Impact assessment of the environmental protection policies in the upstream oil industry in Nigeria

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DEDICATION

This research dissertation is dedicated to God Almighty for his grace during my study in North-West University, Potchefstroom, South Africa

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ABSTRACT

The need for energy and the associated economic benefits from the oil and gas deposits found mainly in the Niger Delta region of Nigeria necessitated the exploration and exploitation activities being carried out by the oil and gas Companies. However, these exploration and exploitation activities due to their unpredictable nature have a huge potential for environmental pollution as been experienced in the form of oil spills, gas flaring, irresponsible disposal of waste and several other activities that have resulted in the environmental degradation of the Niger Delta region.

In the light of these, the Federal Government of Nigeria having experienced the consequences of pollution of the environment during the Koko Toxic Waste Dump incident in the then Bendel State in 1987 established a regulatory body tasked with the responsibility of harmonizing the economic interest from the oil and gas exploration and exploitation activities with the sustainability of the natural environment by developing well structured and articulated policies aimed at guiding the operations of the oil and gas operators, track their compliance and administer appropriate punitive measures for non compliance.

However, this research work which is aimed at evaluating the impact of the environmental protection policies in upstream oil and gas activities in the Niger Delta region, involved the use of questionnaires and interviews. These questionnaires were completed by the management and staff of three major oil and gas companies operating within the area, the Department of Petroleum Resources and members of the Host communities. The interview was carried out to provide relevant feedback on their assessment of the impact made by the environmental protection policies on the upstream oil and gas activities in their operational areas/host communities.

The study however concluded that “Although there is a regulatory body tasked with the responsibility to develop, implement and track compliance of the environmental protection policies in the upstream oil industry, the body is ineffective and as such the impact of the environmental protection policies is inadequate.

Appropriate informed recommendations on the improvement strategies to the identified gaps that resulted in the unfavorable conditions were also provided.

ACRONYMS AND MEANINGS

S/N	Acronyms	Meaning of Acronyms
1	BBL/D	Barrels of Liquids per Day
2	BOP	Blow out Preventer
3	BOPD	Barrels of Oil per Day
4	CIA	Central Intelligence Agency
5	CMP	Consequence Management Plan
6	CNL	Chevron Nigeria Limited
7	CO	Close Out
8	DPR	Department of Petroleum Resources
9	E&P	Exploration & Production
10	EIA	Energy Information Association
11	ERDI	Environmental Renewal and Development Initiative
12	FEPA	Federal Environmental Protection Agency
13	FME	Federal Ministry of Environment
14	FO	Flare Out
15	GDP	Gross Domestic Product
16	HDI	Human Development Index
17	ISO	International Organization for Standardization

18	KJR	Key Job Responsibilities
19	MEND	Movement for the Emancipation Of the Niger Delta
20	MOSR	Mineral Oil Safety Regulations
21	MOU	Memorandum of Understanding
22	MPU	Mobil Producing Unlimited
23	NMASBU	Nigeria and Mid Africa Strategic Business Unit
24	NNPC	Nigerian National Petroleum Corporation
25	OE	Operational Excellence
26	OEMS	Operational Excellence Management System
27	SPDC	Shell Petroleum Development Company
28	US	United States

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CERTIFICATION

I hereby certify that the research dissertation constitutes my own work and that all sources used or quoted are indicated and acknowledged in full references.

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DEFINITION OF KEYWORDS

The following definitions of the listed terms are the terminologies that readers will encounter in the course of reading this research work. Definitions to these terms in alphabetical order were obtained from the Environmental Guidelines and standards, Federal Environmental Protection Agency (FEPA) (2002).

Abandoned: The proper plugging and abandoning of a well in compliance with all applicable regulations, and the cleaning up of the well site to the satisfaction of any governmental body having jurisdiction with respect thereto and to the reasonable satisfaction of the operator.(2) To cease efforts to find or produce from a well or field.(3) To plug a well completion and salvage material and equipment.

Abatement: The act or process of reducing the intensity of pollution.(2) The use of some method of abating pollution.

Associated gas: natural gas produced with crude oil from the same reservoir.

Barrel: A unit of measure for oil and petroleum products that is equivalent to 42 U.S. gallons.

Blowout: The uncontrolled flow of gas, oil or other fluids from a well.

Casing: Metal pipe inserted into a wellbore and cemented in place to protect both subsurface formations (such as groundwater) and the wellbore. A surface casing is set first to protect groundwater. The production casing is the last one set. The production tubing (through which hydrocarbons flow to the surface) will be suspended inside the production casing.

Casing String: The steel tubing that lines a well after it has been drilled. It is formed from sections of steel tube screwed together.

Cementing: Injection of cement into the annulus (space) between the casing and the well wall to consolidate the latter and reduced water influxes

Condensate: Hydrocarbons which are in the gaseous state under reservoir conditions and which become liquid when temperature or pressure is reduced. A mixture of pentanes and other higher hydrocarbons

Crude Oil: Liquid petroleum as it comes out of the ground as distinguished from refined oil manufactured out of it.

Development well: A well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive; a well drilled in a proven field for the purpose of completing the desired spacing pattern of production

Down hole: A term used to describe tools, equipment, and instruments used in the wellbore, or conditions or techniques applying to the wellbore.

Downstream: when referring to the oil and gas industry, this term indicates the refining and marketing sectors of the industry. More generically, the term can be used to refer to any step further along in the process.

Drill cuttings: The small pieces of rock created as a drill bit moves through underground formations while drilling.

Drilling Fluid/ Drilling Mud: A specialized fluid made up of a mixture of clay, water /sometimes oil and chemicals which is pumped down a well during drilling operations to cool and lubricate the system, remove rock cuttings and balance the underground hydrostatic pressure.

Dry gas: The volume of gas remaining after all water and natural gas liquids has been removed.

Dry hole: Any exploratory or development well that does not find commercial quantities of hydrocarbons.

Environmental Policy: Statement by the organization of its intentions and principles in relation to its overall environment performance which provides a framework for action and the setting of its environmental objectives and targets.

Exploratory Drilling: Drilling carried out to determine whether hydrocarbons are present in a particular area or structure or to learn more about a subsurface structure.

Flaring: This is the controlled disposal of surplus combustibles vapor by igniting them in the atmosphere.

Near shore Water: These shall mean brackish saline water subject to tidal influence, five kilometers of the high sea from the shoreline. e.g. swamp, estuary and coastal water

Offshore Site: This means any fixed or floating installation off the coast for the disposal of hazardous wastes, acquired and managed by a private firm and/or contractor.

Offshore Unit: Means any fixed or floating offshore installation or structure that is engaged in oil and gas exploration, exploitation or production activities including loading and off loading.

Offshore Water: This simply means water situated between 5km to 50km of the shorelines.

On Site Disposal: site for the disposal of neutralized hazardous waste which is within an operational area acquired and managed exclusively by the licensed operator.

Petroleum: A generic name for hydrocarbons, including crude oil, natural gas liquids, natural gas and their products.

Platform: An offshore structure that is permanently fixed to the sea bed.

Pollution: The act of the introduction by man into the environment, substances, agents or energy in sufficient quality or concentration as to cause unacceptable risk to human health, living organism and ecological systems, unacceptable damage to structure or amenities or unacceptable interference with legitimate use of the environment.

Produced Water: This refers to water that originates from the natural oil reservoir with the crude oil. This water is then separated from the associated oil and gas at the production facility in the upstream operation.

Reservoir characteristics: All of the features that serve to characterize the hydrocarbons (viscosity, density, etc.) and the rock containing them (porosity, permeability, etc.).

Rig: A collective term used to describe the equipment, including the vessel or structure on which the drilling equipment required to drill a well is installed. The most visible component of the Rig is the mast or derrick.

Seismic analysis: The seismic principle is to generate elastic waves methodically and study their propagation through the subsoil. The seismic waves are refracted and reflected as they travel through the various rock strata, and are detected at the ground or sea surface by appropriately placed geophones. The seismic records are interpreted to generate information concerning the shape of the underground strata in the explored region.

Underground injection: The placement of gases or fluids into an underground reservoir through a wellbore. It may be used as part of an enhanced oil recovery system or water flooding processes or for disposal of produced water.

Upstream Operations: These include all activities carried out during the exploration and exploitation stage unto the production and storage processes by the oil industry.

Vent Gases: These are gases that are released un burnt to the atmosphere. Venting may be deliberate for operational release during process upsets, or accidental.

CHAPTER ONE

INTRODUCTION

1.1 Background to the problem

The need for energy has resulted in a wide range of research into acquiring diverse forms of energy. Crude oil is one of these forms of energy being researched, and the prospecting activities have remained active in Nigeria particularly in the Niger-Delta region of the country where this oil has been found in commercial quantities. Since then, oil resources has become the highest foreign exchange earning commodity accounting for about 40% of the GDP, 95% of the foreign exchange earner and 65% of the country's budgetary revenue. (Okorodudu Fubara, 1998)

The Niger- Delta region is located in the southern region of Nigeria mainly around the Atlantic Ocean Coastline and lies between 4^{o} 10' to 6^{o} 20' N and longitude 2^{o} 45' to 8^{o} 35' E and is marked by a very thick equatorial forest with coastal mangrove forest linked with a network of creeks and rivers. The oil producing areas of the Niger-Delta includes Abia State, Akwa Ibom State, Bayelsa State, Cross River State, Delta State, Edo State, Imo State, River State, Ondo State. (CIA World Fact Book, 2005)

This Region with an average rainfall of 4000mm and average temperature of $28^{o}C$ (kuruk 2004) is home to the following ethnic groups; Urhobos(Delta), Ijaws(Bayelsa), Itsekiris(Delta), Isokos(Delta), Ogonis(Bayelsa), Ikwerres(Rivers), Igbos(Abia), Edos(Edo), Andonis, Yorubas(Ondo), Ibibio(Akwa Ibom). (www.worldwildlife.org)

The exploration and exploitation of Oil Resources from this region in Nigeria started in I937 by Shell D' Archy, which is the present Day Shell Petroleum Development Company Limited (SPDC); and the production of oil started in 1956 upon the discovery of commercially viable quantities of crude oil at Oloibiri village In Bayelsa State. (Kolluru 1993)

This gave rise to increased exploration in oil and other industrial activities which translated into commercial production of oil, starting in 1958 thus increasing the revenue of the government, thereby strengthening her financial capacity in implementing viable socio-economic policies,

sustaining other sectors of the Nigerian economy and also meeting planned developmental objectives of the country.

The Upstream oil Industry which is also known as the Exploration and Production (E&P) sector is an all encompassing term commonly used to describe the process of discovery and recovery of crude oil. This sector searches for potential underground or underwater oil and gas fields, drill exploratory wells and subsequently operates the wells that recovers and brings the crude oil to the surface processing facilities. The Niger-Delta has about 606 operating upstream oil fields of which 360 are on shore while 246 of the operating oil fields are off shores (Nigeria Country Analysis Brief, 2005).

This upstream oil producing capacity accounts at its peak an estimated 2.7 million Barrels of Crude oil/ day (bbl/d) in 2006, making it the largest producer of Crude in Africa, and sixth largest crude oil producer in the world. Unfortunately, production decreased to 2.0 million Barrels of Crude oil/ day (bbl/d) in 2009. (Petroleum Africa Newsletter, February, 2009)

This extensive upstream activities associated with the production of crude oil generates massive amounts of wastes that should be treated appropriately and adequately disposed of. If not done, waste could create a potentially harmful hazard to the environment when released in concentration that is not naturally found. These wastes which includes, hydrocarbon, gases and chemicals could have an adverse effect on the fragile Niger Delta communities and environment if not proactively managed.

Figure 1: Picture shows the Niger Delta from Space.

Source: Wikipedia.

1.2 Motivation for Research

The Niger Delta which hosts the major upstream oil facilities in Nigeria makes up 7.5 % of Nigeria land mass spanning over 70,000 km in nine states of the federation with the indigenous people in the host communities dependent on their local fishing routes and agricultural activities for their survival. However, since the advent of oil and gas activities in the Niger delta in 1956, there has been widespread deforestation and ecological degradation threatening the renewable resource in a number of ways.

These oil rich areas have been faced with so many environmental problems caused by pollution arising from oil activities which includes waste generated from drilling fluids used in production, chemicals injected in well streams to control corrosion and to separate oil from water as well as general and industrial waste also cause pollution. Added to these are problems of gas flaring and incidents of oil spills which have created serious negative impacts on the environment and have culminated into a wider range of socio-economic problems due to loss of arable land and local fishing waters engendering abject poverty and underdevelopment (Nigeria Government gazette, 2002)

These problem continued unabated through the 1970's as there was no central regulating organ of the government vested with the responsibility of harmonizing the economic interest of the government with the sustainability of the environment thereby creating serious conflicts of interest between members of the host communities and the multinational companies within their operational area.

1.3 Perception of the Oil and Gas Multi Nationals by the People of the Host Communities.

The perception of the Oil and Gas Multinational companies by the people of the host communities in the Niger Delta region of Nigeria and the reaction to their presence and operations is really a cause for concern by all the relevant parties. This perception and the associated consequences of the reaction have cost the Nigerian economy greatly in terms of human lives, property damage and revenue loss.

History has reported that issues of pollution, environmental degradation, the rights to health and to a healthy environment, the rights to an adequate standard of living (including the rights to food and water), and the rights to gain a living through work for millions of people living within the Niger Delta have dated back to the 1900 (Okechukwu Ibeanu, *2007).* This research work will take a look at the relationship that exists between the upstream activities of the oil producing companies and the socio-economic and environmental concerns of the Niger Delta

people. It will also try to work out an understanding of the reason for the present day perception of the oil and Gas Multinational companies by the host communities in the Niger Delta and the basis for the reaction to their presence in their communities.

1.3.1 Negative Perception.

The general perception of the oil company by the people of the host communities in the Niger Delta is a negative one which stems from facts dating back to the Military Era of the regime of the Late Dictator General Sani Abacha in 1993, when about Nine (9) Ogoni Human right activist were Executed after a ''Mock Trial' for demanding amongst other things that they receive compensation for the degradation of their land by the oil and gas operators which has amassed a massive $30billion from the crude oil extracted from the Ogoni land. (Okechukwu Ibeanu, *2007)*

The negative perception is supported by the following facts:

a. Revenue from oil accrued from the region according to the Energy Information Association (EIA 2005a) report shows that it contributes 40% of the Nations GDP, more than 90% of the foreign exchange earnings and 80% of government revenue and still the people of the host communities lack basic infrastructures such as good road networks, potable water supply, electricity, basic primary and secondary health care facilities especially in the rural communities, poor educational facilities and a host of others

b. Corruption: In spite of Nigeria's vast oil resources, the World Bank estimates that as a result of corruption 80% of the oil revenue that accrues to the domestic front (I.e., the state and indigenous investors) benefit only 1% of the population. (Energy Information Association EIA 2005a). The people of these communities are privy to this information and this fuels their hostile attitude towards the oil and gas operators in their communities.

c. Poverty has become an endemic amongst the people of the host communities within the Niger delta because the Niger Delta ecology which determines the economic activities especially within the rural communities has been severely degraded due to oil and gas related activities. The soil types, climate, physiography, water, plants, animals and human beings interact, utilizing vegetation types. This interaction is largely responsible for the well being of the people as most of the inhabitants in the rural/sub-urban communities are either fishermen or farmers who are dependent on their local fishing routes and farmlands for their sustenance. As a matter of fact, since the advent

of oil and gas exploration and production activities, the poverty rate seems to have been on the rise. According to the statistics released by the national poverty eradication commission, it shows an exponential yearly increase in the number of impoverished people across the six states of the Niger delta, the data also goes to show that between 1980 and 1996, an average of 14 million people which reflects an average of 1.5 million families assuming an average family size of six live below the poverty line of $1 per day (N150/ Day). The United Nation statistics also revealed that Nigeria ranks 159th out of 177 countries on its Human Development Index and reports that more than 70% of Nigerian lives on less than $1 per day (N150/ Day).

Table 1.0 below shows the breakdown of the % poverty rate of some of the states in the Niger Delta.

S/N	Niger Delta States	1980	1985	1992	1996
1	Akwa Ibom	10.2	41.9	45.5	66.9
2	Bayelsa	7.2	44.4	43.4	44.3
3	Cross River	10.2	41.9	45.5	66.0
4	Delta	19.8	52.4	33.9	56.1
5	Edo	19.8	52.4	33.9	56.1
6	Rivers	7.2	44.4	43.4	77.3

Source: Federal office of statistics, Reproduced by the National Poverty Eradication Program June, 2001.

d. Environmental Degradation is a major contributing factor to the negative perception of the oil and gas companies in the Niger delta region. Natural hazards, biodiversity loss and forest depletion, pollution and negative impacts of industrialization vis-à-vis oil exploration have created serious environmental concerns in the Niger Delta and are the major cause of productivity losses within the region. According to statistics released by the United Nation in 2006, it revealed that over seventy percent of the people living within the Niger Delta depend on the natural environment for their living and non-living livelihoods. This is as a result of the fact that the Niger Delta is the world largest wetland which covers an area of 36,000km of creeks, marshland, tributaries and lagoons that

drains into the Atlantic by the Bight of Benin. Therefore, degradation of the environment due to the oil and gas operation is a big blow to source of livelihood of the inhabitants.

e. Military Intimidation of Host Communities is also a factor that created the negative perception that the people of the host communities have of the oil and gas operating companies. History has reported violent clashes between the youth of the host communities in the region and the Military particularly the Nigerian Army. Recently in November 1999, the people of Odi Community in Bayelsa State in the South-South Region of the Niger delta experience a military intervention when they had problems with Shell Producing and Development Company which resulted in the Nigerian Government calling the Military. This resulted in the loss of over a 100 lives and property damage worth billions of Naira.

The above listed facts have resulted into incidences of resistance where militant groups have emerged in the form of the movement for the emancipation of the Niger Delta (MEND). Such groups have perpetuated their destructive activities by sabotaging pipelines meant for oil and gas activities, this was done in an attempt to voice their protest against the degradation of their environment and the marginalization of their people which has resulted in colossal losses of lives and properties and a partial erosion of economic activities due to security threats.

By the 1980's the growing environmental protection consciousness both nationally and internationally led to the creation of the Federal Environmental Protection Agency, (FEPA). This government parastatal created in 1988 by the Federal Government of Nigeria, had a sole responsibility to protect the Nigerian Environment. This organization later metamorphosed into the Federal Ministry of Environment.

It is worthy of note, that this dissertation has been undertaken because, despite the abundant natural resources present in the Niger delta, the living conditions within the host communities is below par prompting the need to evaluate the damaging impact of oil exploitation on the Nigerian environment and the extent to which environmental protection policies have been effective in combating these environmental menace, bringing to the fore, pertinent research questions as highlighted below;

The Pertinent Research questions considered for this dissertation includes the following:

a. What are the environmental problems impacted by the upstream oil industry in Nigeria?

b. What has been done by the Nigerian Government and other national and international bodies to control the environmental problems?

c. Why are environmental problems still experienced in the upstream oil industry in Nigeria?

d. What has happened to the environmental protection policies of the upstream oil industry?

e. Do the operating companies in the upstream oil industry in Nigeria comply with the stipulated environmental guidelines and standards in their operation and waste management

f. Does the Federal Ministry of Environment actually regulate the operations and waste management strategies of the upstream oil producers in the Niger Delta area of Nigeria?

1.4 Problem Statement

From the above discussions and pertinent research questions, the problem to be researched is to assess the environmental impact of upstream oil and gas activities on the human and socio-economic lives of the Niger Delta people, and the effectiveness of the environmental protection policies put in place to stem the tide.

1.5 Purpose of the research

The main aim of this research work is to:

a. Critically examine the impact of environmental pollution caused by upstream oil and gas activities in the Niger Delta.

b. Critically examine effectiveness of the environmental protection policies in the Nigerian oil and gas industry.

c. This work also aims at investigating the environmental impacts of drilling and production technologies and techniques as deployed in the upstream oil industry in Nigeria, with a view to assessing the efficacy or deficiencies in environmental protection laws as it applies to the host communities in the Niger Delta.

1.6 Scope and specific objectives of the research

The scope of this research work will be focused on the following:

a. Evaluate the efficacy of the environmental protection policies as implemented in the upstream oil industry.

b. Validate that the environmental protection policies is implemented in the upstream oil industry and compliance to this policy is evaluated and defaulters are identified

c. Evaluate the existence of a consequences management plan such as penalties, for non-compliance to the environmental protection policies as implemented in the upstream oil industry.

d. Assess the impact of non-compliance of the upstream oil producers to the environmental protection policies on the host communities.

1.7 Deliverables and output flowing from the research

The following are the deliverables from this research work:

a. Establish the effectiveness of the body created to harmonize the oil exploration and exploitation activities of the upstream oil producers with its environment protection policies.

b. Seek to propose a strategy to close-out the gap identified by either the upstream oil producers or the establishment that have the responsibility to protect the environment

Conclusively, this chapter gives an overview of the upstream oil and gas activities in the Niger-delta, citing in particular, the huge natural resource potentials the region possesses which has bolstered the state of the Nigerian economy since the mid 1970's but has equally had consequential impacts on its fragile ecology. These sustained environmental impacts continued unchecked for many years but in the late 1980's, agitations from many quarters led to the promulgation of several environmental acts and the establishment of relevant agencies tasked with the responsibility of overseeing the activities of upstream operators. This work however seeks to investigate the effectiveness of these agencies, upstream operators' compliance to the laws, and consequence management plans.

The next chapter would critically examine the exploration and exploitation activities that are carried out in the oil and gas industry, in a bid to understand how the waste that impact on the

environment is generated, the waste management techniques used in managing the impact of the waste on the environment, the confirmation of the existence of the oil industry regulatory body in Nigeria and their roles and administrative framework

CHAPTER TWO

BACKGROUND

LITERATURE REVIEW

2.1 Overview of upstream oil operation and their associated waste

In order to have a full understanding of the impact of the activities of the upstream oil operations on the environment, there is the need to understand the activities that constitutes the upstream (exploration and production) business, the waste generated by these activities and the regulatory body tasked with the responsibility of harmonizing the economic interest of the government with the sustainability of the environment.

The background study of this research work will provide a brief explanation of the major activities carried out in the upstream business supplying information on the sequence of operations from the exploration stage through to the developmental and production stage.

Waste is often generated in oil and gas business and for the purpose of clarity, waste is regarded as a by-product of a chemical process which may involve gaseous emissions such as the oxides of sulphur, carbon and nitrogen, liquid effluents in the form spent organic and inorganic solvents or any other material not used for its intended purpose. The different waste streams generated during these stages will be identified and the various waste management techniques relevant to the upstream oil and gas operations will be evaluated.

The following activities constitute the upstream oil operations business. It also gives a preview into the waste generated during these activities:

2.1.1 Exploration (seismic survey)

Seismic survey is usually the first field activity in the exploration stage of oil operation. This stage entails the search for hydrocarbon bearing rocks and water bodies in which geological maps are reviewed to identify major sedimentary basins. Aerial photographs are deployed to

identify promising earth formation such as vaults and anticlines which predominantly signifies the presence of hydrocarbon. (Ikein A.A 1990)

Various methods are used to carry out seismic survey operations. According to Nooman D.C. and J.T. Curtis (2003) the common amongst the applicable methods are:

a. The generation of acoustic waves at specific points along a relatively straight survey line which denoted changes in the subsurface geological strata. Sensors arranged along the survey lines records the detected changes.

b. The use of short holes technique which involves the detonation of small explosive charges placed in small diameter holes. These holes are drilled to a depth ranging from one to thirty meters. Nooman D.C. and J.T. Curtis (2003)

The data generated from these surveys are processed using computer tools to map the underlying strata which are interpreted to determine the size and shape of the geological structures, which then serves as feed data in determining the engineering decision for further investigation.

The excavation and other activities required for seismic survey for the construction of oil and gas facilities creates a potential for environmental pollution. This exploration activity could create the loss of biodiversity of the natural resources inherent in the area of the survey, and thus have a devastating impact on the eco system. (Ikein A.A 1990)

According to Nooman D.C. and J.T. Curtis (2003) principal amongst the common waste generated at this stage of the exploration activities are:

a. Explosive waste

b. Non-biodegradable flammable waste

c. Non flammable waste

2.1.2 Exploratory Drilling

The Engineering decision attained from the report of the seismic survey will necessitate the next phase of the exploration activity which will seek primarily to confirm the presence of

hydrocarbon and also estimate the internal pressure of the reservoir. This stage essentially will require the drilling of an exploratory well. Nooman D.C. and J.T. Curtis (2003)

The drilling process will depend on the geographical formation of the area. In drilling offshore, a drilling barge, a submersible drilling rig or a drilling ship is used to provide all the required activities associated with drilling the well.

Once the drilling commences, drilling fluids or mud is continuously circulated down the drilling pipe and back to the surface equipment to balance underground hydrostatic pressure, cool and lubricate the drilling bits, and flush out rock cuttings.

A series of hydraulically actuated steel rams that can close around the drilling casing to quickly seal off the well are used to militate against the risk of uncontrolled blowout. Steel casing is run into the completed sections of the exploratory well and cemented into place to provide structural support to maintain the integrity of the well, isolate underground formations and protect useable underground water.

Once the hydrocarbon depth has been attained, initial well tests are conducted to determine the formation pressure, physical and chemical characteristics of the oil and gas and establish the flow rates of the well.

This stage of the exploration and production activities in the upstream operation has a huge potential to create large amount of waste being released into the environment. The waste management system and controls used at this stage would determine the environmental pollution recorded during this stage. (Darling, T 2005)

According to (Nooman D.C. and J.T. Curtis (2003)) principals amongst the waste generated during this stage are:

a. Drilling mud and cuttings

b. Cement waste

c. Work over and simulation fluids

d. Excess drilling chemicals

e. Construction materials

f. Non burnable waste scrap metals

g. Oil spill

2.1.3 Construction Operation

The need for the construction of infrastructure required as support activities to the exploration and production in upstream operation cannot be overemphasized. Facilities needed to be constructed will be determined by the geographical location of the exploratory activities to be carried out. In offshore and creek upstream activities, the construction of water ways, camps, pipelines and canals may be required during the development and production stages, whereas in the land locations, road construction and security to the exploratory well area would be paramount.

According to Nooman D.C. and J.T. Curtis (2003) the under listed are the waste that would be generated during this stage that have a potential to cause environmental pollution are:

a. Unused construction materials

b. Used lubricating oils, paints and solvent

2.1.4 Development and Production

This stage of the exploration activity will entail the extraction of oil and gas from the exploratory well drilled earlier from the identified reservoir, and also necessitates the drilling of more wells into the reservoir to optimize production.

A production facility may be required to separate, store and transport the produced fluids. The size and type of installation needed for this activity would depend on the nature and location of the reservoir, daily production capacity, degree of treatment needed to be attained from the installation, governments' regulations guiding the operation activities in the location and nature of export options.

Routine operation on the producing wells would be required to maintain and optimize production, ensure the integrity of the facility and ensure safety and security of the facility is maintained at all times. These activities necessitate the provision of work force accommodation, communication equipments, waste treatment and disposal facility and service and maintenance stations. (Bateman, M. 2000)

Nooman D.C. and J.T. Curtis (2003) stipulate that common waste generated at this stage of the exploration activities include:

a. All associated waste common to exploratory well drilling stage

b. All associated waste common to construction stage

c. Waste associated with oil production such as Gas flaring, vent gases etc.

The above mentioned activities are the sequence of operation that constitutes the exploration and production operation of the upstream business, and also the expected associated waste from each stage. The management of such expected waste is discussed below:

2.1.5 Human, Socio-economic and Cultural Impacts of Upstream Oil and Gas activities on The Niger-Delta.

Upstream exploration and production activities have induced social, economic and cultural changes in the communities within the Niger-delta. The extent of these changes is especially important to local groups, particularly indigenous people who may have their traditional lifestyles affected. The key impacts been experienced in the Niger-delta include changes in; (Koos, J.P 1996)

a. Land use patterns, such as agriculture, fishing. Hunting as a direct consequence or as a secondary consequence by providing new access routes, leading to unplanned settlement and exploitation of natural resources.
b. Socio-economic systems due to new employment opportunities, income differentials, inflation, differences in per capital income, when different members of local groups benefit unevenly from induced changes as it was been witnessed in the 'ogoni' communities of Rivers state.
c. Socio cultural changes such as social structure, organization, and cultural heritage, practices and beliefs, and secondary impacts such as effects on natural resources, rights of access, and change in value system influenced by foreigners.
d. Planning strategies, where conflicts arise between development and protection, natural resource use, recreational use, tourism and historical and cultural resource.
e. Aesthetics because of unsightly and noisy facilities; and

f. Transportation system, due to increased road, air and sea infrastructure and associated effects (e.g. noise, accident risk, increased maintenance requirements, or change in existing service).

2.2 Waste management in the upstream oil operation

Upstream oil operation business principally deals with the searching for and the recovery and production of crude oil and natural gas. These natural resources don't exist in isolation. So in the recovery and production of crude oil, the need to separate the products that is required from the naturally recovered fluid is important. (Bateman, M. 2000)

The process of separating the various constituent of the recovered fluid is done by series of activities that introduces various chemicals and other treating process to achieve the final required product. The unused products, spent chemicals and other constituent would be declared as waste.

Waste in the oil production field can be defined as any unavoidable and unwanted material resulting from an industrial operation for which there is no economic value and as such must be disposed.

It can also be described as any material that is surplus to requirement and cannot be used as a feedstock, therefore must be managed as a finished product. (Veil, J. 2003)

Waste management therefore is the conscious and deliberate efforts at putting away available waste without re-contaminating the environment. (ISO 1400 Manual 1996)

Shell annual report (1999) articulates that a standardized waste management system should clearly incorporate waste segregation as a top priority. Its goes on to state that the failure to recognize the need to segregate waste accordingly may result in creating a waste mixture that may be incompatible with the treatment process, the recycle process or the disposal process thereby creating a higher waste disposal cost.

However, waste in the upstream oil production can generally be classified in various forms. It can be classified according to its general physical and chemical characteristics; it can also be classified according to its source of origin.

Classification of waste in the upstream oil industry according to their physical characteristics would fall under the following headings. (Jansen, J.D & Wind, j. 1996)

a. Gaseous waste

b. Liquid waste

c. Solid waste

Classification of waste in the upstream oil industry according to their chemical properties would fall under the following headings. (Jansen, J.D & Wind, j. 1996)

a. Hazardous waste: which included waste such as reactive waste, corrosive waste and toxic waste

b. Non hazardous waste

Classification of waste in the upstream oil industry according to their source of origin would fall under the following. (Jansen, J.D & Wind, j. 1996)

a. Drilling waste

b. Drilling rig waste

c. Producing waste

d. Produced water formation

e. Sanitary waste

f. Medical waste

This broad classification takes into account the various kinds of waste that will be encountered. This information will assist the upstream oil facility to put in place a waste management system that would effectively manage the waste challenge. (Jansen, J.D & Wind, j. 1996)

2.3 Waste management techniques in the upstream oil operation

The need to manage the waste generated in the upstream oil operation necessitates the development of several waste management techniques.

Key amongst the techniques used in the upstream oil operations are:

2.3.1. Source reduction techniques. (Jansen, J.D & Wind, j. 1996)

This technique operates on the principle of reducing or eliminating the volume and relative toxicity at the source from where it is generated. This technique is achieved to a practicable extent by focusing on the alternative materials, process or procedures that would generate the least amount of waste.

Three major strategies are normally employed when adopting the source reduction technique and these are;

a. Reducing the volumetric capacity of the waste

b. Reducing the severity of toxicity

c. Process optimization

2.3.2 Re-Use techniques. (Jansen, J.D & Wind, j. 1996)

This operates on the technique that the waste materials may be used directly or in alternative means or downgraded to become source materials for other processes. The waste materials could also be re-issued if unused.

Typical examples of this technique in practice in the upstream oil operation business include:

a. The use of vent gas as fuel for machineries and burners

b. The use of drilling cutting waste as raw material for brick manufacturers

c. The use of process waste water as utility water

d. The use of condensed steam as condensate for feed water in boilers

e. The use of heavy hydrocarbons as raw material for road construction

f. The return of oil based drilling mud to the vendor for reprocessing and re-issue in other industries as raw material

2.3.3 Recycle/Recovery technique (Jansen, J.D & Wind, j. 1996)

This technique is considered after all available re-use option has been exhausted. Here the waste generated is evaluated for recycling/ recovery either in the process, on site or sent to third party contractors for recycling /recovery.

Typical examples of this technique in practice in the upstream oil operation business includes

a. Recovery of heavy hydrocarbon deposits in tank bottoms by centrifuging or filtering by third party contractors for use as asphalt in road construction

b. Recycling of waste metals by smelting by third party contractors to produce metals

c. Recycling of sludge to produce fertilizers for agricultural purposes.

2.3.4 Waste Treatment technique. (Jansen, J.D & Wind, j. 1996)

After careful consideration and realization that none of the above three methods could be utilized to manage the waste generated, the treatment option which would minimize waste volume or toxicity should be considered.

The treatment technique includes:

a. Biological methods e.g. composting, tank based reactors

b. Thermal methods e.g. incineration, cement kiln, open burning, thermal desorption

c. Chemical methods e.g. neutralization, precipitation, extraction

d. Physical methods e.g. gravity separation, filtration, centrifugation

2.3.5 Surface discharge technique. (Veil. J 2003)

In this method of waste disposal which primarily deals with aqueous waste streams, the sensitivity and capacity of the potential receiving environment, the concentration of potentially harmful components in the waste to be disposed and the volume of the receiving water body are carefully considered to be within permissible limits of the regulation guiding the operations.

Typical example of this waste disposal method could be observed in the offshore operation whereby the operational regulation permits the dumping of process waste water into the sea at an approved conductivity.

2.3.6 Injection technique. (Veil. J 2003)

This technique is specific to the upstream oil operations. Exploratory and production injection wells without commercially viable hydrocarbon deposits are identified and are used as waste dumping reservoir.

Waste fluids such as process water, dehydration and sweetened waste, blow down liquids, produced water and waste drilling fluids and slurries are pumped down a well into a suitable underground formation for disposal in a manner that will not adversely affect the environment.

This waste disposal process can be carried out using either of the following methods:

a. Annular injection

b. Down hole injection

2.3.7 Solvent extraction technique. (Veil. J 2003)

This technique employs the use of solvent to extract oil from oily solids and the solvent is generally re-used. It operates in a closed up loop system for the vapor phase and hence ensure that there are no direct air emissions from the process.

The disposal system for the waste water generated from the solids during this process can be treated depending on the constituent of the waste water stream or could be injected using the injection techniques.

Typical examples of sludge solvent used in the solvent extraction technique includes triethylamine , and methylenechloride.

These waste treatment and disposal techniques are the various techniques available to the operators of the upstream oil business in treatment and disposal of waste. The most suitable is usually evaluated and employed in waste treatment/ disposal at the various stages of the exploration and production operations. (Jansen, J.D & Wind, j. 1996)

2.4 Planning of the environmental protection policies for the upstream oil operation

The need for energy has resulted in a wide range of research into acquiring diverse forms of energy. Crude oil exist as a natural form of energy. Whilst man pursues social and technological development, the exploring and exploiting of this natural form of energy possesses great potential for environmental pollution. (Okorodudu Fubara, 1998)

There is a need for scientifically based protection of the environment from the adverse effects of industrialization associated with the exploration and production activities in the upstream operations. This can be achieved through proper management of our environment and good planning for future development is highly essential.

This was evident in the upstream oil operation in Nigeria in the 1980's when environmental problems associated with oil and gas operations took a dramatic turn because of the Koko toxic waste dump issue in the then Bendel state. This event took place on the 19th of September 1987, when Gian Franco Rafaelli, an Italian businessman who had resided in Nigeria for about 20 years dumped 3880 tons of toxic and hazardous waste in the forms of polychlorinated biphenyl sulphate (PCBS), methyl melamine, dimethyl ethyl acetate formaldehyde which were the most hazardous of that time on behalf of an Italian company. This episode created a lot of environmental hazards for the people living within the host communities as it contaminated their water and polluted their lands resulting in an outbreak of water borne diseases. The incident forced the federal government of Nigeria to reassess the general state of its environmental regulations; it also alerted the general public of the inadequacy of a legal framework for environmental protection in Nigeria.

This event gave rise to the need for adequate environmental protection policies guiding the operations of the operating companies in relation to the overall environmental performance. The government developed a rudimentary government structure and adopted some regulations designed to protect the environment. These environmental policies are legislated and intended to be statement of intentions which provides a framework for actions and settings of environmental objectives and targets. (ISO 1400 handbook, 1996)

The Federal Environmental Protection Agency was created by Decree 58 of 1988 as the overall central regulatory body responsible for formulating environmental policies, prescribing national guidelines and standards, supervising compliance and enforcing all concerned operators to comply with these guidelines. (Aina & Adedipe, 1991)

In 1992, the Agency's mandate was expanded by law to cover the conservation of natural resources and biological diversity. These represented the efforts made by successive administrations to ameliorate environmental problems of the country.

The Federal government of Nigeria in 1999 began a new trend in the environmental battle by according it priority in its developmental programs. Accordingly, it created, for the first time in the history of the country, a Ministry of Environment in June 1999. The Federal Environmental Protection Agency (FEPA) was absorbed and its functions taken over by the new Ministry.

The primary mandate of the Ministry as stipulated by the government is to protect and improve water, air, land, forest and wildlife of Nigeria as mandated by Section 20 of the National Constitution. The administration's policy thrust is summarized in the Environmental Renewal and Development Initiative (ERDI). The objective of ERDI is to take full inventory of all natural resources, assess the level of environmental damage and design and implement restoration and rejuvenation measures; and to evolve and implement additional measures to halt further degradation of the environment.

The Ministry is also to ensure the sustainable utilization of the environment and its resources by evolving tools for poverty alleviation, ensuring food security, foreign policy and international development and good governance. For effective implementation of its mandate a number of priority programs were set up to address municipal waste management and sanitation, industrial pollution control including oil and gas, and conservation of bio-diversity and wildlife. Particular attention is also paid to the environmental problems of the Niger Delta due to the concentration of the upstream oil operation in the area. (www.nigeriafirst.org, 2006)

2.5 Institution and administrative framework for the Development and implementation of the environmental protection policies in the upstream oil operations.

Historically, past efforts of the Nigerian government in protecting the environment were primarily geared towards the safety, protection and conservation of the economically important natural resources. (Aina E.O.A and Adedipe O.N.1991). This was evident from the list of the existing environmental laws which includes; Aina E.O.A and Adedipe O.N.(1991)

a. Oil Pipe Act of 1956

b. Forestry Act of 1958

c. Minerals Act of 1958

d. Mineral Oil Safety Regulation of 1963

e. Oil in Navigable Water Act of 1968

2.5.1 Institutional framework

Nigeria operates a Federal system of Government with thirty six states and a Federal Capital Territory. The Federal Environmental Protection Agency operates a central system consisting of five (5) regional zones with offices in Lagos, Port Harcourt, Benin city, Kano and Kaduna and the head quarters in the federal capital territory.

The zones were established to address the various pollution and waste management problems that affected the state of the natural environment. The upstream oil operation was identified as one of the potential source of environmental pollution and as such the Department of Petroleum Resources (DPR) of the Federal Ministry of Petroleum Resources was created and tasked with the responsibility to supervise and regulate the activities of the oil industries in the country.

This was carried out by the department by creating the Oil and Gas Pollution Control Unit to effectively regulate the industry.

2.5.2 Administrative framework

The Department of Petroleum Resources is vested with the necessary powers by various legal provisions to perform the following functions and responsibilities:

a. Supervise all oil industry operations being carried out under licenses and leases in the country in order to ensure compliance with the applicable laws and regulations in line with good oil producing practices.

b. Keep and update records of oil industry operations, particularly on matters relating to oil reserves, production and exports of crude oil, gas and condensate. This includes updated records of licenses and leases and the rendering of regular reports to Government.

c. Advise Government and relevant Agencies on technical matters and policies which may have impact on the administration and control of oil.

d. Process all applications for licenses so as to ensure compliance with laid-down guidelines before making recommendations to the Honorable Minister of Petroleum Resources.

e. Ensure timely and adequate payments of all rents and royalties as at when due.

f. Monitor Government Indigenization policy to ensure that local content philosophy is achievable.

These functions cover all activities in oil operations both in the upstream and downstream, as well as the petrochemicals industry.

Conclusively, this chapter supplies an introduction to the basis of upstream oil and gas exploration and exploitation, its human and socio-economic impacts on the local communities, the associated waste generated and the different techniques employed in waste management.

It also supplies information about the existence of the environment protection policy that guides the operations of the oil and gas operators in Nigeria as promulgated by Decree 58 of 1988 of the Nigerian Government.

The next chapter will describe the methodology that the researcher employed in doing the research.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

This Research work aims at assessing the effectiveness of the governmental agency responsible for providing guidelines and also ensuring that legal requirements are implemented in the bid to control the activities of the upstream oil producers in the study area.

It would then proceed to examine the impact of environmental pollution caused by upstream oil operators by collating the opinions of members of the host communities within the Niger Delta. This study will establish the effectiveness or otherwise of the environmental protection policies and legislation as promulgated by the Federal government to sustain the environment.

It also assesses the position of the host communities regarding the impact of the environmental pollution caused by the selected three major upstream oil industry leaders operating in the Niger-Delta area of Nigeria. The study will evaluate the direct and associated effects of the oil exploration and production activities on socio-economic lives of the host communities.

The host communities are the communities of the Niger- Delta region located in the south-south region of Nigeria mainly around the Atlantic Ocean Coastline and lies between 4^{o} 10’ to 6^{o} 20’ N & longitude 2^{o} 45’ to 8^{o} 35’ E. These oil producing areas of the Niger-Delta includes Abia State, Akwa Ibom State, Bayelsa State, Cross River State Delta State, Edo State, Imo State, River State, Ondo State. (CIA World Fact Book, 2005)

Nigeria lies between latitudes 4^{o} 15'N and 13^{o} 55'N and between longitude 2^{o} 45'E and 14^{o} 4'E. (Allen, 1981) and is home to the Niger-Delta area that was chosen for this research work because of the high concentration of petroleum prospecting activities in the region.

3.2 Population and Sampling

The research procedure adopted involves developing a questionnaire defined by the employees of the selected companies based on their years of experience and levels of technical and administrative involvement. The respondents interviewed from the selected upstream companies did cut across the upper and middle level management staffs. These employees participated and responded to the interviews and questionnaires of the researcher with the results collated and reviewed. Members of the selected host communities were not left out as their opinions were also sought based on the relationship that exists between the activities of the oil and gas industry and their environment.

Three major multinational upstream oil and gas companies operating in the Niger-Delta area were selected for this research work. These companies were chosen for this research because of the key roles they play in the Nigerian oil and gas industry. The companies included; Chevron Nigeria Limited, Shell Development Company limited, and Mobil Producing Unlimited.

Employees of the Department of Petroleum Resources (DPR) which is an arm of the Nigerian National Petroleum Corporation (NNPC) that is responsible for supervision and control of the oil industry with a mandate to ensure that oil companies carry out their operations according to international oil industry standards and practices also form a critical part of this research work.

The work breakdown structure which is used for this research is carried out and presented in the following way:

a. Sampling technique/sample size selection

b. Data collection and Questionnaire design

c. Data processing, analysis and presentation

3.2.1. Sampling technique/sample size selection

The information gathering method employed by the researcher is the use of personal interviews for top management representatives of the three major multinational upstream oil and gas companies operating in the Niger-Delta area and the department of petroleum resources (DPR).

Questionnaires were also administered to members of staff of the three major multinational upstream oil and gas companies operating in the Niger-Delta area and the department of petroleum resources (DPR) and finally members of the host communities of the operating companies.

Two (2) management representative were selected and interviewed in each of the three operating upstream companies to obtain the managements perspective on the impact of environmental protection policies as it affects the upstream business in the Niger- Delta of Nigeria.

Ten (10) respondents were also chosen from the technical and operating department in each of the three operating upstream companies based on the positions they occupy on the companies hierarchy and their depth of understanding of upstream oil and gas activities to participate in questionnaires designed to obtain candid information on the compliance of the operating, maintenance and waste management strategies of the selected upstream oil and gas companies to meet the environmental stewardship agreement with the Federal government and the people of the host communities.

Two (2) management representative in the department of petroleum resources were selected and interviewed on the impact of environmental pollution on the economy and what the department of petroleum resources is doing about the activities of the upstream oil operation business as it affect the environment in the Niger- Delta region of Nigeria. These representatives were selected based on their experience as regulators of the activities in the oil and gas industry and also on their commitment to environmental management.

Twenty (20) employees of the Department of Petroleum Resources (DPR) were also selected to participate in the questionnaires in a view to capture the opinion of the employees regarding the potential effectiveness of the environmental protection policies in guiding the operations of the upstream oil companies, the department's managements implementation strategy of the

environmental protection policies, upstream oil operators compliance to the environmental protection policies and the effectiveness of the consequence management plan of the department.

Finally, Thirty (30) host community members of various sex, professions and age group were selected with Ten (10) representing each of the major host communities of the three major multinational upstream oil and gas companies operating in the Niger-Delta area for this research work to give their opinion on the environmental stewardship of the upstream oil companies supposedly aimed at improving the state of their natural environment thus positively affecting the lifestyle of the people as stated in decree no 86 of the 1992 federal ministry of environment act which stipulates that;

- ✓ Before any upstream oil and gas operator takes a decision to undertake any activity that may significantly affect the environment, prior considerations of its environmental effects should first be taken.
- ✓ Upstream operators should lay emphasis on the implementation of procedures to achieve the above goal especially as it pertains to the host for notification, information exchange, and consultation activities likely to have significant Trans- state (boundary) environmental effects.

Their views on the community relation strategies of the major multinational upstream oil and gas companies operating in their area was also taken into consideration as well as the consequence management strategy employed by the regulating bodies of the upstream oil operators.

3.3 Design and Administration of Questionnaires.

The research design to be employed in this work is a carefully structured and strategic investigation aimed at obtaining answers to the research problems that bother on the efficacy of environmental protection policies in Nigeria by analyzing opinions generated from the questionnaires and other physical observations.

3.3.1. Data collection and Questionnaire design

The **validation** of the questionnaire was done by the researcher, taking into consideration the scope of the research work and also its aims and objectives. The questionnaires for the Thirty (30) respondents who were selected from the technical and operating department of the three operating upstream companies were designed specifically to source feed data from the respondents in a view to deduce the degree of compliance of the companies to environmental stewardship.

The questionnaires administered to the personnel of the Department of Petroleum resources (DPR) were tailored specifically to get the candid opinion of the respondents to their awareness of the environmental protection policies in Nigeria, the DPR's deployment strategy to upstream oil and gas operators in Nigeria, its compliance tracking system and also the consequence management plan mitigated for non compliance by the upstream oil and gas operators in Nigeria.

Also the **validation** of the questionnaires administered to the members of the host communities of the operating companies were tailored to get the candid views of the people on the consequences of the environmental impact of the activities of the oil producing companies on their professions and way of lives.

Finally, the personal interviews of the top executives of the three major multinational upstream oil and gas companies operating in the Niger-Delta area which were selected for this research work and also in the department of petroleum resources (DPR) were conducted to get management's perspective on the efficacy of environmental protection policies in Nigeria, their views on the effectiveness of the DPR's deployment strategy of this policies (if available) to upstream oil and gas operators in Nigeria and the extent of compliance to the policies by their respective companies. The interview also inquires about the top management's view on the effectiveness of the compliance tracking system as deployed by the department of petroleum resources (DPR) and the consequence management process applicable for non compliance.

3.4 Feed Data Collation and Analysis.

This entails the collation of the feedback from the primary data sources which includes formal interviews and questionnaires. The analysis of this data would employ the use of secondary data, statistical and computer tools which would then be presented using various pictorial representations for ease of interpretation.

3.4.1 Data processing, analysis and presentation

The methodology adopted for this research involved conducting interviews for various respondents of selected organization and host communities in a professional manner, These interviews each lasted for about 15 minutes with the respondents required to provide relevant personal information and also opinions on the technical questions been put across to them. A total of 40 technical questions were asked, cutting across a broad range of areas that covered the individuals awareness of environmental protection policies in Nigeria's upstream oil and gas industry, opinions on the feasibility of implementations/corporate adherence to any such policies that he or she may be aware of, the individuals thought on the best strategies for waste management were also a subject for discuss, and other questions that is connected to the research topic for dissertation.

Results generated from the interview were collated, analyzed and graphically represented to give a detailed descriptive analysis of the public opinion on the impact assessment of the environmental protection policies in the Nigeria's upstream oil and gas industry.

3.5 Expectation

In line with our objective of examining the impact of environmental protection policies on the upstream oil and gas activities in Nigeria, results generated from our survey will be systematically reviewed in the subsequent chapters in order to assess the successes and shortcomings of the environmental protection policies in Nigeria's upstream oil and gas industry, and also evaluate areas of potential improvement in the bid to establish primarily the effectiveness of the various organization tasked with the responsibility of managing environmental issues associated with oil and gas activities in Nigeria.

Conclusively, this chapter discusses the methodology employed by the researcher in carry out the research and gives the work breakdown structure employed in implementing the task. The next chapter would provide the feedback on the analysis of the primary data obtained from the field research work.

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 General

The impact analysis of the environmental protection policies guiding the operations of the upstream oil and gas companies in the Niger Delta States has been an issue of concern for all the relevant parties involved in this revenue generating activity of oil and gas exploration and production in Nigeria. Therefore, it is imperative to know how the members of the relevant parties {i.e. the upstream oil and Gas Operating Companies, the regulating authorities (DPR), etc} have been effective in the area of environmental management and the opinions of the Host Communities regarding environmental protection policies that has been a contentious issue amongst the major stakeholders involved.

This research work carried out this task by obtaining information directly from the relevant parties through the use of a survey using questionnaires and personal interviews.

The data gathered will be analysed to decipher the actual impact of the environmental protection policies guiding the operations of the upstream oil and gas companies in the Niger Delta States on the people in the host communities and the actions by the relevant authorities. This chapter will deal with information and data acquired while carrying out the empirical investigation.

Graphical illustrations in the form of tables and charts were mainly used to depict the research ideas and information contained in this chapter. They are intended to be used as visual aid to enhance the readers understanding.

4.1.1 Oil and Gas Companies and their Upstream Asset in the Niger-Delta.

The three main multinational oil and gas companies operating in the Niger-Delta area of Nigeria that provided data and feedback for this research work from their operating assets were:

a. Chevron Nigeria Limited

Chevron Nigeria Limited is a subsidiary of the Nigeria and Mid Africa Strategic Business Unit (NMASBU) of Chevron global company and operates a Joint Venture with the Nigerian National Petroleum Corporation where it holds a 60% share in the revenue accrued from the sales of the crude oil in oil field where it operates. Chevron has a concession covering approximately 2.2million acres (8900SqKm) mainly operating in the Onshore and offshore area of the Niger Delta which is located along the Gulf of Guinea.

Further details of Chevron Nigerian Limited can be found in Table 4.1 below.

(Chevron Corporation Fact File Sheet, 2010. https:// www.chevron.com)

b. Mobil Producing Unlimited

Mobil Producing Nigeria is a subsidiary of the Exxon Mobil Corporation and is the second largest to Shell in operating the joint venture with the Nigerian National Petroleum Corporation. It began its operation in 1955 under the name Mobil Producing Nigeria with a concession covering 800,000 acres in shallow offshore in the Niger Delta.

Further details of Mobil Producing Unlimited can be found in Table 4.1 below. (Our Activities in Nigeria, 2010. https:// www.exxonmobil.com)

c. Shell Producing and Development company

Shell Producing and Development Company is the largest oil and gas company in the Niger Delta and comprises of about 6000km of flow lines and pipelines, 90 oil fields, 1000wells, 72 flow stations, 10 Gas Plant and 2(two) major oil export terminals at Bonny and Forcados which are both situated in the Niger Delta.

Further details of Shell Producing and Development Company can be found in Table 4.1 below. (Shell at a Glance, 2010.https:// www.shell.com/ng)

The above three companies were chosen as part of the sample population due to the extent of their operational presence in the country, their joint venture agreement with specific

governmental departments such as NNPC, the pollution potential of their activities and other attendant risk associated with their exploration activities in the host communities.

A further breakdown of the operational details of these multinational operating in the Niger delta region to validate their environmental pollution tendencies is shown below:

Table 4.1: Operational Details of Multinationals oil and gas companies in Niger Delta
*Figure as at 2009

S/N	Operating Company	Total Employee Strength	Upstream Asset In Niger Delta.	Upstream Oil Production/day (bopd)
1.	Chevron Nigeria Limited	Nearly 2500 Regular staff	**Asset Area** / **No of Platforms.** **North Offshore** 7 **South Offshore** 5 **Swamp Operations** 6 **Eastern Operation** 5 **Deep Offshore** 1	480,000bopd*
2.	Mobil Producing Unlimited	Approximately 1900	**Asset Area** / **No of Platforms.** **Offshore & onshore Areas** 90 **Deep Offshore** 1	720,000bopd*

3.	Shell Producing and Development Company	Approximately 6000	**Asset Area** / **No of Platforms.** **Offshore & onshore Areas** — 94 **Deep Offshore** — 1	629,000bopd*

These above mentioned upstream asset are predominantly located in different communities in the Niger Delta.

Table 4. 2: Indicating the major operational facilities of the operating companies used by the researcher in the deployment of the questionnaires and interviews for the research.

S/N	Operating Company	Case Study Asset	Location in Niger-Delta
1.	Chevron Nigeria Limited	Escravos Terminal.	Ugborodo community, Warri south west local government, Delta State.
2.	Mobil Producing Unlimited	Qua Iboe Terminal.	Ibeno community, Ibeno Local Government Area.Akwa Ibom.
3.	Shell Producing and Development Company	Olomoro-oleh Flow Station.	Oleh, Isoko South, Delta State.

It is imperative to note that the operating activities of these oil and gas companies in the Niger Delta which have the capacity of produce approximately 1.9million Barrels of crude per day can create a huge potential for environmental pollution.

4.1.2 Department of Petroleum Resources and its control Centers In Niger-Delta.

The Department of Petroleum Resources (DPR) has control centers in some of the states in the Niger Delta due to the presence of the oil and gas operating companies. These control centers have a responsibility to perform the duties as spelt out in the duties of the Department of Petroleum Resources (DPR) in Chapter 2 of this research.

In a bid to have hands on control of the activities of the upstream oil and gas companies operating in the Niger-Delta, the Department of Petroleum Resources (DPR) situated localized control centre in the following cities in the Niger-Delta. Below is a list of the States and cities where the DPR has control centers in the Niger-Delta.

a. Port Harcourt in River State
b. Warri in Delta State
c. Owerri in Imo State
d. Aba in Abia State
e. Akure in Ondo State
f. Ibeno in Akwa Ibom State

These control centers have an administrative set up that assigns responsibilities to its personnel in various fields to ensure that all their spelt out functions are accomplished.

This complete list of the Head quarters and Zonal control centers of the DPR meets the deliverable of the research work as spelt out in chapter 1, sub 1.6b, which establishes that the Federal Government of Nigeria in a bid to optimally harmonize the economic interest with the Environmental integrity establishes a Body saddled with the responsibility to protect the environment. DPR Fact file: Available Online on http:// www.dpr.com

4.1.3 Host Communities used in the research and Rational behind their Choice.

The researcher considered the number of Oil Fields and production platform in each of the producing areas where the Oil and Gas companies operated and considered the best choice based on the matrix below.

a. Amount of oil and gas platforms of each of the companies that are available within the community

b. Proximity from the researcher

c. Disposition of host community

d. Available resource and skilled man power to carry out research

e. Educational qualification of the host communities

f. Occupation of the host communities

g. Advice from friends and indigenes who are members of the host communities

Based on these criteria, the researcher's decision is captured in the table 3 below.

Table 3: Asset of upstream oil and gas operators used for questionnaires & interviews

S/N	Operating Company	Host Community	Types of Asset	No Of Asset
1	Chevron Nigeria Limited	Ugborodo community, Warri south west local government.	Platforms	Nil
			Flow stations	Nil
			Terminal	1
2	Mobil Producing Unlimited	Ibeno community, Ibeno Local Government Area.	Platforms	Nil
			Flow stations	Nil
			Terminal	1
3	Shell Producing and Development Company	Oleh community, Isoko South Local Government Area, Delta State.	Platforms	Nil
			Flow stations	1
			Terminal	Nil

Information current as at September, 2010

4.2 Results of feedback from the Field

This research work employs the use of analysis of designed questionnaires and personal interviews to seek to answer the pertinent questions asked in chapter 1 sub 1.2 in a bid to produce deliverables as stipulated in chapter 1 sub 1.6.

4.2.1 Questionnaire Feedback

Out of the 80 questionnaires distributed to respondents by the researcher, 71 respondents completely filled and returned their questionnaires while 9 respondents did not complete the questionnaire. This represented an 88.75% response rate. The response also shows that 71.9% of the respondents were adult male while the remaining 28.1% of the respondent were female mainly representing respondents from DPR and the host communities.

The chart shown in Figure 2 below shows the total response rate of the male to female and also the unreturned.

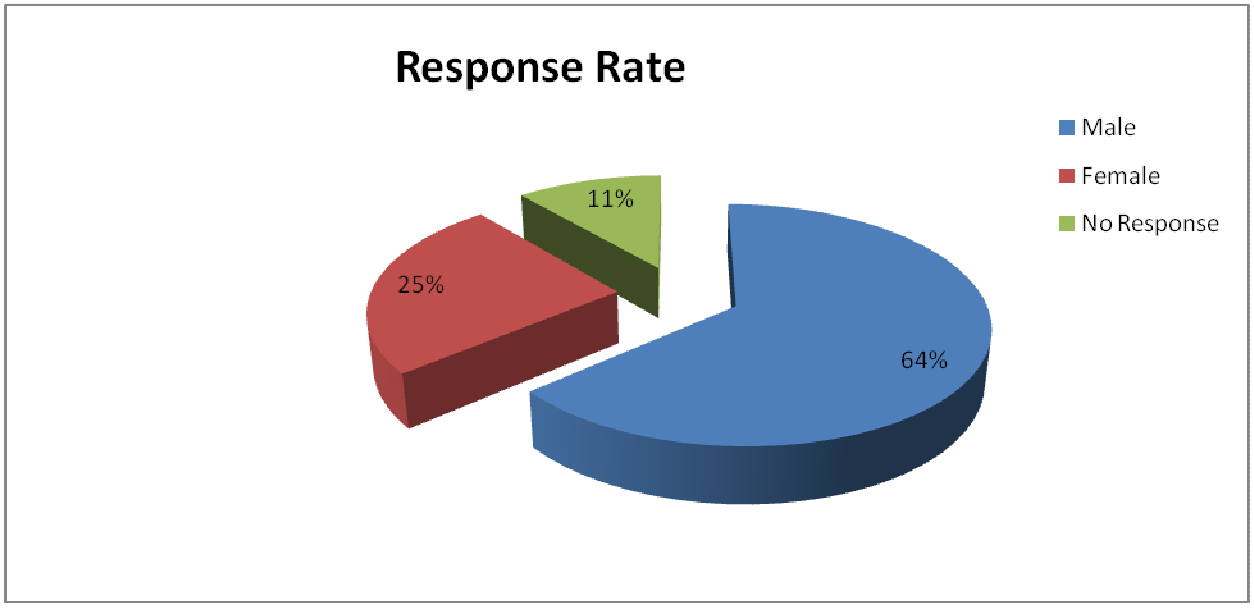


Figure 2: Represents the response rate of the male, female and personnel who did not respond to questionnaires.

A further breakdown of the response of the questionnaire of the different units is given in the table below:

Table 3: Showing the Result Distribution of the interviews conducted in the operational facilities of the companies used by researcher.

Company	Number of Respondents interviewed		Nationality		Educational Background		Work Experience		Age Distribution of Respondents		Number of Respondents Aware of Environmental Protection Policies	Respondent opinion on EPP'S Performance	
	Male	Female	Nigerian	Foreigner	Tertiary Education	Secondary education or Less	Less than 10 Years	Btw 11-20 years	Less than 25	Btw 25-50		Good	Poor
Chevron (Escravos Terminal)	7	3	9	1	6	4	1	9	1	9	10	5	5
Mobil (Qua Iboe Terminal)	9	1	8	2	7	3	3	7	2	8	9	10	nil
Shell Olomoro-Oleh flow Station	8	nil	8	nil	5	5	nil	8	8	nil	8	8	
DPR Delta State	10	6	16	nil	13	3	11	5	6	10	16	16	nil

4.2.2 Interpretation of Questionnaire Feedback.

The results obtained from the various respondents interviewed will be analyzed and interpreted in order to obtain a detailed report on the public opinion on environmental protection policies.

a. Chevron Nigeria Limited (Escravos Terminal operations, Ugborodo)

Ten (10) personnel (including 7male and 3female) were selected as potential respondent from this chevron business unit and all ten completely filled out relevant sections of the questionnaires and submitted within the time frame advised by the researcher. Of this figure, 90% were Nigerian nationals between the ages of 25-50yrs with between 11-20years work experience while 10% were foreigners, less than 25years old and had less than 10years working experience respectively.

Approximately 60% of the respondent had tertiary education while the 40% had secondary education. Operations personnel constitute 50% of the respondents while 30% were maintenance personnel and personnel from the other departments constituted the remaining 20%.

Additionally, 100% of the respondent from Chevron Nigeria limited asset were aware of the environmental protection policies and also believes it is a noble intention from the Federal Government of Nigeria in its bid to harmonize its economic interest with environmental stewardship. However, 2% of these personnel do not understand the objectives of the Environmental protection strategy.

Also from the 100% that are aware of the environmental protection policies 50% are of the opinion that these policies are not easy to comply with and the department of petroleum resources is not doing enough to help the Multinational oil and gas operating companies to comply with these policies.

However, 80% of chevron employee respondents believe that the company has a clearly defined strategy to achieve a pollution free environment while 60% believes that the organization is actually maximizing its potential to comply fully with the environmental protection policies.

b. Mobil Producing Unlimited (Qua Iboe Terminal Operations, Ibeno)

Of the Ten (10) respondents of 9male and 1female that filled out relevant sections of the questionnaires distributed in this Mobil work location, and submitted within the time frame advised by the researcher, 80% were Nigerian nationals who were between the ages of 25-50yrs and 70% had between 11-20years working experience while the remaining 20% were foreigners of various nationalities and are less than 25years old. 30% of the respondent had less than 10years working experience.

The educational qualification of respondents shows that while 70% of the respondent had tertiary education, the remaining 10% had secondary education with 20% with less than secondary education. The operations personnel constitute 80% of the respondents while 20% were maintenance personnel. 90% of the respondent from Mobil producing unlimited asset confirmed awareness of the environmental protection policies with 10% indicating ignorance of this policy within their system. 100% of the informed personnel in the system however believe it is a noble intention from the Federal Government of Nigeria in its bid to harmonize its economic interest with environmental stewardship.

Also majority of the 90% that are aware of the environmental protection policies are of the opinion that these policies are not easy to comply with and the department of petroleum resources is not doing enough to help the Multinational oil and gas operating companies to comply with these policies.

However, 100% of the respondents believe that the Mobil producing unlimited has a clearly defined strategy to achieve a pollution free environment while 90% believes that the organization is actually maximizing its potential to comply fully with the environmental protection policies.

c. Shell Producing and Development Company (Olomoro-oleh Flow Station)

Eight (8) respondents all male completely filled out relevant sections of the questionnaires and submitted within the time frame advised by the researcher representing 80% return rate. Of this, 100% were Nigerian nationals majorly within 25-50yrs age bracket with between 11-20years of working experience. 50% of the respondent possesses tertiary education, while the remaining 50% had secondary education. Operations personnel constitute 50% of the respondents while 50% were maintenance personnel.

100% of the respondent from Shell producing and Development company asset confirmed awareness of the environmental protection policies and believes it is a noble intention from the Federal Government of Nigeria in its bid to harmonize its economic interest with environmental stewardship.

All personnel that participated also believe that the company has a clearly defined strategy to achieve a pollution free environment and that the organization is actually maximizing its potential to comply fully with the environmental protection policies

d. Department of petroleum resources (Warri Regional control center)

Out of the20 questionnaires distributed by the researcher to members of staff of the department of petroleum resources in the Niger Delta regional office, 16 respondent comprising 10male and 6 female completely filled out relevant sections of the questionnaires and submitted within the time frame advised by the researcher representing 80% return rate. Of this, 100% were Nigerian nationals while 60% were within the 25-50yrs age bracket and 70% of these respondents have between 1-10years of working experience. 80% of the respondent possesses tertiary education, while the remaining 20% had secondary education.

100% of the respondent from DPR confirmed awareness of the environmental protection policies and believes it is a noble intention from the Federal Government of Nigeria in its bid to harmonize its economic interest with environmental stewardship and also believe that the company has a clearly defined strategy to achieve a pollution free environment and that the organization is actually maximizing its potential to enforce compliance of the oil and gas operating companies with environmental protection policies.

e. Oleh, Ugborodo and Ibeno Host Communities.

Out of the 30 questionnaires distributed by the researcher to members of three (3) different host communities i.e. 10 questionnaires for each host community in the Niger delta, 27 respondent comprising 17male and 10 female completely filled out relevant sections of the questionnaires and submitted within the time frame advised by the researcher representing 90% return rate.

Ugborodo community had a 100% response rate with respondent returning all 10 questionnaires completely filled and returned with the time frame stipulated by the researcher. Oleh community had 9 out of the 10 questionnaires returned representing a

90% return rate. However, Ibeno community had an 80% return rate with 8 of the 10 questionnaires returned.

Of this, 100% were Nigerian national within the 25-50yrs age bracket who has lived more than 20years in the community. 30% of the respondents are of the Itsekiri tribe while 20% are of Uhrobo tribes. An additional 10% of the people of the host communities are of the Isoko origin while an additional 15% fall under the Ijaw. The final 15% are of various minority tribes and are classified others.

The chart in Figure 3 below shows a graphical representation of the various tribes of the respondents that participated in the survey for this research. Itsekiri tribe in the Niger Delta dominated the respondents while minority tribe like Ibibio, Igbo, Yorubas etc constitutes the others

Local Tribes of the Host Community Respondents

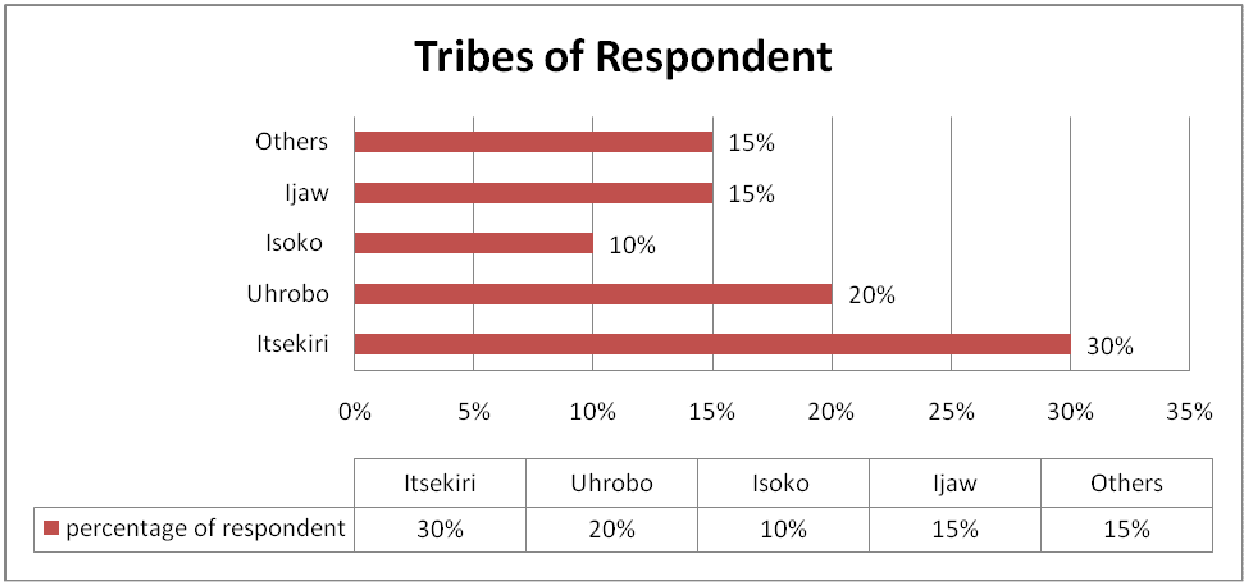


Figure 3: Represents the various tribes of the respondents from the different host communities

Majority of the members of the host communities have little education. 25% have secondary education while a whopping 70% have lower than a secondary education. A paltry 5 % of the people of the host communities possess tertiary education.

Fishing represents the main occupation of the people of the host communities accounting for 60% of the occupation of people in the three host communities used for this survey. Farming

represents 25% while hunting represents a paltry 5%. The balance 10% represents people in other occupation such as teachers, laborers' and other artisans.

The Figure 4 below gives a graphical representation of the different occupation of the members of the host communities.

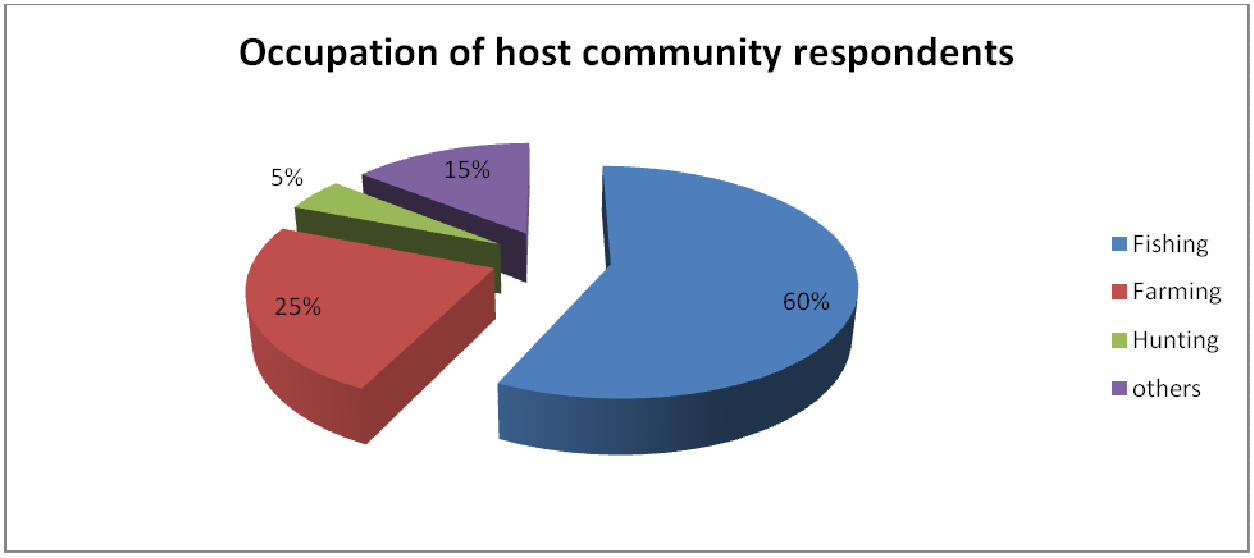


Figure 4: Represents the different occupations of the respondents from the host communities

4.3 Analysis of questionnaire feedback from the Field

The different Multinational oil and gas company operating in the Niger delta have different local communities where they have their main operation and as such would be dealing with various tribes of people with diverse predominate occupation inherent in the community.

This create a huge potential for conflict as the environmental pollution issues that might arise from the operational activities and waste management strategies of the companies might have a negative impact on the occupation and source of livelihood of the people of these communities. This research work uses the feedback from the questionnaire to provide answers to the expected deliverable as itemized in chapter 1 sub 1.6

4.3.1 Pollution impact on Host Communities from Operations of upstream oil and gas Companies.

From the feedback of the questionnaires and the interviews conducted on members of the host community, 100% of the respondents confirmed that the operations of the oil and gas operators in their communities actually pollute their environment in one form or the other. Water pollution as a result of oil spills and other forms of waste disposals constitutes about 45% of the pollutions claims from the respondent who are members of the host communities.

Gas flaring which constitutes a direct air pollution and associated/ indirect land and water pollution as a result of acid rains constitute 50% of pollution claims from the respondents, other forms of pollution constitutes the balance of 5% of the environmental pollution claims.

The Figure 5 below shows a diagrammatic expression of the various environmental pollution culprits on host communities.

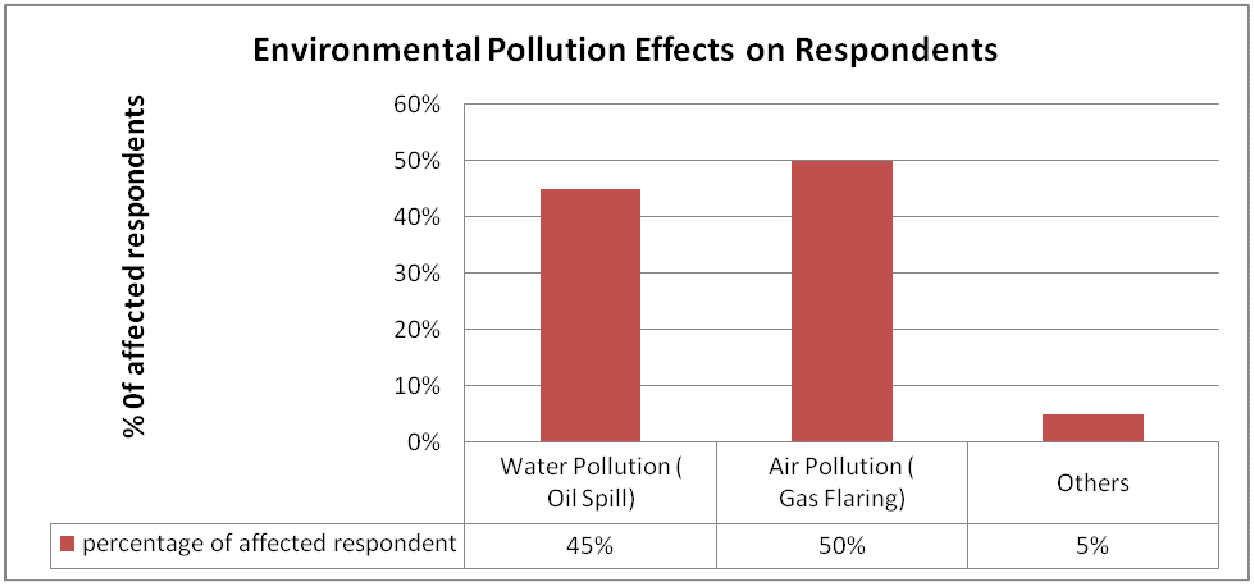


Figure 5: Represents the percentage of respondents directly impacted by various environmental pollution problems in Niger Delta.

Approximately 93% of the respondents in the various host community claims to have been directly impacted by at least a form of environmental pollution created by this oil and gas operators that are operating within their communities while the 7% who have not been directly impacted claims to have seen it happen around them. 40% of the respondent attributed the pollution to operation from Shell producing and Development company while 33% of the respondent mentioned chevron Nigeria Limited as their major environmental pollution culprit. An additional 26% attribute the environmental pollution experienced in their community to the activities of Mobil producing unlimited.

The chart in Figure 6 below gives a graphical representation of the feedback data from the respondents on the pollution impacted on the different Host communities by the different Upstream Oil and Gas operating companies.

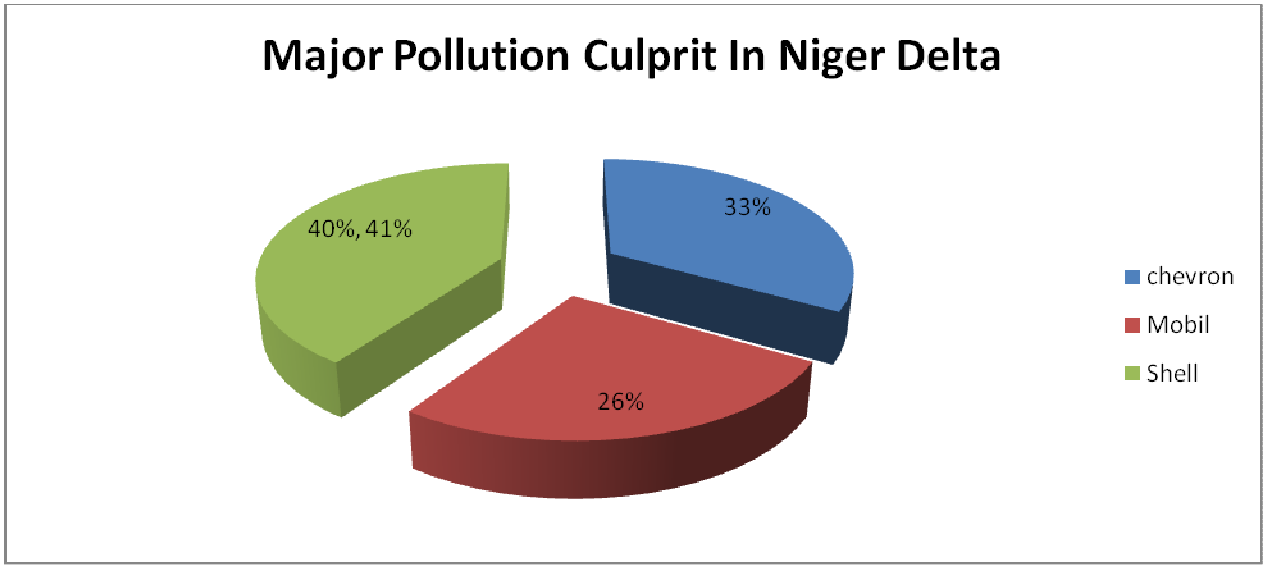


Figure 6: Represents the percentage of respondents that accused the various multination of polluting their environment

Concerning environmental stewardship, 70% of the respondents from the host community where Shell producing and Development company operates rates the company's environmental stewardship as being poor while 20% of respondents rates it as being fair while 10% rates their environmental stewardship as being good. While 60% of the respondents in chevron Nigeria Limited rates chevron's environmental stewardship as being poor, 30% and 10% rates it as being fair and good respectively. In the case of Mobil producing unlimited, 62.5%, 25% and 12.5% of respondents rates their environmental stewardship as being Poor, Fair and good respectively. It is sad to note that no respondent in all the host communities where the oil and gas operators have operating interest rated their environmental stewardship as being excellent.

The chart in Figure 7 below gives a graphic representation of the analysis of the responses of the people of the various host communities where the major Oil and Gas Operators used in this research work have their operating assets.

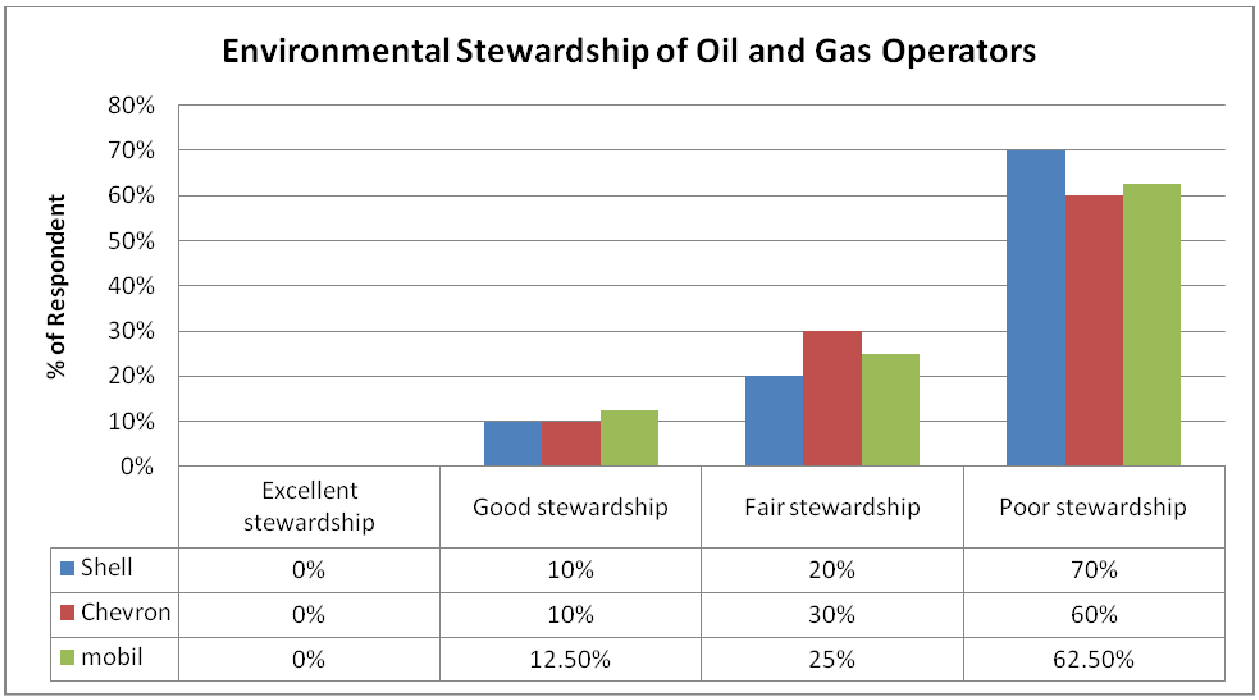


Figure 7: Represents the views of the respondents on the environmental stewardship of the three (3) major Oil and Gas operators in Niger Delta

The analysis above as deduced from the feedback from the various respondent in the different host communities of the states in the Niger Delta where the Multinational Oil and Gas Operators clearly confirms that the Multinational Oil and Gas operators doing business in the Niger-Delta Region of Nigeria actually has an environmental pollution impact on the socio economic lives of the Host community.

4.3.2 Achieving Environment integrity and Existence of Regulatory Body

The existence of the environment protection regulatory agency has been established from the literature review in chapter 2 of this project work. In that section it was evident that the agency responsible for the environmental protection regulations of the operations Oil and Gas Multinationals originated as a result of the environmental protection deficiency observed from the koko dump issue of 1987 in the then Bendel state of the Niger Delta area of Nigeria. This led to the creation of the Federal Environmental protection Agency (FEPA) IN 1988, which has metamorphosed to the present day DPR. However, this chapter also verifies with the feedback

received from respondent of the questionnaires that the agency is fully operation in the Niger Delta region as confirmed with the following facts.

100% of the respondent in both the department of petroleum resources and all the three multinational upstream oil and gas operators in the Niger Delta answered in affirmative to the question of the existence of the environmental protection agencies regulating the operations of the oil and gas Companies and the regulating policies as applied to the industry.

However, 24 respondents out of the 27 who responded to the questionnaire in the different host communities claimed to have knowledge of the existence of the environmental protection agencies regulating the operations of the oil and gas companies and the regulating policies as applied to the industry. The figure represented an 89% response rate, while 11% claims ignorance of the regulatory agency.

The chart in Figure 8 below gives a breakdown of the personnel who are aware of the existence of the DPR in the various units where the questionnaires were distributed.

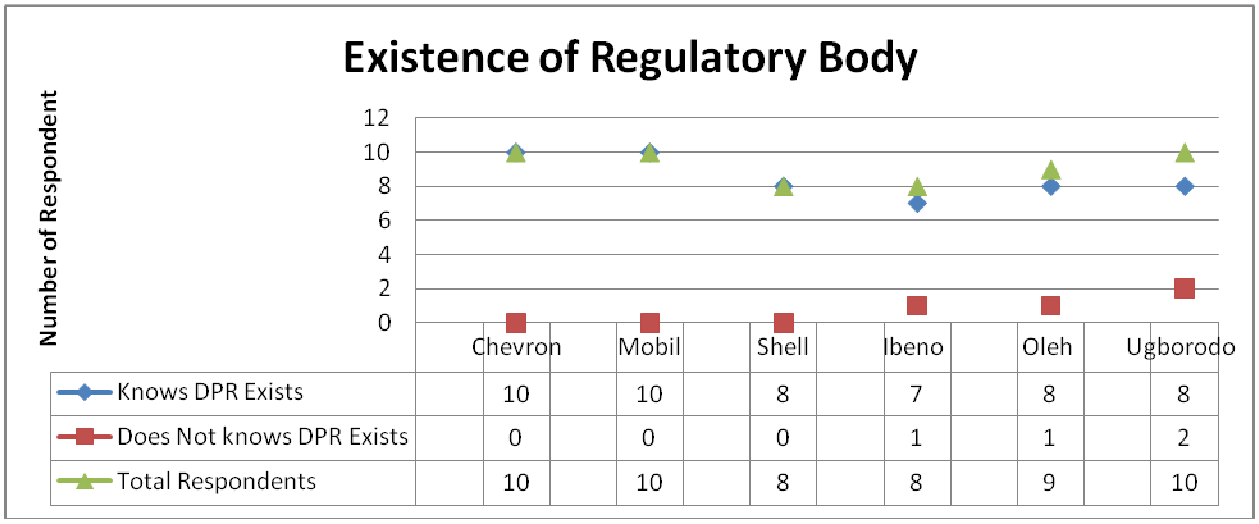


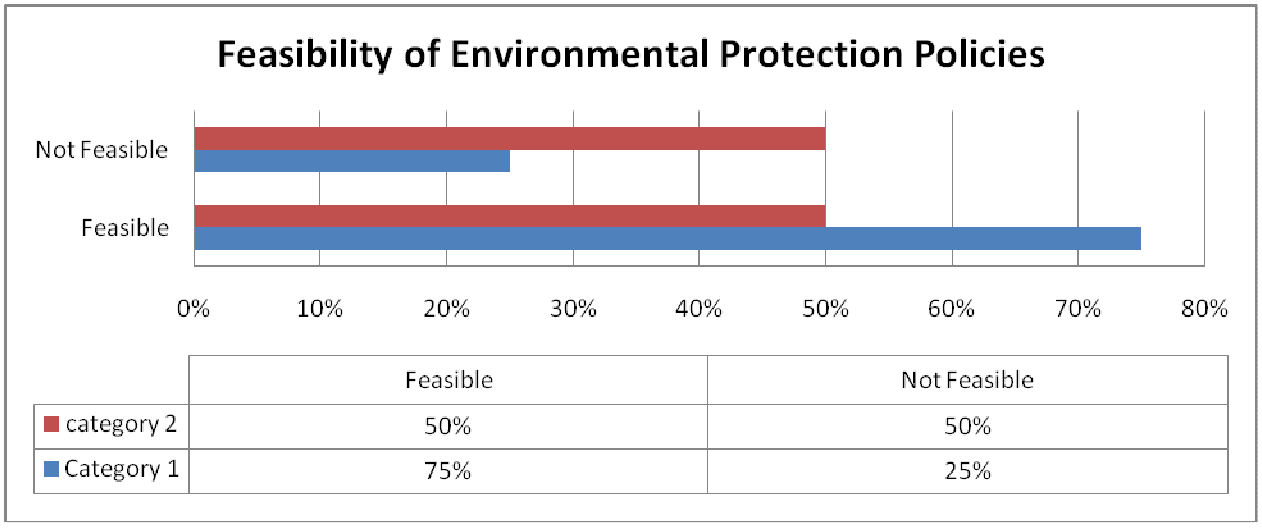
Figure 8: Represents respondents' awareness to the existence of the regulatory body (DPR) in regulating the operation of the Oil and Gas Operators

4.3.3 Effectiveness of Regulatory Body of the Upstream Oil and Gas Companies in the Niger Delta.

The effectiveness of the regulatory body of the upstream oil and gas companies was evaluated using questionnaire feedback from two categories. The first category which consists of the personnel of the three Oil and Gas operators in the Niger Delta had a response rate of approximately 94% amongst the personnel who responded to the questionnaire. The second category deals with respondent from the host communities where there was a 90% response rate.

From this feedback, 75% of the respondent of the first category believes that the objectives of the environmental protection policy of the upstream oil industry are clearly defined and feasible. 25% of the respondents however feel that the objective are not feasible and cannot achieve the objectives of the regulatory body. 50% of the category 2 respondents are of the opinion that the objectives of the environmental protection policy of the upstream oil and gas are feasible while 50% aired their view in the contrary.

Figure 9 below gives a graphical representation of the study carried out in the research work to evaluate if the Environmental protection policies guiding the operations of the upstream oil and gas operators in the Niger Delta is feasible or not.



	Feasible	Not Feasible
category 2	50%	50%
Category 1	75%	25%

Figure 9: Represents respondents view on the feasibility of the environmental protection policies of the DPR.

On the response to the effective enforcement of the upstream oil and gas companies operating in the Niger Delta by the staff of the regulatory body, approximately 86% of the respondent

amongst the members of staff of the multinational Oil and Gas Company representing category 1 are of the opinion that it is not adequate. Approximately 7% of the respondents are of the opinion that the supervision of the operational activities of the operating companies in the Niger Delta by the regulatory body saddle with the responsibility are fairly adequate while the remaining 7% of the respondent are of the opinion that the effectiveness of the supervision is adequate.

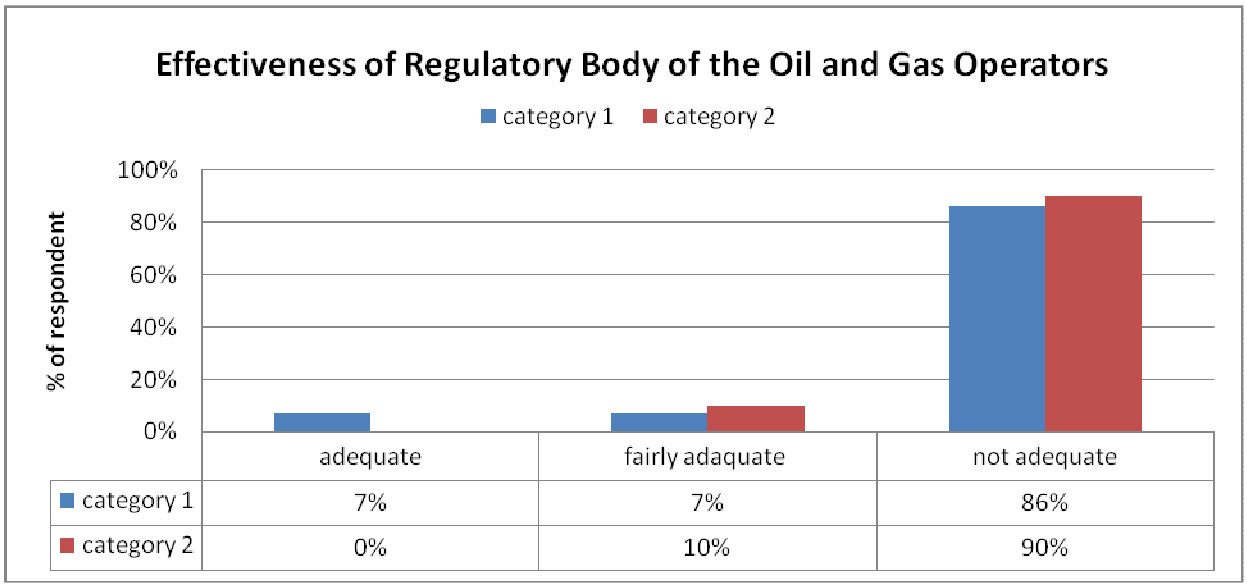


Figure 10: Represents the respondent view on the supervision of the operations of the Oil and Gas operators by DPR in the Niger Delta

However, from the chart above, we can see that respondent the host communities representing category 2 were more critical in their assessment of the regulatory as 90% of them were of the opinion that the supervision of the operations of the Oil and Gas operating company is inadequate in their communities. Approximately 10% of the respondents were of the opinion that the supervision of the operational activities of the operating companies in the Niger Delta by the regulatory body saddle with the responsibility is fairly adequate. While of the 27 persons that responded to the question about the effectiveness of the supervision of the activities of the operating companies in the Niger Delta by the regulatory body saddle with the responsibility, nobody responded that the supervision was adequate.

Approximately 80% of the employee of the Upstream Oil and Gas Operators in the Niger Delta who pleaded anonymity with the researcher are of the opinion that their organization are mostly aware of the regulation as stipulated in the environmental protection policies and Guidelines but do not comply with these regulation mainly due to poor supervision from the

regulatory bodies. However 12% of the respondents claim that their companies always comply with all the stipulated regulations. The balance of 8% of respondent were of the opinion that organization are mostly aware of the regulation as stipulated in the environmental protection policies and Guidelines and sometimes complies with it.

The chart below in Figure 11 gives the feedback of the respondents from the Upstream Oil and Gas Company in the Niger Delta on the compliance to the environmental protection policies.

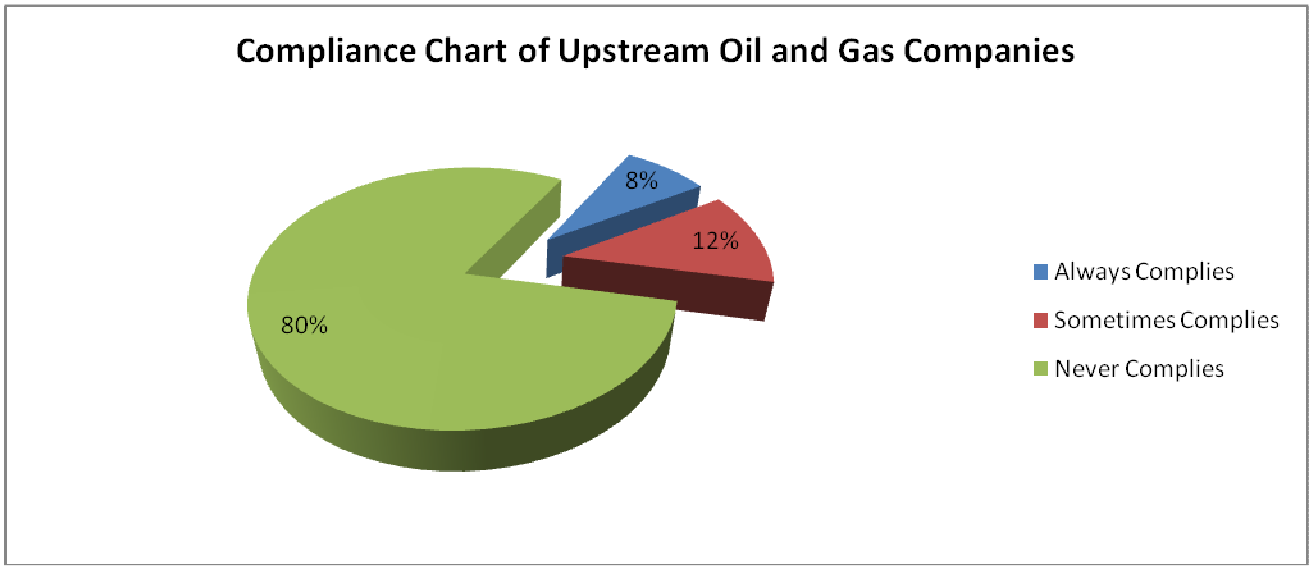


Figure 11: Represents the views of the personnel of the various Oil and Gas Operators in the Niger Delta on their compliance status to the Environmental policies

From the chart above, we can see that 80% of the personnel in the Upstream Oil and Gas Company in the Niger Delta confirm that although the company is aware of the Environmental protection policies and Regulations guiding their operation, they do not comply with the regulation. 12% of the respondents are convinced that their organization sometimes comply with the environmental protection regulations, while 8% of the respondent to the questionnaire confirms that their organization always complies.

4.4 Analysis of Interview feedback from the Field

The researcher employs the use of personal interviews to survey the responses of Six (6) top management staff of the Upstream Oil and Gas Company operating in the Niger Delta and Two (2) top management staff of the Department of petroleum resources (DPR). This report draws upon the researchers understanding of those interviews. The researcher did not record or

produce verbatim transcripts of any interviews, nor did he ask interviewees to review or endorse the notes taken by the researcher.

Of all the personnel identified and interview, everyone responded satisfactory to the questions asked thereby recording 100% response rate. The respondent consisting mainly of adult male Nigerian employee having between 20 and 30years working experience in the operations department of their various companies shared their experience.

From the reports of the interviews conducted, 100% of the respondents are aware of the potential environmental pollution problem posed by the operations of the organization and are in agreement with the federal government of Nigeria's strategy to regulate these environmental issues.

On the part of the respondent from the top management staff of the Upstream Oil and Gas Company operating in the Niger Delta, 100% of the respondents are conversant with the Environmental protection policies of the upstream oil industry as stipulated by the department of petroleum resources (DPR) in their organization and agrees with the regulations and guidelines as stipulated in the Environmental protection policies presently used in the upstream oil industries. They are of the opinion that their organization has a clearly defined environmental protection strategy which it deploys in its operational activities to ensure compliance to these regulations and guideline.

Approximately 67% of the personnel interviewed are of the opinion that gas flaring is the major environmental pollution issues that they are currently facing within their organization while 33% believes upstream Oil spill remains the main threat to environmental integrity.

All the personnel interviewed claimed that their organization has completely eradicated the solid and liquid waste disposal threats to the environment with appropriate waste management techniques

The chart in Figure 12 below reflects this finding.

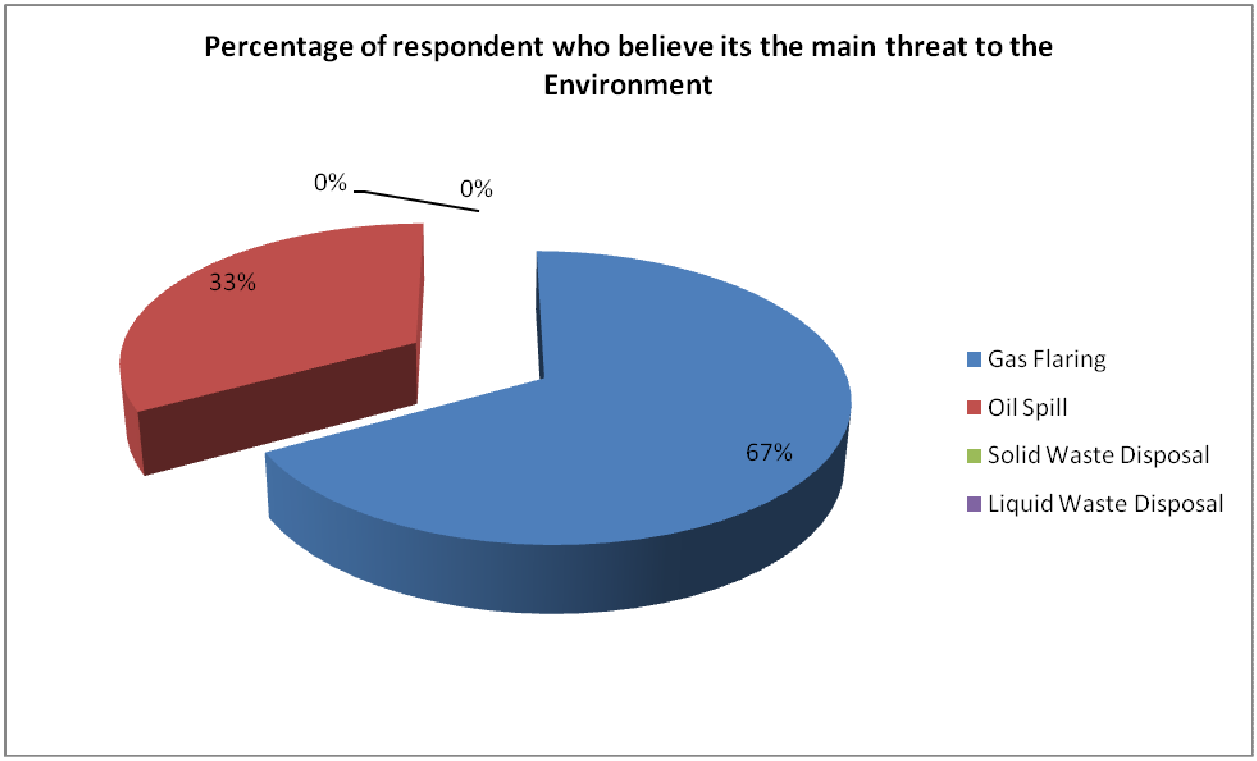


Figure 12: Represents the views of the top managements on the Major environmental threats from the Upstream Oil and Gas Operators

Furthermore, all respondent were of the opinion that in a bid to attain a pollution free operation, the upstream oil and gas operators in the Niger delta still needs to put in a great deal of effort in developing technologies that would help them improve on the gas flaring situation in the Niger delta. This is evident from the Escravos Gas to Liquid project presently being undertaken by Chevron Nigeria Limited.

On the Gas Flare out directive issued by the Federal Government of Nigeria to eliminate all gas flaring activities in the Niger Delta by the 31st of Dec 2010, 75% of the respondent feels that it is an impossible task, while 12.5% of the respondent feels that it is achievable with a great deal of effort. 12.5% of the respondent however refuses to comment on the issue.

The chart in Figure 13 below gives a pictorial representation of these findings:

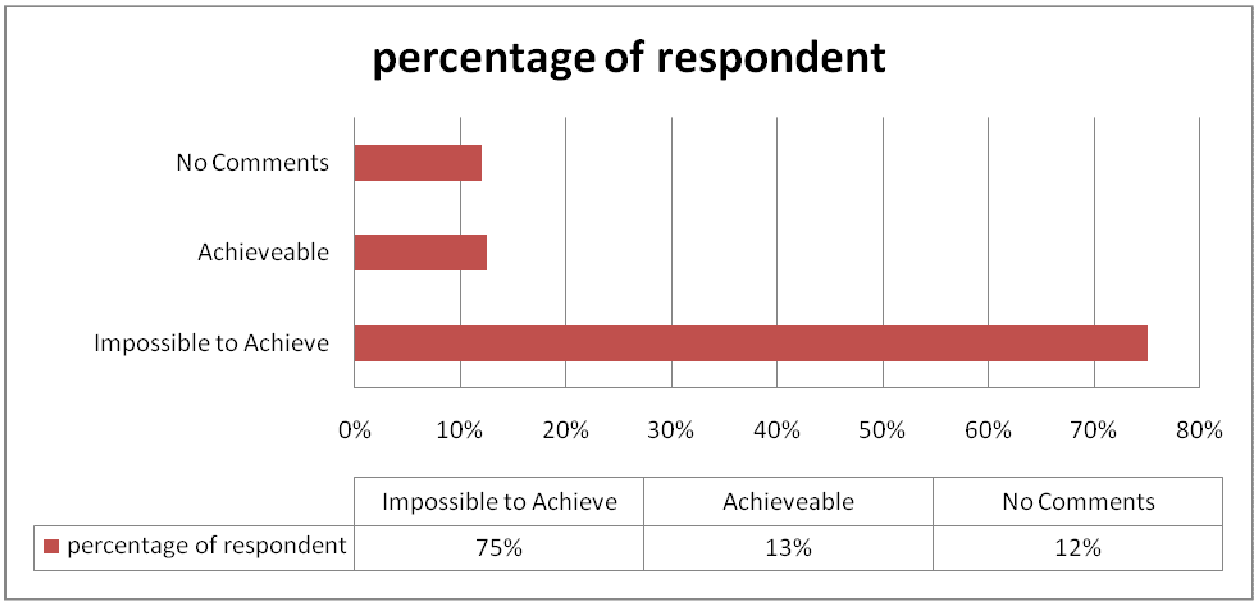


Figure 13: Represents the compliance probability of Oil and Gas Operators to the Gas Flare out Directive of the Federal Government

Finally, all the respondents claimed that their organization has a cordial relationship with the leaders and people of the host communities and also with the members of the department of Petroleum resources (DPR) which is the regulating body.

On the part of the respondents from the top management of the Department of Petroleum Resources, both personnel interviewed are aware of the potential environmental pollution problems associated with the operations of the upstream oil and gas companies in Niger Delta region of Nigeria.

They also claims that their organization have a clearly defined environmental protection regulations and guidelines deployment strategy which it deploys in its regulatory activities to ensure compliance to these regulations and guidelines and believes that these strategies are very effective and are effectively deployed and monitored by competent personnel.

On the issue of gas flaring and upstream oil spills which are the two major pollution culprit in the oil and gas industry in the Niger Delta, the respondents are of the opinion that the oil and gas multinational operators should employ the use of technology to re-use the burnt gases. They agreed with the federal government's directive on Flare out date given to the upstream oil and gas operators in Niger Delta region of Nigeria.

Finally on the issue of cooperation of the leadership and members of the host communities in dealing with the operations of the upstream oil and gas companies, the respondent claims that there is mutual respect between them.

Conclusively, this chapter has basically analyzed the feed data coming from the respondents of the research survey in responds to the pertinent questions asked in chapters 1 sub 1.2 and thereby delivering the deliverables as stipulated in chapter 1, sub 1.6a and 1.6b of the research dissertation.

The next chapter will seek to further deliver on the deliverables as stipulated in chapters 1 sub 1.6c and 1.6d to fully assess the impact of the environmental protection policies guiding the operation of the upstream oil companies in the Niger Delta region of Nigeria.

CHAPTER FIVE

DISCUSSION

5.1 General

The collective analysis of the results of the survey conducted on the different groups by the researcher has a direct response to the deliverables expected of this research work that:

The Multinational Oil and Gas operators doing business in the Niger-Delta Region of Nigeria do have an environmental pollution impact on the socio economic lives of the people of the Host communities in which they perform their operations. This is evident from the feedback of the questionnaires in which:

a. 100% of the respondents answering the question about the issue of the pollution impact on the socio economic lives of the people of the host community by the multinational oil and gas operators responded that the oil companies truly pollute the land, water and air due to their operational activities.

b. 93% of this respondents claims to have been directly impacted by the consequences of the pollution created by the operations of the oil and gas operators in their communities.

c. 40% of the respondents accuse Shell Producing Development Company (SPDC) for the pollution experienced in their Community.

d. 33% of the respondents accuse Chevron Nigeria Limited (CNL) for the pollution experienced in their Community.

e. 26% of the respondents accuse Mobil Producing Unlimited for the pollution experienced in their Community.

f. 50% of the respondent attributed Gas flaring as the major source of pollution from the oil and gas operators that is experienced in their community.

g. 45% of the respondent however feels that oil spills polluting the water in their community is the major source of pollution from the oil and gas operators.

h. 5% are of the opinion that other forms of pollutions such as fire outbreaks, waste dumping on land, are the pollution experienced from the oil and gas operators.

These confirmations from the analysis of the feedback gotten from the respondents from the various host communities verifies that the upstream operations of the oil and gas companies operating in the Niger Delta area of Nigeria do have environmental pollution impact on the socio economic lives of the host communities where they operate and the environmental protection policies which is also confirmed to be operational has limited control on the environmental pollution effect on the socio economic lives of the members of the host communities.

Also the Nigeria Government in a bid to harmonizing the economic interest of the upstream oil industry and the environmental integrity established a body saddled with the responsibility to protect the environment. This is evident from the feedback from the questionnaire in which:

a. 100% of the respondent in both the department of petroleum resources and all the three multinational upstream Oil and Gas Operators In the Niger Delta answered in affirmative to the question of the existence of the environmental protection agencies regulating the operations of the oil and gas Companies

b. 89% who responded to the questionnaire in the different host communities claimed to have knowledge of the existence of the environmental protection agencies regulating the operations of the oil and gas Companies and the regulating policies as applied to the industry

c. While 11% of the respondents from the different host communities claimed that they have no knowledge of the existence of the environmental protection agencies regulating the operations of the oil and gas Companies and the regulating policies as applied to the industry

This finding above clearly establishes the deliverable as stipulated in chapter 1 sub 1.6a and 1.6b.

5.2 Major Gaps Identified while Assessing the Impact of environmental protection policies in Upstream Oil and Gas Operations in the Niger Delta

From the analysis of the feedback of the questionnaires sent out to the personnel of the major oil and gas operators, the department of petroleum resources (DPR) and the host communities, major gaps were identified in the operations of the oil and gas operators and the regulatory body mandated by law to oversee the day to day activities of the Oil and Gas Operators and

these gaps impedes the effectiveness of the environmental protection policies as it affects the operators in the upstream oil and gas industry.

Critical amongst the major gaps identified are:

a. **Inadequate supervision**: 25 out of the 28 respondents from the operations and maintenance personnel of the three major multinational oil and gas operators representing approximately 90% were of the opinion that the supervision of the upstream oil and gas operators to ensure 100% compliance to the environmental protection policies by the regulating body (DPR) is inadequate. On the part of the respondents from the Host communities, approximately 75% of them feel that the monthly visitation by the personnel of the department of petroleum resources to confirm the activities undertaken by the upstream oil and gas operators in the Niger Delta conforms with what is stipulated in the environmental protection policies is less than adequate and as such, the members of the host communities blames this for the present environmental pollution situation in their communities.

   Inadequate supervision by the regulators of the environmental protection policies is a potential avenue for the operators of the oil and gas facilities to cut corners and safe cost on waste treatment and disposal strategies which accounts for the bulk of the environmental pollution issues. This inevitably would leads to an environmental pollution situation.

   Also, the members of the host communities as history has shown, sometimes exhibits their grievances by sabotaging the facilities of the oil and gas operators and this inevitably will lead to environmental pollution issues.

b. **Negative Perception**: from feedback of the questionnaires sent to the members of the host communities, approximately 80% of the respondents were of the opinion that the oil and gas operators in their communities are not welcomed. 20% however responded that they are indifferent about their operations. This could be attributed to the fact that the people expect the oil and gas operators in their communities to provide social amenities for their communities since the responsible authorities such as the local government authorities and state governments are not meeting up to their obligations.

   Furthermore, almost 90% of the respondents amongst members of the host communities claim that the regulation of the activities of the upstream oil and gas operators in their communities by the staff of the DPR is relatively inadequate. This they attribute to be the major cause of the environmental pollution experienced within their

communities and as such have developed hatred towards the activities of the upstream oil and gas companies.

This situation has degenerated so much in some communities that the members of the communities have resulted in creating militant groups such as Movement for the Emancipation of the Niger delta (MEND) to sabotaging the pipeline transporting the petroleum product from their communities, and this result in environmental pollution. All these have a huge impact on the operations and the environmental integrity of the oil and gas operators.

c. **No clearly defined consequence management plan**: From the feedback of the questionnaires received, 90% of the personnel from the major oil and gas operators operating in the Niger Delta said they have no knowledge of the consequence management plan that is deployed in an event of a violation of the environmental protection policies. 10% however claimed to have basic knowledge of the consequence management plan being used by the regulatory body. Since the majority of the operating personnel in the oil and gas fields have no knowledge of the consequences of their action or inactions which can lead to pollution, they will really not be obliged to strictly follow the requirements of the environmental protection policies.

   Furthermore, all the respondents from the host communities claim to be ignorant of any such plan and as such do not know the consequences of the environmental pollution activities

   However, all the personnel of the regulatory body (DPR) and the top management personnel interview in the DPR and the major multinational oil and gas companies acknowledged being aware of the consequence management plan.

d. **Faulty Policies:** From the feedback of the questionnaires sent to the personnel of the department of petroleum resources, 80% of the staff of the department feels that the flare out directive issued by the federal government to the oil and gas operators in Nigeria to eliminate all gas flaring by 31st December, 2010 is an unrealistic target. This is an unfavorable condition as the impact of such an environmental protection policy would be detrimental to the industry.

   The unrealistic tendencies of the flare out deadline directives given by the federal government of Nigeria could be attributed to the amount of infrastructural work that needs to be put in place to harness the gas that is presently being flared. So having a

directive that does not consider the impact of such directives on the organization it applies is really an ill advised policy.

The gaps identified and discussed above are the major ones amongst the gaps constraining the major upstream oil and gas operators that are operating in the Niger Delta from complying fully with the environmental protection policies and achieving a pollution free operation.

Therefore, developing strategies to close out these gaps that disallow the full compliance to the environmental protection policies would effective create an enabling environment absolute compliance to the environmental protection policies and thus achieve a pollution free operations in the upstream oil and gas business in the Niger Delta. This will also deliver on the deliverable as stipulated in 1.6c.

5.3 Strategies to close- out gaps identified in upstream Oil and Gas Operations in the Niger Delta

This section of the research dissertation would seek to highlight some strategic plans that if deployed would close out the gaps identified in the compliance attitude of the operators of the upstream oil and gas companies towards the environmental protection policies thereby aspiring to achieve a pollution free operations.

The analysis of the feedback received from the various respondents from the different groups, forms the basis for the development of the strategic plan that would be discussed in this section and they will be aimed at addressing the aforementioned gap already identified and discussed.

5.3.1 Visible Leadership and Effective Supervision

Lackluster supervision has been identified as one of the major hindrance that impedes the effective compliance of the major oil and gas operators to the environmental protection policies as stipulated by the department of petroleum resources.

To effectively close out the leadership and supervisory gap in the operations of the DPR to manage the activities of the major upstream oil and gas operators in the Niger Delta, the following plan can be deployed:

a. A top management staff of the department of petroleum resources to personally visit the various operational upstream oil and gas fields unannounced and at random

to physically observe their degree of compliance to the environmental protection regulations in their day to day operations.

b. A staff of the department of petroleum resources to work full time at all the operational assets of the oil and gas operators in the Niger Delta and logs the daily activities of the fields into the data base of the DPR for effective monitoring.

c. The various stake holders including the DPR, major oil and gas operators in the Niger Delta and the representative of the Host communities to hold a monthly meeting to address all issues concerning the environmental pollution issues due to non compliance of the environmental protection policies experienced during the outgoing month. This will create an accountability opportunity for the stakeholders and also help create a forum for dialogue.

d. Random samples of the waste from the oil and gas operators in the Niger Delta by the top management representative of the DPR would also help ensure that the operators keep the waste that is being disposed within the stipulated limits.

e. Leadership models such as operational excellence (OE) and operational excellence management system (OEMS) that have succeeded in organizations such as Chevron Corporation should be developed and implemented in the DPR.

5.3.2 Positive perception of Members of the Host Community

The analysis of the feedback from the respondents of the various host communities shows that the members of these communities generally have a negative perception of the activities of the oil and gas operators doing business in their area. This coupled with the negative reports about the history of the degradation of the land, water and air by the operators of the oil and gas facilities has created a negative perception in the minds of the inhabitants of these communities.

This research work would supply some suggested guidelines that if implemented would seek to redress these issues and change the perception of the inhabitants of these communities from the present negative one to a positive perception.
This would also bring about lasting peace and co-existence amongst all parties involved in the upstream oil and gas business and ultimately eliminates the environmental pollution associated with sabotage by the members of the host communities.

Keys amongst the guidelines to redress these issues are that:

a. The regulatory body of the oil and gas industries and the major upstream oil and gas operators should as a matter of urgency address all the outstanding memorandum of understanding (MOU) issues that it signed with the members of the host communities. This as reported has always been the bane of the struggles between the Members of the host communities and the major oil and gas operators.

b. The upstream oil and gas operators provide social amenities such as hospitals, pipe borne water, electricity and good road network in the communities where they operate because the environment issues arising from their operations do have a negative effect on the people of the host communities. From the analysis of the feedback from the respondent, 75% of respondents claim that a member of their family has been medically impacted by the effect of the operations of the upstream oil and gas operators. Therefore providing the above mentioned social amenities in the communities they operates would help improve the perception of the people towards their operations.

c. Employment opportunities be created for the members of the host communities to allow them be gainfully employed in facilities operating within their communities and take ownership for the waste disposal from these facilities into their land.

d. The major upstream oil and gas operators that do business in these local communities should develop means such as scholarships to students from schools these communities, and creation of skill acquisition centers to give back to these communities to help change the negative perception and foster peace and harmony to all concerned.

e. The major upstream oil and gas operators should integrate the leadership of the host communities in which they operate in all decisions that affects the environmental protection and waste management issues to improve transparency and accountability between the oil and gas operators, the regulatory body and the leadership of the host communities. This will help change the negative perception of the people and eliminate environmental pollution due to sabotage.

5.3.3 Functioning consequence management plan.

The consequence management plan as applied in this research work for upstream oil and gas operations is the laid down sequence of operation and actions that should commence at the detection of an environmental pollution activity.

These plans should be public knowledge to all personnel involved in the upstream oil and gas operation so that they are aware of the consequences of their actions. However, from the analysis of the feedback from the respondents in the major multinational oil and gas operators, 90% claims to have no knowledge of this plan. This is not a very good situation as these personnel unaware of the consequences of their actions may become potential environmental pollution culprits.

This research work would proffer guidelines that if implemented would create a functioning consequence management plan for the upstream oil and gas operators. Key amongst these guidelines is:

a. The document containing the plans dictating what consequences should follow any environmental pollution issue should be visibly located in all operating assets of the upstream oil and gas operators.

b. The environmental legislation should clearly state the fines or penalties for non compliance to environmental protection policies in upstream oil and gas activities. These penalties should be stringent enough to deter operators from polluting the environment

5.3.4 Realistic Policies and Guidelines.

The Federal government of Nigeria through the regulatory bodies of the upstream oil and gas operators formulates policies and operational guidelines to control the activities of these upstream oil and gas operators so as to achieve its goal of harmonizing the economic interest of the government with the sustainability of the environment

Therefore, the formulation of bad and uninformed policies is a potential disaster for the industry. A typical example of such is the Flare out policy which stipulates that gas flaring in all the operational assets of the upstream oil and gas should be eradicated by 31st December, 2010

is seen within the industry as an uninformed and bad policy due to the fact that it is an unrealistic target if the economic interest of all stake holders is put into the equation.

The infrastructural activities that should be a pre requisites to this policy is far from being implemented and as such giving a flare out directive within such time frame is simply telling the operators of the oil and gas operating assets to shutdown their wells.

This research work would proffer guidelines to help in policy formation in regulating the environmental protection plan of the federal government of Nigeria.

a. Persons responsible for policy formation should be drawn from the stakeholders since they have the knowledge of the activities that should prelude any policy.

b. A realistic time frame should be given for all deadline directives to ensure that the probability of achieving the deadline should be 1.

c. Appropriate punitive measure should be spelt out for defaulters to all deadline directives to increase the chances of compliance.

d. Consistency should be paramount in all policy formulation to ensure fairness to all parties involved.

It is important that the environmental protection policies should be well informed, realistic, and fair and firm so that all the operators of the oil and gas activities in the Niger Delta region on Nigeria know that compliance to these policies is mandatory.

5.4 Consequence management plan in the upstream Oil and Gas Operations in the Niger Delta.

The consequences management plan as used in the upstream oil and gas exploration and exploitation business is the laid down sequence of operation and actions that should commence at the detection of an environmental pollution activity.

From the feedback received from the respondents of department of petroleum resources, the major upstream oil and gas operators and interviews of the top management staff of the DPR and Major oil and gas operators, this research work verifies that a consequences management plan exists in the Department of petroleum resources in its regulation of the upstream oil and gas operations and this would be attached in the appendix of the research work.

Conclusively, this chapter discusses the findings from the analyzed results in chapter 4 and addresses the expected deliverable in chapter 1 sub 1.6. Furthermore, this research work has been able to deliver on all the expected deliverable and as such the next chapter would conclude this work and make necessary recommendation from its findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Dissertation Content

Crude oil exploitation and development activities is unarguably a major factor that generates most of the negative impacts on the environment thus posing serious threats to health and the general wellbeing of the people within the vicinity of operations and even beyond.

The assessment of the impact created by the environmental protection policies which guides the operations of the upstream oil and gas operating companies in Nigeria is a key aspect of one of the goals of the Nigerian government which is to ensure that as it strives to fully harness the economic benefits from the potential hydrocarbon resources obtainable in the Niger Delta, the environmental sustainability of the host communities should not be compromised.

This singular ambition necessitated the creation of regulatory bodies tasked with the responsibility by the Federal government of Nigeria to harmonize the economic benefit of the oil and gas operations with the environmental protection desire.

The regulatory body in carrying out this function developed rules and regulations to guide the operations of the oil and gas operators who carry out exploratory and exploitation activities in harnessing the oil and gas with a potential for environmental pollution and administer appropriate punitive measures to defaulters.

This research work seeks to assess the impact of these rules and regulations in guiding the everyday operations of the oil and gas operators in the Niger Delta, and also assess the consequence management strategy the regulators employed in deterring the oil and gas operators from defaulting

6.2 Conclusions

So as such, this research dissertation has the following conclusions

Chapter 1 gives a background study which is to evaluate the impact assessment of environmental protection policies on upstream oil and gas activities citing some of the health

and in particular socio-economic problems the host communities face as a result of these activities.

In the bid to establish the objective of this study, efforts were made to look briefly at the history of environmental degradation in Nigeria, the post 1987 koko waste dump issue which led to the creation of several governmental parastatal to oversee the operations of oil and gas operators in the country and the promulgation of environmental laws to guide the operations of these operators.

Furthermore, the chapter also sought to investigate the compliance of the upstream operators to the environmental laws and the reaction of the host communities to these which has increasingly resulted in several conflicts of interest amongst the parties involved overtime.

Finally the terminologies and technical jargons that readers will encounter in the course of reading this research work were discussed.

In chapter 2, a technical overview of the upstream oil and gas operation was discussed with emphasis on waste generated during the different stages of the exploration and exploitation stages taking into consideration the potential of these activities to cause environmental pollution.

The chapter also validates from reports that a body was created by the Federal government of Nigeria to oversee the development, implementation and compliance tracking mechanism of the environmental protection policies as used in the upstream oil and gas operations in the Niger Delta of Nigeria.

The methodology and work breakdown structure to be employed in achieving all the predefined deliverables in response to the pertinent questions asked which were within the scope of the research work were discussed in chapter 3. The audiences and the survey tools were defined and the expectations from their feedback from the questionnaires and interviewed deployed in the survey were discussed.

Chapter 4 discusses the background into the major upstream oil and gas operators in the Niger Delta that form the case study for the research work. It also sheds more light on the regulatory body responsible for the upstream oil and gas operations and the host communities where the upstream oil and gas operators carry out their operations.

This chapter also has pictorial representations giving clear and concise presentation of the feedback analysis from the survey conducted in direct response to the expected deliverable and

also answers the pertinent questions asked in chapters 1 which is in line with the scope of this research.

Chapter 5 discusses the results from the analysis in chapter 4 with the aim of highlighting the major deliverables obtained from the findings. This chapter also identified and discussed the major gaps that were reported from analysis of the feedback from the respondents while assessing the impact of environmental protection policies in upstream oil and gas operations in the Niger Delta area of Nigeria.

Furthermore, strategies to close out these identified gaps in the operations of the oil and gas operations were discussed and the availability of the consequence management plan as used in the upstream oil and gas operations in the Niger Delta.

Finally, the deliverable of this research work can thus be summarized as follows:

a. The federal government of Nigeria in a bid to optimally harmonizing the economic interest of the upstream oil and gas industry actually established a body tasked with the responsibility of implementation and compliance tracking mechanism of the environmental protection policies as used in the upstream oil and gas operations in the Niger Delta of Nigeria. This was reported by (Aina & Adedipe, 1991)

   This Federal Environmental Protection Agency was created by Decree 58 of 1988 as the overall central regulatory body responsible for formulating environmental policies, prescribing national guidelines and standards, supervising compliance and enforcing all concerned operators to comply with these guidelines. (Aina & Adedipe, 1991)

   The DPR which is the department that controls the day to day activities of the upstream oil and gas operators was created from the federal ministry of petroleum resources and tasked with the responsibility to protect the environment from the adverse effect of industrialization associated with the exploration and production activities in the upstream operations through proper management of our environment and good planning for future development.

b. The effectiveness of the DPR which is the body created to harmonize the oil exploration and exploitation activities of the upstream oil producers with its environment protection policies was assessed by two different categories of respondents in this research work.

   The first category of respondents which constitute the personnel from the three major upstream oil and gas operators had approximately 86% of the respondent rating the effectiveness of the DPR as “not adequate”. Approximately 7% of the respondents are of

the opinion that the effectiveness the regulatory body is “fairly adequate” while 7% of the respondent are of the opinion that the effectiveness of the DPR is “adequate”.

The second category of respondents which constitute the personnel from the host communities where these upstream oil and gas operators operate in the Niger Delta had approximately 90% of the respondent rating the effectiveness of the DPR as “not adequate”. Approximately 10% of the respondents are of the opinion that the effectiveness the regulatory body is “fairly adequate” while 0% of the respondent are of the opinion that the effectiveness of the DPR is “adequate”.

Finally, averagely 88% of the respondents from both categories rate the effectiveness of the DPR in regulating the activities of the industry as being inadequate and this verdict represents great cause for concern.

c. The strategy to close out the gaps identified from the analysis of the feedback of the questionnaires sent out to the personnel of the major oil and gas operators, the department of petroleum resources (DPR) and the host communities that impedes the effectiveness of the environmental protection policies as it affects the operators in the upstream oil and gas industry was developed in this research and includes but not limited to the followings:

- Visible Leadership and Effective Supervision
- Positive perception of Members of the Host Community
- Adequate staffing and training of personnel
- Adequate funding
- Regular inspection of oil and gas facilities
- Functioning consequence management plan
- Realistic Policies and Guidelines

These strategies if implemented has a potential to close out the gaps that impedes the effectiveness of the environmental protection policies as it affects the operators in the upstream oil and gas industry that were reported from the analysis.

d. The analysis of the feedback from the respondents of the personnel of the major oil and gas operators, the department of petroleum resources (DPR) and the host communities in the Niger Delta shows that consequence management plan which is a laid down sequence of operation and actions that should commence at the detection of an environmental pollution activity already exist and would be attached to the appendix of this research work.

6.3 Recommendations

The research verified that the impact of the assessment of the environmental protection policies currently used in the upstream oil industry in the Niger Delta of Nigeria is not effective.

The ineffective implementation of such policies results in potential environmental pollution occurring in the host communities of the upstream oil and gas operators.

To ensure an improved impact of the environmental protection policies in the upstream operations, the following recommendations are made and if implemented by the government and other relevant stakeholders, it will result in greater benefits that will guarantee a sustainable environment.

a. The Department of Petroleum Resources should be re-positioned to carry out its regulatory responsibility in the oil and gas industry by ensuring the followings are done:
    - Personnel qualification and industry related experiences should be the key criteria for selection of decision or policy makers within the DPR.
    - Adequate funds and equipments needed for smooth regulation of the activities of the petroleum industry should be provided.

b. The Environmental Protection Policy and Guidelines should be reviewed annually by all stakeholders involved to ensure that they remain relevant to the needs of the present day oil and gas industry.

c. Consequence management plan that stipulates the laid down sequence of operation and actions that should commence at the detection of an environmental pollution activity should not be applied generally as presently used but must be relevant to a particular operation of the oil and gas industry.

d. Regular Assessment of the compliance of the upstream oil and gas operators should be made public and environmental pollution issues should be discussed in forum amongst stakeholder to develop best practices.

e. Defaulters of the environmental protection regulation in the upstream oil and gas industry should be investigated and the results of the investigation should be made public and then the appropriate punitive measure that is sufficient to deter a re-occurrence should be taken.

f. Subsequent defaulting of the environmental protection policies by the same upstream organization that has defaulted previously should be thoroughly investigated and stiffer penalties applied which could include suspension of license to the defaulting organization.

g. As a reward for the organization that fully complies with the environmental protection policies, incentives such as tax rebates on highly optimized equipment should be given to any operating assets with a 100% pollution free operation.

h. The regulatory body such as the DPR and other bodies by the federal government should shift focus to the possibility of cleaner environmental technologies and better waste management strategies in upstream oil and gas business, though this will require huge investments, the government and the operating companies should see it as a collective responsibility and fund waste management projects towards achieving a cleaner environment for the host communities

i. Monthly stake holder meetings should be held between the various stakeholders and the other participant including facilitate the development of mutual trust and result amongst the stakeholders.

j. Resources allocated for the development of the host communities where the major upstream oil and gas companies should be increased to ensure that the members of the Host communities benefits from the adverse effect from the exploration and exploitation activities of the Host community

Conclusively, the research work has been able to verify the existence of the regulatory body tasked with the responsibility to develop an action plan that would harmonize the economics benefit of oil and gas exploration and exploitation with the desire environmental integrity. Also the existence of the regulation guiding these activities of the oil and gas operators has also been established.

However, the general conclusion from this research work is thus: “Although there is a body tasked with the responsibility to develop, implement and track compliance of the environmental protection policies in the upstream oil industry, the body is ineffective and as such the impact of the environmental protection policies is inadequate.”

The basic recommendation from the research work to improve the system to achieve the regulators goals are found in 6.3 above.

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APPENDICES

Appendix 1: Letter of Introduction for Questionnaires

Appendix 2: Questionnaire for Respondent from the Major Multinationals in Nigeria

Appendix 3: Questionnaire for Respondents from the Department of Petroleum Resources (DPR) in Nigeria

Appendix 4: Questionnaire for Respondents from the Members of the Host Communities in Niger-Delta

Appendix 5: Interview for Top Management from the Major Multinationals in Nigeria

Appendix 6: Interview for Top Management from the Department of petroleum resources in Nigeria

Appendix 7: Guidelines for the Establishment of Hydrocarbon Process Plants (Petroleum Refinery and Petrochemicals Plants) In Nigeria (EGASPIN)