoxide, hydrogen, oxygen, methanol or other gases.[175] 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 environmental concerns and explosion hazards, provision of early release detection including pressure monitoring of gas, liquid conveyance systems, smoke and heat detection for environmental concerns and many others.[176]

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[171]Ibid
[172]Part VII of the P(EDP) (HSE) Regulations 2016.This part provides for fire and explosion safety in Uganda's Oil and Gas sector
[173]Regulation 93; See also Oil and Gas Standards Catalogue approved as at 31st December, 2017
[174]Regulation 104(1)
[175]Regulation 105(1)
[176] See Regulation 105 (2 (a)-(i)) for more fire & explosion control measures. AlsoSee 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.

In addition, the law provides that where a passive environmental concern protection unit used at a facility or during a petroleum activity, the unit shall be designed to provide relevant structures and equipment with sufficient environmental concerns resistance in regard to load capacity, integrity and isolation properties during a design environmental concerns load[177] which is another risk mitigation mechanism aimed at ensuring environmental concerns 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 dimensioning environmental concerns.[178]

The operator is required to ensure that spaces with key functions and equipment and a high environmental concerns risk, are separated from the surroundings by means of environmental concerns divisions [179] and these shall be designed to resist a dimensioning environmental concern, to prevent environmental concerns from spreading to the adjacent areas or cause equipment in those areas to become inoperative for a minimum period of one hour.[180]

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.[181]

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

[177]Regulation 101
[178]Regulation 102(1)
[179]Regulation 103(2)
[180]Regulation 103(3)
[181]Definition of ''Safety Functions'' in regulation 3 of the P(RCTMS(HSE)Regulations 2016

measures have been taken to prevent such accidents and to limit their consequences to human health and the environment;

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 sitting of new operations or developments around the facility.[182]

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 1[183].The licensee is required to send a safety document to the Authority[184] 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.[185]

In addition, the licensee is required by law to review or revise the safety document every five years under normal circumstances[186]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.

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.[187]

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

[182]Regulation 14 (1) of the P(RCRMS) Regulations 2016
[183] Regulation 14(2)
[184] Regulation 14(3). And the Authority in this case is the Petroleum Authority of Uganda
[185] Regulation 14(5)
[186] Regulation 15(1)
[187] Office for Nuclear regulation available at www.onr.uk/operational/tech-asst-guides/ns-tast-gd-051.pdf accessed on 1st/12/2018

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…"[188] 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 environmental concerns 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 agreements and accepted at the national level.[189] 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; it is incorporated in the Ugandan Constitution and the Environment Act.[190] These concepts have crystallized into a set of legal principles that are governing the petroleum industry's operations worldwide.[191] Thus when strictly followed, they ensure that environmental 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.

4.4.1The Principle of Prevention

Under this principle, any state is under duty to prevent damage within its jurisdiction.[192]

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

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

[190]Kakuru, K., Ssekyana, I., (eds), Handbook For Environmental Law In Uganda, (Second Edition, 2009)

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

[192] Mapping the Oil and Gas industry to the Sustainable Development Goals. Available at https://www.undp.org/.../sustainable%20 Development/.../for%20commentmapping... Accessed on 15th July 2019.

Protection of the environment is better achieved by preventing environmental harm than remedying or compensating for such harm.[193] The effect or harm caused by environmental concerns 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.[194]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 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.[195] 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.[196] Environmental impact assessments are also widely employed to identify potential threats to the environment so that preventive measures can be taken.[197]

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

[193] E Brown Weiss, "Our Rights and Obligations to the Future Generation for Environment," (1990), vol 84, (J INT'L'L. pp. 198).
[194] Ibid
[195]'Environmental Protection in the Petroleum Industry' Encyclopedia of Hydrocarbons, Vol 4, p509.
[196]Ibid.
[197] S Max Valverde, 'General Principles of International Environmental Law.' Available at https://core.ac.uk/download/pdf/51089370.pdf accessed on 17th April 2019.

generations to meet their own.[198]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.[199] 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 link between development, environment, wellbeing and the basis of full enjoyment of a wide range of human rights.[200]

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.[201]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.[202] Third, is the integration of environment and development.[203] These elements simply 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.[204]

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.[205] 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

[198] Sustainable Development Goals: United Nations Environment Assembly of UNEP. Submission to the HLPE 2016.Avaialble at https://sustainabledevelopment.un.org/index.php?page=view&type=30022&nr=243&menu=3170 Accessed on 15th 4, 2019.
[199] Ibid
[200] Ibid.
[201]E Brown Weiss, "Our Rights and Obligations to the Future Generation for Environment," (1990), Vol 84, (J INT'L'L. pp. 198.)
[202] Ibid.
[203] Ibid.
[204]The Rio Declaration on Environment and Development.
[205]Mapping the Oil and Gas industry to the Sustainable Development Goals. https://www.undp.org/.../sustainable%20 Development/.../for%20commentmapping aaccessed on 18th April 2019.

predict potential risks implementing preventive measures. This aims to averting risks which could prevent the project from being beneficial to future generations.[206]

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.[207]

4.4.3 The Precautionary Principle

The precautionary principle addresses problems of environmental decision-making under conditions of scientific uncertainty.[208]The first treaty to embody this principle was the 1985 Vienna Convention for the protection of Ozone Layer.[209] 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.[210]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.[211] 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.[212]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.[213]it advocates for action even when there is no full 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

[206] Ibid.
[207] Ibid.
[208]Kakurupg 13.
[209] Convention for protection of the Ozone Layer, March, 22, 1985.
[210] United Nations Convention on the Rio Declaration of Environment and Development, June 15, 1992, Principle 15.
[211]Ibid.
[212]Brown Weiss, E., "Our Rights and Obligations to the Future Generation for Environment," (1990), vol 84, (J INT'L'L. pg. 198).
[213] Organization of African Unity: Bamako Convention on the Ban of the Import into Africa and the Control ofTransboundary Movement and. Management of Hazardous Waste within Africa, Jan. 29, 1991, 30 I.L.M. 773.

petroleum pipeline exploded, resulted into environmental concerns 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.[214]

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 environmental concern 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.[215]

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.[216]it, therefore, follows that since the oil or gas spills are known to cause environmental concerns and the damage on the environments is irreversible, the Precautionary principle should be effectively used and implemented used by the 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).[217]

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

[214] The Guardian, 2nd March 2019 available at https://www.theguardian.com Accessed on 17th June 2019.
[215]Godfrey Nyakana -vs.- National Environment Management Authority (NEMA) and Others (Constitutional Appeal No. 5 of 2011).
[216] A. Poddar, Indian Supreme Court Precautionary, p.6. a available at http://jurip.org/wpcontent/uploads/2017/03/Arup-Poddar.pdf accessed on 27th May 2019.
[217]Kakurupg 12.

measures.[218] 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.[219]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.[220]

The above principles imply that oil exploration and production have 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 complying with safety regulations.[221] This kind of practice can however be averted where the polluter pays principles 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. The practicability of implementing the International, Regional and National laws in managing risk in the oil and gas sector in Uganda

As earlier discussed, the laws in place are adequate but will meet a weak system of implementation. It is not only in Uganda but worldwide, oil companies are not committed to implementing international and national laws as prescribed reason why environmental oil spills are inevitable.

International laws comprise of binding and non-binding treaties and agreements that govern the relationship between countries. Uganda subscribes to the international instruments discussed above and has gone ahead to adopt some of the principles of international environmental law into national laws. An example is the National Environment Act, 2019 has incorporated all the

[218]The Rio Declaration on Environment and Development.
[219]Principle 16, Declaration of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, UN Doc. NCONE151126 (Vol. I).
[220] Ibid. pg 258.
[221]Principle 16, Declaration of the United Nations Conference on Environment and Development,

international environmental principles intended to safeguard the environment such as the Polluter pays, precautionary, sustainable development among others. The practicability of implementing international laws in Uganda is therefore through adopt and domestication of the principles into national laws. This is because, enforcement of international laws is quite difficult. Some of the international agreements are not binding and lack sanctions. Besides, Uganda has a history of signing international agreements but implementation and enforcement remain a challenge.

The regional framework can be implemented as the some of the laws like the East African Community Customs Act are being enforced in Uganda. However, the challenge is that the regional laws on the topic under study are minimal and not all countries in the East African Community are willing to subscribe to the laws. There is also lack of social, economic and political unity among the regional countries. Each country is concentrated on individual transformation and may view Uganda's oil discovery as a concern for Uganda. Whereas Tanzania has accepted to pass Uganda's pipeline through its territory, Tanzania has not ratified the Protocol on environment and Natural Resources. Even if it became law, it is not known if Tanzania will willingly ratify. The implication is that Uganda may still be responsible for environmental damage caused by the Pipeline.

The National laws were enacted after comprehensive research in countries like Norway and Nigeria and good practices are incorporates. From the summary of provisions cited above, the laws are adequate and cover a higher percentage of environmental concerns in the oil and gas industry. The laws have prescribed the requirements to be put in place before an oil company is licensed and commences activities. The research discovered that the licensed companies are on track with the legal requirements. However, as earlier highlighted, environmental risks such as oil spills and explosions can only be determined when production commences. The research found that the sector has much emphasis on use of local content but there are fears that trained local personnel in the industry are few and without experience. When production commences, the local personnel will be learning on job. Proper implementation of the national laws will therefore, become robust after a certain period. The danger is that as they continue learning and gaining practical experience, there will be mistakes and environmental risks will be inevitable.

The major challenge with implementation of environmental laws in Uganda is weak enforcement system and corruption. The oil and gas industry is lucrative and it is more likely that enforcement officers/agencies may be prone to corruption than to strictly implement the law. An example is that there is NEMA as a lead environmental enforcement agency but cases of eradication of wetlands, contamination of water bodies with plastics are on the rise. There is cause for alarm that in the oil and gas sector, environmental enforcement lapse will cause fatal disasters.

In summary, the international, regional and National laws on environmental protection in the oil and gas sector are good and adequate. However, these laws are new, enforcement agencies such as PAU, NOC are newly established with personnel who have limited or no experience at all in the field. The oil companies licensed to carry out the activities have more experience or the best practices and it will be dependent on the willingness of these companies to incorporate the laws in their daily operations. Hence, enforcement must be stepped up upon commencement of oil and gas production.

4.6 Minimal comparison with 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.[222]

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 environmental concerns protection is designed to ensure that in event an environmental concern load, it provides efficient environmental concerns resistance to the relevant structures and equipment with regards to the load capacity, integrity and insulation properties.[223]

Environmental concerns load according to the law means the maximum degree an environmental concerns system is designed to handle or accommodate; and passive environmental concerns

[222]Regulation 10(4)
[223]Regulation 51(1)

protection means a group of systems that compartmentalises structures and equipment through the use of environmental concerns resistant related walls or floors.[224]

The regulations also provide for environmental concerns divisions where the operator/contactor is required to ensure that the main area on a petroleum facility is separated by environmental concerns wall that has the capacity to withstand the designed environmental concerns load and explosion load, satisfying the environmental concerns rating standards if exposed to hydrocarbon environmental concerns.[225] Ghana has not yet had any reported environmental risk concerns with its oil production.

The above regulations are similar with Uganda's ***Petroleum (exploration, Development and production) (health, safety and environment Regulations) 2016*** and both emphasise environmental concerns 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 management[226] 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 environmental concerns 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 environmental concerns safety. However, unlike Ghana, in Uganda, oil production has not yet commenced thus implementation and enforcement of the law are not yet tested.

[224]Regulation 51(2)
[225]Regulation 52(1a)
[226]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

4.7 Lessons learnt from other countries.

4.7.1 Norway

Norway is one of the countries that has learnt from its initial mistakes and put strong oil laws and policies that have enable the country successfully manage its oil resource. The Norwegian government has set up policies such as ***don't drill everything at once, limit the oil income in the short run, don't spent the bulk oil money but invest in trust funds or other sectors, and never use, do not use oil money in political campaigns*** and currently Norway does not have challenges arising from oil production.[227]

In terms of environmental management, in the initial stages, exploration of oil in the continental shelf, there was little control over the oil activities to the environment where by companies were expected to carry out their oil activities within a 1km radius. The negative impacts of environmental risks overweighed the benefits.

The Norwegian government put in place laws and polices restricting oil activities within the radius of 3km and discharge of oil drillings, cuttings, mud into the sea. But there were routine monitoring and research on the likely impact on environment until a 10km radius was found sufficient.[228] The Norwegian government required every company to submit annual reports on the state of environment but would similarly carry out its out independent investigations. Negatives results of the reports would prompt the government to swiftly change legislation and set new rules. Currently Norway adopted the **Refill, Reuse and Recycle**, of the drill cuttings and mud and cases of environmental contamination are minimal.

The government further changed its offshore monitoring technique from field-based monitoring of sediments to a regional monitoring of both sediments and the water column. The change is cost effective and allows agencies to obtain proper data and overview of the environmental conditions in the oil production area. The regional monitoring has thus led to excellent collaboration between the authorities, oil companies, scientists and consultants and shows that

[227]Oil Revenue and economic growth; How Norway did it? http://futurechallenges.org/local/the-wealth-of-a-nation-how-norway-escaped-the-oil-curse/

[228] Gray, J. S., Bakke, T., Beck, H. J., & Nilssen, I. (1999). *Managing the Environmental Effects of the Norwegian Oil and Gas Industry: From Conflict to Consensus. Marine Pollution Bulletin, 38(7), 525–530.* doi:10.1016/s0025-326x(99)00004-1

the skepticism of the 1960s has changed to a fruitful and profitable liaison which has led to protection of the marine environment and a mutually beneficial data collecting system.

Uganda can adopt a similar approach to safeguard the environment and avoid environmental disasters like it is in Nigeria. This can be possible especially the regional monitoring mechanism where the Albertine Region can be divided into subregions for purpose of ensuring proper monitoring than field monitoring by a select individuals from PAU, NEMA and Ministry of Energy and Mineral development. Uganda must ensure that it does a background check on the environmental management history of companies licensed to conduct oil activities in the Albertine Region.

In the UK after the Alpha Piper incident, lord Cullen made recommendations that were implemented leading to enactment od stringent laws and regulations that placed the huge burden of enforcing the environmental laws and regulations in the oil and gas industry on the oil companies. These were forced to incorporate the laws into their daily activities and this has helped the UK oil and gas industry to avoid further fatal incidences.

Some the UK laws on environmental safety regulations have been adopted by Uganda in the NEA, Occupational Safety and Health regulations. It is recommended however, that further benchmarks be made on how to successfully enforce the strictly compliance by the OCs in Uganda.

CHAPTER FIVE: DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 General 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 How to address environmental concerns in the oil and gas industry

Environmental concerns 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 environmental concerns 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 environmental concerns 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 environmental concerns is very high. The potential for environmental concerns is present in most of the operations due to vapor or product leaks which in most cases result into environmental concerns 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 environmental concerns and heat related hazards.[229]

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

[229]NoopurSonee, 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.

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 industry[230]. 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 Enhancing a plausible Legal framework

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.[231] 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.

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, 2019. The NEA, 2019 is comprehensive on what the oil companies must put in place to prevent accidents. The lead agencies such as NEMA, and PAU are required to ensure that all is in place before issuing licenses. There are regulations like the Petroleum Regulations, 2016 which address the prevention and control of environmental concerns and explosions. The study found that some of the employees are not aware of petroleum regulations hence the need for sensitization.

The study also found out that the Prime Minister's office has not yet complied with teh obligation under S.93 of the NEA. There is a draft National Oil Spill Contingency Plan but not

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

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

yet passed. There is also a draft National Oil Spills Contingency Regulations but not yet passed into law.

5.4 Efficacy 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 opinions 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 environmental concerns accidents in the industry, even though they are not brought to public attention…..*"

Another Respondent noted that *"…….Managers of these oil companies have experience from elsewhere and believe that they know it all. They are reluctant to follow the laws put in place because they think they have more knowledge of the field than Ugandan*". *Another point is that they are all foreign companies and they do not value our lives much. They are profit oriented and look at investing in Uganda as doing a favour. This is coupled with the special treatment and hospitality they receive from the lead agencies and politicians within Uganda."*

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 environmental concerns accidents before carrying out petroleum operations in the country."

Overall, it would appear that these laws and regulations are comprehensive and have been enacted following international environmental standards. The only challenge is ineffectiveness on implementation, compliance and enforcement. In fact, there has been a catalogue of environmental concerns and explosions especially of fuel tankers carrying petroleum products.[232] These have led to deaths and a large number of people sustaining serious injuries.

This has happened before production commences. One wonders how the situation will be when mass production in the country commences!

5.5 Legal Lacuna.

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

[232] 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.

5.6 Suggestive reconditions

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 environmental 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 environmental 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 environmental concerns accidents is monitoring the environmental concerns risk operations that have been identified by the company.

Furthermore, the study also revealed that IOCs have tried to put in place environmental concerns controlling tools like functional environmental concerns 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 environmental related accidents. They have tried to offer effective monitoring by hiring people to always keep watch. Sometimes they outsource companies specialized in prevention and control of environmental concerns 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 environmental concerns 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 environmental concerns 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 environmental concerns outbreaks or how to control environmental concerns. We also majorly employ people with skills and specialty in handling environmental concerns outbreaks and also we put in place equipment like*

environmental concerns extinguishers in place to put out environmental concerns 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 industry[233] 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.[234] 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.[235]

In addressing the effectiveness of these other measures, the study found that the risk management measures employed have been effective since the occurrence of environmental concerns 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 think that these risk management strategies have been effective in ensuring safety in the petroleum industry since the company has the right personnel with*

[233]Suslick, 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
[234]Badiru, A. B., and Osisanya, S. O., (2013) Project Management for the Oil and Gas Industry. CRC Press
[235] ibid

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 environmental concerns 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.[236] 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 and risk. During the process, however, project managers either underestimate or overestimate risks[237] as it is not easy to appropriately assess the magnitude of potential environmental concerns risks that may occur.

5.7 Hiccups faced in other risk management.

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.

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

[237] 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.

These study findings are in line with Hopkins'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 mitigation[238] which proves a challenge especially during the risk assessment process.

Some managers noted that they have tried to comply with the requirements of laws and regulations in regard to environmental risks. But maintain that since the industry is not yet at the production phase, they cannot hasten that what is place will be sufficient or effective. Environmental risks are accidents arising as a result of many factors human error, negligence, mechanical faults among others. They have tried their level best to prepare for the risks and are optimistic that from experience gained in the industry, they will try as much as possible to minimize the risks.

5.8 Way forward

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 environmental management, 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 environmental concerns 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*

[238]Hopkin, P, (2014). Fundamentals of Risk Management, 3rd Edition. London: Kogan Page.123

company to reduce the occurrence of risks like environmental concerns accidents in the operations of their businesses….."

5.8.1Training

The study revealed that employees and safety managers are required to have trainings on environmental, 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 environmental concerns 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 environmental concerns 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 in a management position, it's my responsibility to see that the environmental concerns 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:

Environmental concerns 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 are 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 environmental concerns 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.

The punishment for failure to implement the measure is minimal as compared to profits intended to be received from the industry. It is costly to put in place measure as compared to payment for failure to implement.

Considering the effectiveness, these laws and regulations have not been effective in preventing and controlling environmental concerns and explosions. In fact, numerous fatal environmental concerns 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 environmental concerns. 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 environmental concerns 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 bleach 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 recommends, the companies to employ the right people with the right expertise in risk management implementation and setting aside a budge 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.

5.10.1 Recommendations for further research

Since this study explored the efficacy of the law risk management that have been adopted to ensure environmental concerns 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 environmental concerns 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.

5.11 Demographic indicators of respondents

The study involved the use of interviews. There were 10interviews 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 2: Summary of the background data of key informants (N=10)

ITEM	DETAIL	FREQUENCE	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 understudy 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 understudy.

Bibliography

Text books

Adedeji Bodunde Badiru& Samuel Olusola Osisanya, *Project Management for the oil and Gas industry*: A World System Approach (CRC Press, 2013).

Adejoh F. Ogwu, Salihat B., & Cornelius J., *Environmental Risk Assessment of Petroleum Industry in Nigeria, International Journal of Scientific Research and Innovative Technology ISSN: 2313-3759 Vol. 2 No. 4; April 2015*

Berg L B, *Qualitative Research Methods for Social Sciences* 2001.

Berg L. *Qualitative Research Methods for the Social Sciences*. Oston Allyn & Bacon, 2009, pp.101-157.

Redgwell, C., *'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), pp.102-10, (Martha M. Roggenkamp et al, eds).

Greg Gordon, et al (eds) *Oil and Gas Law: Current Practice and Emerging trends* (2nd Edn, Dundee University, 2011)

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

Hart, S.M., 2002. Norwegian workforce involvement in safety offshore: regulatory framework and participants' perspectives. Empl. Relat. 24 (5), 486–499.

Hovden, J., Lie, T., Karlsen, J.E., Alteren, B., 2008. The safety representative under pressure. A study of occupational health and safety management in the Norwegian oil and gas industry. Safety Science 46 (3), 493–509.

Inge, J., 2007. *The safety case, its development and use in the United Kingdom, PROC.*in: Proceedings of the 25th International System Safety Conference 2007, Citeseer.

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

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

Karlsen, J.E., Lindøe, P.H., 2006. *The Nordic OHS Model at a Turning Point?? Policy Pract. Health Saf.* 4 (1), 17–30.

Reinhardt, F. (2000). *An Overview of Risk Assessment: Four Factors that influence Risk. In Down to Earth: Applying Business Principles to Environmental Management*. Boston, Mass.: Harvard Business School Press.

Kakuru K, Ssekyana, (eds), (2009), *Handbook for Environmental Law in Uganda,* Second Edition, Environmental Protection in the Petroleum industry' Encyclopedia of Hydrocarbons, Vol 4, p. 509.

Kemp, A., 2011. *The Official History of North Sea Oil and Gas* Vol. I Routledge.

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

Paterson, J., 2011b. *Health and Safety at Work Offshore.* In: Paterson, J., Gordon, G., Usenmez, E. (Eds.), Oil and Gas Law: Current Practice and Emerging Trends. Dundee University Press, Dundee.

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

Walters, D., Frick, K., 2010. *Worker participation and the management of occupational health and safety: reinforcing or conflicting strategies??in:* Frick, K.P., Langaa, J., Quinlan, M., Wilthagen, T. (Eds.), Systematic Occupational Health and Safety Management – Perspectives on an international Development 2000. Pergamon, Oxford, pp. 43–66.

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

Journal Articles and papers

A J Plumptre, 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.

A. Poddar, indian Supreme Court Precautionary, p.6. Available at<http://jurip.org/wp-content/uploads/2017/03/Arup-Poddar.pdf> (Accessed on 27th May 2019)

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

Beattie, A. (2011). 5 Biggest Risks Faced By Oil and Gas Companies. [Online]investopedia. Available at: http://www.investopedia.com/articles/fundamental-analysis/12/5-biggest-risks-faced-by-gas-and-oil-companies.asp. Accessed on21st August 2018

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

Conner, Haley, "Managing Environmental Risk in the Oil and Gas Industry" (2015). *CMC Senior Theses.* Paper 1121.
http://scholarship.claremont.edu/cmc_theses/1121

Cullen, W.D.: The Public Inquiry into the Piper Alpha Disaster, HMSO, London, 1990

Dagg, J., Holroyd, P., Lemphers, N., Lucas, R., Thibault, B., 2011. Comparing the Offshore

Dessel J P, 'The Environmental Situation in the Niger Delta, Nigeria. Greenpeace, Netherlands: The Hague,' (2005), vol 2005, issue 1,iOSC<http://ioscproceedings.org/doi/abs/10.7901/2169-3358-2005-1-567> Accessed on 19th 08, 2018

Drilling Regulatory Regimes of the Canadian Arctic, the U.S., the U.K., Greenland and

Norway. Available [Online] ⟨http://www.pembina.org/pub/2227⟩. Accessed on 3rd June, 2018

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

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 21 May 2019).

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

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

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.

E G Guba& V S Lincolin, 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.

Ethical Consideration in research. Available <www.wiley.com>samplechpters> (Accessed on 14th July, 2019.)

EzumaOkoronkwo. Risk Management Techniques in Oil and Gas. A focus on the risk of Oil Price Volatility. Available at https://www.academia.edu.(Accessed 3rd June 2018)

F Amir, 'Measuring the impact of Office Environment on Performance Level of Employee' (2010) 2 (2) Asian Journal of Empirical Research. Available <http://acssweb.com/journal-dwtcilphp?=> (Accessed on 21st August 2018)

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

Friday Adejoh Ogwu,Salihat Badamasuiy, and Cornelius Joseph. Environmental Risk Assessment of Petroleum industry in Nigeria international Journal of Scientific Research and innovative Technology ISSN: 2313-3759 Vol. 2 No. 4; April 2015.

Gray, J. S., Bakke, T., Beck, H. J., & Nilssen, I. (1999). *Managing the Environmental Effects of the Norwegian Oil and Gas Industry: From Conflict to Consensus. Marine Pollution Bulletin, 38(7), 525–530.* doi:10.1016/s0025-326x(99)00004-1

Health and Safety Executive, 2006a. A guide to the Offshore installations (Safety Case) Regulations 2005. Available [Online] ⟨http://www.hseni.gov.uk/l30_a_guide_to_the_ offshore_installations_safety_case_regulations_2005.pdf⟩Accessed 14 May 2019.

Health and Safety Executive, 2013. RIDDOR - Reporting of injuries, Diseases and

Dangerous Occurrences Regulations 2013. Available (Online) at http://www.hse.gov.

uk/riddor/. (Accessed 30 March 2019.)

Hunter, T., 2010. The Offshore Petroleum Regulatory Frameworks of Australia and Norway. OGEL 4. Available (Online) at www.ogel.org/article.asp?Key=3056(Accessed 30 March 2019.)

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

Lindøe, P.H., Engen, O.A., 2012. Offshore safety regimes – a contested terrain.in: Proceedings of the Draft presented at Working On Safety-conference 11-14 September Sopot, Poland. Available (Online)at http://bit.ly/1fbilPf.(Accessed on 28th July, 2019.)

Mapping the Oil and Gas industry to the Sustainable Development Goals. Available at https://www.undp.org/.../sustainable%20 Development/.../for%20commentmapping... (Accessed on 18th April 2019.)

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

Michael A G Bunter, geologist, B and R Co, petroleum consultants, and Honorary Lecturer, Centre for Energy, Petroleum, Mineral Law and Policy, CEPMLP, University of Dundee available at www.ogel.org/article.asp?key=3028

NNRodhi, N Anwar P AWiguna, *'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.

Norwegian Petroleum Directorate, 2010. Determined to learn from history – Norwegian Petroleum Directorate. (Online) Available at: ⟨http://www.npd.no/en/Publications/ Norwegian-Continental-Shelf/No1-2010/Determined-to-learn-from-history⟩ (Accessed on 18th April 2019.)

North East Educational Research Association Education, 'Qualitative Data Analysis; era.

Nera-Education.org/.../FINAL_NERA_Webinar_Version_For_4.23.14_Fdb.Pptx (Accessed on the 16th June 2019.)

Noopur Sonee, et al. Oil and Gas industry: Review on environmental concerns 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.

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.orgISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)Vol.5, No.29, 2013(Accessed on 21 May 2019).

Paterson, J., 2011a. Significance of regulatory orientation in Occupational health and safety offshore. . BC Environ. Aff. Law Rev. 38, 369.

Petroleum Safety Authority, 2015. Role and area of responsibility. [Online] Available at:

⟨http://www.ptil.no/role-and-area-of-responsibility/category916.html⟩Accessed14th January2019).

Ramseur, J.L., 2015. Deep water Horizon Oil Spill: Recent Activities and On-going Developments. Available [Online] ⟨http://www.fas.org/sgp/crs/misc/R42942.pdf⟩ (Accessed on 21 May 2019).

Rhodes, F. (2013). 1.4.1 Speculative and Pure Risks. [Online] Course.uceusa.com. Available at: http://course.uceusa.com/Courses/content/405/page_20.htm. Accessed on 21 May 2019.

Shrivastava, P., (1995) "*Ecocentric Management for a Risk Society".* The Academy of Management Review, Vol.20, No.1

Suslick, S. and Schiozer, D. (2004). Risk analysis applied to petroleum exploration and production: an overview. Journal of Petroleum Science and Engineering.

Taksar,M and Markussen, C.(2003).Optimal Dynamic reinsurance policies for large insurance portfolios. *Finance Stock*

Tilenga Environmental Social impact Assessment vol.1.13.09.2018 Available at nema.go.ug>all>nema>docspdf. (Accessed on 26th July, 2019.)

Verma DK, Johnson DM and McLean JD, *Benzene and Total Hydrocarbon Exposures in the Upstream Petroleum Oil and Gasindustry.*AIHAJ.2000 Mar- Aril; 61(2).

Electronic/Internet Sources

BusinessDictionary.com, (2014). What is risk? Definition and meaning. [Online] Available at: http://www.businessdictionary.com/definition/risk.html. Accessed on 21st August 2018.

Fuel enviromental concerns: 33 burnt to death, past fuel environmental concerns 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.

https://www.eac.int/environment/natural-resources-management/protocol-on-environment-and-natural-resource-management.(Accessed on 24th June, 2019.)

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

International Maritime Organization. Available at www.imo.org (Accessed on 4th March 2019.)

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/. (Accessedon 30th July, 2019)

Office for Nuclear regulation. Available at www.onr.uk/operational/tech-asst-guides/ns-tast-gd-051.pdf, (Accessed on 1st/12/2018)

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

The Guardian, 2nd March 2019. Available at https://www.theguardian.com. Accessed on 17th June 2019.

Appendices

Appendix 1: interview Guide

PETROLEUM INSTITUTE

Dear Sir/Madam;

I am ……, 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 environmental concerns 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 environmental concerns 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 environmental concerns 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 environmental concerns accidents in Uganda's Petroleum industry?

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9. As an organization, have you adopted any risk management strategies to prevent and control the environmental concerns hazards?

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

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11. To what extent have these laws been effective in ensuring that environmental concerns safety in the petroleum iindustryis achieved?

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

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13.In your opinion, how have these risk management strategies been effective in ensuring that environmental concerns safety in the petroleum iindustryis achieved?

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14. What challenges have you faced as an organization 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 organization, what have you done to counter or reduce on these challenges faced in the implementation of risk management strategies?

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16. What would you recommend to ensure environmental concerns safety in this industry which is susceptible to environmental concerns?

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Thank you for your cooperation