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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**DEVELOPING AN EFFECTIVE MECHANISM OF
OIL POLLUTION MANAGEMENT IN THE
NIGER DELTA**

By
JA'AFARU LABARAN DAURA
Nigeria

A dissertation submitted to the World Maritime University in partial fulfilment of the
requirements for the award of the degree of

MASTER OF SCIENCE

In
MARITIME ADMINISTRATION AND ENVIRONMENTAL PROTECTION

2000

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The content of this dissertation reflects my own personal views, and is not necessarily endorsed by the University.

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Abstract

Title of Dissertation: **Developing an Effective Mechanism of Oil Pollution Management in the Niger Delta**

Degree: **MSc**

From the beginning of the last century, large data were collected and recorded on some important accidents related to transport of oil. Particular attention was focused on the consequence of spilt oil in marine environment. It was convincingly gathered that unless drastic measures are taken, substantial part of marine resources that plays key role in supporting life on earth are at the brink of being destroyed. The uniformity and harmony of regulations created under the IMO was said to be the reason behind the success of its conventions. As a result of this, there was generally a sharp decrease in the quantity and rate of occurrence of oil spill.

Nigeria as a nation and as an exporter of crude oil is presumed to be potential place of accidental oil spill. Some possible causes of this include loading/discharging of oil, bunkering, fire & explosion and routine ship operations. There have been some efforts by the government to address at least some of these problems, such as membership of IMO, and establishment of Ministry of Environment.

Despite this strive, there have been continuous reports of oil spill particularly in the Nigerian coast of Niger delta. Since export of oil is crucial to Nigerian economy, the exploitation and exploration will have to continue to the detriment of the environment. Consequently, by sustainable development, the sharp effect of this could be abetted. This includes adequate regulations to act as preventive measures, critical examination of existing and new projects on how they would affect the environment and program of response to possible accidents. These are the issues discussed in this dissertation with particular attention to Nigerian coast of Niger Delta.

KEYWORDS: Environment, Oil, Pollution, Regulations, Development, and Government.

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List of Abbreviations

CLC	International Convention on Civil Liability for Oil Pollution Damage
DEPA	Danish Environmental Protection Agency
DPR	Department of Petroleum Resource
EER	Environmental Evaluation Report
EIA	Environment Impact Assessment
IMO	International Maritime Organisation
IOPC	International Oil Pollution Compensation Fund
ISU	International Salvage Union
ITOPF	International Tanker Owners Pollution Federation
LR	Low Range
MARPOL	International Convention for the Prevention of Pollution from Ships
MOE	Ministry of Environment
MRCC	Marine Rescue Co-ordination Centre
MOU	Memorandum of Understanding
NMA	Nigerian Maritime Authority
NIO	Nigerian Institute of Oceanography
NNPC	Nigeria National Petroleum Company
NOSCC	National Oil Spill Control Committee
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
SUA	International Convention for the Suppression of an Unlawful Act
SWOT	Strength, Weakness, Opportunity and Threat
ULCC	Ultra Large Crude Carrier
UN	United Nations
UNCLOS	United Nations Convention on Law of Sea
VLCC	Very Large Crude Carrier

Chapter 1

Introduction: Nigeria's Maritime Potentials

The maritime zone of Nigeria constitutes that which has been defined in the 1982 United Nations Convention on Law of Sea, i.e. the Territorial Sea, Contiguous Zone and Economic Exclusive Zone.

The coastline is a culmination of varieties of natural features and good favourable climatic conditions that make life and living feasible. This was the situation prior to the present developmental activities that started some decades ago. The coastline stretched to approximately nine hundred kilometres. One of the most important parts of this coastline is the Niger delta region. It is basically a place where the economic life-wire of the nation lies. Crude oil prospecting, exploration and exploitation, a shipping, port as well as fishing and boating are the main significant activities taking place there which consequently pose a potential threat to the well being of the environment in the surrounding area. The developments related to oil prospecting were a sequel to Nigeria's economic boom which was a result of the multiplication of crude oil prices in the world market in the mid seventies. The level of threat has been increasing ever since.

To help understand the under pinning problem of oil spill pollution in order to offer a better approach to combat the negative effects, the strengths, weaknesses, opportunities and threats of the present regulatory regime need to be examined.

Figure 1.1 Nigeria and Neighbouring Countries in the West Africa Subregion



(Source: Shell Nigeria, 1999)

Nigerian government business is operated under the principle of separation of power comprising the executive, legislative and judiciary. Ministries are answerable to the presidency, among them the Transport. The work of the maritime senate committee in

the legislature is to debate and scrutinise proposals whenever tabled before it by the executive or other user organisation. The National Maritime Authority (NMA) mission statement was rather designed focusing more on economic policies, particularly those pertaining to shipping, ships and general maritime safety, hence it has not been receiving any subvention from the government for running its daily activities. The Ministry of Environment on the other hand was established a year ago to deal with issues related to marine environment policies among other things.

Nigeria is a member of the International Maritime Organisation (IMO), a United Nations specialised agency charged with the safe operation of ships and the marine environment. A couple of treaties like Oil Pollution Preparedness, Response and Co-operation convention have been ratified by Nigeria, though not yet incorporated as binding national law. Also ratified is the 1982 United Nations Convention on the Law of the Sea (UNCLOS).

Under the existing structure, the Ministry of Transport oversees under its power the running of affairs of all the ports in the country, namely the Nigerian Port Authority. However, some degree of autonomy is exercised in the field of revenue generation. While some percentage of this is allowed for the port's day-to-day keep up, a substantial amount usually ends up in the federation account.

A World Bank assisted study revealed that Nigeria's international trade is about eighty to ninety percent sea-borne. General cargoes are the main goods for import, mostly using general cargo ships. However, recent developments attributed to security are now forcing nearly thirty percent of imports to Nigeria through the ports of the neighbouring countries. The poor operating condition of the four oil refineries favours the importation of premium motor spirit for domestic consumption. On the other hand, export to countries around the world is mainly crude oil; as a result, tankers ranging from small to

ultra-large crude carriers call and load their cargo in the six loading terminals all located in the Niger delta. There are no reception facilities in either the ports or oil loading terminals. Nigeria has a substantial reserve on shore and offshore of oil that can last up to fifty years. The present export capacity is two million barrels per day. This has made the country the sixth largest oil exporter in the world. The Ministry of Petroleum Resources oversees the oil industry. Exploration and exploitation is achieved through contractual agreement with multi-national oil companies, currently numbering about five.

Recently, there has been a growing number of piracies and armed robbery cases in the territorial sea. Although this is not a new phenomenon as in the eighties, a joint team of scrutiny operation set up by the federal government and comprising of the navy, police and customs were able to disperse and restore normalcy.

Another threat to the marine environment is the introduction of alien marine species by tankers that call to load cargoes at the oil loading terminals. Most of the tankers calling are coming in to Nigeria on ballast voyages, naturally before loading; they will have to discharge the ballast water. An unfortunate condition is consequently created, where undesirable species are introduced.

The recent IMO initiative on port state control has seen many regional memoranda of understanding (MOU). The pressure exerted by those developed MOUs has consequently driven away substandard ships to regions where the agreement is yet to be taken up, among which are West and Central Africa. As unseaworthiness and substandard ships are a threat to the marine environment, the region is vulnerable to and at risk of being polluted.

Recognising the abundant resources found in the Nigerian maritime zone, particularly the Niger delta region, there are ample opportunities and a basis for sustainable development projects (some of which have already taken up). These include:

- The Expansion and technical upgrading of artisanal fisheries and the creation of a national fisheries capability at an industrial level. The aim of this will be to increase production of fish and the by-products, domestic consumption and export sales. The advantages are an increase in employment opportunities and protein consumption. This implies the construction of some fishing ports to be equipped with relevant modern facilities.
- The Development of a centre for the loading and processing of natural gas and petroleum offshore. The discovery of gas and oil offshore opens new prospects to the energy sector. In addition to satisfying the domestic need, the surplus will go to export, thus it will make a substantive contribution to the national economy.
- The Modernisation and expansion of maritime transport and improvement of navigational safety. The increase in imports and exports of goods calls for the need to build or improve and upgrade port facilities. This will be aimed at coping with the expected increase in volume of cargo and cross-trading activities as well as traffic associated with the offshore industry.
- The Development of a Marine Park in the reef conservation zone. Apart from an increase in tourism, there is an opportunity for the preservation of the natural characteristics of reef areas thus providing a natural laboratory and an area of scientific research. This project may include the mapping of the park area and formulation of a management plan encompassing the control of human settlement, regulation of beach use and protection of reefs from pollution.

Focusing on these issues related to the marine environment and ecology, the maritime administration can generate an appropriate mission and vision statements. A mission is a statement of purpose based on objectives put forward by an organisation with the hope

and aim of achieving a set of given goals within a specific period of time(J. F. R. Hugdson, 1999). While a vision is a statement indicating the overall aim of an organisation for a long time to come. These are important managerial tools used as yardsticks to measure the objectives and progress achieved by an organisation and a guidance to keep tuning into the right track.

1.1 Relevance of the Topic to the Field of Study

The Niger delta region is one of the most important coastline areas of Nigeria. Considerable maritime activities such as the exploration and exploitation of crude oil, shipping, ports operations, fishing and boating are taking place there. As these activities have negative tendencies on the marine environment, there is a need to have proper monitoring in terms of regulations. These would have to be designed focusing on prevention and response in the case of marine pollution.

To address the problem of marine pollution, IMO has been to the rescue of its members by making some relevant prescriptions such as MARPOL and OPRC. Maritime Administration and Environmental Protection is therefore crucial in this instance. The personnel in Maritime Administration are responsible for overseeing the effectiveness of maritime regulations on behalf of the government. As training facilitates awareness, hence therefore the relevance of this topic to the field of study.

1.2 Research Methodology

This work was mainly based on secondary sources. Particularly consultation was heavily made on government maritime policies. Information from the Nigerian port authority and companies conducting oil exploration activities in the Niger delta are used as well. They include those drawn from the internet and news reporting from online

newspapers. Studies based on the publications from the Maritime Administrations is made extensively. Other organisations referred to for information were used including the Nigerian Institute of Oceanography responsible for marine aspects and the Maritime Academy of Nigeria responsible for manpower development.

In a nutshell following are the summary of material used:

- ITOPF, Technical information papers no. 1-13
- IMO, Manual on oil pollution, London
- Federal environmental protection agency publications
- Nigerian Environmental laws
- Nigerian Shipping Law by Mbanefo

Periodicals:

- Marine policy
- Marine pollution policy
- Third World Quarterly

Other sources:

- Government reports and publications
- Oil industry papers
- Conference and seminar papers

1.3 The Scope

The aim of this dissertation is therefore to examine with a view to providing solution how this development affects the region, and the role the Maritime Administration is playing since its creation in the late eighties. In the process other important issues such as listed below will be cross examined:

- Examine the existing current environmental situation in the Niger delta, to cover the climatic conditions and the development especially those akin to the prospecting for oil. This will be discussed within the framework of chapter two
- Identify the nature and extent of the threat to the environment as a result of oil and gas exploration activities currently taking place in the Niger delta.
- Examine the effectiveness of the existing regulatory and organisational regime for restricting marine oil pollution in the Niger delta.
- Chapter five will suggest ways of implementing an appropriate and effective contingency plan in case of oil spill emergencies based on the provision of the OPRC convention. This would include the need for a sensitivity-map exercise based on the priority of environmentally sensitive areas.
- Take a look at the purpose of examining a similar set-up elsewhere of successful maritime administrations specifically with regard to strategy and organisation for oil spill response. This is in order to draw appropriate techniques and lead to a comprehensive solution to the problem of marine oil pollution in the Niger delta.
- To examine training and development requirements with a view to ensuring availability of the necessary skills of oil spill management.

Finally, recommendations on strategic planning, direction and the target to aim at will be made.

Chapter 2

Review of Current Situation

The Niger delta is that part of Nigerian coast adjacent to the Atlantic Ocean. It is the region where the river Niger forms a confluence with the Atlantic Ocean. An aerial plan of the delta is triangular or “bird-foot” in shape. It comprises and forms borders by a chain of about twenty small barrier islands of approximately two hundred square kilometers. It is through these barrier channels, which separates the islands, that tides and water from the Atlantic Ocean surge to the one million five hundred thousand hectares of mangrove forest and swamp laid inland. It is by statistics the third largest in the world. This lies within the Equator and Tropic of Cancer, signifying all year round sunshine with an average annual temperature of thirty degrees and an annual total rainfall of over 3800mm.

The process of this formation is dated back to several thousands of years ago. It happened mainly due to bifurcation of the River Niger and its tributaries as well as deposits of transported materials dropped by the river. This has created and provided a favorable condition for the growth of vegetation along the coast. The result is the widest variety of trees, fauna and flora along the entire coast. The region, due to its characteristic climatic conditions forms three types of marine zones of permanent-fresh water swamp, fresh water swamp and seawater. All these different zones harbor a variety of ecological resources ranging from forest species, benthos, birds and fish. In

addition, large amounts of marine non-living resources are found. These consist of hydrocarbons of significant commercial quantity, both on and offshore.

Out of the approximate total of nine hundred kilometers of Nigerian coastline, the Niger delta occupies one fourth. The main principal towns in the Niger delta are Warri, Sapele, Burutu, Port harcourt Degema, Okrika and Bonny having a total population of about seven million with an estimated annual growth rate of three percent (Shell, 1999).

2.1 Oil Exploration and Exploitation

Nigeria's national development plan focuses on a number of inter-related activities. These include the development of gas deposits offshore and the eventual creation of a center for the loading and processing of natural gas and petroleum.

The expedition in quest for the oil and its derivatives in the Niger delta region started some fifty years ago. The exploration and exploitation started initially on shore and is gradually moving and/ or has moved to the offshore. The process of exploration and the production of crude oil normally consists of four basic stages; geophysical survey, drilling, establishing & construction of production facilities and field closure.

The aforementioned processes were all well established in the area. Up to four thousand oil wells have been drilled from 1937 to date (Guardian Nigeria, Oct 1999). Those drilled wells with favourable yields are constructed along with their associated oil production infrastructures such as platforms, flow stations, tank farms and loading terminals. These facilities are all connected and linked by a complex network of pipelines of over six thousand kilometres.

One important bi-product of crude oil production in the Niger delta is gas. A Substantial amount, approximately one thousand standard cubic feet, is produced with every barrel of oil (Shell, 1999). Considerable amounts of such associated gas produced (95%) is being flared.

The estimated on and offshore oil reserve is about twenty billion barrels. There is currently a total of two hundred and fifty oil fields and two hundred more fields with undisclosed reserves of oil and gas.

2.2 Shipping, Ports and Oil Loading Terminals in the Niger Delta Region

Under the Nigerian national development planning in the maritime transport sector, five out of nine seaports in Nigeria were located in the Niger delta region. They include the port of Port Harcourt, Onne, Warri, Koko, and Sapele. There are also eight oil-loading terminals both on and offshore.

Port Harcourt is the third largest port in the country with a maximum draft of 7.6 meters. It has thirteen berths, mooring and tanker buoys (NPA, 1996). Cargoes being handled include general cargoes, petroleum crude/refined products, vegetable oil, coal and explosives.

Warri port has a maximum draft of seven meters. It has eight berths with facilities and other service crafts. Iron and steel, RORO, and general cargoes are the main shipment in and out of the port. Koko port has a draft of seven meters. It is located on the river Benin, one of the tributaries of the River Niger. Oil and general cargoes are the main shipment. Sapele port was designed for the export and shipment of timber and other forest products. Generally, bulk liquid and solid cargoes are also being handled.

The loading terminals are where ten different grades of crude and condensate are exported. The terminals are of two categories; those located on and those offshore/floating. The classes of vessels used in lifting oil ranges are from general purpose to ultra large crude carriers. About five percent of crude oil export is shipped by long range tankers (LR1) of dead weight between forty five thousand and eight thousand tons. Eighty percent of the crude is shipped by long range ships with a dead weight between eighty thousand and one hundred and sixty thousand tons. Ultra large crude carriers (ULCC) provide the remaining fifteen- percent of dead weight between three hundred and twenty thousand tons and above. Statistically, an average of four VLCCs pass by the Niger delta area weekly, in addition to several general cargo ships, fishing, oil production support vessels and naval ships. Below is a table showing a summary of the crude oil loading terminals, their location and type/grade of crude lifted from each.

Table 2.1: Oil Loading Terminals, Location and Capacity

TERMINAL	OPERATOR	CRUDE OIL GRADE	LOCATION	NO. OF BERTH & STORAGE
Bonny		Bonny Light and Medium	Onshore	NA
Qua Iboe	NPA/Mobil	Qua Iboe Light	Onshore	0.5 Mil Barrels
Brass	NPA/Agip	Brass Blend	Onshore	0.2 Mil Barrels
Antan		Antan Blend	Onshore	NA
Odudu		Odudu Blend	Offshore	NA
Forcados	NPA/Texaco	Forcados Blend	Onshore	3.3 Mil Barrels
Escravos	NPA/Chevron	Escravos Blend	Onshore	2.8 Mil Barrels
Oloibiri		Penington Light	Offshore	NA

(Source: NNPC, Nigeria)

2.3 Nature of Threat to the Environment

The ultimate consequences of human activities in the Niger delta have portrayed a growing concern and mark of environmental degradation. Apparently, the activities related to oil exploration constitute a substantial part of the problem.

There are four basic cycles of oil and gas exploration and production. The first stage is geophysical surveys to identify possible sites, which involves seismic activities. The detail process is the generation of sound waves at the underground layer. This is achievable by introducing some explosive charges in the assumed potential site.

As a result, the following impacts were observed: the process of seismic activities include land clearance along the path of the identified field and soil destabilization, thus culminating in a loss of vegetation and soil erosion.

As was the practice in the region, the second stage of oil exploration is drilling to verify field locations and assessment of production potentials. The process includes construction of a pad of a size normally between five and twenty thousand square meters. The associated bi-product of drilling includes clay mud and the flushing out of rock cuttings. Other bi-products include the generation of dredge spoils and increase in turbidity of the surface water along the Niger and its tributaries. The Dredging of the river channels is essential and is usually employed to increase the size and width of river channels. This allows for conveyance of materials in and out of the site.

The impact as a result of this is land acquisition and its transformation for access roads and canal dredging and/or sand filling. The consequence will be an increase in turbidity of water in the Niger tributaries, loss of some sensitive vegetation as well as accidental oil spills.

The third stage is the establishment of production facilities. In this process, a mixture of oil, water and gas is produced. These are transported to the production facilities and coastal terminals by means of pipelines. There are altogether about four thousand drilled sites of which more than three-quarters have undergone the aforementioned process.

Part of the oil exploration company's obligation is to treat the oily/ wastewater, which normally contains salts, heavy metals and oil before disposal. This is done at the water treatment and disposal systems located at Forcados and Ughelli.

Prior to the establishment of the Federal Environmental Protection Agency in the late 1980s, (now Federal Ministry of Environment), there has not been any requirement in the national legislation for Environmental Impact Assessment (EIA) on new projects. This means that all the existing facilities and infrastructures are without a well defined EIA. However, this is now mandatory for all new projects. For the existing ones, it is required that Environmental Evaluation Report (EER) be prepared and made available for scrutiny.

Out of these stages/ processes of oil exploration and exploitation, oil spills constitute a substantial percentage of the potential threat to the ecosystem of the Niger delta. There is recently a growing number of cases and complaints connected to oil spills. It seems as though there is an improper check and monitoring of the environment. The responsible authority seldom takes corrective measures. In addition, there is insufficient scientific study and an absence of adequate and reliable baseline data for assessing the impact of oil spills in the region. Most of the cases are reported much later after the spill, hence rendering any response to be weak, inaccurate and difficult to monitor.

One of the earliest of such reported cases happened between 1967 and 1970, during Nigeria's civil war, called the Ebubu spill (Shell, 1999). It was caused as a result of sabotage and vandalism of Agbada to Bamu oil trunk pipeline. An Exact or approximate estimated quantity of the oil spilled is not known but it is believed to be quite substantial.

The observed impact of this is the interference with recreational use of the coastal area thus hampering fishing and boating. Although there is no well-established tourism and marine parks, the resultant spill plays a major role in dispelling the future and potential of establishing one.

Sketchy reports of minor spills are being received moment by moment. In April 1984, a barge sank in the Bonny estuary and spilled about two hundred barrels of crude oil (Snowden & Ekweozor, 1987). This was after the reported Funiwa 5 blowouts of 1980. Other oil related pollution as a result of spills is that of the Orhionmwon river of September 1999, the continued dumping of waste crude oil and refined products into Ubeji river by the Warri petrochemical refinery (Vanguard Nigeria, Aug & Oct 1999).

Action taken by the regulatory body is difficult to explain as no official result of the impact is being produced, therefore making the present arrangement very much ineffective. Over eleven thousand barrels of crude oil was lost along the Escravos-Warri refinery pipeline due to line breaks at Benneth Island. Similarly, two million four hundred thousand barrels of crude oil was pumped through Escravos-Warri refinery including the opening stock but, the actual volume received at the plant was two million three hundred thousand barrels. The shortfall is considered to have leaked out into the environment.

In a similar situation, crude oil pumped from the Chevron operated Escravos terminal to the Warri and Port Harcourt refineries was three million five hundred thousand barrels in September 1999. A standard deviation of one hundred and ten barrels was recorded and was considered to have been lost enroute. For the last fifteen years, a total of about two thousand seven hundred and ninety nine oil spill accidents have occurred. Out of this, a total estimated quantity of over two million one hundred and five thousand three hundred and ninety eight barrels of oil was said to have been spilled (Ogbonna, 1999).

One other anticipated source of oil pollution in the Niger delta is waste and sludge discharges from ships and activities related to port operations. The Closure of fields, an important marine activity in the region, is another source and problem of oil pollution and management.

The inherent danger of oil spill related pollution is environmental degradation. The endangered resource in the Niger delta includes changes in water quality parameters and traces of toxic metals. The magnitude and adverse effect depends on the location and the quantity of the oil spilled. A baseline survey carried out on the effect of oil spill that occurred in April 1984 shows “ a considerable reduction in both fidler crab and polychaete density in the post spill period”. Also discovered was that “oiling of prop roots at the spill-site was higher at the outer edge of the mangrove zone (29.6%) than at 10m inside the edge of the zone (20.7%)” (I. K. E. Ekweozor, 1987).

The strategic location of the Nigerian coast can make it vulnerable to potential oil pollution. There is a possibility of spilt oil to drift resulting from accidental discharge by tanker movements in and out of neighbouring countries like Cameroon and Angola, even though there has not been a case of paramount magnitude related to such an incident.

2.4 Oil Pollution Regulatory and Organisational Arrangements

The Federal Ministry of Environment through its marine pollution department is the main government department in charge of oil pollution matters. The responsibility includes policy formulation, mapping, contingency planing and (immediate) response to reported cases of marine pollution and coordination of clean up operations. The contributions from the Ministry of Transport are input from its maritime related parastatals. The input is mainly on policy, planning and logistics. Polluters are always required to take the responsibility to clean-up operations and make compensation in case of damage.

Table 2.2: Breakdown of the Oil Pollution Regulations and Clean-up Arrangements

	Policy Development	Regulation legislation	Provision of service
Environment management	Federal Ministry of Environment, National Maritime Authority, National Institute of Oceanography, Nigerian Port Authority.	Federal Ministry of Environment	Polluters

(Source: J. F. R. Hogdson, WMU *(as modified)*)

In principle, the National Maritime Authority is the maritime administration responsibilities for implementing government policies related to shipping and marine environment protection. The formulated policy that forms a statutory function of the authority comprises the following;

- To ensure that Nigerian national carriers exercise fully Nigeria's carrying rights of at least forty percent of the freight in the revenue and volume of the total trade to and from Nigeria.
- Ships registration.
- To monitor the activities of vessels of the companies granted national carrier status.
- To grant assistance to indigenous companies in order to boost their fleet and expansion of ship ownership.
- To regulate liner conferences and national carriers.
- To register ships.

- To examine seafarers.
- To carryout inspections and surveys of vessels.

The Nigerian Institute of Oceanography (NIO) is a research institution established by the government. The aim is to undertake research of Nigerian ocean space and provide useful data such that when translated into information will facilitate sustainable exploitation of the ocean resource.

The Federal Ministry of Agriculture has the Fisheries division to look after. However, the regulation and survey of fishing vessels are the responsibility of the Maritime Safety Division of the National Maritime Authority. The Federal Ministry of Environment is responsible for safeguarding the marine environment against pollution. This is a newly established Ministry. Before then, marine environment affairs were under the Federal Environmental Protection Agency.

In a nutshell, it is a widely accepted fact that the sea is a source of life and the ocean is the main producer of oxygen, therefore as the population of the earth increases the sea's resources of food is also increasingly becoming important. "But infinite as the sea may seem, only one tenth of it is productive. Plant and animal life are generated only where the temperature is right-and where there is an abundance of light and food. That is largely on the continental shelves. But these vital areas are also the most vulnerable" (DEPA, 1999). The ocean is certainly vulnerable, as it is vast, since all pollution sooner or later finds its way to the sea. Oil in water kills birds and shellfish, it pollutes the beaches and damages or destroys the minute organisms that are the very basis of marine life.

It can be deduced that the Niger delta and its adjacent coastline makeup one of the richest areas in the world in terms of resources. Prominent among these is the

hydrocarbon. The exploration, exploitation and consequent transportation of oil poses a great threat to other resources and the marine environment of the area.

Some effort has been made to reduce this to the lowest possible level. This includes input from the oil exploration companies operating in the area in terms of clean-up and compensation and from government, policy, planning and logistics.

It seems though, from the foregoing, despite all the measures put in place to tackle the problem, the same cannot be said of achieving significant success. However, measuring success of this nature is, in most cases, a relative term, that is, with logical comparison of other countries having a similar situation, then areas of weakness can be traced. This, therefore can lead to the adoption of a reasonable solution, even though the organizational structure and set-up of different countries as well as available resources may differ.

The existing regulations pertaining to oil pollution in Nigeria are;

- Decree forty two on toxic waste 1988
- DPR Petroleum and Drilling act 1969
- DPR (Guide lines on waste and effluent disposal) 1992
- Oil in navigable water act 1968 (Oil Pollution convention)
- Mineral oil safety regulation 1963

Chapter 3

A Comparative Analysis with other Countries

The purpose of making this comparison is to workout modalities of measuring the effectiveness of related organisations as obtained in other countries. The ultimate goal is to facilitate the taking up of appropriate improvement measures in order to mend areas of weakness. Three countries were considered for this purpose; Denmark, Norway and Brazil. The climatic condition of their coastlines is similar or worse than that in the Niger delta. The idea therefore is to figure out what is lacking or has been over emphasised in the Niger delta so as to apply appropriate corrective measures by learning from these States and applying an effective control and management of oil pollution in the Niger delta. In making a comparison of this nature, the following factors are very important; planning, regulations, implementation and monitoring.

3.1 Danish Arrangement

Denmark like any other country has unfortunately had at one time suffered pollution from oil spill in its marine environment. This is more because of the exposure of its seven thousand four hundred kilometres long coastline and hundreds of islands as well as its west coast facing the North Sea where heavy activities related to offshore oil exploration are increasing in a faster rate. The East Coast forms a narrow entrance to the Baltic Sea called the Danish Straits. About fifty million tons of oil is transported through the strait annually apart from heavy ferry traffic crossing (DEP

Oct, 1999). Most of the spills occur near the shoreline. The characteristic rough climatic conditions of the area associated with poor visibility have always a tendency of drifting any spill to the nearest coastal areas, which implies the necessity for immediate clean-up. This should be by mechanical recovery as provided in the national regulations. Among the earlier notable spills is the IBN ROCHD (1984).

The Ministry of Environment is the executive arm of the government assigned to deal with the issues of marine environment pollution. The responsibilities consist of drafting a plan of action to prevent and co-ordinate contingency planning. The idea was sought having in mind the tendency and potential of the Danish maritime zones to be subject to activities, especially those related to the oil pollution. Apart from shipping, there are a lot of other activities related to the exploration and exploitation of marine resources particularly hydrocarbon of which crude oil is the cheap product. To facilitate a smooth flow of operation of its assigned undertakings the Ministry has delegated the planning and operational aspects to the Danish Environmental Protection Agency (DEPA).

The overall co-ordination of the response arrangement rests on the shoulders of the DEPA. This includes maintaining the national contingency planning in addition to that for offshore operations, refineries, power stations, ports, municipalities and counties.

The organisations assigned with the responsibility of combating and cleaning of oil and chemical spills in the sea is the Marine Rescue Co-ordination Centre (MRCC). Others participate in the following structured pattern:

- Danish Armed forces
- Emergency Management Centre
- Danish Institute of Fishery and Marine Research

However, an initial response is required from the polluter, for example if there should be pollution in a refinery or port areas, the authority of the port or refinery is required to act within their contingency planning to overcome the problem, otherwise assistance may be requested from the proximate county, municipality, armed forces, MRCC in that order.

MRCC is a specialised agency established solely for combating, among other things, oil pollution in the marine environment. It is made up of two divisions, strategically located in two different places, with sufficiently trained personnel.

The Emergency Management Centre has six divisional offices all stock piled with response equipment and personnel that are put on 24-hourcall. In addition, there is another stockpile of equipment and dedicated vessel held and maintained at a naval base.

Private participation is not left out in the oil clean-up response. Commercial contractors are available and can be hired to perform a clean-up operation. Moreover, commercial tug operators for towage and salvage operation to save vessels in distress and in danger of polluting the marine environment can be hired.

The Danish Environmental Protection Agency (DEPA) also has the responsibility of establishing contingency planning on behalf of ports and refineries. In order to effectively discharge its duty and responsibility the DEPA has adopted two approaches; preventive measures and oil pollution contingency organisation. It is charged to make approval and supervision in connection with exploration and appraisal wells, discharge into the sea of substance/materials in connection with exploration and production of an oil and contingency plan.

Five potential sources of oil pollution are identified in Denmark as:

- Operational discharge from ships

- Accidental spill from ships
- Operational discharges from offshore production
- Accidental spills from offshore production and
- Land based discharges.

In choosing the approaches for abetting oil pollution, international co-operation was considered to be very important. Preventive measures are applied at the source. This is to minimise the impact of the pollution to a minimum possible. Furthermore, to strengthen the International Maritime Organization's conventions and protocols, (MARPOL 1973/78) was signed and adopted.

3.1.1 The Bonn Agreement

The experience of the previous oil spill in the region prompted the need to have a joint effort for effective oil spill combating, especially when it is likely to constitute a serious threat to the coastline areas. Members are the North Sea coastal states (United Kingdom, Denmark, Norway, Germany, Netherlands, Belgium, Sweden and France). Information and experience are shared on a continuous basis to ensure response to potential oil pollution incident remains consistent, effective and appropriate and to help each other in the event of oil spill and carrying out surveillance for the purpose of detecting violators of regulations. The strategies adopted include the publication of technical aspects of the work in the form of manuals and handbooks.

Some of these publications that are related to oil pollution include:

- Bonn Agreement Counter- Pollution manual: A compilation of information on counter-pollution operation and procedure.
- Bonn Agreement Aerial surveillance handbook: A guide specifically for aerial surveillance to track downs and quantifies the magnitude of pollution.
- Oil pollution at sea- securing evidence on discharges from ships: An illustration of different appearance of oil when spilled in sea.

- Manual on gathering of evidence: Intended for use in conjunction with Oil Pollution at Sea manual to provide guidance on how to bring polluters to book.

3.1.2 The Helsinki Convention

Apart from IMO conventions, other regional organisations were also considered to be of paramount importance. Of most significance is the convention on the protection of the marine environment of the Baltic Sea area (HELSINKI Commission). This is a regional grouping of coastal states of Baltic Sea namely, Sweden, Denmark, Finland, Germany, Lithuania, Russia, Estonia and Poland. The common goal/purpose of this is to provide unified international co-operation for the protection of the Baltic Sea. It covers all sources of pollution; ships and land based. The result of this co-operation led to the declaration of the Baltic Sea as a special area by IMO. This implies that there will be no operational discharge by ships except in the reception facilities provided by the ports in the area.

Further on the matter, various committees were established:

- (i) Environment Committee: Covers all aspects of the marine environment by gathering data, analysing and sharing the same.
- (ii) Technological Committee
- (iii) Maritime Committee
- (iv) Combating Committee

3.2 The Norwegian Arrangement

The aim of policies related to oil spill in the marine environment is to prevent its occurrence or if it happens, to contain and make a recovery in the minimum time possible without it spreading out of the source. Norway is party to all the international treaties designed for the purpose of preventing, combating and compensation for reinstatement of the damage resource in case of oil spill in the marine environment. The conventions ratified are:

- MARPOL
- Intervention
- OPRC
- CLC
- Fund

In addition to ratification of these conventions, there have been in place the following national regulations;

- Regulations concerning discharge of oil-contaminated drill cuttings from petroleum activities on the continental shelf.
- Regulations concerning storage of oily mixture and other harmful substances on ships.
- Regulations concerning experiments with oil.

The Ministry of Environment (MOE) has been appointed by the government as a competent authority and was assigned with this responsibility.

The preventive measures against oil pollution are dealt with at the ministerial level. Usually a proposal is made to the executive and consequently to the legislature for scrutiny and endorsement. It is then returned to the judiciary for careful use of suitable interpretation commensurate with the existing laws. The policing against violators is partly carried out by the MOE. This is based on past experience that oil spills and their pollution are associated with shipping and ports/terminal operations. The relevant conventions adopted for prevention are the MARPOL and Intervention convention.

The control and emergency response to oil spills is delegated by the Ministry to the Norwegian Pollution Control Authority (Norcontrol). Its main task is concerned with marine oil spills. Two divisional offices were established around the coastline. This is to allow for flexibility to respond within the shortest time possible.

Norcontrol keeps copies of inter-community contingency plans and other important data like coastline sensitivity maps. It keeps as well marine resource stakeholders such as Fisheries Department informed of any impending danger or case of spill. In addition, it is responsible for carrying out of training and the maintenance of oil spill response technology at the National Training Centre for oil pollution control.

The response to an oil spill is made up of three stages; Private, Municipal and Government contingency planning. The plans of the various stages are collected and amalgamated into a simple response plan.

The private otherwise first stage of response is limited to ports/terminals and the immediate community in whose area the spill occurs. Oil industries are required to make available to the competent authority their contingency plans. If, however, it was discovered that the spill is worse than the first stage can cope with, reinforcement may be required from the second stage.

The second stage is concerned with municipality. In this respect Norway is zoned into thirty-four maritime units. The scope of this response stage is a bit wider than private. It covers up response beyond the capability of private or first stage, and up to four nautical miles from shoreline. Participants are drawn from interested parties such as Local Authorities, Civil Defence Force or Army.

The government provides subsequent response, which is the third stage. It is in the form of provision of equipment, materials, vessels and personnel. The system allows the required flexibility such that when a particular stage is call upon for help, it can contribute without any hindrance.

3.2.1 Bilateral and Regional Agreements

Norway is party to the following regional and bilateral agreements:

- Bonn agreement

- Norbrit plan (Bilateral contingency plan with the UK)
- Copenhagen agreement (with Denmark, Finland, Iceland and Sweden)
- Bilateral agreement (with the Russian Federation for the Barents sea)

3.3 The Brazilian Arrangement

Recognising the danger of oil spill, preventive measures were the first option considered against future spill occurrence. This, therefore, is the basis for adoption of MARPOL by Brazil. Relative to other South American countries, Brazil is one of the most developed. It occupies an area of eight million five and eleven thousand, nine hundred and sixty five (8,511,965) square kilometres with a coastline of approximately eight thousand kilometres. This lies adjacent to the Atlantic Ocean. The Bulk of the Brazilian trade is transported by sea. The Brazilian potential to marine oil pollution has in every respect a similar scenario as to other developing countries.

The subsequent step taken against oil pollution is the process of response action. Brazil sought to implement the Oil Pollution Preparedness, Response and Co-operation Convention (OPRC) as a step towards tackling possibility of marine oil spill pollution and this was developed in stages for successful result.

The OPRC provided an established standard procedure and guideline for co-operation in order to deal with oil pollution casualties. There is emphasis on technical co-operation between States by bilateral/ multilateral co-operation for preparedness and response to oil pollution accidents, as well as a research and development program.

The rationale behind this co-operation is to receive assistance from other countries in an emergency situation as well as to afford them develop their own contingency planning.

3.3.1 The OPRC Convention Implementation in Brazil

The idea of the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 originates as a result of a growing fear of the danger associated with oil spills by the industrialised nations. Experience from the previous oil spills shows the menace and difficulty of the problem. In addition, it has been observed that external assistance and co-operation for the response operation among nations plays the required vital role. Hence, therefore, the call for the adoption of this convention.

Brazil is producing sixty percent of its petroleum needs, exploited from its territorial waters. A Substantial amount is, however, imported; up to ninety five million tons in 1998 (PETROBRAS, 1998). By record, the level of oil spills in Brazil is not considerably alarming. For instance, out of the twenty-seven accidents registered in 1998, hardly any one of these reached two tons. This cannot, however, be taken for granted, as there is a more probable increase of future occurrence.

Brazil has very much recognised the danger attached to this, therefore the strive for the adoption of the OPRC convention as a measure of safeguard. Statistics carried out show that most of the oil spills in Brazilian territorial waters constitute a discharge of dirty ballast water and oily mixture by ships in transit. This markedly exceeds the most pronounced accidental tanker spills.

The strategy employed for the implementation of the OPRC convention is a plan of response and co-ordination at three levels namely; regional, municipal and state. Provision is also made to invite the Navy when the need arise.

Part of the requirement for ratification of the OPRC convention is having in place a national contingency plan by the prospecting country. In order to have this in place;

the Brazilian government promulgated an inter-ministerial working group. The responsibility charged to them was to propose the organisations that will be involved.

After the draft proposal was made, a workshop was organised to address the responsible organisations and the stakeholders. Invited also were similar organisations in countries such as Canada and Uruguay. This is to solicit and facilitate a forum of mutual and multi-lateral co-operation.

The workshop also noted the following important points;

- Examination of existing facilities including human resource to be utilised.
- Proposal for establishment of a fund to complement government effort for the procurement of equipment, maintenance and pursuing the necessary legislative back up.
- Establishment of legislation pertaining to use of dispersants in combating of marine oil pollution.
- Sensitivity mapping of a suitable scale for areas susceptible to marine oil pollution damage as well as locating and deployment at strategic place of adequate equipment to each chosen area.
- Follow-up for the speedy adoption by legislatures of the laws pertaining to oil pollution. This includes all the relevant IMO conventions.

3.3.2 Oil Spill Response and Contingency Planning

The working group in charge of the promulgation of the Brazilian oil spill response recommended some process of implementation of oil spill response exercise. This was divided into three tiers; each was given a mandate to produce a contingency plan with respect to the characteristics of the assigned area. The three tiers of response will be;

- Tier one-Local/ industry.

- Tier two-Area/ Regional councils.
- Tier three-National/ Ministry of environment.

In the event of an accident involving an oil spill, the polluter is required to notify the authority; in this case it could either be the Ministry of Environment, Science and Technology or Marine Department.

With a given notification, the clean up exercise is followed immediately by the first tier, second tier and/or third tier in that order. The first tier will call upon the second tier only when the magnitude and the scale of the incident is such that all the resources and facilities before them prove ineffective and exhausted.

The National Oil Spill Control Committee (NOSCC) was assigned to co-ordinate the activities of all the three tiers of response. It is also to see to the speedy response action necessary to any reported case of oil spill. In addition, it is also to advise any of the response tiers on logistics and their primary responsibilities.

The committee recommended that the On-Scene Commander (OSC) can be any Commanding Officer of a government vessel that is first to arrive at the spill location. Powers were vested in such a commander in order to combat oil spill pollution. Apart from OSC, there is a Shore Clean-up Co-ordinator (SCC). He will act as a subordinate to OSC, though will be appointed by the NOSCC. His task is to act according to the provision made in the contingency plan, which is to act in a situation where oil pollution reaches the beach.

3.3.3 Equipment and Training

The National Oil Spill Control Committee designed a plan for Brazilian oil pollution contingency planning to be able to combat approximately twenty five thousand tonnes of persistent oil. The inventory of equipment will therefore be made to reflect

this figure/amount. It is also noted that the equipment when used will be effective in a reasonable time framework of response.

In the event of a big disaster, arrangements and agreements for assistance with other countries and interested bodies/organisations within the framework of the OPRC convention will be made through the NOSCC.

At the national and regional levels, the Ministry of Environment is responsible for the co-ordination and training in oil spill response management and equipment operation. At the first tier level, the industries will be responsible. The training will be followed by exercises at least once a year. This is in view of updating the response capability of each tier.

3.4 Making Comparison

In conclusion, the ratification of international conventions dealing with marine oil spill pollution is of paramount importance. All avenues that stress a need for co-operation among countries is provided therein. This need arises due to the costs and financial implications involved in putting in place the provisions of the conventions, for example establishment of a national contingency plan, regular exercises and maintenance of equipment in the case of OPRC. Ratifying a convention also means having in place the reception facilities and vigilance in the maritime zones to ensure compliance with the discharge limits by ships as stipulated in MARPOL.

The procedures and methods employed by other countries could be a very important parameter for any prospecting country, hence the brief look at the systems of the countries mentioned in this chapter. This will facilitate and allow for the selection of the best and appropriate arrangements to suit the Niger delta area.

Table 3.1: Status of OPRC in Brazil, Denmark, Nigeria and Norway

Countries	Prevention and Safety			Oil Spill Response	Compensation						
	MARPOL	Intervention	Salvage		OPRC	CLC			Fund		
						‘69	Prot. ‘76	‘92	‘71	Prot. ‘76	‘92
Brazil	Y	NA	Y	Y	Y	N/A	-		N/A	N	
Denmark	Y	NA	Y	Y	-	N/A	Y	-	N/A	Y	
Nigeria	N	N	Y	Y	Y	N/A	-	Y	N/A	-	
Norway	Y	NA	Y	Y	-	N/A	Y	-	N/A	Y	

Note: OPRC was ratified by Nigeria, though not yet enforced. Prot= Protocol, Y=

Ratified, N= Not ratified, NA= (Data) Not available

(Source: ITOPF,1999)

Chapter 4

International Prescriptions

Statistics of the global marine environment pollution trend show a considerable increment of occurrence every now and then. However, land-based pollution is shown to have a higher percentage among the various sources. This includes; bi-products of industries, run-off from agricultural pesticides and herbicides and effluent discharged from urban areas. Furthermore, other forms of pollution are attributed to shipping and marine activities. The most important of these is oil, which is a result of ship operation and tanker accidents. Consequently, significant amounts of oil continue to get into the marine environment as a result of incidents occurring during the terminal operations. This was found to be greater by volume compared to spill incidents as a result of tanker accidents.

This chapter will closely examine the international prescribed standard, particularly the work of the International Maritime Organization (IMO) and other stakeholders for the protection of the marine environment. The impact of these regulations will also be looked at in order to have an insight into their effectiveness.

4.1 The United Nations Convention on Law of Sea

The United Nations Convention on the Law of the Sea (UNCLOS) serves as an umbrella of all the treaties concerning the use of the sea. It comes into effect in 1982. Subsequent international conventions or agreements, especially those related to shipping, are complementary to the provisions of UNCLOS.

The relevant part of UNCLOS dealing with pollution is section five; “International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment”. Countries signatory to the convention are called upon in article 211 to:

Establish international rules and standards to prevent, reduce and control pollution of the marine environment from vessels and promote the adoption, in the same manner, wherever appropriate, of routing systems designed to minimize the threat of accidents which might cause pollution of the marine environment, including the coastline, and pollution damage to the related interests of coastal states.

Also required is the establishment of regulations by flag states in their national legislation for vessels flying their flag. Such rules are required in effect to be standard such that they could be internationally acceptable. Port and coastal states are also required to establish the same to include vessels exercising innocent passage. Apart from this, flag and port states are, by section six, required to enforce such rules.

The above provisions are, without prejudice to other international conventions, entered into by the flag/ port states. It is in every respect a boost to complement the effort of States party to observe effective control of their maritime zones vis-à-vis marine environment pollution.

4.2 The Work of the International Maritime Organization

The International Maritime Organization (IMO) is a United Nation's specialised agency charged with the responsibility on matters relating to the safety and the protection of marine environment from pollution as a result of shipping activities. In order to discharge its duties, IMO normally convenes international treaties otherwise known as conventions. The member countries signatory to such conventions then adopt and make them part of their national legislation and enforce them.

IMO conventions relating to pollution of the marine environment have been fashioned out in the following way:

- Prevention
- Response
- Compensation and reinstatement

4.2.1 Marine Environment Pollution Prevention

The first acknowledged problem with respect to marine environment pollution was in the late 1950s. Naturally, after the discharge of cargo, tankers need to clean their tanks using a jet of hot water to prepare for the next round ballast voyage, this will also allow for loading the next cargo. This is known as tank washing. The washed oily mixture is then thrown over board, usually into the harbour. This has caused enormous oil pollution problems in port areas around the world.

It was later discovered that the residue of the tank washings could be stored in a slop tank (load on top), where gravity naturally separates it. This is possible as water is slightly denser than oil. By adopting this principle, ports and marinas were greatly safeguarded against oil pollution as a result of ship and port operational activities.

According to statistical analysis, as much as about eight hundred tons of oil is saved and prevented from entering the marine environment for each tank washing on large tankers.

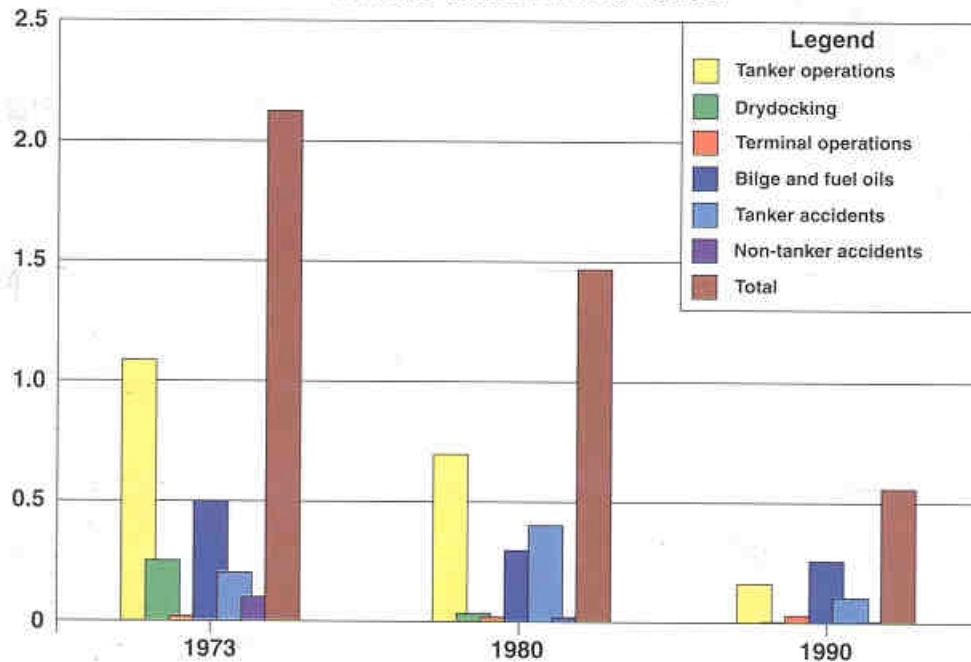
In 1973 a milestone was reached when a treaty was developed for the adoption of more rules in addition to strengthening previous regulations dealing with marine oil pollution. It was followed up by a protocol in 1978, together known as the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). The essential regulatory provisions of condition for discharge of oily mixture from tankers provided in annex one of the convention are as follows:

- (i) the tanker is not within a special area;
- (ii) the tanker is more than 50 nautical miles from the nearest land;
- (iii) the tanker is proceeding en route;
- (iv) the instantaneous rate of discharge of oil content does not exceed 30 litres per nautical mile;
- (v) the total quantity of oil discharged into the sea does not exceed for existing tankers 1/15000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers 1/30000 of the total quantity of the particular cargo of which the residue formed a part; and
- (vi) the tanker has in operation an oil discharge monitoring, control system, and a slop tank arrangement.

Figure 4.1

Oil pollution from ships

How IMO measures have worked



(Source: IMO News, 1999)

Also required in the convention is the international oil pollution prevention certificate, oil record book, ship oil pollution emergency plan and reception facilities at oil loading terminals, repair ports and in other ports in which ships have oily residue to discharge.

Another instrument relating to prevention of oil pollution in the marine environment is the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (1969). This convention was triggered by the grounding of the tanker Torrey Canyon off the coast of the United Kingdom.

The fear of pollution arose on the possibility of the grounded tanker and its loaded cargo drifting towards coastline areas. The relevant provision was prescribed in article one. State parties are required to take action and/or measures necessary to: “prevent, mitigate

or eliminate grave and imminent danger to their coastline or related interest from pollution or threat of pollution of the sea by oil, following upon a maritime casualty or acts related to such a such, which may reasonably be expected to result in major harmful consequence”. In addition, the convention also addressed the question of public international law. This is in line with the provisions of the Law of Sea convention on the same subject matter.

Further efforts to suppress the menace of marine oil pollution were made through the mechanism of 1989 international conference on salvage. Protection of the environment was one of the items considered to be addressed. This includes “substantial physical damage to human health or marine life or resources in coastal or inland waters or areas adjacent thereto.”

Coastal States are by this convention mandated (based on the principle of international law) to take action against pollution or threat of pollution along their coasts by authorisation for salvage operations in case of maritime casualty.

Originally, a threat to the marine environment was sought during the grounding of the tanker Amoco Cadiz. According to a report, had it been that the tanker was salvaged, the incident would never have happened.

In order to encourage potential salvors should accident occur in future, they are entitled to be compensated for the effort made based on the value of the salvaged property. This, however, depends on the success of the salvage operation.

On the drawing board is another draft convention by the IMO; Bunkers Convention. It was found that bunker spill, though normally small in quantity, is capable of causing devastating marine environmental pollution due to the high frequency of it occurring. A small release of heavy oil in the wrong place can lead to huge claims as well. The

Bunkers convention is distinctly different from other treaties because it is designed to deal with the operation and management of ships unlike CLC which is dealing with the incidental spill of cargoes. A registered ship owner will be held responsible and liable for any spill connected with Bunkers. The convention employs the principle of strict liability, hence therefore, the proposal for the requirement of compulsory insurance.

4.2.2 Response to Marine Oil Pollution

The increase rate of occurrence of oil spills in the marine environment and the recognition of its severity as well as its devastating negative effect leads to the convening of a response treaty known as the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) in 1990.

The aim of the convention is to facilitate an international co-operation to tackle oil pollution incidents by consideration of regional agreements and arrangements in various parts of the world.

It is believed that an early response has the tendency of reducing further damage that may occur. Also in consideration is the need for international co-operation by States and information exchange of previous incidents, measures taken to prevent and/or respond, equipment used as well as the shortcomings and difficulties encountered. By such an exchange, States are able to put themselves in a state of readiness and alert to prevent/respond promptly. The provision contained in various articles of the convention includes the requirement of:

- Oil pollution emergency plans
- Oil pollution reporting procedure
- Action on receiving an oil pollution report
- National and regional systems for preparedness and response
- International co-operation in pollution response and

- Research and development

Other important related resolutions are:

- Establishment of oil pollution combating equipment stockpiles
- Promotion of technical assistance
- Development and implementation of a training program for oil pollution Preparedness and response

4.2.3 Compensation and Reinstatement Regime

It is significant to note that this aspect is one of the early moves made by the international community to provide a system of mending damage and payment of compensation for the work undertaken to safeguard the marine environment. The idea came up in 1967 as a result of an incident involving a Liberian registered tanker, Torrey Canyon. The question that arose is who is to pay or be held liable for the damage and reinstatement of the marine environment.

Obviously this matter partly deals with private law, which to a larger extent is hinged to the marine environment issue. A convention was thought to be well suited if it applied Worldwide, bearing in mind the international nature of shipping.

The proposal of the IMO Legal Committee was to have an International Convention on Civil Liability for Oil Pollution Damage (CLC).

The aim of the CLC is to provide and compensate those who suffer pollution damage as a result of ship based oil spill in the marine environment and cover up expenses incurred on preventive measures. The convention employs strict liability on the ship owners. In this respect, they are required to have adequate insurance that can cover their liabilities.

This requirement is to every seagoing ship with the capacity to carry two thousand and above tons of oil as cargo, fully laden or on ballast voyage notwithstanding. The scope of the convention covers damage suffered in the territorial sea and economic exclusive zone of the state party.

The idea of the International Oil Pollution Compensation Fund come up as it appears obvious that the financial remedy provided under the CLC is grossly inadequate for any given incident to satisfactorily compensate the victims. Two purposes will be served; relieving the ship owner from the full burden of responsibility imposed on him by the regime of CLC and at the same time reinforce and give additional compensation where insurance cover required in CLC appears to be insufficient or difficult to pursue. This simply means the victims of oil pollution can obtain compensation beyond the ship owner's liability. Another important advantage is that where the ship owner is not guilty of being liable for the oil spilt, the International Oil Pollution Compensation Fund (IOPC) will be on hand to pay up in place of CLC. The scope of the IOPC Fund covers damages suffered in the territorial sea and beyond of the States party. The contribution to the fund is derived from the Government or persons who receive or import oil consignments.

4.2.4 Piracy/Armed Robbery and Oil Spill

Ships are exposed to many dangers associated with oil spills in the marine environment either on the high seas, territorial waters or in ports areas, the types of ship not withstanding. Prominent among these dangers is piracy/armed robbery.

Often pirates would board a steaming ship at night, make their way to the ship's bridge, overpower the officer of the watch and tie him up or handcuff him to the rail while the rest of the gang made for cabins to demand money and valuables.

Apart from the danger to the ship's crew, there was the spectre posed by a ship steaming at full speed, unattended, in a confined waters (W. A. O'Neil, 2000).

As a result of the Exxon Valdez disaster some eleven million gallons of oil was spilled in the sea from its damaged cargo tank. This was devastating ecologically and the environmental pollution affected about one thousand eight hundred miles of coastline. The reason for this is never connected to piracy. Nevertheless transpose and compare this scenario to a situation where an unmanned ship bridge as a result of piracy/armed robbery is allowed to steam in a particularly sensitive area carrying dangerous cargo in busy traffic for some say thirty minutes. Obviously the ship could run a ground or collide with another. The end result would be oil spill if the ship happen to be a tanker. Such is the potential disaster with piracy/armed robbery against ships. However, so far there has not been on record a case of an oil spill incident as a result of piracy/armed robbery.

The hotspots of piracy/armed robbery attack around the world are West Africa, Malacca Strait, South China Sea and South America. In West Africa it was recorded that 1982 to 1986 were the years when the highest number of cases of about twenty-five attacks were reported (Focus on IMO, January 2000). This was mainly against ships at anchor awaiting berth.

One other development, was when seven cases were recorded prior to 1989 in the Malacca strait. From thereon, there was a significant rise in the number of attacks, from twenty-eight to fifty annually by 1991. In most of these instances, a typical attack is carried out when the ship is steaming at night. After boarding, the attackers then make their way to the ship's bridge to carry out their assault.

The story is the same in the South China Sea. A compiled report indicates that from May to December 1993 there were forty-two out of sixty-seven worldwide reported

incidents. Furthermore, out of two hundred and ten cases reported worldwide in 1998, ninety-eight occurred in this region.

For South America, attacks are most often conducted on ships at anchorage or in port areas. A total of thirty-eight attacks were reported in 1998.

Table 4.1: Number of Worldwide Piracy and Armed Robbery attacks between 1991 and 1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total	107	106	103	90	188	228	247	202	285

(Source: J. Abhyanker, 1999)

4.2.5 International Response to Piracy/Armed Robbery Attacks

The growing number of cases of piracy and armed robbery in the Malacca strait has sent signals and caused an alarm to the international community. The IMO, which is the concerned body and an umbrella of the shipping world, issued two circulars: MSC/Cir. 622 and 623: Recommendations to Governments for Preventing and Suppressing Piracy and Armed Robbery against ships and Guidance to Ship owners and Ship operators, Shipmasters and Crews on preventing and suppressing acts of piracy and armed robbery respectively.

4.3 The Impact of International Regulations on Shipping and the Marine Environment

The Torrey Canyon incident, which attracted huge media attention, has marked the starting point of many international treaties to curtail the amount of oil pollution into the marine environment. Most of the IMO member States are party to this, signifying a unified international approach to the problem. As a result, there was a drastic reduction in the quantity of oil entering the marine environment.

The International Salvage Union (ISU) annual pollution survey shows that in the four years; 1994 to 1997 its members salvaged nearly six million and seven hundred thousand tonnes of oil, chemicals and bunkers. In 1997 alone, nearly one million tonnes of oil from twenty crude carriers was recovered, the largest having over two hundred and fifty thousand tonnes on board.

The International Convention for the Prevention of Pollution from Ships helps very much in preventing ship source pollution. Some vulnerable areas that are hitherto considered endangered have now been accorded full protection by designating them as special areas. Ports and oil terminals, as well as ship design and construction are all subject to the requirement of the conventions, for example, requirement for reception facilities in ports, and double hull approach, oil water separators, and slop tankers on ships.

Obviously State parties to international conventions have taken a step forward to sanitise the marine environment by driving away substandard and potentially dangerous ships from their territory, which are the primary source of marine oil pollution.

The area of response to oil pollution incidents, is meant to be addressed by the International Convention on Oil Pollution Preparedness, Response and Co-operation. States party to the convention are ever on alert, in readiness with effective contingency plan in case of a marine casualty that may involve an oil spill.

Should an oil spill occur, arrangements for the deployment of resources are always in place for the reinstatement of the damage caused and for necessary compensation. This can be achieved by adoption of conventions such as the International Convention on Civil Liability for oil Pollution Damage and International Compensation Fund for Oil Pollution Damage as prescribed by the International Maritime Organization.

Chapter 5

Action Plan for Improvement

In designing a contingency plan for marine environment emergencies, some assumptions have to be made. As oil has the tendency to causing devastating damage to the marine environment and is not always stationary, it present a difficulty and hindrance to clean-up and reinstatement program in most cases.

It was argued that it is worthwhile focusing on preventative measures instead of response, considering the enormous cost associated with the latter. The cost of correction and reinstatement is normally about thrice as much compared to that required for prevention.

Obviously disaster in the marine environment is bound to happen without advance notice as long as shipping continues. It is therefore important not to ignore contingency for response action, since the possibility of occurrence cannot be ruled out. A well organised contingency planing has the advantage of being time and cost effective. Another advantage is using the contingency planning to draw up and locate high-risk areas requiring priority in terms of prevention from further possible damage.

The situation with respect to contingency planing in Nigeria is, to say the least, at the infancy level. All the components of the maritime industry are in one way or another linked or associated with transportation of dangerous cargo that may affect the

marine environment. They are by law required to have their response action plan in readiness.

By definition, this is referred to as first-tier response. In an ideal situation, this arrangement will only address a disaster of a smaller magnitude. The international prescriptive standard suggests three tiers of response and is the practice in most countries.

Considering Nigeria in the West Africa sub region and the enormous activities related to oil exploration, exploitation and transportation, beginning to develop a contingency plan to cover the three tiers of response is a notoriously difficult task. This can, however, be made easy by identifying existing hazards and the resources that are at risk from these hazards. Once a contingency plan has been put in place, it is necessary to keep reviewing and updating it to facilitate its effectiveness. A Contingency plan can only be adhered to if reinforced with a national legislation. The adoption of international conventions into national legislation can no doubt help especially when they focus on developmental projects and industrialisation.

5.1 Contingency Plan for Oil Spill Emergencies in the Marine Environment

A marine emergency contingency plan means having in place a well-trained manpower and the right equipment, as well as response organisations. Some equipment is required to combat oil spills of a larger scale, which is capital intensive. Where they are available, their transportation to the spill site is another difficult task. Regional co-operation among states is vital in this instance because the cost of preparation for responding to a catastrophic accident can greatly be reduced.

When considering a contingency plan by any state, it should be designed in such a way that it should combat the worst probable incident. It would however require an enormous response arrangement process that may take a long time. This

arrangement nevertheless, has the advantage and capability of dealing with any smaller emergency situation.

5.2 Threat and Effect of Oil on Marine Ecology of the Niger Delta

Human activities linked to developments in all its facets are associated with direct or indirect pollution of the environment. The concept of contingency planning was therefore devised to deal with incidents that directly pollute the environment. In order to be followed to effectively handle emergency situations resulting from an accident, at least three questions need to be addressed.

The first is with regard to the particular kind of pollutant. The second is the resources likely to be affected and, finally, the kinds of response actions appropriate to each resource, taking into account the time, weather conditions and location of the endangered resources.

The study of the trends, behaviour and effect of persistent oil when spilled in the marine environment is so far not conclusive. Further research is needed for a detailed investigation into the effect of oil on the ecosystem. Nevertheless, the magnitude of damage is solely dependent on the quantity or volume of oil spilled, time and condition of the year as well as type and changes in the behaviour of marine organisms. The extent of damage is therefore a combination of these or their variation. Some of the prescribed remedies to marine casualties involving oil spills are:

- Aerial recognisance (some spill of minor quantity doesn't require response, it get clean up naturally).
- Mechanical recovery (not suitable for open sea condition).
- Use of chemical dispersants (has the advantage of serving vegetation like mangrove and bird that may otherwise be trapped amid spilled oil. It short

coming is the contamination that may be on smaller marine organisms when the broken down oil particles settle at the sea bottom).

- Shore clean-up. (Aggressive shore clean up could sweep out smaller organisms that may survive the spill if left alone).

Although the effect of oil on marine ecology may depend on other factors, the ultimate consequence is the change in the habitat, either temporary or permanent. Changes in growth, behavioural change of organisms and species is inevitable. Greater concentration and toxicity may even lead to sweeping out or the transformation of entire species or organisms.

In many instances, though birds and mammals may escape being trapped in a particular spill area, when they are unfortunately caught up, they become contaminated or killed. The catches and fishing gear can also get contaminated depending on their proximity to the spill site. A moderate contamination may be found in fish species in some cases. The overall effect is the reduced hatching of fish eggs and sometimes hampering of reproduction capability.

On reaching the shoreline and beaches, the tendency is for the spilled oil to infiltrate into the soil strata and eventually reach the water table. Human contamination may occur as the average rural communities depend on open wells and boreholes as a source of drinking water. Likewise the industrial installations that are sited close to the spill area are susceptible to damage by oil. For example, water intake for treatment plants or power stations that use coastal water as a coolant may ingest spilled oil. The result will be an interruption in the water treatment process or damage to the whole plant. On the other hand, vegetation, such as mangrove plantations and salt marshes, are a likely target. They become vulnerable causing the tainting of their tissues over an extended period of time.

In the case of an oil spill incident within the port or marinas the damaging effect is that pertaining to vessel safety and economic interests. Vessels may not be allowed into the affected area for an extended period of time. This restriction of commercial shipping and other waterborne activities in ports or marinas could have an economic effect on the local community.

5.2.1 Identification and securing of spill site

In the event of an oil spill incident, the first item of a contingency plan will be to notify the responsible authority. The foremost step by the authority therefore is to secure the source of the spill. This implies that the authority, or those acting on its behalf, are expected to have prior permission to enter any premises in an event of this nature. It should be borne in mind that for this task to be accomplished successfully, well-trained personnel and the necessary equipment must be readily available. A shipborne oil spill incident may require personnel with experience and knowledge of shipboard engineering systems, while spills originating from a pipeline/network will require personnel with first hand general plumbing knowledge and fluid mechanics in addition to safety regulations.

In an effort to secure the source of a spill, personnel may need to work with the aid of equipment. Most often the required equipment will be specialised to suit a difficult working environment. Securing a spill from a ship may sometimes require the employment or support of divers to facilitate the repair of a leak(s) in the underwater side of the tanks.

5.2.2 Measures to Eliminate or Reduce Further Spills

The second step is to take measures to eliminate or reduce further spill. This therefore means; for example, discharging the content of all adjacent tanks to the secured ailing one or closing all valves and pumping out the remainder in case of a

pipeline burst or rupture. By this action, the quantity of oil likely to be spilt into the marine environment will be reduced to the lowest minimum. This, however, can be very difficult and expensive especially if the ship sinks as for example in the case of the Erika in 1999, off the coast of France. In some exceptional circumstances this may be the only solution to avoid further pollution.

5.2.3 Monitoring and Tracking of Spilt Oil

Depending on the prevailing condition, spilt oil in the marine environment has always the tendency to move about. This is the most critical moment especially if the spot of the spill incident is surrounded by sensitive installations, for example water treatment plant, beach or shoreline, aquaculture and/or fishing ground. In a normal situation, and where the necessary combating equipment is readily available, all the above mentioned sensitive areas can adequately be protected before recovery, otherwise a close supervision and monitoring of the spill direction is necessary. This can be done using planes or helicopters. Recent research on this subject has seen the development of mathematical computation that allows an estimation as to where the spilt oil would likely be at a particular moment of time. This allows advanced preparation to safe guard /protect interests or resources likely to be at risk.

5.2.4 Protection of the Resources at Risk

The next step in arresting the menace of spilt oil is the protection of resources that might be endangered if allowed to come into contact with the oil. If there happens to be as less equipment, then the protection of resources have to be accorded priority. A good contingency plan must always contain an up-to-date map containing all the resources and their location. This is otherwise known as a sensitivity map. There are basically three primary categories of the resources: environmental, which comprises marine fauna and flora; social, for example beaches and economic resources, such as fishing grounds. Protection of the resources implies the deployment and use of

different types of equipment, mainly booms of varying degrees and sizes. Each resource might therefore require equipment peculiar to it and able for the it location. The sensitivity map will also be required to make plans for the protection of sensitive areas threatened according to the movement of the oil; current and wind conditions.

5.2.5 Recovery of Spilt Oil

In the recovery of spilt oil, a combination of different equipment is inevitable; booms are used to protect, concentrate and contain. Skimmers are used for recovery and collection tanks for storage of recovered oil. The recovery of spilt oil is one of the most difficult tasks; this is because the weather conditions can change to rough any moment. As the weather changes, some of the physical properties of the oil tend to change also. Time also is another factor that can determine the success of any recovery action. The longer it takes to deploy and arrange to recover oil from the sea the more difficulty and the less successful the operation will be. There is also the need to organise a shore reception facility where the recovered oil can be stored before making a decision on further action. The choice of facility type is crucial. One way of disposing recovered oil is by sending it to a refinery for treatment. The choice of the equipment for the recovery of oil at sea is also important. The difficulty and rapid changing weather conditions in the sea mean that specialised equipment has to be employed. The same principle and approach may be applied for recovery in relatively calm water. A given incident where twenty-percent recovery is achieved can be considered successful.

5.2.6 Equipment and Clean up of Contaminated Areas

This most often will be required in a situation where the spilled oil has come in contact with resources or facilities that could jeopardise their usefulness. Beaches, shorelines, ports & marinas as well as marine vegetation can all come under attack. When contaminated, they obviously would need to be cleaned up.

It is worth considering that for shoreline clean up, the type of shoreline determines the most appropriate technique to be employed. An oil spill that is in motion due to the effect of either wind or current should be accorded more preference than those stranded. It has been observed that environmentally sensitive shoreline resources like mangroves, marshes and corals can achieve self-purification when left for the natural cleansing process to take place. This is particularly important where the pollution is not heavy. A well-established organisation is essential for proper co-ordination of the exercise for best results especially where these are spread over a wide range of shoreline types. Finally, regular exercises to get accustomed with the equipment and the working environment are equally important.

5.2.7 Remedial and Restoration Work to Damaged Sites and Resources

After the clean-up of oil from an incident scene the aftermath is the damage to marine living resources and/or their breeding ground. An aggressive clean-up exercise could also pose another problem. It is therefore important to carefully examine the affected vulnerable areas and resources with a view to restoring them to their original state. One measure employed to provide funds for this purpose is the adoption of the IMO conventions: International Convention on Civil Liability for Oil Pollution Damage (CLC, 1969) and International Compensation Fund for Oil Pollution Damage (FUND, 1971).

5.3 Incident Command System

Normally in the event of an incident involving a casualty in the marine environment, many organisations tend to offer help. These range from Air/Marine Authority, Insurance companies, Conservationists, the Coast Guard, Marine Patrols and many more depending on what is available in a particular country. This therefore implies a burden of the laborious task of co-ordination on the responsible authority. This

inevitably has the tendency of causing more chaos and makes the process of contingency planning a notoriously difficult undertaking.

The philosophy of a systematic co-ordination of response organisations at the accident scene is not a new concept. As a matter of fact, this was accorded recognition and promoted in the OPRC convention of the International Maritime Organization. The most important distinction with that of the United States version is its wider coverage to include landbased disasters (J. D. Spitzer, 1992). The Incident Command System (ICS) is simply an act of bringing together all the interested organisations and stake holders in the event of a marine environment emergency to work together under a single command system. Though each organisation may differ in the type of their available offer, the key word here is co-ordination under a single command.

ICS has been categorised into three: Type A, B, and C. Type A is characterised by being more flexible with minimum co-ordination. Participating organisations are often left to act at their discretion. Co-operation with each other comes only to avoid duplication and conflict of interest. Type B is a bit more rigid when compared to type A, “Resources are shared, but are closely controlled by the “owner” organisation”. Even though resources are pulled together to achieve single aim, each organisation prefer their owned set up of command and co-ordination. Type C is distinguished by being absolutely under single command system. It is widely prefer as it afford to provide hitch free implementation of the contingency plan in any emergency situation. It has an advantage over types A and B especially when there are many organisations attending to single emergency situation.

As was mentioned above, the development of contingency planning in Nigeria is at the infancy level. It is clear that the mandate given to the National Maritime Authority does not specifically address a potential maritime emergency as a result of shipping activities. Additionally, there was the recently created Federal Ministry of

Environment which it is perceived would have under its authority matters related to the marine environment. Nevertheless, there were numerous stakeholders like oil exploration and exploitation companies, ports & marinas, refineries and conservationists to mention a few that are directly or indirectly connected to the marine environment in Nigeria and the Niger delta in particular.

First of all there is the need to have a clear definition by the Federal government on who will assume the leadership role for co-ordination of the incident command. The leader will therefore be responsible for the design and up-dating of the contingency plan in the event of a marine environment emergency. The lead organisation will also be responsible for assigning the role of ranking stakeholders according to needs and priorities.

There might however be some disadvantages like the difficulty likely to arise in choosing between the Ministry of Environment and Maritime Authority as the lead agency/organisation. The role of states and local environment protection agency may also cause some problems. Moreover, there could be in the first place the problem of co-ordinating the activities of various response teams in a given emergency situation. Another difficulty would be the bringing together to the same level all available response teams, which might initially have different accounting and hierarchical reporting procedures.

The aforementioned disadvantages cannot in anyway override the merit of having an incident command system in Nigeria. Some of these advantages are:

- Pulling all the available response teams under a single command will reduce any duplication of effort that may exist.
- There will be little or no room for criticism as all the response teams are to harmonise to work under one command.
- The flexibility for adapting the response to incidents not only peculiar to the marine environment.

- As the response teams work together, the chance is there to learn and exchange ideas on different approaches to tackle existing and future emergency situations. There is therefore an opportunity for updating and improving the contingency plan.

In a nutshell, it is worth emphasising the fact that accidents are always bound to happen. Contingency planning is therefore a means to reduce or eliminate the consequence of marine environmental emergencies. The best result can be achieved in planning for a contingency if the potential threat and the resources at risk are known. With this, an effective response action can carefully be selected to address the impending problem.

5.4 Government Policies and Regulations

The record has shown that there is a remarkable reduction of quantity in oil spilt due to accidents especially in ports and marinas around the world. This is a success attributed to the various international treaties which most of the coastal States are party to. But convening and signing treaties is a tedious task. The same goes for regional or bilateral co-operation on common objectives among individual States. In the past, custom and immigration procedures were the major hindrance obstructing help coming from neighbours in the event of marine casualties. The fact is that no single nation has the capacity and capability to effectively handle a significant oil spill disaster.

A legally binding convention in addition to regional co-operation is therefore the surest way of getting help in the shortest possible time. This notwithstanding the fact that the agreement reached in such conventions forms an integral part of the national regulations. In other words, national regulations are in fact a transformation of internationally agreed treaties. Developing and convening an international treaty is a task that consumes a lot of time before it materialises, as has been seen from the

present binding agreements. It therefore requires the patience and dedication of all the parties concerned.

Most of the international conventions make emphasis on co-operation amongst countries in dealing with the pressing problems put forward, while the national regulations, among other things, try to enforce and take corrective and disciplinary action on any violator of the law. It is, therefore, important for coastal states to be party to all the vital treaties that are of significance to their strategic policies. Some of the conventions that have a direct impact and are important to the marine environment are:

- International Convention for the Prevention of Pollution from Ships (MARPOL)
- International Convention on Civil Liability for Oil Pollution Damage (CLC)
- International Compensation Fund for Oil Pollution Damage
- International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)

With these conventions as tools for the suppression of marine pollution, tremendous pollution of the marine environment by oil can be curtailed.

5.5 Environmental Impact Assessment and Evaluation Reports

The concept of Environmental Impact Assessment was first introduced in the United States in 1969. It is a cross-examination to purposely scan through a project put forward for implementation. Generally prior to this, executors of a developmental project hardly think about the environmental impact. Negative implication attached to most projects overrides their advantages. Sometimes it is hard to know this demerit from the onset, but mostly towards the end of the project's life span.

The most affected is the environment. Projects like port development and shipping as well as offshore oil exploration and exploitation are some of the activities posing threats to the marine environment. The Niger delta and its adjacent coast has, for

more than fifty years, been subjected to the aforementioned projects. This has been found to be directly threatening to the fishing activities causing the death of fish and sometimes a serious health risk to the human inhabitants and marine ecosystem in the area. Heavy dependence on seafood adds seriousness to the issue since thirty percent of the protein consumption is derived from the marine environment.

On the other hand, less development and economic activities means less pollution to the environment. A similar case of such activities was noticed in the Northwest Pacific, off the coast of China (UNEP, 2000). It had hardly had any activity, developmental or economic without adverse consequence to the environment. It will be wrong to stop developmental projects and economic activities in order to preserve the environment anyway. However, a compromise could be reached by opting for the Environmental Impact Assessment (EIA). Therefore, the surest way to avoid the problem of marine pollution as a result of development is to embark on an EIA on any proposed project and an Environment Evaluation Report (EER) on the existing ones. The aim of the EIA therefore is to allow sustainable development and management of the sea, obtain the long-term best possible benefits as well as to protect ecological integrity.

As for the Environmental Evaluation Report, the existing projects, which hitherto have not been subjected to EIA, are comprehensively scanned to make them viable vis-à-vis their feasibility in the marine environment. This implies proper scrutiny of the proposed project. EER is therefore equivalent to EIA.

5.6 Training Requirement

For big oil spill disasters, highly specialised combating equipment is required. This involves the use of booms for containment, skimmers for recovery, aircraft for aerial surveillance and vessels. As co-operation from various quarters is recommended, it is therefore necessary to make all the personnel involved exercise regularly. Training

and broader participation is equally needed for the dissemination of information to maintain confidence and obtain public co-operation. It goes also to say that effective preparation and management depend on training and experience, which should be built-in to any good contingency plan.

Regular exercise and drills at least once a year should include participants from the government, industries and public. This joint exercise will allow for an effective response under a single Incident Command System.

To conclude this chapter, it is worthwhile mentioning that a good and effective oil spill contingency plan should possess the following features:

- The assessment of the resources likely to be under threat.
- Development of credible response strategies.
- A well-defined and harmonised command system with proper allocation of equipment and responsibilities.
- Regular commitment to training and exercise by the participants from government, industries and local communities.

Chapter 6

Conclusions and Recommendations

There are ample opportunities and strengths favouring the development of Nigeria's maritime industry. Foremost is the length of the coastline, which is about nine hundred kilometres. It is full of natural features and resources. The Niger delta is part of this formation, the most important resource found there is crude oil both at shore and offshore.

The three important government establishments of relevance to the marine environment are the ministries of Transport, Environment and Petroleum resources. Laws regarding marine pollution are based on the 1954 Oil Pollution Convention. Though the OPRC convention was ratified, it has not yet been endorsed by the national legislation. The Ministry of Environment is just a year old, its specific role with regard to the marine environment is not clearly defined. The maritime administration lacks a clear mission on environmental policies.

Correct usage of opportunities created by those advantages on shipping and general maritime affairs can lead to a breakthrough to overcome the perceived threat to the marine environment. There are, however, some shortcomings posed by some alarming problems, which can as well be utilised to establish appropriate policies and a strategic planning process. The disadvantages or weaknesses are enumerated as follows:

- Inadequate compliance and enforcement of international conventions related to the marine environment.

- Increased rate of piracy and armed robbery in Nigeria's territorial waters
- Absence of well-structured national marine legal framework to deal with marine environment issues.
- Absence of comprehensive and effective national contingency plan.
- Non existence of appropriate training and development to ensure availability of the necessary oil spill management skills.

These can be use as a guiding principle for developing mission and vision statements. The government's marine environmental protection strategy will be able to reflect the following priorities and may form a strategic policy on the subject:

1. Provision of an effective regulatory framework to ensure pollution prevention is minimised: by ratifying international conventions like: MARPOL, OPRC, CLC, IOPC Fund, SUA.
2. Effective industry funded and positioned capacity for response to at least first tier oil spill accidents.
3. Response initiative to include: provision of a comprehensive and effective national contingency plan and negotiation for co-operative agreement(s) with international partners in the provision of capacity to respond to oil spill incidents.
4. Provision of appropriate training to ensure availability of necessary oil spill management skills.
5. Active participation and support in the development and implementation of ballast water management measures.
6. Support for the development of shore reception facilities.
7. Mapping, creating the feasibility for the establishment of marine protected areas; conducting of comprehensive sensitivity map exercise to prioritise environmentally sensitive areas.

Nigeria has so far been able to develop its maritime capacity in some fields vital to the economy. These include the physical construction of the basic infrastructures, and economic policies connected to international shipping.

The prospect for crude oil started about half a century ago. This aspect of development continues spontaneously from the shoreline and gradually moves offshore. According to the latest statistics, Nigeria is rated as number six among the major oil-producing nations in the world. Six main oil terminals are currently in use, with ships of varying capacity calling to load cargoes. Under the agreement entered into with multi-national oil companies, part of their contract responsibility is to survey and develop oil fields and jointly sell the exploited crude from which dividend is shared. In this respect, the Ministry of Petroleum Resources represents the Nigerian government. For domestic consumption, the Nigerian National Petroleum Company is responsible for refining and distribution. To facilitate this, there are in operation four refineries, three of which are located in the Niger delta region. The refineries are connected to a huge pipeline network.

In the area of ports and shipping, considerable progress in terms of development has been made. There are altogether nine seaports having drafts ranging from seven to nine metres; five of these are located in the Niger delta. As a result of these developments, there has been constant worry over the impact on the surrounding environment. The most important is the activities related to oil exploration, exploitation and refining. There is, on average, a report of an oil spill every two months. The problem is attributed to routine loading operations and leakage at the oil terminals and widespread deliberate vandalisation of pipelines. However the majority of the reported oil spills are smaller in scale and quantity.

Concerned with the present trend of environmental degradation, the federal government in the late eighties established the Federal Environmental Protection Authority, now the Ministry of Environment. Its mandate is to check these activities

in order to make adequate provisions for the prevention and response to the problem of environmental pollution.

The most important consideration in dealing with the problem of oil spill and the corresponding pollution is to examine the work of others. In this respect, Danish, Norwegian and Brazilian initiatives were studied all the three oil producers. Norway and Denmark are geographically located in a busy shipping route with ships of varying capacities passing through their territorial seas.

Regulations play a vital role in controlling pollution, thus it has been established that substantial parts of their environmental regulations are derived from international treaties under the auspices of International Maritime Organization. In addition to this, there is a strong regional co-operation and agreements on matters relating to the marine environment. The power to administer this task was vested in the maritime administrations and/or ministries of environment as the case may be. In response to an accidental spill of oil, they all heavily relied on the provision of the Oil Pollution Response and Co-operation convention with a strong co-ordinated command system. At the international level, there was concern over the disturbing nature of oil spills. Clamour for international response started early in the middle of the last century with the Oil Pollution convention. Subsequent accidents that followed agitated the need for revision and introduction of more stringent measures. In the circumstances, therefore, important treaties were reached that gave birth to conventions such as MARPOL, Intervention, OPRC, and SUA. These were considered to be a booster to the 1982 United Nations Convention on Law of Sea. The aim of these laws is to provide a basis upon which national regulations can be laid. The conventions provide a worldwide harmony of marine oil spill pollution regulations.

The purpose of the marine (oil) environmental emergency contingency plan is to be able to respond where preventive measures have failed to stop an accident. In order to achieve success, regulation and enforcement are essential. The most suitable

remedy can be drawn from the OPRC convention, which contains provision for mutual co-operation amongst nations to work on the ground to achieve a unified response action. This is because no nation has the capacity to adequately and successfully combat a large-scale environmental emergency, especially those related to oil spills. For a given emergency situation, as was the practice in most contracting states to the convention, the following response actions are sequentially taken:

- Identification and securing of spill site
- Taking measures to eliminate or reduce further or subsequent spill
- Monitoring and tracking the movement of spilt oil
- Protection of the resources at risk
- Recovery of the spilt oil
- Clean up operation of contaminated area
- Remedial work and restoration of damage sites and resources
- Provision of combating equipment

The degree of success in implementing contingency plans depends on the co-ordination of various response groups offering help. Usually help comes from all quarters, therefore a command system will obviously reduce chaos and confusion.

Fortunately, there has never been a large-scale oil spill emergency in Nigerian waters. However, the potential of having one cannot be ruled out. The reasons for a possible accident include lack of adequate preventive and response measures. In addition are, the Nigerian oil industry's current capacity of about two million-barrels per day, and the frequent rate of call by VLCCs to Nigerias' oil loading terminals. Oil spill has the potential to affect the ecology and economic well-being of the inhabitants of the Niger delta. The local population depends heavily on fishing as food source and for income earning. Water transportation and cabotage is significant as well.

The present and potential predicament in the Niger delta is a direct result of the developmental activities in areas of shipping, oil exploration and exploitation. The

majority of these projects were embarked upon forgetting the likely consequences. In contrast, new projects are by Nigerian law required to be assessed with a view to making adequate arrangements to safeguard the environment. This is known as Environmental Impact Assessment (EIA). However, for existing projects where this has not been undertaken, an Environmental Evaluation Report is required instead.

Having the capacity to prevent or respond to oil pollution emergencies could be a worthless undertaking if there is no trained manpower to manage it. Training and exercises are an important step towards improving the skill of the response team. Based on the above submission, recommendations are therefore given below for the sustainable development of the marine environment in the Niger delta.

An organisation with a clear mission and vision statements will directly face all impending goals for which it was set up to achieve. Drawing on such a statement can be done through the SWOT analysis. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. Based on this, there is a need for the Nigerian Maritime Administration to thoroughly revisit its mission and vision so as to come out with environmental policies, which will adequately focus and address all the problems of pollution in the marine environment.

In trying to establish good environmental policies, the work of countries with similar interests that have achieved some degree of success can be considered. This includes co-operation with organisations, both intergovernmental and non-governmental. This can alleviate mistakes or the embarking on a worthless exercise.

Striving for the adoption of international treaties and sound national legislation is essential for a regulatory environment, which supports safe shipping operations, protection of the environment and adherence to internationally agreed standards and procedures.

A program of marine environment protection requires training and exercises to be part of a contingency plan in case of emergencies. This will ensure the ability for success and achieving the set goals.

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