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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**EVALUATION OF CONTINGENCY PLANNING
FOR THE PROTECTION OF CONGO'S MARINE
ENVIRONMENT AGAINST OIL POLLUTION**

BY

OKAMBA JEAN-JACQUES JOSEPH

Republic of Congo

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

GENERAL MARITIME ADMINISTRATION

AND

ENVIRONMENT PROTECTION

(GMA & EP)

1996

DECLARATION

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

The contents of this dissertation reflect my own personal views, and are not necessary endorsed by the University.

...18...19...1996...


.....

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REPUBLIQUE DU CONGO



ABSTRACT

The subject intends to give an integrated approach to the protection of the Congolese marine environment against oil pollution by the evaluation of the existing contingency planning. It will show the necessity for the country to get a real contingency plan. The Congo has a small coastline without any world-known environmentally sensitive areas. However, shipping routes, oil exploration, the establishment of offshore fields and floating sea terminals have increased the risk of marine pollution, which has become a reality. Does, the Congo at present have resources, ability and the possibility to respond to environmental disasters ? What is the level of risk? Is the existing contingency planning sufficient to handle the situation? What is the role and the responsibility of the government in the establishment of a secure national contingency plan? What are the possible solutions to contain oil pollution from and towards neighbouring countries?

The dissertation proposes to examine these factors, to determine the state response available to the emergency situation in the Congo, to draw conclusions and to make necessary proposals to overcome deficiencies or evident weaknesses in the current system.

With this dissertation, the author will not only try to analyse various aspects of these issues, but will also show from different studies, possible solutions to the current problems, even if it is not really the specific intent of the author to do so. Other specialists may subserviently offer solutions as these questions should interest people in neighbouring countries or in the region who are concerned with the same problem.

TABLE OF CONTENTS

| | |
|-------------------|-----|
| Declaration | ii |
| Acknowledgements | iii |
| Abstract | v |
| Table of contents | vi |
| List of Tables | ix |
| List of Figures | ix |

Plan

| | |
|---|---------|
| I-Introduction: The oil industry and the development of the Congo | page-10 |
| II-The Congolese marine environment | page-13 |
| 2.1-The Congolese marine background | page-13 |
| 2.2-The potential oil spill sources | page-15 |
| 2.3- The marine environmental policy | page-23 |
| III-The marine environment protection framework | page-30 |
| 3.1-The background | page-30 |
| 3.2-The national legislation | page-33 |
| 3.3-The implementation of international legislation | page-35 |

| | |
|--|---------|
| IV- Planning improvements | page-43 |
| 4.1-The case study of regional marine pollution | page-43 |
| 4.2-The possible impacts | page-45 |
| 4.3-The contingency plans of resident oil companies | page-47 |
| 4.4-The set limits of the plans | page-56 |
| 4.5-The assessment of the plans | page-57 |
| 4.6-The option for a national contingency plan | page-62 |
| V-The treatment of oil pollution in industrialised countries | page-65 |
| VI- Recommendations and Conclusion | page-69 |
| 6.1-Specific needs for change | page-69 |
| -Conclusion | page-71 |
| -Bibliography | page-74 |

LISTS OF TABLES AND FIGURES

a) List of Tables

| | |
|--|---------|
| Table 1.Movements of Tankers at Djeno terminal | page-22 |
| Table 2.Movement of tankers at Yombo terminal | page-22 |
| Table 3.Total seaborne oil movement | page-23 |
| Table 4.Evaluation grid of contingency plans | page-61 |

b) List of Figures

| | |
|--|---------|
| Figure 1.Currents and Winds components | page-46 |
| Figure 2.Elif and Agip action diagrams | page-49 |
| Figure 3.Treatment of any pollution | page-51 |
| Figure 4.Operational actions for inland waters | page-52 |
| Figure 5. Walter spill notification | page-54 |
| Figure 6.Oil spill task force organisation | page-55 |

CHAPTER -I-

I-INTRODUCTION: OIL AND THE DEVELOPMENT OF THE CONGO

This chapter will provide such a background by describing and analysing the oil industry and the relationships around the country. It is concerned exclusively with the period over twenty years when the growth of the oil industry has exceeded all other large scale economic activities.

A description of the world's oil industry demands the use of many superlatives. By any standards, it is today the world's leading industry in size, as others depend on it, and it is probably the only international issue that concerns every country. As a result of geographical separation between regions of major production and large consumption, it is first in importance in its contribution to the world's tonnage in international trade and shipping. In his book, "Oil companies in the international system" Turner, (1983, page 21) affirms that at present oil became a tool for pressure and power. Because of these and other attributions, such as its involvement in both national and international development, rarely a day passes without oil being in the news. Often the significance of such items is not apparent in isolation or without some background knowledge of the way in which the industry has been or is internationally organised, including its impacts upon individuals or groups of countries in which operations and interests lie.

The Congo, like many other oil producing countries, belongs to a group often called "the international industry". This does not mean that they control any world industry, rather it simply refers to the fact that here the industry operates internationally within the framework of a complex network which connects most

countries especially those where ownership and direction still lies in the hands of a very small group of well known companies called major in the oil industry terminology.

Partly as a result of Brazzaville's former position as the capital of France during the Second World War and then of French Equatorial Africa, and partly because the Congo and Oubangui rivers have provided the main access to the Central African Republic and Chad for a long time, the Congo's economic structure evolved rather differently. It was based on transit, on agriculture and timber. Petroleum was discovered in 1957 and since has then been exploited at Pointe-indienne - loango near Pointe-noire. So until 1970 the hydrocarbon sector, the only significant mining activity, was not very important. In 1971, when these deposits were almost exhausted, new offshore oil fields were discovered successively by Elf-Congo in the south-west of the Congolese waters and Agip-recherches-Congo in the centre-north. The Elf-emeraude field went into production in 1972 and reached 2,5 million tons in 1974; but the exploitation would require expensive stream-injection procedures for recovering output so it still remained unexploited because of heavy viscous petroleum. At the same period the Congolese authorities, with help and good co-operation between Algeria and the Congo, discovered that the two foreign companies named above, had not paid any taxes for a long time. Only for the year of 1972, the amount of total taxes was two billion C.F.A.Francs. So Congolese authorities decided to acquire more control over this activity. Firstly, they created a state owned society "Hydro-Congo", a national society responsible for oil research and exploitation with a monopoly over distribution of petroleum products in the national territory. Second, they built a refinery which initially opened in 1976. The first quinquenal plan was created and an optimism as never before was born in the country as time approached for its development. Many other oil fields were discovered and the outputs of crude oil consequently rose sharply, reaching 8 million tons per year.

The former president, Marien Ngouabi promised in a state program speech that in 1973 there would be no unemployment in the country. The government planned to ask neighbouring countries for help with the workforce. Congo's population was 800,000 inhabitants at that time.

In 1979, the economic policy changed and the new government emphasised that the Congo had a mixed economy and would benefit from the expertise that private investments could provide. New reforms have been taken and the petroleum sector furthermore became open to private and foreign investment. In the country, the population was speaking not about oil but about "milk and honey". However, everything has not always been in order, and economic growth has fluctuated widely in recent years due to increases and decreases in international oil prices. Later, international conflicts which followed the invasion and the annexation of Kuwait gave some benefits to the Congo's petroleum industry by boosting international prices and by encouraging exploration in the producing areas outside the Middle East. With the establishment of Walter International who bought Amoco's installations, the Congolese sea waters were exploited by three foreign companies: Elf is present in the south-west, Agip has the middle and Walter then took the north-eastern part. Today, with the planned development of new major fields Elf-nkossa and Agip kitina, the production is expected to reach 15 million tons per year by 1996/1997 and to be over 70% of the government revenues.

CHAPTER -II-

THE CONGOLESE MARINE ENVIRONMENT

The second chapter is a general description of the Congo. It concerns the location of the country, its international boundaries and some marine aspects of the area, for example currents, winds and tides that affect the safety of navigation. It also presents the risks related to marine pollution for the Congo and neighbouring countries posed by offshore installations and international shipping routes.

2.1-The Congolese maritime background

1- General description

Geographically located in Central and West Africa, the republic of Congo is a small country that lies on the equator between respectively Gabon and the Atlantic Ocean on the West, and Zaire to the East where the Congo River, common to both countries, and its tributary, the Oubangui, form the longest side of the eastern boundary of the state. To the south the Congo is bordered respectively by Zaire again and the province of Cabinda (Angola); and at last to the North, north-west, by the Central African Republic and Cameroon. The area is 342,000 km² and supports a population of 2,694,000 habitants (source UN.1992).

The Atlantic Ocean stretches along the Congolese coast for about 200km and the ocean water characteristics can be defined as swell type waves. The national topographic chart data basically shows that the Congolese shoreline, as a part of national wildlife reserve, is characterised by a coastal plain dominated by narrow, moderately steep, sandy beaches. It also comprises two large bays namely Pointe-

Noire Bay where the port and industrial bases are located, and Loango Bay, which is well known for its villages of local fishermen. Along the coastline the sea intersects a number of river mouths and their associated lagoons and swampy mangroves. The ocean tides together with the currents from the large rivers, create turbulent water along the coast. Between the major rivers, the Congo and the Kouilou, there are cliffs, numerous small streams and lagoons, the mouths of which are in general closed by sandy bars and can directly be connected to the ocean, usually only during the high runoff periods. However, closing these mouths, sandy bars are commonly low in elevation and can be overstepped by waves at high tides. This is a rich area in aquatic flora, wild fauna, fish and shrimp. Close to the bay of Loango, the zone has recently been subject to strong erosion, about two meters per year and a solution to the erosion has not yet been found. The continental shelf and slope is notched with submarine valleys or canyons, including that caused by the Congo River. Beginning in the vicinity of the coastline, longshore and rip currents extending several dozen kilometres inshore towards the inner part of the estuary and exert considerable influence on the loss of coastal sedimentation (National geographical Institute sources, ORSTOM 90).

2-Prevailing currents

The main oceanographic currents in the region were described by Longhurst in 1962. The coast between the Congo river and the Cap Lopez (Gabon), is bordered by a sandy beach on which the heavy surf breaks, particularly during the dry season. To moor ships or boats along the coast is difficult and impossible except in a few places, and then only on exceptional fine days. In this area tides are semi-diurnal, that means, every twenty hours, two cycles of low tides and two others of high tides with a sea level variation that ranges from 1.8m to 2.7m during spring tides, 0.7m to

0.5m in reap tides. Along the coast, tides are influenced by the cold Benguela current, which flows ordinarily south-north, almost to the equator, from the vicinity of the Cape Good Hope to the Gulf of Guinea. During different seasons this zone is subject to the varying activity up-stream Equatorial counter currents. Between 30 and 40 miles from shore the current speed is about one or two knots, but it is stronger from December to January when the south coastal winds turn west. Between the mouth of the Congo river and the Cape Lopez, generally the current sets steadily in a north-west direction, attaining sometimes a velocity of about two knots. It can be explained as a resultant between the Benguela current and the flow out of the Congo River, which joins the former south of Ponta da Moita. This united current turns off west from Cape Lopez to become a part of the south equatorial current.

The prevailing regional wind systems along the coast generate an offshore flow component in the surface layer of the seas due to the combined action of the wind effect and the rotation of the earth. The Congolese basin contains isobarhs with depths ranging from zero to two hundred meters near the coasts, and five hundred, to more than a thousand meters in the high seas.

2.2- THE POTENTIAL OIL SPILL SOURCES

This section looks at the problem which the three foreign oil companies Elf, Agip and Walter face with the dangers of oil spills.

It would be easy from the previous description, to consider Congolese seawaters as sensitive areas, but many other factors are necessary to consider as that influence this idea, although the previous section has been very useful to the geophysical understanding of the region. But, having described the geophysical aspects does not

give a complete picture to the problems of pollution which threaten the Congolese seawaters and shores.

As many oceans or seas in the world, with the exception of the dead seas, the Atlantic Ocean in the Congolese area is subjected to many activities which create oil spill risks. Those are increasing every day due to the fact that Congolese waters constitute a part of important maritime routes from the Middle East to Europe and vice-versa, especially for the marine transport of oil and hazardous cargoes. The estimated total volume of oil transported annually along the Gulf of Guinea, according to IMCO/UNEP 1982 was, 706 million tons, from Fearnleys-World bulk trades 1994 data, total sea bornes crude oil in million tonnes was 827.2 in 1992 and 849.8 in 1993. However, the sea-lines are very wide and the number of tanker accidents involved in the region, is low compared to other regions and oil from vessel casualties in innocent passage has not been detected in the Congolese areas. Today, the apparent quantity of oil found on beaches and lagoons has risen as a result of spills due to tank washings and ballast discharges from offshore traffic, from tankers visiting the neighbouring country Angola and from its own installations as the Congo is a small oil producer with only 8 million tons per year operated by Agip, Walter and Elf.

Cabinda, located on the southern border of the Congo, between Zaire and the Congo, is one of the biggest oil producers in the region, producing 320,000 barrels a day and poses as the primary threat to the Congo where foreign generated marine pollution is concerned. The oil installations are composed of three floating sea terminals and their annexes; the two which are most important lie at latitude 5.°06'S and on longitude 12°04'55E. The first terminal "Maloango terminal" is located 24 kilometres north of Cabinda. The second is "Takula terminal", located 40 kilometres west north west of Cabinda. Both belong to Cabinda Gulf Oil LTD and export crude oil, butane and gas (LPG) 24 hours a day from two independent single mooring buoys around the terminals. Each of them can moor LPG vessels of 140,000 tons maximum dead-weight and load 30,000 barrels per hour. At the other

terminal tankers of 325,000 tons maximum dead-weight can be moored at a 40,000 barrels per hour rate. In 1993, vessel traffic statistics recorded 121 vessels. It is necessary to note that there is another terminal, called Palanca, located 23 miles west and 23 ° NW of Luanda. They can store 274.000 tons of oil for vessels between 40.000 and 280.000 tons dead-weight moored by the bow; the loading rate is 65000 barrels per hour.

Generally, as in all the region, the current sets toward the north but is seasonally influenced by floodwater from the Congo River, which flows in a south-westerly direction mainly occurring during the dry season between June and September. From October to May heavy squalls with winds gusting to 5 knots may be experienced (Lloyd's,1995).

Concerning the Elf Congo oil company the pollution risk is high at Djeno terminal where oil from offshore platforms of Elf and Agip are stored. The combined terminal of Djeno is situated only 3 miles from the coast and is subjected to among other things industrial discharges. The storage point is linked to the offshore platforms by kilometres of pipelines running from different fields which also threaten the marine environment. All together they are sources of oil pollution and put this area in a great environmental risk. Some platforms, particularly those in the Likouala field, are not so far from the border with Angola and are more than twenty years old, needing to be monitored by the maritime administration. Four storage points complete the oil industry installation. One of them, the oldest, the Djeno terminal accomodates about six or seven tankers monthly with a 120,000 ton or a 125,000 ton loading capacity to reach the single mooring buoy SBM Djeno which has a transfer capacity ranging between 8,000m³ and 12,000m³ rate per hour.

The Elf-Congo general security plan, specifically covers marine pollution and fire, but does not yet take into account the atmospheric pollution. The area around the terminal is today black and covered by oil products that confirm negligent practices that degrade, the welfare of fishermen and the population of the Saint Paul district. The development of a new field by Elf in Nkossa will give the opportunity in the

current year to bring to the area new technology for the exploitation of a field located at 60 kilometres from the coastline and at 3,000 meters depth under the seabed (Elf-Congo, Jeune Afrique, May 1996). There is a large oil reserve with an estimated thirty years of future exploitation without any foreseen problems related to return on investments or profits. The total cost is more than 950 billion CFA Francs and the money has been invested by a consortium among which Elf for 51%, 30% for Chevron and 19% for the Congolese state (Hydro-Congo). Half of this money had been used to build the biggest floating oil factory in the country, a 110,000-ton base for materials, habitat, exploitation, oil extraction and storage included, corresponding in size to two football fields. This factory is now sailing towards the Congo and should reach its destination in June. The production will start in July and should reach 120,000 barrels a day, or 6 million ton per year and will raise the total production by 60%.

Elf will probably give special attention to its equipment and institute high standards and arrangements since the field is located in the high seas, at around sixty kilometres from the coast. It is hoped that Elf's special requirements for this installation will protect the workforce and the environment.

Located in the north of the bay of Pointe-Noire, the small refinery, "la Congolaise de raffinage" CORAF, constitutes a terminal for the port which is on its turn a loading and a discharging point. They can store all together fifty thousand tons of different oil products and gasoline. This is in a populated area of the town Pointe-Noire. The safety organisation and the duties of the refinery and the terminal are identical for fighting against fires. But, the administration of the refinery places more emphasis on international requirements for oil spills than does the terminal. The refinery is equipped with a laboratory, a system of oil water separation, incinerators to treat residues and equipment to control pollution.

In terms of production period and size, Agip is the second largest oil company active in the Congo. Installation, platforms and submarine pipelines are located in three major fields, to the north-north west of Pointe-Indienne in the bay of Loango, the

marine III concession lies a hundred kilometres from Pointe-Noire. Two of the fields in this concession are linked by remote controls and pipelines from where one central platform at the Zatchi field serve as a single control and booster centre to regulate oil production and to send it to the Djeno terminal, where it is maintained by heating at appropriate temperatures. The Kitina field in the high seas is independent, and will be linked to the same terminal by pipelines controlled from its own installations.

The possible oil spills of which Agip installations are subjected to can be associated with breaks of pipelines or failures in production operations due to human errors, well eruptions or the accidental extinguishing of flares. All these elements have been included in the Agip safety and contingency plans, the analysis of which is subsequently addressed.

Since 1991, with the coming of Amoco as a new partner, a new experience in the exploitation has been attempted and the first floating oil production and storage sea terminal took place in the Congo. Amoco then, Walter International since 1995, manages the Yombo oil field located 55 miles north-west of Pointe-Noire. The installations are comprised of two fixed platforms A and B connected via submarine pipelines to the multipoint anchored Conkouati, which is used as a storage facility and marine terminal.

The Conkouati displaces approximately 232,000 dead-weight (dwt) with more than 40,000 barrels a day of oil handling capacity. This crude is considered hazardous when fresh because of high percentages of hydrogen sulphide, is stored on board until sufficient quantity is accumulated for periodical removal by shuttle tankers ranging in size from 80,000 to 125,000 dwt. Transfer operations take place at least one time per month and are accomplished by the vessels side-to-side. The Yombo crude is low in American Petroleum Institute (API) gravity, heated on board and serves as fuel for the terminal itself. The risks of oil spills associated with the production operations varies from small flowing wells, drips and leaks to the catastrophic loss of one or more tanks on the floating terminal Conkouati, while the

most probable cause of any significant spill incidents could be related to a failure of the hose during the transfer, although it is carefully metered and monitored. In this field, the problems are most likely detected by the periodic visual observations for oil spills and by the hydrogen sulphide sensors used to register poisonous gas leaks. For major spill incidents, such as total pipeline failure, there is a pressure monitoring instrument on board the Conkouati to detect them. However, according to a Walter company security man in charge of marine environment, flowing wells present a clean up problem due to the time required for well control. With the storage capacity of one hundred fifty thousands tons of oil, Walter has improved its security on board the Conkouati to include in a contingency plan, the analysis of which is an interesting subject, given that nobody knows when or what accident can happen.

The estimations of possible sources and volumes are listed below:

Platforms: oil water separator upset=250 barrels a day crude oil until controlled

-flare failure=100 barrels crude

-pumping well failure =2,000 barrels a day crude oil until shut down

-Fuel transfer loss =50 barrels diesel fuel

-Shuttle vessel deballasting =0; dirty ballast prohibited

Shuttle tanker:=vessel ramming, tank holed with loss of 20% of contents or 26,000 barrels of crude

Transfer operations

-Hose flange leak=estimation, 20 barrels per hour until shut down

-hose drainage = 23 barrels

-hose failure =23 barrels per hour until shut down

-shuttle vessel tank overfill=variable estimation, around 500 barrels per hour

Along the coastline, many activities can be affected by any major pollution of the sea. Fishing and tourism together contribute to the welfare of the population and attract seasonally people to the bays, streams and lagoons for sportive activities and for visits to the national wildlife park.

The Congo has a humid climate due to the existence of the many rivers, which also serve as means of communications, allowing it to be a transit country for countries such as the Central African Republic (CAR), Chad and Zaire. This function is complimented by the use of the railways "chemin de fer Congo-Ocean" CFCO between Pointe-Noire and Brazzaville. The Congo river is a transportation route for all kinds of goods, including oil to the previously named countries.

The Congo is not only a producer country, but can also be a polluter for the neighbouring Gabon, which has 800 kilometres of coastline. Gabon is itself a big producer in the region with more than 450,000 barrels a day. The oil installations are composed of on and offshore equipment. There are four terminals, among which the biggest is Cape Lopez belonging to Shell-Gabon located near Port-Gentil, and has the capacity to load vessels of 150,000 dwt size with a loading rate of 12,000m³ per hour.

The following section evaluates the oil pollution risks and presents them in forms of tables, describing all the movement of oil transfers from terminals to tankers and to abroad destinations.

The figures below show the movement of tankers in different terminals in January 1996 and the first table concerns the activities at Djeno terminal and at the port of Pointe-noire.

Table 1

| Operators | Quantity(tons) | Vessels | Dates | Charterers |
|---------------|----------------|------------|----------|------------|
| Elf | 130,000 | Mega Buck | 02.01.96 | BP |
| Coraf | 52,000 | SUNRISE | 05.01.96 | Somaref |
| Elf/Agip | 130,000 | NorthJahre | 08.01.96 | Hess |
| Coraf | 50,000 | Spirit | 11.01.96 | Somaref |
| Elf Aquitaine | 125,000 | Provence | 14.01.96 | CPC |
| Agip | 125,000 | Honam Jade | 20.01.96 | CPC |
| Elf | 125,000 | Berge Sep | 23.01.96 | CPC |
| Elf | 125,000 | Heritage | 28.01.96 | Elf |

table 2 deals with the Yombo terminal:

| Operator | Charterer | Quantity(tons) | date | Vessel |
|-----------------------|-----------|----------------|----------|----------|
| Walter International. | Deneb | 80,000 | 12.01.96 | Stinness |

In total the crude oil sea borne export in January 1996 was 942, 000 tons

Following are the pipeline distances for a flow of 3000 m³ per hour for each company from the platforms to the storage points:

Agip =98km

Elf =127km

Walter=15km

Table 3 represents, from ships route sources, the total crude oil sea borne in millions ton which passed through the Congolese sea waters.

| Years | 1992 | 1993 |
|-------------|-------|-------|
| WestAfrica | 133.3 | 130.5 |
| Middle East | 693.9 | 719.3 |

2.3-THE MARINE ENVIRONMENT POLICY

The marine policy is the framework for decisions to plan or implement integrated management of marine resources and ocean space with a view to avoiding or to minimising conflicts among competing uses of the ocean, protecting the long term values and benefits presented by the extension of the marine area under national or international jurisdiction.

This integration of ocean policy requires a sound understanding of the different phenomena taking place in the marine environment, namely the active participation

between the actors intervening in the various sectors, close co-ordination at the decision making level, harmonisation at the planning level and substantive co-operation at the implementation level. Some factors have to be considered:

- 1- geographical situation or spatial dimension
- 2- natural resources
- 3- different administrations involved
- 4- elevated rate of pollution increase
- 5- marine science, technology and education

Regarding the value of the natural, maritime and continental assets available for the socio-economic development of the Congo in particular and for West and Central African region in general, the government created a ministry in 1981 in charge of overall environmental policy, including marine, atmospheric and continental aspects. Until now atmospheric environment activities are conducted by the National Forecast Agency and Asecna (Agency for the security of air navigation) for air transport needs. In the maritime field there has been a lack of updated laws and regulations since the post colonial period. There existed a navy and a maritime administration staff "La direction des services de la marine marchande" in charge of the management of seafarers and maritime vessels. The involvement of the country in some United Nations organisations such as FAO, WHO and IMO since 1975, has helped to discover, through participation in international and regional meetings, the necessity to reorganise the maritime administration.

Because of the introduction of a new policy, marine environment protection measures are now drawing attention to the need for state involvement. During an ordinary congress of the Congolese labour party (PCT) in 1985, the idea was initiated to create a powerful ministry of the sea, including navy, merchant marine and fishing activities. However, this kind of restructuring would cost too much, and therefore only the maritime administration has been changed and thus "La Direction de la marine marchande" was born.

In October 1987 "La Direction Generale De La Marine Marchande" was created by Decree 87/580 and later in that year the Ministerial Order 1234, in November 1987 described in detail the functions of the DIGEMAR . This governmental body has an executive and advisory role for the management of overall maritime policy in the Ministry of Transportation, Civil Aviation and Merchant Marine. That includes the management of maritime activities as described in the referred text in collaboration with other users of the sea, administrations and governmental and non governmental agencies into two hundred miles of the territory.

From the point of view of organisation, La DIGEMAR is composed of three central directorates, managed by an identical number of directors :

1-The maritime transport direction manages all activities related to port facilities and cargo shipping import and export activities.

2-The directorate of general and seamen administration, as indicated, is in charge of the office personnel and of issues relevant to seamen actions.

3-The directorate of maritime navigation security is responsible for all problems related to ships' safety (crew, cargo, ship), sea installations or occupations, navigation, sales, mortgages, maritime search, rescue and marine pollution.

As expressed in the decree, for the marine protection against pollution, the main objectives are the following:

1-to develop appropriate preventive measures and effective systems to discover and report at any time the existence of an oil spill;

2-to take prompt measures in order to restrict the spread of oil;

3-to assure that public understanding, health and welfare are provided adequate attention;

4-to apply adopted techniques to clean-up operations and oil collection;

5-to institute actions to recover compensation for marine environment losses and damages; and,

6-to develop and expand maritime relations with neighbouring countries or those of the region with the aim to establish joint ventures and co-operation in the protection of the marine environment and the development and execution of contingency plans. Apparently the marine environment has been defined as one of the most important tasks during the Congo's monopartism period, but it had never been considered thoroughly until 1989. The Congolese environmental agencies did not profit from the existence of one of the best laboratories in West-Africa belonging to ORSTOM (Organisme chargé de la recherche scientifique dans les territoires d'outre mer), which is located along the country's coast and specialise in marine field.

Today, other relationships are being established with different oil companies working in the Congolese seawaters and the shipping industry. Because of change in the administration and failure to follow through with record keeping a considerable delay has resulted in developing an understanding of marine environmental issues. Now, with the implementation of west European style of democracy in the Congo, the environment has become included as an entegral part of the life of the nation's people, as established in the new 1991 constitution. Since then a firm environmental policy was established and other relationships were formed with investors with the aim to have the environment protected in all development fields.

The marine environment policy addressing marine pollution is based, in short on the following aspects: prevention, protection, surveillance, response, and the evaluation to enhance prevention. So it looks like a perpetual circle.

From these areas, different goals and objectives developed along with the ways to realize them in the short, medium and long term. State actions which were determined as follows:

One of the important basics of this policy is the legislation related to the subject; starting from the national legislation, this includes the adoption and the implementation of international conventions, along with the creation of positive bilateral and regional agreements against pollution and dumping.

The Congo does not have a contingency plan and the actions of the maritime administration to prevent pollution have been described through the "code de la marine marchande". According to this act, surveillance should be conducted in two ways. First, from the point of lowest tide into the sea to one hundred meters on the coastline, each agent of any state administration such as customs, navy, port or merchant marine, has the duty to report any oil spill incident discovered in this area. Second, the surveillance can be done only through the different means. It is the job of the navy in the high seas, the maritime administration along the coastline, the foreign oil companies, which have supply vessels and private helicopters and finally other available governmental bodies. They have an obligation to inform the maritime administration in the case of any oil spill detected or which they are aware. Information reported should include the location, the spread direction and any evaluation that would assist in providing rapid response action.

Preventive actions are made under the responsibility of oil companies in their safety zones around the oil fields in the areas of pipes installations and at sea terminal. All installation on or under the sea are to be shown on nautical charts and followed-up by frequent daily and weekly urgent messages to navigators(avurnav) to inform them of any changes and to suggest the maritime routes that are better to sail.

The last point is the most important regarding this dissertation topic as it concerns the combat against oil pollution, which is possible only if there is a contingency plan. This action is still conducted by oil companies. They are frequently accused of being the source of internal oil pollution. However should be noted that sometimes oil spills come from Cabinda. As practically the same oil exploitation companies are located in both Cabinda and the Congo, there exists a mutual understanding that each must deal with any marine pollution that may arise from the other operations. However, the reality is that the currents flow mainly from Angola to the Congo. Thus the companies operating within the Congolese border are the ones that must deal with the clean-up.

The issues of compensation and the restoration have not shown good results because of a lack of adopted legislation.

In its long term policy the administration projects to provide a laboratory to follow the evolution of pollution in the Congolese seawaters, to study the dispersant uses as they can be adapted to national waters and to analyse the effects of discharging ballast water from tankers. The provision of port reception facilities are included as one of the objectives as related to the conventions "Oil Pol 54, Marpol73/78".

The marine environment policy includes naturally the preservation of marine resources by having sustainable control over them. The maritime administration is ready to contribute with others to the reflection on this subject as its development and management requires considerable scientific and technological knowledge the intensive exploitation has the potential to cause adverse impacts on the marine environment .

Another important point relates to the education of the public to create awareness so that everybody knows of issues and consequences of oil pollution. This is a long and continuous action that is needed.

The aid and co-operation of ORSTOM have helped the Congo to initiate some specific actions, which have been summarized in different reports to national and international agencies.

On the grounds that the first impacts of any pollutant action cannot be stopped within the national waters, and that the effects are not restricted to the national boundaries, some positive arrangements to protect the overall marine environment have to be made. They include:

- 1-Development of legislation to play a leading and a supporting role.
- 2-Development of national, coastal, oceanographic, scientific and technical programs are needed to provide ocean services (monitoring, data, information, forecasting) to various ocean users

3-Difficulties to be overcome for the national comprehension of coastal, and ocean development and management: While a special program strategy has already been formulated, problems still remain with implementation.

4-Implementation actions are needed in as a support of the bilateral co-operation treaty, between Angola and Congo; That has been signed but its application is still in the process of development because of internal problems in Angola.

CHAPTER -III-

THE MARINE ENVIRONMENT PROTECTION FRAMEWORK

Environmental issues today are of capital importance. It is enough to consider the serious claims of the world population who are asking for a sustainable development. To achieve this goal, the Congo cannot manage this alone. Chapter 3 will therefore explain the necessary marine policy and the national and international legislations related to the protection of the marine environment, which are important for sustainable development.

3.1 BACKGROUND

The marine environment receives pollutants from diverse sources. Some of those are natural; however, the vast majority are anthropogenic, which entails manmade sources, such as cargo oil spills from ships, dumping of dredged spoils and wastes, blowouts and operational discharges from offshore oil and gas exploration and production, in addition to direct and diffuse discharge from land based activities. If traditionally ocean and land based sources have been considered separately on the international arena, apart from marine pollution from land, significant effort has been given to ocean sources, in particular shipping and dumping. It is now recognised that protection of the marine environment at acceptable and ecological levels requires a comprehensive approach. This means that there are many activities competing to derive benefits from the ocean and none of these, as vital components of the global life support system, should be regarded as having more guaranteed rights over the others. All uses of the marine environment by man involves certain

stewardship obligations and considerations of all alternative uses must always be undertaken.

This recognition has led to significant, durable and successful efforts, made and incorporated by one hundred and sixty four nations, formulating an international convention on the law of the sea, and giving support to the notion that the ocean must be dealt with comprehensively, or in other words, the idea of sustainable development is of primary importance. It identifies strategies available to countries from the use of the ocean as a receptacle for wastes. The goal is to protect marine ecosystems by maintaining their quality at acceptable limits as determined by scientific, institutional, social and economic factors.

The basis for this approach to the marine environment protection is the concept of environmental capacity that is generally considered as the ability of the environment to accommodate a particular level or type of activity without causing any pollution. The principal components include the identification of the uses and resources in a system, the determination of system 's characteristics and the assessment of the response of the system to a changed rate of use.

In the marine environment, standards have been established to reflect the rate at which a pollutant, introduced in the medium, may be assimilated without creating limitations to other short or long term uses of that environment.

Finally, some monitoring to the ecosystem in question is required. The degree to which a marine environmental capacity approach can be managed, clearly depends upon the existence of complete databases on the uses of physical, chemical and biological processes within the ecosystems, and the toxicological effects of specific pollutants.

For this reason the use of a range of strategies in different countries is necessary because each strategy has different applications depending upon the extent, detail and nature of available information. In reality, pollution control carried out by a nation or a delegated authority within a nation often covers two, three or more control strategies. In practice, the priorities need to be listed concerning the prohibition

and restriction of substances, and assessed on the basis of many criteria such as toxicity, persistence, bioavailability, bioaccumulation and tainting. Based on such assessment, these substances are then categorised. One of the categories can refer to elimination of pollution by these substances, another can apply to substances for which states should take all appropriate measures to control and to minimise pollution. Some substances can appear in more than a single category depending on concentration.

Available control strategies for the marine pollution may be categorised into three basic groupings according to studies made by Kasoulides, G.C.(1988):

1-marine environmental quality controls

2-emission or source controls

3-environmental planning controls

This set of strategies allows an approach to the management and the protection of particular environments which may involve restrictions or modifications of activities at sites as well as discharges; This means that pollution control standards may not be employed or they may augment zoning or other use restrictions.

So the implementation of environmental protection through the Law of the Sea will require continuous efforts by the international community. The United Nations Environment Program (UNEP), through its regional seas action plans, has been addressing in a comprehensive way, the sources affecting the quality of regional seas in many parts of the globe. Most of the action plan has noted land based sources as significant contributors of pollutants. However, very little attention is given to the analysis of strategies available to countries wishing to tackle these sources of pollution, even if there is a guideline known as the Montreal Guidelines for the marine environment protection against land based sources.

In general separate conventions and action plans are of utmost importance for the marine environment protection against pollution.

3.2-NATIONAL LEGISLATION

The national law is a primary legal feature to protect the marine environment. A right is nothing if it cannot be exercised and it is the duty of any state to implement and to apply the laws where necessary through different bodies. The Congolese legislation is based upon the French public law and is subdivided into constitutional, commercial, criminal, civil and administrative laws. Their applicability is enforced by codes, with additional texts adapted to every situation.

These texts govern rules, regulations and relations in the society and punish all infractions against other people. The marine environment is one of those factors considered by the law and the use of aerial, maritime surveillance and chemical analysis can help to identify offenders or to determine the most appropriate response to a particular oil incident. In this case legal procedures can also lead to liability for the polluter, both in civil and criminal law depending on the determination of the pollution level and the effects.

Civil law liability gives rise to injunctions to cease certain operations or to pay damages which may be considerable. Criminal law proceedings can result in fines, criminal damages, imprisonment or a combination of these. Both laws have a significant influence in the fact that proceedings may be used as evidence to establish liability or guilt or to refute them. This will depend upon the importance placed by a national court on the correlation with other evidence such as an oil record books, visual or circumstantial evidence.

Beyond all these considerations, there number of marine environment protection laws in the Congolese legislation is insufficiency. The first national law related to this subject is the 1991 constitution of the country. In its one hundredth article, the constitution recognises rights for every one to have a clean, normal, environment related to atmospheric, marine and habitat. A concrete action was taken through the law 003/91 that fixed anti-pollution norms for the atmosphere, landwaters, habitat areas, towns and villages.

For the marine environment there is nothing new since 1983; at that point the national assembly meeting adopted the law 11/83 of March 1983 considering Marpol 73/78 as a national law and gave to the government the authority to ratify the convention. Only now are the Congolese authorities in the process of executing this by depositing an instrument for the convention and also its two first annexes.

In the beginning of oil exploitation in the Congolese seawaters two additional texts to the merchant marine Code or Act 30/63 of 30 June 1963 contributed widely to the protection of marine resources and the environment. The original text of the code did not mention at any point marine pollution that as it was not unknown at the time of the writing of the Act. They are: the twenty-first and twenty-second Orders of April 1970. The first one concerns the exploration and exploitation of hydrocarbons. It defines the responsibilities of oil companies in their field squares, in terms of safety for navigation, aids to navigation for the platforms, and pipelines, and the protection of the marine environment by avoiding oil spills. No pollution, voluntary or accidental, is allowed.

The second Order's text is linked to the first by the fact that it is related to the exploitation of marine resources and fishing products. It regulates the fishing areas by zoning and sharing them between traditional and industrial fisheries. It also classifies the natural marine resources considering them as high value products to be protected.

The specifics of are contained in articles twenty, twenty-one, twenty-two, twenty-three, twenty-five and twenty-seven addressing the amount of fines and penalties to be paid, according to the level of pollution. This ranges from around one hundred thousand to twenty million C.F.A. Francs or forty thousand US dollars. For the damage to marine resources and fisheries, the amount would be on the higher end.

Both texts are of the value, but they need some reforms to up-date them and back them with strong enforcement provisions.

The dumping of dangerous goods is concerned in the law 003/91; no dumping is allowed in the Congolese waters for nuclear residues and wastes. However, in

August 1992 an additional text, the order 3884 of the Ministry of Transport, Civil Aviation and Merchant Marine defined the dumping zones for non toxic goods at one thousand five hundred meters depth into the Atlantic Ocean between the coordinates Long. 11°15', 11°30' South and Lat. 5°00, 5°15' West.

3.3 THE IMPLEMENTATION OF INTERNATIONAL LEGISLATION

The United Nations (UN), which deals with such matters as the development of telecommunications, the safety of aviation, the peaceful uses of nuclear energy, the improvement of education and world 's weather created, a special agency 51 years ago, the "International Maritime Organisation (IMO)" whose particular responsibility consists of international shipping, the improvement of safety and the reduction of marine pollution.

Today, the protection of the marine environment has become such an important matter that two United Nations agencies IMO and UNEP. Both have responsibilities for issues and try to find solutions in two ways: regional and international co-operation. Both use a number of different concepts and expressions to address to the various sources of marine pollution, introducing general obligations for states to establish binding regulations and take such other measures as may be necessary for the prevention, reduction and control of pollution.

These provisions refer to a range of norms including, for example, generally accepted, applicable international rules and standards and recommended practices and procedures. But, it is not clear whether a definite distinction can be drawn between rules and standards. International standards are defined as normative instruments while four alternative means are necessary to identify the rules: adoption, acceptance, ratification and entry into force as an international convention. All these

interpretations would require widespread incorporation in national laws in order to establish that the international rules and standards of the convention are generally accepted.

Under the auspices of UNEP, adopted regional conventions are not discussed in detail; in general they do not develop new standards for the combating of oil pollution but they investigate the co-operation between their member states for the implementation and enforcement of existing ones. Each convention is negotiated among the interested parties and the texts reflect the regional approach to the nature of international standards and the extent of their readiness to accept obligations not expressly accepted by them.

The Republic of Congo is one of many other countries in the Gulf of Guinea. It lies a region located between Côte d'Ivoire and Angola, and is concerned with the 1981 Abidjan Convention for co-operation on the protection and development of the marine and coastal environment of the West and Central African Region (W.A.C.A.F.). This convention primarily relates to normal and accidental discharges, or dumping from ships. Named WACAF 1, it ensures the effective implementation of the applicable international rules and standards established by or within the framework of IMO related to vessel source pollution.

Since 1981, two major revisions have been made. In 1983 a new text which became the WACAF 2 Convention, was adopted. It considered all sources of pollution which can affect the sea, including land based sources from towns, refineries, oil terminals, and any other activity, whose wastes are dumped into the sea.

After certain preventive actions were taken, the WACAF 3 Convention asked in 1985 for the combating actions against marine pollution by encouraging each country to elaborate its contingency planning or its studies on it. It then seeks bilateral and multilateral co-operation with the aim to provide help to the other parties in the case of high level marine pollution. Based on those ideas, the Congo conducted a mission in 1985 under the auspices of UNEP and UNDP and a report on national contingency planning was made by a French expert B. J. Fouchier. Until now, there has not

been any reaction to this report from the Congolese side. However, in the co-operation aspect a bilateral protocol was signed between both governments of Angola and Congo to prevent and to combat together any oil spill and to have a common monitoring and research program to assess marine pollution .

The international rules and standards regarding the prevention of marine pollution, either by deliberate or accidental discharges, are developed in conventions drawn up under the auspices of IMO. Although some agencies such as ILO or general conferences like UNCLOS include a wide range of activities related to safety, adequate manning standards, orderly traffic conditions and seaworthiness, IMO may still be the only general organisation which can be said to represent the common interest in the prevention, control and combating of marine pollution.

Oil pollution of the seas and waterways has existed for as long as products have been transported by vessels. First regulations for carrying bulk oil were issued by Peter the Great in 1725. In 1912, the Royal Navy switched to oil fuel, a policy that was followed by modern navies (P.M.Alderton, 1984 annexe B p.211). As a result there was a growth in the size and number of tankers and with that oil pollution was recognised as a problem. Different countries tried to introduce national measures to control pollution and only in 1954 did they get an international agreement on the prevention of pollution of the seas by oil.

The international legislation related to the marine environment protection against oil spills can be classified in four groups:

1-The first group is composed of the two conventions the role of which was the preventing of operational oil pollution. It includes OIL POL54 Convention which was ratified by the Congo, and MARPOL, which is on its way to be accepted in the Congo in the next few months. The main beneficiary is the marine environment as their provisions prohibit deliberate discharge of oil and oily mixtures after tank cleaning operations.

Oil Pol 54 assumed that operational pollution was acceptable if it did not occur in certain prohibited areas which extended at least fifty miles from the nearest land. To

reduce this form of pollution the contracting parties were required to provide facilities for the reception of oily waste ashore. Two amendments were made, one in 1962 to extend the prohibited zones, and the other in 1969 to prohibit operational discharges of oil unless certain conditions were complied with to make them at environmentally acceptable levels.

By 1973, it was generally felt that substantial improvements and extensions were necessary, therefore the new International Convention for the Prevention of Pollution, MARPOL, was adopted and its 1978 protocol superseded the Oil Pol 54 for its contracting parties.

The MARPOL 73/78 Convention and protocol, that should be read as one document, deals with all forms of marine pollution covering around 88 percent of the world's shipping tonnage, except the dumping of land generated waste into the sea. It is composed of five annexes among which two are compulsory. It differs from Oil Pol 54 in that it covers pollution by chemicals, packed goods, sewage and garbage as well as oil. The most important provisions of MARPOL 73/78 are related to the construction and the equipment of tankers as probable and potential polluters of the sea.

The provisions deal with the following:

- Issue of an international oil pollution prevention certificate valid for 5 years.
- Control of the discharge of oil or oily mixtures from all ships, tankers and others.
- Provision of separators and filter equipment
- Maintenance of an oil record book
- Provision of valid certificates for fitness for the carriage of noxious liquid substances in bulk
- Provision of segregated ballast tanks (SBT)
- Provision of reception facilities at loading terminals, repair ports for oil residues and mixtures.

Some other conventions are listed below that are involved in the protection of the marine environment.

2-The second following group relates to the safety, the preventing of accidental pollution. Five conventions are addressed and the three first have already been ratified by the Congo and their provisions accepted.

THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966(LL.66)

This convention applies to all vessels above a certain tonnage. Its provisions relate to the ship loading limits and its purpose is to prevent overloading beyond the limits allowed by the certificate. In the case of negligence of these provisions, a tanker will be more vulnerable to danger of sinking or capsizing, the consequence of which is the pollution of the concerned area.

THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS 74/78).

It aims primarily at the protection of human life at sea, prescribing uniform rules on navigation, prevention of pollution, stability, machinery, electrical installations, fire prevention, along with some other aspects related to the construction of ships. The main points affecting tankers and the marine environment require the issuance of a safety construction certificate. This requirement addresses cargo pumping, piping and venting arrangements and also the fitting tank with an inert gas system (IGS) to protect the cargo and the vessel.

THE CONVENTION ON THE INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA (COLREG 72)

In Chapter V of the Solas Convention, some rules deal with safety of navigation, but the majority are to be found in the Colreg 72. This convention lays down the proper rules of the road and may adopt traffic separation schemes to conduct vessels and their movements in relation to other vessels at sea, including tankers which carry oil or any dangerous cargoes. The IMO general provisions permit coastal states in their territorial sea to adopt routing measures and to amend them independently with the

objective to clear local navigational hindrances, offshore drilling installations or sudden hazards that may for instant emergency measures.

THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCH KEEPING FOR SEAFARERS (STCW)

This convention was drafted with the close co-operation of IMO and ILO and has incorporated protection of the environment as an additional objective to safety of life and property. It includes technical provisions covering deck, engine and radio operations, laying down basic standards for training of crews and rating of oil tankers, chemical tankers and liquefied gas tankers.

THE INTERNATIONAL CONVENTION ON MARITIME SEARCH AND RESCUE (SAR79)

Its main purpose is to facilitate co-operation between Search and Rescue (SAR) organisations and between those participating in SAR operations by establishing the legal technical basis for an international SAR plan to provide assistance to persons in distress at sea, when the master of a ship receives a signal from any source, aircraft or ship. In case of emergency calls from any tanker the operations have to be conducted as determined by the convention in the aim to help the master, the crew and the cargo as fast as possible to avoid pollution of the sea.

3-The next group of conventions linked with reducing the consequences of accidents and relates to two conventions that the Congo has not yet been involved with:

MARPOL 73/78, which was described above, through its protocol introduced a new concept, and stipulated that new tankers must meet certain requirements regarding subdivision, stability and protective location of segregated ballast tanks where the impacts of collision or grounding are likely to be the greatest. In the same way to reduce the cargo spill and after such accidents another important requirement was made that effectively called for single hull tankers to be banned and changed into double hulls.

THE INTERNATIONAL CONVENTION ON OIL POLLUTION PREPAREDNESS, RESPONSE AND CO-OPERATION, 1990 (OPRC).

The purpose of the convention is to provide a global framework for international co-operation in combating major incidents or threats of marine pollution. The convention provides for IMO to plan an important co-ordinating role and is designed to facilitate mutual assistance, to encourage states to develop and to maintain an adequate capability to deal with oil pollution emergencies.

4-This last group of conventions concerns the providing of compensation for pollution paid to those who suffer when pollution does occur. It links two conventions which are not yet ratified by the Congo.

THE INTERNATIONAL CONVENTION ON CIVIL LIABILITY FOR OIL POLLUTION DAMAGE (CLC69)

The civil liability convention applies to ships carrying more than 2,000tons of oil. Such a ship must obtain a government certificate testifying that there is adequate insurance or other security to meet the convention liabilities. The purpose of this convention is to put the onus of paying compensation on the ship owner.

This convention is supplemented by the 1971 oil pollution compensation fund (FUND71), which is financed by the receivers of crude oil in contracting states. The amount depends upon the amount of oil they import.

CHAPTER IV

THE IMPROVEMENT OF PLANS

The economic development and its followed effects ask for continuous attention of public powers of any country in terms of technological and human preparation. This chapter shows from fictious situation where the Congo and its neighbouring countries, Angola and Gabon, can be implicated in major oil pollution emergencies and shows that the sectoral contingency plans are not sufficient. It presents an example for a probable structure of a national contingency plan of a suitable type for the Congo, and invites the different decision makers to address the existing deficiencies.

4.1 The case study of a hypothetical marine pollution scenario

The tanker Stena Queen Anya, Liberian flag, chartered by an American citizen loaded 125,000 tons of heavy crude oil at the Djeno terminal located at 28 kilometres from Pointe-noire and 3 miles from the coast. The plan was to load more cargo of around 100,000 tons at Palanca Terminal in Cabinda, Angola. Its final destination was Haifa in Israel taking the route passing the Cape of Good Hope, and continuing up the East African coast and finally through the Suez Canal.

On the way to the Palanca Terminal the master decided not to sail the original route going further out from the coast, but to turn off sooner towards Cabinda. The oil tanker had just crossed the border between the Congo and the Cabinda when a sudden engine failure created a loss of power. At 22.00 hours local time, the tanker

which has been carried by the opposing winds and currents ran a ground on rocks and sand at a depth of twelve meters and 5 miles from the coast. One starboard tank broke and the oil started gradually to leak in a location not so far from the former port of Maloango. The quantity increased from hour to hour.

The next morning the first traces of crude oil were found on the beach near the wharf of potassium. The winds favourable to moving the oil spill shorewards allowed it to enter the port of Pointe-Noire before twelve o'clock.

From the time of grounding to the first day after, ten thousands tons of crude oil had been lost and there was a risk of further break-up from one or two other tanks that would increase the pollution.

By night an emergency call was picked up at the Palanca Terminal and in the Congolese waters at the barge hotel Maya from where it was further transmitted to the Djeno terminal.

From the authorities side, the President General Director of Elf Congo, the President of the Republic, the Prime Minister and others involved in the issue were informed and warned of the possible disastrous effects on the marine environment. An emergency meeting of the Cabinet was called at 9.00 hours in the morning to take necessary precautions to minimise the effects. The following points were considered:

- 1-An emergency ministerial committee was created, led by the Prime Minister and supervised by the Ministry of Transportation.
- 2-The Congo has no National Contingency Plan to treat oil spills and hazardous materials thus one needed to be created.
- 3-The port of Pointe-Noire needed to make a contingency plan as none existed.
- 4-The oil companies working in the national waters each had their own sectorial contingency plan adapted to their installations. Were they effective for this type of accident ?
- 5-There was an agreement on pollution response between Angola and Congo, but was it to be applied ?

4.2 The possible impacts

The event happened in March which is the warmest period of the year followed by strong rains. In addition the evidence indicated a high natural assimilative capacity for oil spilled in the local coastal environment. Other factors involved in the relatively rapid disappearance of oil from the water surface were the strong prevailing currents and high suspended sediment content of water.

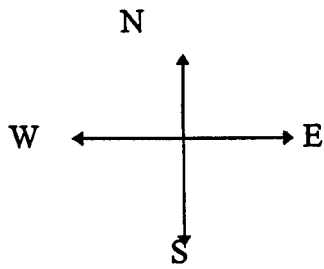
The combination of these factors normally sink and disperse most spills quickly. Therefore natural open water dispersion can be assessed as an active or significant process. The prediction of spill movements can be estimated manually using vector addition of observed currents and wind conditions .

In general the procedure is as follows :

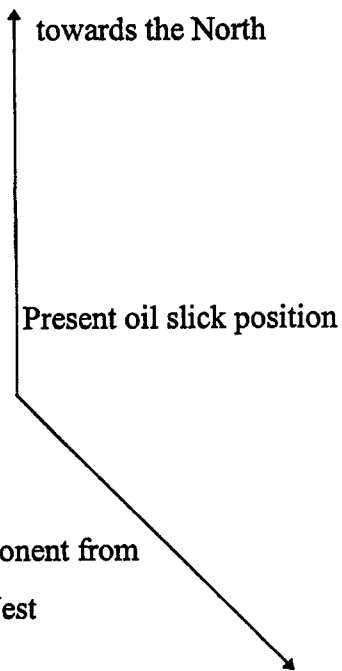
- 1-In their relative directions and lengths, the ocean current and wind components are drawn.
- 2-Starting from the top , the current vector is then drawn as a parallel line to the wind vector, measuring the same length.
- 3-From the point at the origin to the tip of the parallel wind vector line, the resultant vector is obtained. This is the indication for the direction and the velocity of slick movement.

The information of the current measurements obtained on board the oceanographic vessel MICOPERICO and compiled in the office of the ORSTOM agency in Pointe-Noire confirmed this assertion and showed that the currents, also had changed in relation to the high or low tides variations. Because of the influences of the Congo and the Kouilou rivers, which make them stronger, there is a net predominance of North West-North North West or South East-South South East orientations of current. Considering the waters depths from ten to twenty meters and the above explanations, the slick movement can be represented as the following figure under the influence of currents and winds:

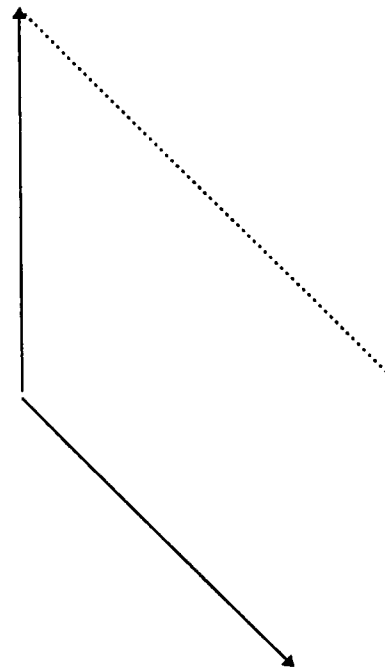
The figures-1- show the addition vectors for North West wind and North Current



1) Current Component: 0.3km/h

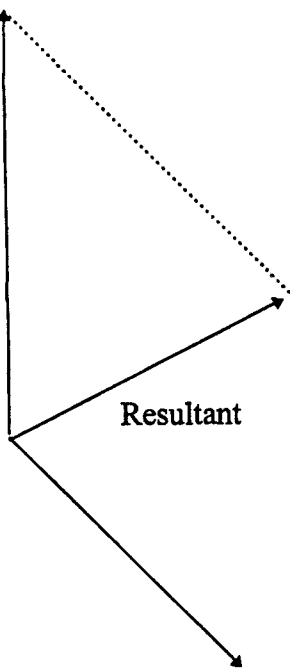


2)



Wind Component from the North West

3)



From this data all oil spills coming from the south of the country, extraterritorial or not, would reach the national coastline and impact the areas between the Cabinda border and the Kouilou river. The areas concerned are the Saint Paul District, Djeno Terminal, the wharf of potassium and the Loango Bay.

Studies show that there is a possibility that if an accident occurs around the Agip Kitina fields, located at 31 kilometres from the coasts, it would have some impacts on the area between the former administrative checking point Madingo and Lake Conkouati .

However, if any event happens in the zone of Walter International fields on the open sea, 40 kilometres north from the coast, the case will be of interest more for Gabon's territory located only 30 minutes sailing North, and it would never or at the minimum scale reach the Congolese areas.

4.3-The contingency plans of resident oil companies

Beyond all considerations, such as the international aid, which would be obtained and would help the Congo to contain an oil spill and salvaging the vessel; consider the following question:

What are the capabilities and the limits of the different plans of the resident oil companies in this kind of situation? This is discussed in this section .

The present scenario is not so far from the possible reality in the southern part of the Congolese waters.

The first plan to be improved is the Elf Congo contingency plan which has been drawn up only for marine oil spills in the territory around its sea installations, pipes and platforms . Two cases, minor and medium spills, are addressed and could be solved with success by their own equipment, or with the assistance of other missions in the Gulf of Guinea. In case of important oil spills, the specialists of Elf think that they can ask too for the assistance from the permanent Secretary of the French

Contingency Plan (SECPIM) located in Paris. That is not a timely solution to the problem.

According to the Elf definitions:

A minor oil spill is defined as pollution of some cubic meters of oil products for a short period of time, and with no danger to the marine environment, while a medium gravity spill corresponds to any important pollution in a range of some hundred cubic meters a day for a variable period of time of a few days and which creates a danger to the marine environment.

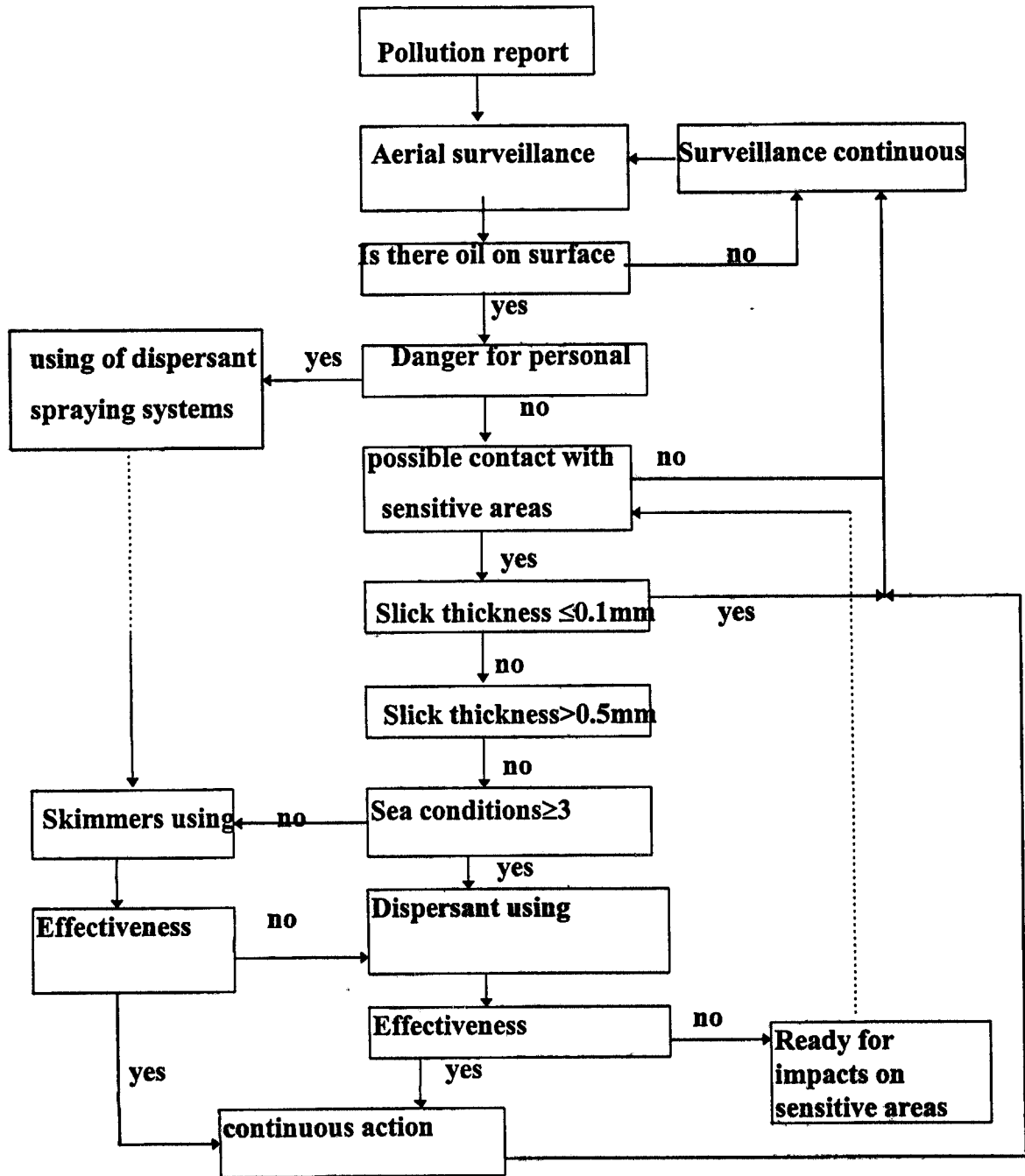
The plan is based on the following principles:

1-The mechanical recovery of oil products as soon as possible. This will depend upon the size of spill, the sea conditions and the slick thickness.

2-The use of dispersants in a radius of 500 meters around the installations. The aim is to push away fire risks and reduce coastal pollution.

In both cases, the co-ordinator for all operations on the site is the person held responsible who has to evaluate the needs, to report to the director of the operations (DOPE) and to the safety and environment manager (RSE). The application of the dispersants is made with the assistance of supply vessels and one helicopter.

The operational actions can be summarized in the diagram below.



The following plan to be presented belongs to Agip Congo.

As with Elf, Agip has an internal contingency plan adapted to two situations, minor and medium oil spills. The definitions are the same as in the Elf document but the approach and the procedures which are different in the treatment of spills. Five parameters are taken into account:

-the origin of oil pollution

-their causes

-their characteristics ;

for crude oil it is necessary to know the colour, its consistency, the smell, the aspects of layers, the slick dimensions, the thickness and the estimated release.

-the locale

-the marine weather conditions (winds, currents, temperatures)

The principle of treatment is composed of two components, marine pollution and inland water pollution, which concerns lagoons, mouths of rivers and lakes linked to the ocean. The summary of the treatment is represented at the same level as in the Elf plan.

In the case of minor pollution, the only co-ordinator is the security man (RUS) or the person responsible for the site. He has an obligation to report to the competent authorities and is helped by the marine safety supervisor for all marine operations.

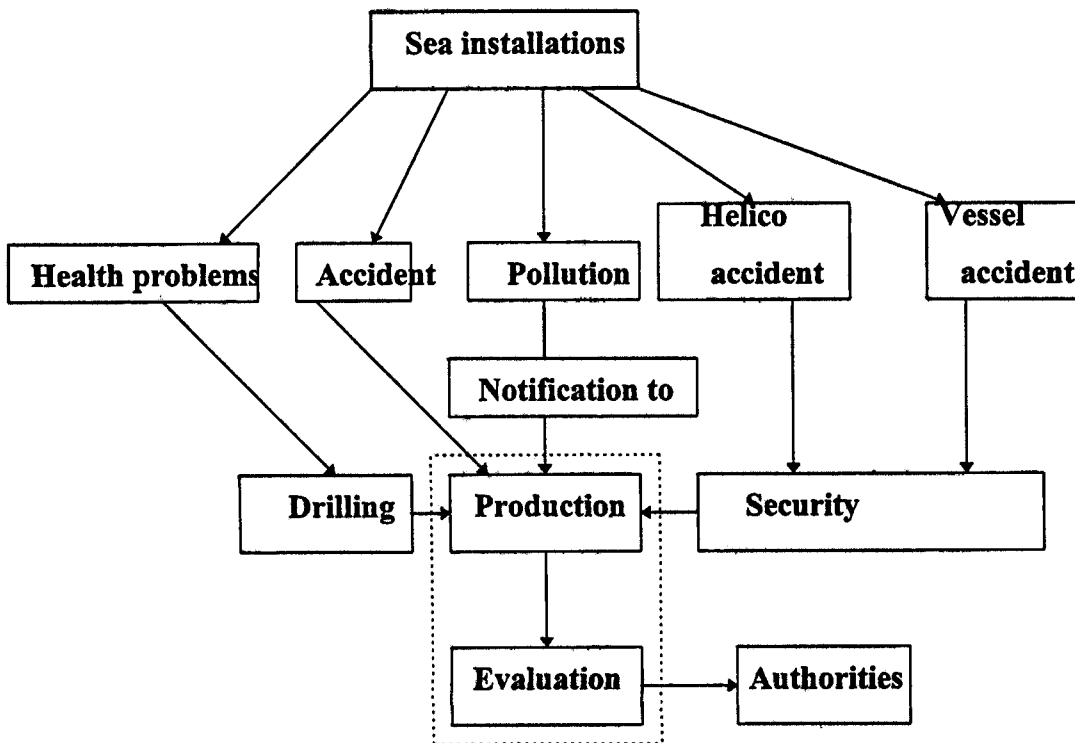
For medium pollution, the RUS informs his superiors and remains in permanent contact with the production and the security departments co-ordinating all the response operations.

In the worst case, only the General Director of Agip Congo has the authority to contact and to inform the administrative and political authorities, the associated partners, the other oil companies and to co-ordinate the assistance coming from outside the company.

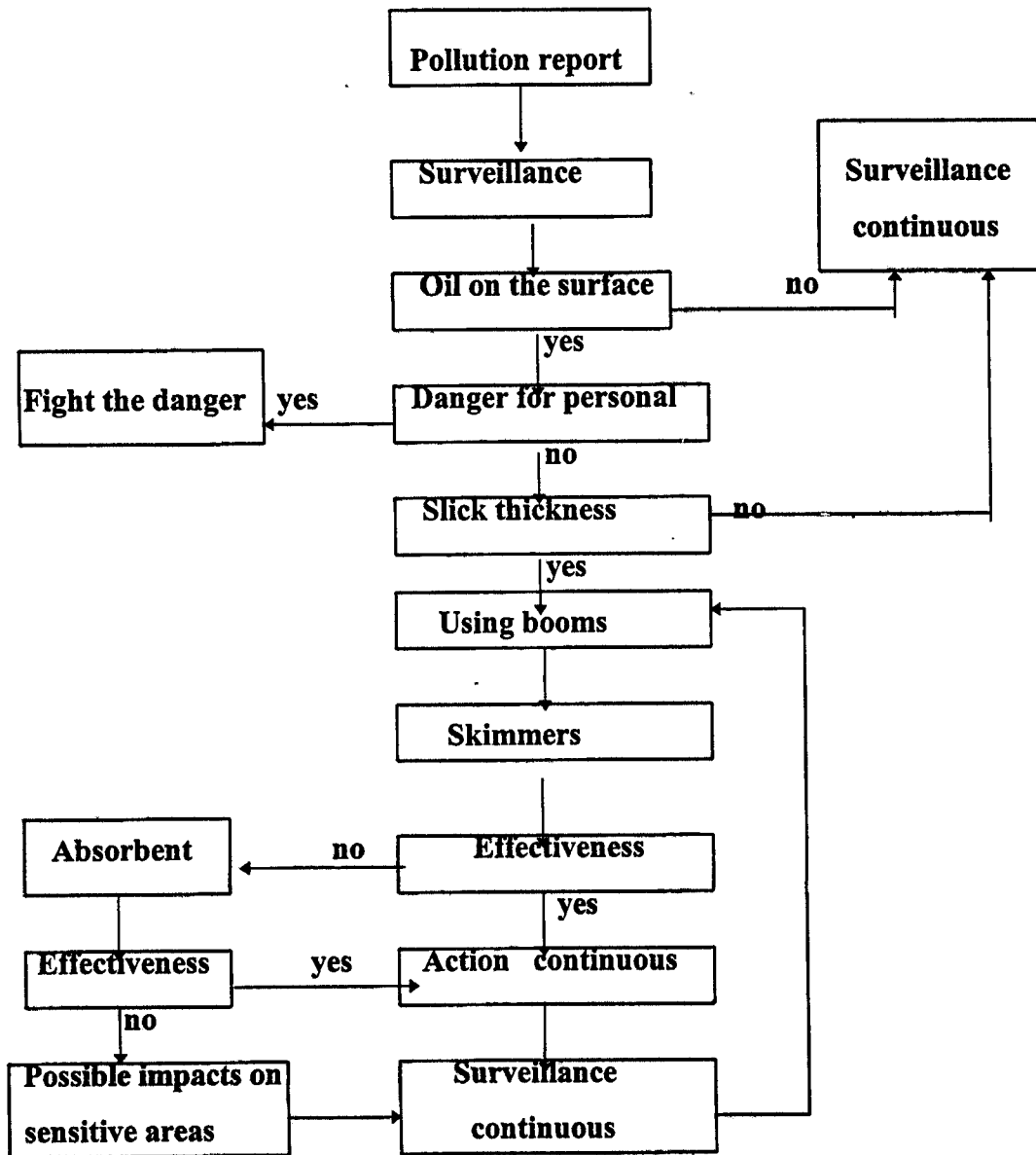
Below are represented the summary of their approach in treatment diagrams (figure.3)

a) Alert procedures

These are concerned with any kind of events from the sea as presented below. Related to these there are three levels of departments to be notified.



b) Pollution of Inland waters



The following relates to the Walter International Company (WICI) contingency plan.

This is the only company which has taken into consideration in the plan not only oil but also hazardous materials. The three levels of pollution are given the following definitions for use inside the company:

-a minor spill is described as a discharge of oil less than 500 barrels in coastal waters, under circumstances in which it is not expected to threaten a shoreline area, such as the mangrove swamps.

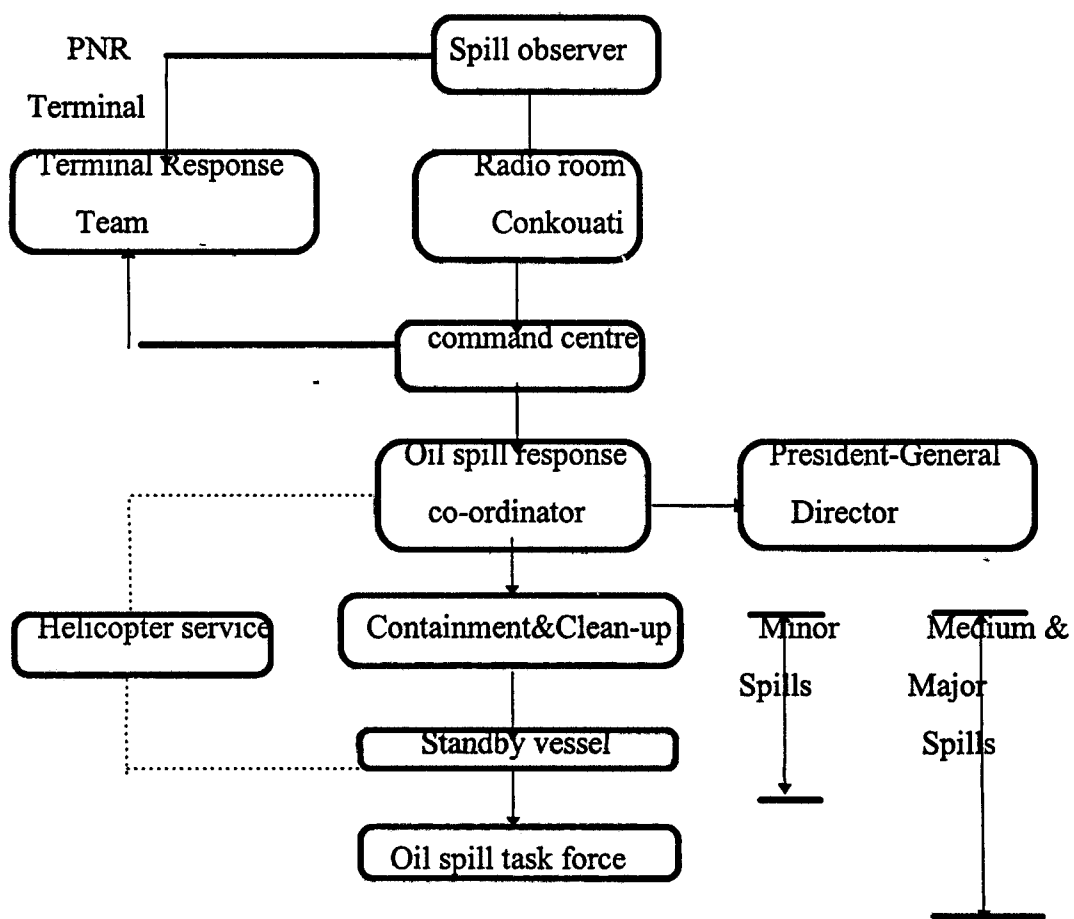
-a medium spill is the quantity of oil between 500 and 3,000 barrels or more to coastal waters. According to the safety representative, this category may require assistance beyond the resources of WICI.

-a major spill concerns an oil discharge of more than 3,000 barrels in coastal waters including substantial threat to public health and welfare, to human life, creating extensive contamination to large open water areas or shorelines and a threat of catastrophic consequences, or the raising of the public concern.

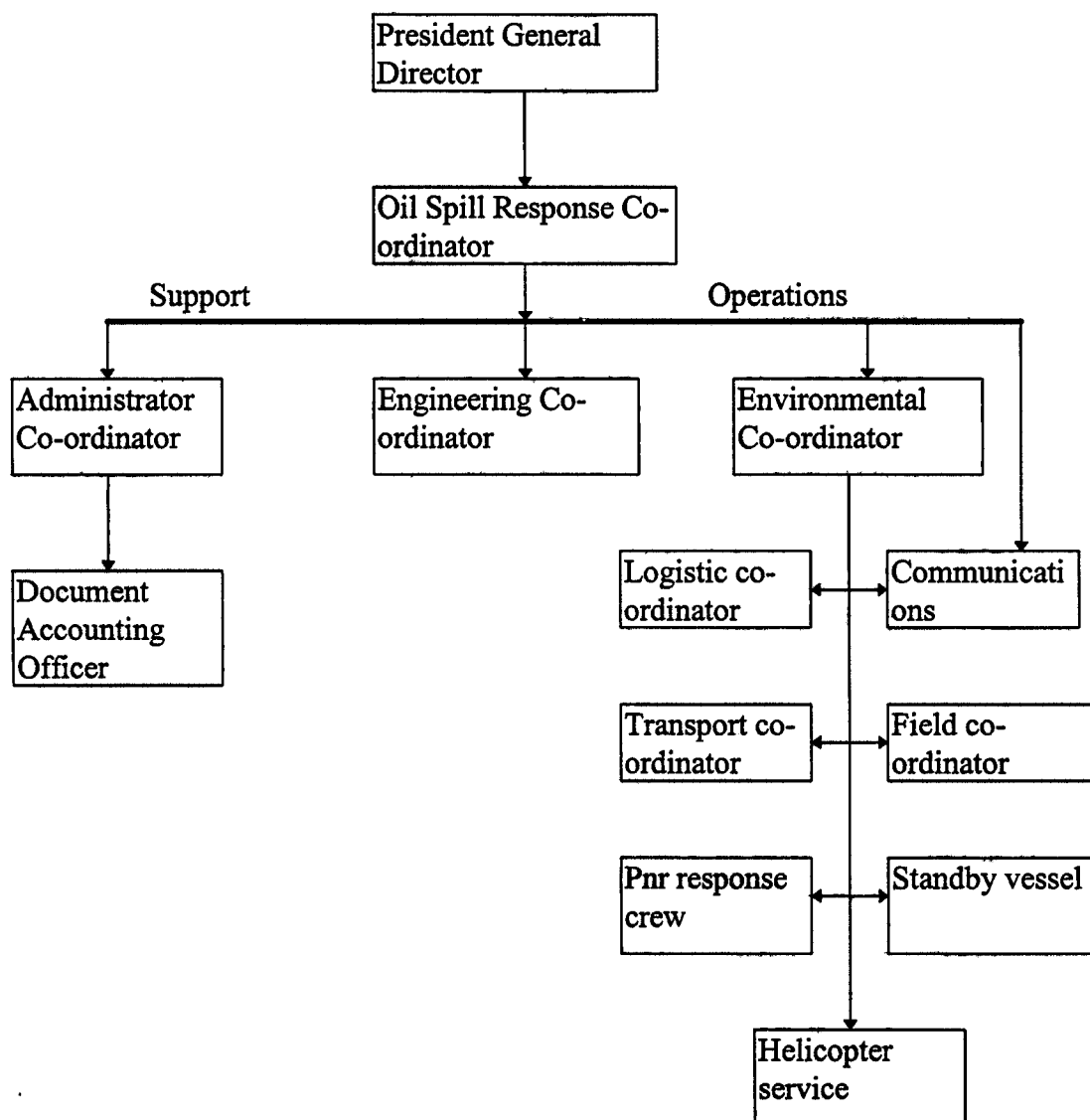
Like the two previous companies, this plan is adapted to its own installations, platforms and sea terminal.

The plan stands on three components, two are represented by diagrams below :

Spill Notification



Oil Spill Task Force Organisation



4.4-The set limits of the plans

This section will assess the capability of the plans' resources and will describe their limits in resolving any major spill issue at a national or regional level. As was mentioned before, the analysis of the oil companies' contingency plans shows a common characteristic: they are sectoral and adapted more or less to their internal installations.

In addition to the presentation of the documents which are different and debatable, there are ten pages for the Elf plan, twenty pages for Agip's and ninety for Walter's. The reader has in front two styles and two methods in the management of oil pollution. The problem is that none of these companies gives a real definition of oil or products they are able to respond or to clean-up.

One of the methods is that used by the Walter company. It asks for technical precision and human support through periodical training of personnel involved in combating the oil pollution. This is the only plan which classifies the oil pollution in three levels. Regarding the equipment maintained on board the floating production and storage vessel (FPSO) Conkouati, it is composed of fifty barrels of dispersant Wellaid 3316, protective equipment, one hundred meters of skirt booms and twenty bales of sorbent pads. They are just enough to contain a minor spill, because medium or major spills will rapidly cross the border and start to pollute Gabon located at 30 minutes sailing north from the Walter International fields. So in the present case Walter company cannot provide sufficient assistance, which means that its installations have to be left without adequate protection.

The other plans of Elf and Agip are very similar in their application but different in conception, failing to address the third level or major pollution that they might faced with. There is no obligation under existing legislation, to take into

consideration this third level. However Agip has taken into account the particularity of inland water pollution.

In both plans no training of task forces are mentioned to maintain the standards of the personnel involved. Further, they address controlling the pollution only in the sectors of their fields where the coastline may be reached by the oil pollution.

As in the neighbouring countries, Cabinda and Gabon, the response equipment in the Congo is limited. The equipment is identified by type, by owner and may or may not be available at the time of incident, which means that mutual aid should be explored between the companies.

Nevertheless Agip and Elf have together eight supply vessels, some barrels of dispersants Dispolene 36 s, Prodesolv 128 d, solvent Inipol EAP 22 and two small ferry boats the Angelica and the Aida to carry people and equipment.

In addition, they can ask for help from their subsidiaries in Angola where there is 400 metres of boom and in Gabon where there is 600 meters of boom and dispersant spray equipment.

The last point to consider is the fact that no plan has mentioned restoration, or clean-up as being the responsibility of the polluter, nor the methods to be followed.

4.5 The assessment of the plans

The contingency plan must stand by itself if it is to be evaluated as adequately prepared to respond to the different levels of incidents. So the problem is not the answer question related to the existence of the plan, but rather to see how effectively prepared the organisation is to carry out its responsibilities for incident response. That suggests a determination of whether the existing plan is satisfactory to respond to the needs of the community or is it limited to the mere establishment of procedures to protect its own facilities. To assess any contingency plan means to examine each constitutive element and to verify the basic information obtained from the plan. The principal elements to assess the plans are the following:

-Organisational responsibilities

The objective :

To identify the main actors involved and to describe the role for each, clarifying by title the person in charge of emergency response.

To identify the relationship between key players responding to an incident and define the interfaces of authority and responsibility with the government entities involved and the others and to clarify individual rules.

-Risk evaluation

The objective is to address the potential harm of a spill upon the locale, to prevent or to mitigate any danger that is presented by an oil spill, taking into account the unusual conditions, the natural medium of current and being, and the sensitive areas, such as corals reefs, wetlands and beaches. At the moment the event occurs the gravity of the impacts and the number of people at risk in accordance with the quality of the intervention have to be able to be readily identified.

-Notification procedures and systems of communications

The objective there is to ensure that the alert procedures are defined and described and that through existing means, such as radio or telephone the key individuals can be reached around the clock, to include all officials who provide direction, control the response effort, evacuation of people and additional assistance.

-Emergency equipment and facilities

The aim is to identify command posts for the response group, to describe facilities and stockpiles of equipment available within the maritime administration, the port and industry. It is also needed to describe the interface with medical facilities, hospitals, first aid, protective equipment written and any specialised assistance.

-Capabilities

The objective is to identify the extent of capability that can be provided by those responsible to provide emergency response to potential or actual hazards for each type of emergency related to properties of the material spilled. In this element it is important to address specifics such as procedures, capabilities of the participants,

the monitoring equipment, and additional sources of experienced personal that may be called.

-Protective actions

The objective here is to ensure that someone is identified by title to be in charge of authorising, and determining whether protective actions, evacuation or sheltering are needed. Detailed procedures are needed that include notification, transport, traffic control and reception centres set-up.

-Public information

The aim is to ensure that this important aspect of the plan provides for a spokesperson who will communicate with the media and the public. This person also should be in charge of a public education and community awareness program to be conducted periodically.

-Training and drills

The objective here is to ensure the functionality of the plan through the provision and description of annual training programs, periodic drills, plan tests or special training for the first responders in the use of response equipment.

-Post emergency and restoration

The aim is to provide a mechanism to determine when the emergency is over and there is no more immediate danger in the area concerned. This means the authorised people can re-entry the zones, that a return to normal activities can start, including following clean-up, continued monitoring of an affected area as well as restoration, investigation and documentation activities.

-Maintenance

The objective here after kind of event, is to ensure that a person responsible for maintaining an updated plan, and incorporating lessons learned. It should also describe the method for annual review and revision of the plan, the method to improve the plan based on knowledge acquired from drills and tests.

The planning elements can be used for various purposes. Each participant can review the existing plan to determine where work is needed for the co-ordinated response,

for improvements or as a framework to develop a new integrated community plan or to set priorities for developing core elements as a basic foundation.

From these elements a check list for the evaluation of an emergency response plan can be drawn and presented under the form of a matrix. In the check list, the objective is to find the answers to the following questions:

Have the levels of vulnerability, the probable locations of hazardous incidents, the public health concerns and the sensitive environmental areas been identified?

Does the plan include information on the chemical and physical properties of the substances identified in the area, the most appropriate safety and response information and hazard mitigation techniques?

Has one group been identified in the plan as having command and control responsibility for the pre-response, response, and post response phases?

Has a system been provided to present public information to the community on the relevant activities?

Does the plan address the existence or location or phone numbers for notification of individuals of any incident?

The answer to these questions constitute the basis for an initial evaluation of the sectoral contingency plans of the different oil companies. They are represented by the grid below.

For understanding, the legend to assess the plans is as follows:

A=acceptable; B=minimum necessary improvement needed; C=substantial improvement needed

| | Elf-Congo | Agip-Congo | Walter Internat. |
|--------------------------------|-----------|------------|------------------|
| Elements of planification. | B | B | B |
| Responsibilities | C | C | C |
| Procedures and communications. | B | A | A |
| Equipment and first aid | C | C | C |
| Capability | B | B | B |
| Measures of protection | B | B | A |
| Public information | C | C | C |
| Restoration | C | C | C |
| Evaluation of risk | C | C | C |
| Training | C | C | B |
| Maintenance | B | B | A |

4.6-The option for a National Oil Spill Contingency Plan

This section draws a picture of a National Contingency Plan for the Congo, leaving it up to the specialists of different agencies to implement this project.

The events described in the scenario ask for serious thinking. People say "Help yourself and then the heaven will help you". This assertion can be an idea guide. Surely with the help of the international community this kind of marine pollution could be controlled at short period term, but the effects and the time of an incident are unpredictable. The question is how much time is it possible to save in commencing response operations and how could the consequences be reduced if the Congo is prepared to immediately fight against this enemy, the oil spill? The best way is through a National Contingency Plan for oil pollution and hazardous materials; but, in this paper, the focus will be given more to oil aspects than to noxious materials.

The establishment of a national contingency plan should be prepared in conjunction with the legislation to handle emergency situations created by oil spills or any other events involving hazardous materials at the national level. A national oil spill can be defined as oil pollution at sea, on land, in rivers, lakes and on beaches. There are spills which originate in areas outside of ports or oil companies areas.

Recognising the possibility of an accidental spill in or near the port of Pointe-Noire, the Congolese maritime authority (DIGEMAR) must assume responsibility as the agency entrusted with the implementation of contingency plans and seek the protection of the port environment from spills from oil and other noxious substances. This means that a National contingency plan has to incorporate two other categories of response plans: the port of Pointe-Noire and all oil company contingency plans. The National Plan has to take precedence over all existing and future sectoral oil contingency plans which should be in compliance with its provisions.

The stated objectives of this National plan should be the following:

-To promote the installation in the port of reception facilities for oil and subsidiary products that could also be used as a disposal for collected oil.

-To develop appropriate systems for the detection and reporting of spillage of oil, other noxious substances or of incidents related to shipping operations which could result in such spillage.

-To ensure that response is made either to prevent pollution or to restrict the spread of contaminants subsequent to an incident.

-To ensure that correct response techniques are used to clean-up the pollution.

At the national level, while the co-ordinator of the plan has final jurisdiction, the responsibility for containment, clean-up and disposal can be determined by the geographical location of spill. For this purpose and to facilitate actions, the Congolese waters can be divided into three maritime districts, including the port as a special or autonomous area.

The command structure can be continuous and follow a chain:

1-The National Co-ordinator who assumes final authority for all categories of marine oil spills, upon notification of the occurrence of a spill, will decide either responsibility for actions as belonging to the port, or to oil companies or to the national co-ordinator. He is also responsible for logistical arrangements, communication and other support requested by the responding team when national or international assistance is needed.

2-The port Director should respond to all events inside the port and report to the national co-ordinator.

3-The oil companies managers have authority in their operational zones and should report to the national co-ordinator.

Through this chain of command, the responding team is on scene co-ordinator can seek assistance in order to be provided with any special support that may be available in the Congo or abroad.

On the operational side, it will be necessary to have a strike force team, which consists of individuals with knowledge on the availability of relevant personnel,

equipment and supplies needed in oil spill response. The strike force team should be drawn from the Congolese maritime authority, the national navy, public works, oil companies and other relevant institutions.

The strike force should be under the responsibility of an on scene commander who would assist the national co-ordinator as an adviser in the recruitment of crews and then the mobilisation of supplies and equipment. At the operational level another important task is the education and the training to maintain the team at an acceptable level. All the members should have additional special training in the country and at least once or twice a year should follow a common program with the oil companies teams with the aim to be familiar with any kind of equipment that can be used. In the same way, several short module courses can be followed abroad on the subject of oil response. Arrangements should be made for the on scene commander, his assistants and other members to attend such courses, especially those held in tropical environments.

After the response effort to any pollution, the duties are not yet finished because the assessment of the results must start, and that is the job of other agencies. This job is often forgotten by the general public and the press. The National Contingency Plan must be developed to address the aspects of restoration of the medium and compensation of those affected.

CHAPTER- V-

THE TREATMENT OF OIL POLLUTION IN INDUSTRIALISED COUNTRIES

Life is the best school because of experience. The one who does not profit from the rich experience of other people is ignorant. This applies not just for the individual but as well for governments.

This section presents a vision of how to address oil pollution incidents from the point of view of developed countries which have knowledge, technology and adequate personnel. In the following the author wants to make the reader aware of how oil pollution incidents are contained and controlled by good organisation and assignment of responsibilities in such countries as the USA, Norway and France. This should be beneficial for developing countries, especially for the Congo which is trying to establish equilibrium between economic development and oil pollution risks and the protection of the marine environment.

To write about the USA could mean to undertake a lengthy report because so many agencies are involved in marine environment protection. However, this effort addresses only those whose activities are key to achieving successful response actions. Among these are the National Ocean Service (NOS) part of the National Oceanic and Atmospheric Administration (NOAA) and the United States Coast Guard (USCG). While NOAA provides scientific support to the USCG in oil spill responses, the USCG are overall responsibilities. Local USCG on scene coordinators are able to call upon specialist USCG units for oil spill response known as strike teams. During field research in the USA it was possible to visit the Gulf

Strike Team, which is supported by National Legislation Acts as a Regional responsible assisting in the co-ordination of different agencies efforts to prevent and combat oil spills and mitigate their effects on the environment.

The US coast guard is divided into following maritime regions: Atlantic East, Atlantic South and Pacific West. Each region has a 35-member strike team.

Among the several and different missions assigned to the USCG in order to reduce environmental damages and adverse impacts on the public, the following activities must be overseen:

- The prevention of pollution through the inspection of vessels and the investigation of casualties and pollution incidents.
- The emergency preparedness for maritime disasters from oil and hazardous materials, as well as natural disasters, terrorism, illegal immigration and other military contingencies.
- The emergency sea response to maritime oil spills, hazardous materials spills and the effects of hurricanes.

In short, the unique mission of the strike force is the maintenance and the deployment of highly trained coast guard professionals and cadres in their zones with the support of specialised equipment.

The various strike teams are co-ordinated by the USCG 's National Strike Force (NSF) which provides support and standardisation guidance to the three teams. The NSF provides:

- a Public Information Assist Team (PIAT)
- a National Inventory of oil spill response resources
- a National response system preparedness evaluation program.

At the European level, while pollution response duties are the same as in the USA or elsewhere, a certain number of agreements between states allows them to effectively co-operate in response situations. The cases of Norway and France are interesting in that both countries still have, somewhat different than the USA, influential maritime administrations which lead the National Contingency Plans. At the

agreements level, the Paris Memorandum the key element addressing the prevention of oil spills by establishing a network for port state control of ships entering any European port.

Norway, as a Scandinavian country, is primarily concerned with other the Nordic countries, but a convention to govern the whole region, not yet into force.

Many state organisations are involved in the Norwegian Contingency Plan.

-The Maritime Directorate which develops the plans, makes decisions and issue provisions according to the Royal resolution of 1975-05-02 concerning Norwegian and foreign vessels. In cases of pollution it acts an advisory and supervisory component.

Its authority is based on two separate legislations. One is the Pollution Act which defines the vessel requirements within the Norwegian territorial limits which Norwegian and the foreign ships must follow to avoid pollution. The other is the Intervention Convention, which has been implemented through incorporation in the Norwegian legislation through the above mentioned provisions of 1975-05-02.

-The Nautical Accident Investigation Commission (AKU) which is a corporate body the Maritime Directorate.

-The National Pollution Supervisory Board (SFT) is an independent administrative authority, the role of which is to ensure that all required measures have been taken by all entities with responsibilities to prevent and limit damages to the environment from pollution incidents.

As soon as an accident is reported, close co-operation is established between two administrations and the following practices are observed as far as possible:

At the organisational level, the Maritime Directorate heads the preparedness of all response structures and activates the district and station heads as may be necessary.

Norway does not have a strike force like in the USA, and having many activities to co-ordinate. When a pollution incident occurs, a heavy administrative machine starts. First, the information has to be shared between different administrations and agencies. Then the Maritime district concerned by the event must send an inspector

on duty to evaluate the situation and to recommend any necessary further actions. In the case of considerable pollution, a National Action Commission operates through a rescue and salvage staff. During an action, consultations and expert assistance may be necessary and the contact is established with individual persons or institutions that can assist the Maritime Directorate within the different areas.

As is the case in many other countries, France has a National Contingency Plan called the POLMAR (Pollution Marine) plan and many responsibilities are shared between many departments:

- the Ministry of the Environment
- The Ministry of Transports, Public Works and Communications
- The State Secretary to the Sea

and other national agencies involved in oil spills such as :

- The National and Scientific Research Centre (CNRS)
- The Documentation and Research Centre for Accidental Marine pollution (CEDRE)
- The Directorate of Marine Affairs, which is composed of marine districts and the Marine Investigation Bureau are in charge of all events such as accidents, casualties and pollution at sea.

As in Norway the French Directorate of Marine affairs has the role of advisor and coordinator during operations of the action plans. The contracting parties to the plan from the private or state sectors use the equipment which has been agreed upon and provided by the technical body of the Marine Affairs Directorate to contain, to combat and clean-up oil pollution.

Environmental effects are assessed at the CNRS which then makes proposals for the restoration or the renovation of the affected areas.

CHAPTER-VI-

A) RECOMMENDATIONS

6.1-Specific needs for change

This chapter provides some recommendations that the author thinks useful to follow.

1. The first focus concerns legislation. It is essential that legislation be enacted to establish a National Oil Spill Contingency Plan. This action can be taken independently of other environmental considerations, except for hazardous substances which can be included conveniently under the same legislation.
2. The National Contingency Plan must provide the means to evaluate and determine the capability and preparation of the authority that will be responsible for its issuance and administration. The existence of the plan cannot be considered sufficient if it cannot ensure a satisfactory response to the worst probable oil spill incident that the Congo must have to face. In the present case it should address arising within and outside of the Congo 's waters.
3. The National Plan should consider two other plans. Those from the port of Pointe-Noire and the oil industry sectoral plans, to include inland waters and hazardous materials.
4. Three distinct partners at different levels, the government, the port and industry, must work together for the plan conception and implementation. The responsibilities have to be clearly defined for all the stages of the plan and detailed procedures established. That address the organisation, risks evaluation, notification, communication systems, response equipment, health and safety, public information, sensibilisation, education and training and evacuation.

5. A list of approved dispersants and the areas where they can be used should be drawn up. The appropriate quantities should be acquired primarily by the industry, while the government should prepare arrangements to adapt and utilise crop spraying helicopter during oil spills, as well as providing a small skimming vessel or barge to remove garbage and oil from the sea.
6. Storage facilities should be provided for equipment and supplies.
7. A grant should be given to researchers in the different laboratories to perform water quality analyses, including the determination of oil and grease concentrations.
8. An identification of training programs prepare persons for various pollution response strategies should be made and proposed to the authorities for approval.

B)-CONCLUSION

A proverb says that today prepares for tomorrow. Another adds that the future belongs to the youth. Both lead to the same objective, the fact that the present generation should work hard to make the future better, safe and confident. No father and no mother could want less for their offspring.

The Congo, like many other countries is engaged in the process of development. This requires great attention, not only from the authorities, but also from the population who must be informed and take part in the protection of the environment. In the last two centuries the technological development has brought success to the human kind in many areas. Since some years back man no longer has total control over the technology he created and the industry has become an important source of pollution of the air and water environment. Research into new energy sources led the same man to discover oil first on the land and then at sea. Today oil is important for developed as well as for developing countries. One example of this is the USA which, despite numerous energy options, depends primarily on three non renewable fuels: oil, natural gas and coal. Oil accounts for slightly more than 40% of the USA's total consumption.

In developed countries, many have pinned their hopes for economic progress on their ability to find oil and to a lesser extent, on nuclear power, both sources which has fuelled the industrial transformations of wealthy nations. For the Congo, oil accounts for 70% of the national Economy.

As oil is located far away from the biggest consumers, developed countries, it has to be transported there by sea. Because of this, seagoing transport and oil exploitation has endangered the local coastal countries. This must be offset now by the adopted kind of conventions, rules, and directives governing the prevention of and response to oil pollution. This means that effective oil spill contingency plans must be established. Programs for comprehensively dealing with this threat must be

implemented in accordance with the international community standards represented by the UN Organisations IMO and UNEP.

Such ideas do not always find resonance in developing countries and the Congo cannot avoid this criticism. The naiveté to believe that an unhappy event can happen only to the others must be disregarded. A country has to be engaged in a safer way of developing its oil by having a National contingency plan to preserve its coastal zones and the marine environment in general.

Every one knows the importance of water in our common life for drinking, washing, cooking and swimming. It is also well known that waters do not respect boundaries and pollutants produced in one country often end up in another country's water supply. An accident at sea will have negative effects for the communities' in the neighbouring environments. All this has lead over the past two decades to the drawing up of oil spill contingency plans for oil producing countries as well as for those others where environmental and economic resources are threatened by oil pollution.

Their usefulness has been proven in many instances and their absence felt in many others. Currently oil spill contingency plans are mandated by law in several countries. They are established at national and local levels for specific facilities such as oil installations at sea, ports and refineries. The requirements for an effective oil spill contingency plan have evolved with the experience gained in real situations and such plans are effectively supported by appropriate legal authority. The plans set out clearly the responsibilities for the agencies and individuals involved. Means for appropriate protection, clean up and disposal have been developed into effective strategies.

Everyone is in the same vessel of life and everyone, independently of individual habitat, must participate in the protection of the surrounding marine environment. Like other maritime and oil producing countries, the Congo must live-up its responsibilities and should hurry to achieve these important protection mechanisms for its population and the marine environment. The consideration given to the

increased development activities should be balanced by government actions to ensure that this development is sustainable in the environment sense. The first major step that the government should take in this direction is to opt for the establishment of a National Oil Spill Contingency Plan. This is the first objective to reach.

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