Prevention and control of pollution in the marine environment

Alain Regis Gnambault

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PREVENTION AND CONTROL OF POLLUTION IN THE MARINE ENVIRONMENT

By

Alain Regis Gnambault Kaka
(Gabon)

A Paper submitted to the World Maritime University in partial fulfilment of the requirements for the award of an MSc Degree in the Course of General Maritime Administration.

Supervised by:
Professor Gunnar STUBBERUD
The World Maritime University

May 1985
THIS PAPER REPRESENTS PART OF THE AUTHOR'S
STUDY PROGRAMME WHILE AT THE WORLD MARITIME UNIVERSITY
THE VIEWS STATED THEREIN ARE THOSE OF THE AUTHOR AND NOT
THE UNIVERSITY OR ANY OF ITS RESIDENT PROFESSORS OR
THE INTERNATIONAL MARITIME ORGANIZATION (I.M.O)

THE AUTHOR Accepts FULL RESPONSIBILITY FOR THIS WORK.
TO - EVERY ONE OF US
# TABLE OF CONTENTS

**PREFACE**

**ACKNOWLEDGEMENTS**

**INTRODUCTION**  
: THE ENVIRONMENT  
1

**CHAPTER**  
I  
MARINE ENVIRONMENT  
4  
I-1  
Physical zones  
5  
I-1-1  
nearshore  
5  
I-1-2  
continental shelf  
6  
I-1-3  
the deep sea  
6  
I-2  
Biological zones  
6  
I-2-1  
pelagic zones  
6  
I-2-2  
benthic zones  
7

**CHAPTER**  
II  
POLLUTION  
10  
II-1  
definition  
11  
II-2  
categories  
13  
II-3  
Sources  
14  
II-4  
causes  
15  
II-5  
types  
15  
II-6  
Accidents (by geographical zones ) 19  
II-7  
causes of Tankers' accidents  
20

**CHAPTER**  
III-  
EFFECTS OF POLLUTANTS ON THE  
MARINE ENVIRONMENT  
23  
III-1  
Effects of hydrocarbons  
24  
III-1-1  
impact on pelagic environment  
25  
III-1-2  
impact on benthic environment  
26  
III-1-3  
impact on mangroves  
27
CHAPTER IV
CONSEQUENCES OF POLLUTION 30

CHAPTER V
PREVENTION AND CONTROL OF MARINE POLLUTION 33

V-1 International Organizations 33
V-1-1 IMO 33
V-1-1-1 role of IMO (assistance) 39
V-1-2 UNEP . 41
V-1-3 IOPC FUND 41
V-1-4 P&I CLUBS 42
V-1-5 OCIMF 42
V-1-6 IPIECA 42
V-1-7 OCIMPOLC 43
V-1-8 ITOPF 43
V-1-9 IACS 43
V-1-10 OIEPF 44
V-1-11 IADC 44
V-1-12 OPOL 44
V-1-13 ICS 45
V-1-14 INTERTANKO 45

V-2 Regional organizations & plans 46
V-2-1 regional organization (Kuwait) 46
V-2-2 actions plans 49

V-3 National structures 50
V-3-1 Norway 50
V-3-2 UK 55
V-3-3 Gabon 58

CHAPTER VI
MEASURES TAKEN TOWARDS THE PREVENTION OF POLLUTION 61

VI-1 International and regional conventions 61
VI-1-1 International Conventions 61
VI-1-1-1 DILPOL 54 61
VI-1-1-2 MARPOL 73/78 63
VI-1-1-3 HIGH SEAS 69
VI-1-1-4 CLC 69
VI-1-1-5 FUND 71
VI-1-1-6 GENEVA Convention (M. Seas) 88
VI-1-1-7 GENEVA conv Continental shelf
VI-1-1-8 CIVIL LIABILITY (1976) 88
VI-1-1-9 OSLO CONV 1972
VI-1-1-10 LONDON CONV 1972
VI-1-2-1 Regional Conventions and Agreements
VI-1-2-2 PARIS CONV 1974
VI-1-2-3 STOCKHOLM CONV 1974
VI-1-2-4 HELSINKI CONV 1974
VI-1-2-5 BARCELONA CONV 1976
VI-1-2-6 KUWAIT CONV 1978
VI-1-2-7 ABIDJAN CONV 1981
VI-1-2-8 LIMA CONV 1981
VI-1-2-9 JEDDAH CONV 1982
VI-1-2-10 SOUTH EAST (AGREEMENT 1981) PACIFIC
VI-1-2-10 BONN AGREEMENT 1969

VI-2 International Voluntary Agreements
VI-2-1 TOVALOP
VI-2-2 CRISTAL
VI-2-3 OPOL

VI-3 The Main Constructional Requirements
VI-3-1 SBT
VI-3-2 CBT
VI-3-3 COW
VI-3-4 IGS
VI-3-5 SEPARATOR and FILTER
VI-3-6 MONITOR and CONTROL system

VI-4 The LAW of the SEA 1982
VI-5 Legal Provisions of some States

VI-5-1 ALGERIA

VI-5-2 FRANCE

VI-5-3 GREECE

VI-5-4 IRAN

VI-5-5 ISRAEL

VI-5-6 KUWAIT

VI-5-7 NORWAY

VI-5-8 OMAN

VI-5-9 SWEDEN

VI-5-10 SAINT VINCENT and GRENADINES

VI-5-11 UK

VI-5-12 USA

CHAPTER VII RECOMMENDATION

1- Effective Maritime Administration

2- National Maritime Legislation

3- To Empower Classification Societies

4- Training

4-1 World Maritime University

5- International Meetings

6- Ratification of Conventions

7- Information

8- Regional Cooperation

9- Contingency Plan

CONCLUSION

ANNEX

ANNEX 1- PREVENTION and ABATEMENT of MARINE POLLUTION from SHIPS

ANNEX 2- STATUS of CONVENTIONS (IMO)

ANNEX 3- STATUS of MARPOL 73/78
ANNEX 4 - CONTROL of DISCHARGE (CARGO TANKS)

ANNEX 5 - CONTROL of DISCHARGE (MACHINERY SPACES)

ANNEX 6 - TECHNICAL REQUIREMENTS

ANNEX 7 - LIST of CODES and GUIDELINES for the IMPLEMENTATION of MARPOL 73/78

ANNEX 8 - SURVEY REQUIREMENTS

ANNEX 9 - FORM of POLLUTION REPORT

ANNEX 10 - REPORT of INSPECTION (MOU) (FORM)

ANNEX 11 - MAJOR VIOLATIONS of MARPOL 73/78

ANNEX 12 - SUMMARY of CLC and TOT ALOP FUND and CRISTAL

ANNEX 13 - FORM of CERTIFICATE (IDPP)

ANNEX 14 - FORM of OIL RECORD BOOK

ANNEX 15 - CATEGORIZATION of NOXIOUS LIQUID SUBSTANCES

ANNEX 16 - LIST of LIQUID SUBSTANCES CARRIED in BULK

BIBLIOGRAPHY
P R E F A C E

THE ENVIRONMENT HAS TO BE PRESERVED FOR TODAY AND TOMORROW

It is an obligation for Mankind to preserve its surroundings. This statement was made in June 1972 in Stockholm (SWEDEN) during the United Nations Conference on the HUMAN ENVIRONMENT. All participants were aware of the fact that the Environment is subject to depravities due to its immoderate and uncontrolled exploitation or utilization.

It is generally recognized that pollution has developed into serious environmental problems. The Stockholm Conference adopted a declaration of the HUMAN ENVIRONMENT which included in principle 7 and 21 a general obligation to states to preserve the Marine Environment as follows:

PRINCIPLE 7: States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate use of the sea.

PRINCIPLE 21: States have, in accordance with the CHARTER of the UNITED NATIONS and the principles of international Law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.
The importance of the preservation of the Environment particularly the Marine Environment or the seas has been recognized by the new United Nations Convention on the Law of the Sea 1982, thus the part XII which contains 48 articles in 11 sections deals with:

The preservation and protection of the Marine Environment.

Moreover, that convention states in its preamble that: "The states parties to this convention recognize the desirability of establishing, through it with due regard for the sovereignty of all states, a legal order for the seas and the oceans which will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources and the study, protection and preservation of the Marine Environment".

The marine environment and the living resources which it supports are of vital importance to all nations.
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Deep gratitude to my colleagues.
INTRODUCTION

The purpose of this study is to point out the work which has been done by the International Community through various International Organizations to prevent and minimize the pollution in the marine environment; indeed, many international conventions with technical and legal requirements, codes, guidelines and manuals have been elaborated as regard pollution fighting; but it is necessary to say that because of lack of technical structures, trained personnel and financial problems existing in many countries they are not fully or not even implemented.

This study intends also to present the different steps to be followed and measures to be taken by states in order to permit them to reduce the danger or damage of pollution. Moreover it is important to let people know that concerted actions by governments at national, regional and global levels are essential to prevent and combat marine pollution.

Pollution has many sources which means that many different methods should be employed therefore states shall be able to find the best practical ways to prevent pollution.

Taking into account the fact that Marine Environment is a part of the Environment in general, I would like to give a succinct presentation of the Environment, before going into the subject which has for aim not only to present the problem but also to serve as a guide or an answer to How to reduce Pollution in Marine Environment,
THE ENVIRONMENT

The word Environment has come to mean widely different things to different people.

1- Current milieu, which has to be preserved at all costs in condition as really unchanged as possible.

2- Natural order of things, the combination of external circumstance which is as often adverse as favourable for such human affairs as food production and maintenance of life and which have to be fought against in terms of pests, disease and disasters.

3- Environmental factors: Those exercised by the long history of development of the continents and oceans; the changing of physical and chemical conditions which through geological time to the present have left their influence on the distribution of elements both useful and useless, and which have direct effect or relevance to their employment for human welfare.

An approach of definitions has been given by the:

LONGMAN DICTIONARY OF SCIENTIFIC USAGE
( A GODMAN / EMF PAYNE )

ENVIRONMENT :

1- The active items of the surroundings of an organism

2- Factors in the environment including temperature, humidity, the presence of other organisms and the presence of physical objects; all these can have an effect on the behaviour and existence of the organisms
3- Contrast surroundings which may or may not affect the organisms e.g. a tree is a part of the surroundings of an animal if it has no effect on the animal life. If it provides food, shade or shelter it is a part of the animal's environment.

However we can say that the environment is a compound of economical, social, cultural factors and physical, chemical and biological elements; it includes Air, Water, Soil, Light, Temperature and the presence or absence of other organisms.
CHAPTER I

THE MARINE ENVIRONMENT

EARTH is called the water planet; almost 71% of the world's surface is covered with water.

"It is quite feasible that our planet has the wrong name, ancient people named it EARTH after the land they found themselves surrounded by. For centuries upon centuries, people believed that the planet's surface consisted of small bodies of water such as Mediterranean; if they had known that almost three quarters of their planet were covered with water they might more correctly have named it OCEANS."

Edgard GOLD

The study of the Environment requires that each of the components be studied in proportion to its importance or impact on the subject; without water in our surroundings life would not have taken place. In the early dawn of time this warm hospitable fluid offered a haven for the timiest particle of circumstance that grew to be recognizable life on this planet. Just how non living things became living is yet unknown and the production of the mysterious substance called Protoplasm has not yet been fully understood.

The importance of water cannot be overemphasized. If it were not for the presence of water this planet would be uninhabitable due to temperature extremely above. Although the quantity of water in the forms of vapour and fresh water is slight, it is nonetheless a major factor in our environment
Ninety eight per cent of the mass of all the water existing is seawater. It is estimated that of all the water vapour in the atmosphere were released in the form of rainfall, it would raise the level of the oceans only a single inch.

The marine environment particularly the oceans is a regulator of major processes occurring on the Earth’s surface.

It is the primary source of water that reaches the continent as rain and snow and contains the largest reservoir of carbon which is involved in the biological cycle. The high capacity of water makes the oceans as important regulator of climate and the movement of its currents are fundamental for both marine life and Man.

Fish, crustaceans, molluscs, whales and seaweeds are all major biological resources of the oceans; there are also chemical resources such as Magnesium, Potassium, Biomine, Codine etc...

The economic utilisation of the oceans extends into the areas of communication and transport, tourism and seabed mining.

MARINE ENVIRONMENT for a better approach and understanding has been divided in: Physical zones and Biological zones.

I-1 PHYSICAL ZONES

It is convenient to sub-divide the oceans or seas into three major zones.

I-1-1 The Nearshore zone

This includes the intertidal portions of the coast, estuaries and areas that are partially enclosed by land masses such as harbours, bays, lagoons and passage of water separated from the open sea by fringing islands. The extend of intertidal zone depends upon the slope of the land to the sea and the vertical range of the tidal excursion; the latter can vary from less than 1 metre, as in some areas of the Mediterranean to about 15 metres in the Bay of Fundy (CANADA).
I-1-2 The continental shelf

The sea floor out as far the continental margins. The submarine portions of the lands masses constitute the continental shelf. The depth of water varies but it is typically less than 200 metres. The width of the shelf is extremely variable extending offshore to a distance of only a few km in such areas as the coast of California and some Japanese islands to over 150 kilometres in such areas as the Atlantic coast of North America.

The continental shelf also contains several large marginal seas such as the North Sea and the Baltic Sea. The fauna of the continental shelf is markedly different from that of the deeper parts of the oceans and this area is referred to, by biologists, as the Neritic province.

I-1-3 The Deep sea

Beyond the continental shelf the sea floor slopes fairly steeply (3° to 6° to the horizontal) to form the continental slope, then more gently (1°) to form the continental rise before giving way to the Abyssal plains at 4000 to 6000 metres depth.

In addition there are local topographic features of sea mounts and canyons and each oceanic basin has ridges and trenches which correspond to the arrangement of the Tectonic plates. Again, because of the marked difference in species composition, biologists refer to the area off the continental shelf as the Oceanic province.

I-2 BIOLOGICAL ZONES

I-2-1 Pelagic zones

Marine organisms either float or swim in the water mass are termed Pelagic.

Pelagic organisms are further referred to the terms of those organisms which are strong swimmers such as the fish and squid which constitute the NECKTON and those which are rather weak swimmers or float passively and constitute the PLANKTON.

Planktonic organisms may be either plant (Phytoplankton) or animal
(Zooplankton). Another frequently used term is NEUSTON which refers to those organisms which inhabit the top few centimetres of the sea's surface.

The phytoplankton includes three principal groups: The DIATOMS - the DINOF LagellATES - the U-FLAGELLATES or NANOPLANKTON. These are the primary producers in marine food chains together with the contribution from the large attached Benthic Algae in the coastal zones.

In contrast to the phytoplankton, the zooplankton is derived from many groups of animala: Protozoans, Coelenterates, Etenophores, Polychaetes, Crustaceons, Molluscs etc...

Many species have an entirely planktonic life history and these are referred to as the HOLOPLANKTON. Other organisms including some of those which otherwise live on the sea floor spend only part of their life history in the plankton, particularly as eggs and larvae and these temporary additions to the plankton are called the MEROPLANKTON.

I-2-2 Benthic zones

Marine organisms which live on or in the sea bed are termed Benthic. The large Macroalgae which live attached to the sea floor except for some of the Sargassum species are also restricted to the EUPHOTIC zone.

Coastal waters, however are generally more turbid and turbulent than the open ocean.

The benthic fauna is usually subdivided into those animals which live on the sea bed, the Epifauna and those which live in the sea bed the Infauna.

The Benthos is composed of representatives of all of the major Phyla. The benthic animals which live in the shelf occur in groups of species that are characteristic of particular depths of water and type of sediment.
In temperate seas many benthic invertebrates produce planktonic larvae but those living in the Arctic and Antarctic usually have short or non-existent planktonic larval stages.

From the edge of the continental shelf to a depth of about 400 metres the benthos is much reduced and has a typical fauna; this area is termed the BATHYBENTHIC zone. In deeper water there is the ABYSSO-BENTHIC zone and again below 6000 metres a separate HADOBENTHIC may be defined.

The principal areas of biological production in the oceans are the shallow waters and especially the coastal regions. The Biomass organisms in the deep oceans is much less than in these productive regions. Nevertheless, it is by no means as a lifeless desert, but supports substantial and varied biota adapted to life in reduced light and ultimately is dependent for its energy on organic matters from above.

The presence of life in the deep oceans affects the assessment of the transports of contaminants released there in several possible ways:

FIRST: Organisms sometimes take up contaminants often selectively and create a possible hazard if ingested by man (or animals); they may therefore be links in food chains leading to exposure pathways.

SECOND: If the accumulation of contaminants and BIOMASS and movements of organisms are sufficient to the total quantities of contaminant moved around in this way might be a significant part of the total mass transport, sufficient to alter the concentration field which would otherwise be established by physical and geochemical processes.

Furthermore, the movements of living things may disturb their environment and thereby lead indirectly to mass transport of contaminants which they do not actually carry themselves for example the mixing of surficial sediments by bioturbation.
Containers on the sea bed modify the environment which may affect species composition and potential dispersal of organisms while the contaminants also may affect metabolic activity.

This introduces an important problem affecting the marine Environment: Pollution
REFERENCES:

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3- The Marine Environment pp 73-120 Tycoly UNEP 1982
CHAPTER II

POLLUTION

Since 1968 the public has been greatly attracted to the problem of Pollution of the Marine Environment; there is a general feeling that the sea, the so called last paradise on Earth, must be kept clear at any price.

Marine pollution research started some 30 years ago with studies on radio active wastes dumped into the sea and the first international congress on Marine pollution took place in 1959.

Marine pollution has become a worldwide concern due to the threat to human health, biological resources, flora and fauna, tourism. Marine environment and the living resources which it supports are of vital importance to humanity and all people have an interest in assuring that it is so managed that the quality and resources are not impaired; impairment which can occur due to pollution. The capacity of the sea to assimilate wastes and render them harmless and its ability to regenerate nature is not unlimited.

Marine pollution has become also a global problem, thus DDT (DICHLORO DIPHENYL TRICHLORETHANE ) pesticides used in agriculture has been found in the fat tissue of marine animals far removed from their source and anyone can remember what happened in MINAMATA ( JAPAN ) many people died after having eaten fishes contaminated by Mercury.

Therefore the world should be aware of consequences arising from pollution and take all necessary measures needed which can reduce the impairment of the Marine environment; experience has shown that such incidents as : Torrey Cânyon ( 1967 ) and Amoco Cadiz ( 1978 ) can have serious effect upon the environment damaging such important resources as fisheries and tourism for long periods
II-1 DEFINITIONS

The word Pollution is thought to be derived from the Latin verb "Polluere": To defile, and indeed most dictionary give this meaning.

According to the Oxford English Dictionary, Pollution is the act of making physically impure or foul.

Legal definitions are much more explicit but they often have the result of introducing further terms which add to the confusion, for example the State of California (USA) apparently made a distinction between Pollution: The introduction of anything which adversely and unreasonably impairs the beneficial use of water even though actual health hazard is not involved. And Contamination: The impairment of water quality by sewage or industrial waste causing an actual hazard to public health or an equivalent effect whether or not waters are affected.

From a scientific point of view KLEIN (1962) suggested that it is easier to regard pollution as the actual impurity introduced into water (or Land or Air) rather than the act involved in introducing it, and he proposed a definition of Pollution: Anything causing or inducing objectionable conditions in any water course and affecting adversely any uses to which the water thereof may be put.

The LONG MAN Dictionary of scientific usage (A Godman/EMF Payne) gives the following definition: Pollution: The process of making an environment unhealthy or impure.
The GESAMP (IMO/FAO/WHO/IAEA/UN)

A joint group of experts on the scientific aspects of marine pollution has adopted a working definition of pollution:
The introduction by Man, directly or indirectly, of substances or energy into the marine environment including estuaries resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities.

The UN (UNITED NATIONS) in adopting the new Law of the Sea Convention in 1982 has introduced the following definition in its article 1:
The introduction by Man, directly or indirectly, of substance or energy into the marine environment, including estuaries, which result or likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

As it can be seen both definitions GESAMP and UN are similar. These definitions are clear and comprehensive and embody two important aspects:

- Pollutants, like pests and weeds, are man-made

- Pollution is not an innate property of the substance or energy but it is dependent on the effects that the substance (or energy) produces in a given situation.

This general survey of definitions of Pollution leads to the identification of categories of Pollution.
II-2 CATEGORIES OF POLLUTION

The major categories of pollution can be listed as follows:

- DOMESTIC SEWAGE
- PESTICIDES
- INORGANIC WASTES
- OIL AND OIL DISPERGANTS
- RADIOACTIVE MATERIALS
- PETROCHEMICAL and ORGANIC CHEMICALS
- ORGANIC WASTES
- MILITARY WASTES
- HEAT
- DETERGENTS
- SOLID OBJECTS
- DREDGING SPOIL
- INERT WASTES

These categories refer to various activities principally industrial activities which have increased widely with the development of the new technology.
II-3 SOURCES OF MARINE POLLUTION

In general five sources of marine pollution have been categorized:

1- Land based pollution i.e marine pollution by substances or energy finding their way through runoff from land by rivers, pipelines and outfall structures.

2- Ship generated pollution i.e marine pollution by operational discharges from ships (e.g. by cleaning of tanks or debalasting) and accidental pollution following, for example, collision or grounding of ships.

3- Pollution by dumping at sea i.e marine pollution caused by the disposal of industrial and municipal wastes at sea from ships which have been loaded at land with the purpose of dumping the material at sea.

4- Pollution from sea-bed activities i.e marine pollution by the release of harmful substances directly arising from the exploration, exploitation and associated off-shore processing of sea bed minerals.

5- Pollution from or through the atmosphere i.e marine pollution by the release of harmful substances or energy affecting the marine environment originating from man’s activities on land, ship, hydroplane or aircraft.

Pollution is mostly the result of Man’s activity.

Pollution can be:

- Intentional: Disposal of sewage or chemical effluents
- Accidental: Damage to shipping
- Incidental: Agricultural run off of pesticides or fertilizers

As the major categories and sources of pollution have been outlined, it is quite necessary to point out the causes and types of pollution.
II-4 CAUSES OF POLLUTION

Error of judgement
Tiredness
Negligence
Inadequate training
Sabotage
War
Poor design
Poor maintenance
Mechanical failure
Storms
Floods

II-5 TYPES OF POLLUTION

To illustrate the major categories of pollution I would like to give some figures of pollution occurring in different parts of the world:

ATLANTIC OCEAN

Most of the solid radioactive wastes principally from the United Kingdom but also from other European countries is dumped from ships into a designated area of the Atlantic.

Massive quantities of sludges from sewage treatment are dumped off New-York/New Jersey (USA)

Industrial seepages and oil pollution in Lake Maracaibo

River deposition in GUYANA from mining.
Pollution off the West African coast from industrial and agricultural waste and sewage also oil from tankers discharge and spills

River pollution on North East Brazil and Central America from discharge of waste material from sugar cane alcohol production.

The increasing population of the areas of Rio de Janeiro/Santos (Brazil) has produced heavy and increasing organic pollution from sewage.

Highly toxic industrial waste in Rio de La Plata

RED SEA

Pollution almost critical in the Red Sea because of industrialization

THE GULFS

Severe oil pollution as a result of oil spillages from ships, rigs seepages, refinery discharges and blowout.

INDIAN OCEAN

Mercury, Lead and Copper contents are high in Bombay (INDIA) harbour and large quantities of domestic waste are discharged.

Oil slicks and tar balls in high concentration along the coastline of Southern India.

Tar balls and mats are common on the beaches of Cape Agubras and Natal, it is a major tanker route from the Middle East to Europe

Bad pollution around Indonesian beaches from the untreated sewage and heavy industries on the coast.
GULF OF THAILAND

Untreated sewage and pollution from Tapioca flour mills and tar balls

PACIFIC OCEAN

Japanese and soviet fishing vessels have discharged litter in the Northern Pacific

Steadily increasing level of municipal and industrial waste in JAPAN

The Chinese coast is badly polluted by heavy metals from shore based activities

HIGH sedimentation of minerals and tailings from Philippines mining

Dumping of radioactive waste by Japan in Marianas but stopped after international pressure

Heavy pollution in Sydney (AUSTRALIA) by sewage from inadequate municipal system

Uranium mining in British Columbia has produced radioactive waste and mining tailings

San Francisco Bay (USA) suffers input of sewage of heavy metals Mercury, Lead, Zinc, Cadmium and Copper as well as sewage effluent

Pulp waste from coffee processing in Guatemala

Considerable organic pollution in Chimbote Bay (PERU)

Copper tailings from mining in Chile.
II-5  ACCIDENTS RESULTING IN OIL POLLUTION

Since 1955 the Research Centre of the french Institute of Petroleum has been collected data about accidents occurring in marine environment due to oil exploitation or transport.

From 1955 to 1980, 688 accidents of more than 500 Tons oil spilled have been recensced;

13 due to drilling operations and production
12 " " pipelines (at sea)
16 " " pipelines (in the river)
26 " " offshore installations
621 " " ships

Among these ships, tankers are responsible for 77% of the accidents and for 95.8% of the oil spilled. Thus, only few accidents involving offshore installations have been noticed inspite of the great number of drilling production units existing; nevertheless eight important accidents occurred:

SANTA BARBARA (USA) 1989
PLATFORM G SHELL and CHEVRON OIL (USA) 1970
AMOCO OIL (PERSIC'GULF) 1971
BRAVO EKOFISK (NORTH SEA) 1977
IXTOC I (GULF OF MEXICO) 1979
FUMIWAS (NIGERIA) 1980
NOWROUZ (PERSIC GULF) 1983

The most important of all is the one of IXTOC I; It happened on 3 June 1979 and ended only 295 days after, about 500,000 Tons of crude oil spilled in the Gulf of Mexico, the double of the AMOCO CADIZ pollution. The total cost was estimated to about 629 millions US Dollars (REMOND-GOULOUD, 1982).
II-6  ACCIDENTS IN DIFFERENT GEOGRAPHICAL ZONES

The table below shows the sharing of accidents by zones, these accidents had been reckoned from 1955 to 1979 by the French Institute of Petroleum.

<table>
<thead>
<tr>
<th>ZONE</th>
<th>% of accidents</th>
<th>% of quantity of oil spilled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total</td>
<td>coastal impact</td>
</tr>
<tr>
<td>EUROPE ( ATLANTIC )</td>
<td>17.6</td>
<td>40.6</td>
</tr>
<tr>
<td>AFRICA ( ATLANTIC )</td>
<td>4.1</td>
<td>6.2</td>
</tr>
<tr>
<td>AFRICA ( INDIAN OCEAN )</td>
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<td>21.7</td>
</tr>
<tr>
<td>ADEN-RED SEA</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>OMAN-PERSIC GULF</td>
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<tr>
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<tr>
<td>AMERICA (PACIFIC )</td>
<td>6.5</td>
<td>26.9</td>
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<tr>
<td>AMERICA (ATLANTIC )</td>
<td>25.1</td>
<td>32.3</td>
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<tr>
<td>MEDITERRANEAN</td>
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<tr>
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<tr>
<td>ALL ZONES</td>
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<td>20.0</td>
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</table>

( BERTRAND, 1979 )
From the table it can be seen that EUROPE is the most vulnerable region 40.6% of accidents had a coastal impact followed by America (Atlantic) 32.3%.

Oil pollution (in size) presents some differences in these two regions due to the fact that Europe (Atlantic) is supplied by large tankers (17.6% of accidents and 27.2% of the quantity spilled), in the other hand America (Atlantic) is supplied by tankers and barges of smaller sizes (25.1% and 17.6% of the quantity spilled).

Oil slicks constitute a great threat for the coastal states which are facing accidental pollution.

1979 had been the worst year with 646,000 T for 42 accidents of more than 500 T

Between 1975 and 1980, Europe faced 7 accidents (5 on the Atlantic coasts and 2 on the western Mediterranean).

Atlantic Europe and the east coast of United States of America are among the most vulnerable zones to oil pollution.

II-7 CAUSES OF TANKERS ACCIDENTS

Based on study carried out on 481 accidents BERTRAND (1981) stated that the primary cause of a tanker accident is varying depending on the type of ship: Tanker (loaded or in ballast) or barge.

The most frequent causes are groundings (37.4%) and collisions (27.1%) for loaded tankers, explosion (39.6%) and groundings (28.7%) for tankers in ballast, collisions (40.5%) and groundings (24%) for barges.

As far as the coastal pollution is concerned groundings constitute the principal cause for the loaded tankers.

The increase of risks of grounding seems to rest on the increasing size of ships.

The increase of size of ships which means the development of big tankers has permitted to reduce the risk of collision (because there are not too many ships sailing) but in other hand the risk of grounding is greater.

On technical point of view, criticisms are formulated on big tankers, principally it is stated that they are fragile, less manoeuvrable and a small margin of being afloat in case of accident.
Between 1939 and 1958, 7 Norwegian Tankers broke in two during storms, each wreck of ships was said to be due to the increase of the size of ships.

Until now, the fragility of big tankers is the cause of important accidents (Tanio 1980, Energy Concentration 1980). On the other hand, groundings of Torrey-Canyon, The Olympic Bravery and Amoco-Cadiz have highlighted the danger of increasing the size of tankers & lack of handiness and small margin to remain afloat after an accident.)
REFERENCES:

1- Law of the Sea Convention 1982
   Part I Art 1 (4)

2- Atlas of the Oceans Ed By Alastir COUPER
   (pages 172 to 177)

3- Lecture on GESAMP by Prof. KULLENBERG
   (World Maritime University - 21-2-1984)
Pollutants have deleterious effect on the marine environment, they cause important damages;

Biodegradable organic substances from untreated domestic sewage reduce the level of oxygen

Detergents are toxic

Elevated concentrations of Mercury in fish or other seafood are deadly for human consumption.

DDT elevated concentrations make fish unfit for human consumption and endanger the survival of sea birds and mammals.

Antifouling plants added to the heavy metal pollution may have adverse effects in restricted Bay and estuaries.

Garbage from ships is a nuisance.

Oil is a complex material and each component has a special fate when spilled on the sea’s surface. Oil components are either toxic or may change the pattern of marine organisms.

Since inputs of hydrocarbons into the seas due to marine transportation are still high, I intend to focus my study principally on the effects of hydrocarbons in the marine environment.
III-1 EFFECTS OF HYDROCARBONS

The effects of hydrocarbons in the marine environment depend on many factors:
- The nature of oil
- The physical environment
- The biological environment

The nature of oil

The nature of oil is very important because it will determine the effects.
The Aromatic Hydrocarbons are the most dangerous to the Fauna and Flora because of their toxicity.
The highest of them are the principal cause of immediat mortalities due to the fact that they are very soluble, the heaviest are persistent with a long term toxicity.
Viscosity exerces a great influence upon the behaviour of oil at sea or ashore. It is useful to note that the reactions of hydrocarbons to evaporation, biodegradation and sedimentation permit to determine their behaviour.

The physical environment

It can significantly modify the effects of oil pollution if the oil slick is far from the coast the ecologic effects will be reduced.
Indeed, of 100,000 species living in the sea about 95,000 live in the zones near the coast and the Biomass there is more important.
Phenomenon such as evaporation and biodegradation reduce the toxic effects of oil before it reaches the coast.
IXTOC I (500,000 T ) caused less damages than AMOCO CADIZ (223,000 T )

The biological environment

If is gravelly damaged by oil and its alteration can cause destruction of larvae, eggs and sensitive species.
The biological impact of oil pollution may be spectacular but for the Biologists an oil pollution impact is complex and its appreciation is not immediat.
The visible dead animals are just a tiny part of the total destruction.
Moreover it is only the first step of perturbation that will stay for many years. Oil changes for a long time the features of the environment polluted; furthermore, eggs and larvae are very sensitive.

It can easily noticed that after the beaches have been cleaned the biological impact is still high.

III-1-1 IMPACT ON PELAGIC ENVIRONMENT

Effects of hydrocarbons on Bacteria

Bacteria are of primordial importance in the marine environment; they contribute to the destruction of organic matters whose oxidation is necessary for the recurrence of nutritious salts used by Phytoplankton; generally hydrocarbons in marine environment contribute to the development of germs heterotrophic because their foods are Carbons. The increase of heterotrophic Bacteria was observed in Baltic Sea after the oil slick caused by TSESIS (October 1977) (JOHANSON AND LARSON)
The same observation was noticed by LEE (1977) in doing an experimentation (HAVING added oil in marine environment)

Effects of hydrocarbons on Phytoplankton

The Phytoplankton is the first link of the trophic chain and it contributes for a large extent to the feeding of herbivors. Hydrocarbons damage the abiotic factors (which rely on the environment) and the biotic factors (which rely on the survival of the species); response of phytoplanktonic ecosystem to oil pollution from tankers, platforms or pipelines varies depending on oil slicks and species.

Effects of hydrocarbons on zooplankton

Zooplankton species are sensitive to oil; thus, species with a short cycle are quickly contaminated.
Species with a long cycle such as Molluscs, crustaceans and fishes suffer more and disturbances in reproduction occur.

The effects can be:

Immediat effect: Decrease of Biomass and important mortality.

Middle term effect: Absence of reproduction.
Perturbation of feeding behaviour.
Modification of the nutritious environment.

Long term effect: Species with a long term generation will be extremely contaminated.

III-1-2 IMPACT ON BENTHIC ENVIRONMENT

The Benthic Ecosystem seems to be more sensitive than the pelagic ecosystem to the immediate effects of oil slicks because it is constituted of a lot of fixed organisms which are therefore quickly affected.

Short term effect of an accidental pollution:

Rapid degradation of Benthic Ecosystem.
Destruction of marine organisms by aaxphysia, intoxication and immobility.

Restoration of species is slow occurring step by step, year after year, this is function of the capacities of reproduction of species, of the season, of the degradation of oil slick and the importance also of the oil slick.
III-1-3 IMPACT ON MANGROVES

Before stating the effects of oil on Mangroves, it is necessary to define the Mangroves and to determine their place in marine environment.

MANGROVES: Any group of tropical trees or shrubs growing in swampy ground along river banks with branches that spread and send down roots thus forming hunks and causing a thick growth.

( WEBSTERS NEW TWENTIETH CENTURY DICTIONARY )

The term Mangrove refers to approximately 70 species of trees or bush which occur on sheltered shores and in estuaries or near shore waters in the tropics and some subtropical regions.

Mangroves are outstandingly adapted to grow in seawater which they desalinate by ultrafiltration process. Mangrove swamps provide nurseries and feeding ground for many commercially important species of fish and crustaceans. The stilts, roots, lower trunks and mud surface usually support a varied fauna of oysters, snails, barnacles, crabs and other invertebrates. The upper parts of the Mangrove trees are an essential terrestrial environment with a varied but little known fauna of birds, mammals and insects.

Mangrove forests have many good uses, the wood is good fuel as charcoal or firewood.

Main important function of the Mangrove Ecosystem is to provide food and shelter for an infinite variety of coastal fishes and shellfish.
Mangrove swamps may be subject to the following variety of disturbances resulting from oil industry activities:

- Oil spills
- Spill clean up
- Operational discharges
- Other oil industry activities

An overall impression from the limited literature is that the acute short term effects of petroleum hydrocarbons are likely to high mortalities of invertebrates, defoliation of mangroves and death of seedlings.

A group of scientists initiated in 1977 a post oil survey in Indonesia to measure the effect of oil on Mangroves two years after the accident which occurred on 5 January 1975 when the Showa Maru M/S en route for Japan with cargo of Arabian Light, grounded near Buffalo Rock (Karang Banteng).

It is estimated that approximately 54,000 barrels of oil were spilled.

The result of that post oil survey was that; the occurrence of dead and damaged mangroves was associated with comparatively low numbers of crabs and snails and with comparatively high petroleum-hydrocarbons residues in the sediment. There was some evidence that relatively undegraded hydrocarbons occurred below the surface; the fact that dead mangroves occurred in pockets suggests that they were killed by the standing of slicks.

It is quite evident that pollution occurring at sea can have serious consequences when it reaches the coast; that is the subject of the next chapter.
REFERENCES:

1- Diagnosis and Therapy  Prof. Sebastian GERLACH  
   (Chapter XI)

2- The Health of the Oceans and the need for its Monitoring.  
   G. KULLENBERG  October 83  Page 11

2- Oil Pollution at Seas  IMO  January 1983

3- Mangrove Swamps and the oil industry.  
   Jenifer BAKER

4- Fate and Effects of oil in the Marine Environment.  
   Pierre NOUNOU
CHAPTER IV. CONSEQUENCES

Consequences arising from pollution are particularly important thus pollution cause serious disturbance as regard the supply of fisheries; the loss of marine foods implying the reduction in the quantity or quality of marine produce available to man as a consumer means for fishermen; loss of revenues and for the consumer scarcity of the products available in the market.

After the Torrey Canyon disaster, tainting: accumulation of oil or oil compounds to level causing taste or odours in marine products consumed, or likely to be consumed, by man, rendering them less desirable as food, was reported (SIMPSON 1968) although the tainting was believed to be due to the dispersants used rather than the Kuwait Crude oil spilt.

Tainting of marine foods has been a great concern to fishermen for many years due to the fear of catches being refused on the market or at factories on delivery; crustaceans, fish and molluscs exposed to oily conditions can acquire an objectionable oily taste.

Some countries are depending on the sea when it concerns their feeding and it is also their principal source of revenue therefore any disturbance in marine environment will cause disturbance in their Economy consequently they will be obliged to rely on the importation which have serious effect on their Balance of Trade and Balance of Payment.
Pollution can cause damages to installations within the ports and to ships. Moreover, researches carried out to find the suitable means to combat pollution and protect against damages imply an important financial effort for any country.

Pollution when causing damages to beaches impairs such activities as tourism and all other activities connected to Tourism, those relying on these activities will face less earnings because all people who wanted to spend their holidays at beaches will be forced either to remain at home or to go elsewhere that cause a social problem.

The most terrible danger is the eventuality of impairment of health by contracting diseases from polluted seas; anyone should have in mind what happened in Minamata (Japan): Many people died and several were seriously sick after having eaten fishes contaminated by Mercury released in sea water.

In an attempt to avoid these adversities states have initiated some preventive and protective measures.
REFERENCES:

- Pollution des Mers: Chapter II p 107
  (Gerard Bellan & Jean Marie PERES) PUF FRANCE
CHAPTER V

PREVENTION AND CONTROL OF MARINE POLLUTION

Marine pollution is a worldwide concern, therefore the Community has recognized the need to create and establish international, regional or national structures to deal with the problem of the prevention and control of marine pollution.

V-1 INTERNATIONAL ORGANIZATIONS

As it has been stated above marine pollution is primarily an international problem; the main international organizations involved in marine pollution can be listed as follows:

IMO: International Maritime Organization
UNEP: United Nations Environment Programme
IOPC FUND: International Oil Pollution Compensation Fund
P&I CLUBS: Protection and Indemnity
OCIMF: Oil Companies International Marine Forum
IPIECA: International Petroleum Industry Environmental Conservation Association
OCIFMPC Ltd CRISTAL: Oil Companies for Marine Pollution Compensation Limited Cristal
ITOPF: International Tank Owners Pollution Federation Limited (TANKERS)
IACS: International Association Of Classification SOCIETIES
E&P FORUM: Oil Industry International Exploration And Production Forum
IADC: International Association Of Drilling Contractors
OPOL: Offshore Pollution Liability Association Limited
ICS: International Chamber Of Shipping
INTERTANKO: International Association of Independent Tanker Owners
Taking into account the fact that IMO is the main organization dealing with pollution from ships, it is important to focus the attention on IMO in more details.

After World War II, the United Nations recognized the need to create a specialized agency to deal solely with maritime matters. Accordingly, the United Nations Maritime Conference was convened in Geneva (SWITZERLAND) in 1948 and concluded the convention on the Inter-governmental Maritime Consultative Organization (IMCO) now called IMO. This convention came into force in 1958 and IMCO came into being at that time.

Since its modest start with 21 members states IMO has steadily grown and its membership at present (April 84) totals 128 states together with one associate member; IMO is therefore a universal Maritime organization with its membership comprising all nations interested in shipping.

The objectives of IMO as provided for in article 1 of its Convention are, inter alia, to provide machinery for co-operation among governments in the field of governmental regulations and practices relating to technical matters of all kinds affecting shipping engaged in international trade to encourage the general adoption of the highest practicable standards in matters concerning maritime safety and efficiency of navigation and the PREVENTION and CONTROL of Marine Pollution from ships and to deal with legal matters related thereto.

In the field of Marine Environment Protection, Prevention, Control and Abatement of marine pollution the work programme of IMO is directed towards the following:
- To develop and adopt the highest practicable standards for the control of deliberate and accidental pollution from ships and other equipment operating in the Marine Environment.

- To prohibit the deliberate discharge of oil and other harmful substances into the sea by regulating ship operations such as tank cleaning and deballasting and also by adopting standards for the design, construction and equipment of ships.

- To minimize pollution arising from maritime accidents by adopting standards for construction, equipment, navigation, cargo handling and crew qualifications.

- To mitigate the effects of pollution once it occurs, by adopting certain ship construction and operation requirements and by adopting an international legal regime for intervention in the event of emergencies.

- To establish schemes whereby victims of pollution are compensated for the financial loss.

- To develop procedures and encourage governments in the effective implementation of conventions, including survey and certification of ships, Port State Control and sanctions against discharges in contravention of conventions requirements.

- To promote national and regional arrangements for combating pollution.

- To develop and implement technical assistance programmes to facilitate the implementation of conventions.

The work relating to prevention and control of Marine pollution normally culminates in the formulation of international conventions and similar multilateral instruments, codes of practices, recommendations to governments and other other guidelines and manuals.
Details of the principal conventions and instruments adopted by IMO in the prevention and control of pollution are given further.

IMO works in close association with other shipping and oil industries and in co-operation with other organizations of the United Nations family.

Since 1959 IMO has adopted nearly 30 treaties or other instruments covering many aspects of Maritime Safety and pollution Prevention including such matters as the Safety of Life at Sea, collisions avoidance, measures to prevent pollution by oil and other substances, compensation for oil pollution damage, the right of states to prevent pollution, crew standards and many more.

The major international conventions dealing specially with pollution that have been adopted are the following:

International convention relating to intervention on the high seas in case of oil Pollution Casualties (1969)

International convention for the prevention of Pollution of the Sea by oil (1954)

International convention on Civil Liability for Oil Pollution (1969) Damage


Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (1972)

International Convention For the Prevention of Pollution from ships (1973) as modified by its Protocol of 1978 (MARPOL 73/78)
The principal organs of IMO have since its inauguration been the Assembly, the Council and the Maritime Safety Committee; there are now five specialized Committees:

- Maritime Safety Committee
- Legal Committee
- Facilitation Committee
- Technical co-operation Committee
- Marine Environment Protection Committee

The Committee's activities are largely concerned with implementing the resolutions and dealing with the technical problems associated with the entry into force of the Marine Pollution Convention.

The adoption of MARPOL73/78 led to further increased in IMO's work in the environmental field and one result was the establishment of the Marine Environment Protection Committee (MEPC).

The principal objectives of the MEPC are:

- Solution of technical problems involved in the implementation of the International Convention for the prevention of pollution from ships, 1973, as modified by the Protocol of 1978, including examination of the problems of the implementation of Marpol 73/78 in relation to the protection of the marine environment in special areas.

- Development of suitable procedures for the enforcement of conventions relating to marine pollution.

- Promotion of technical co-operation, including the development of regional arrangements on co-operation to combat pollution in cases of emergency.

Specific subjects:

- Uniform interpretation and application of the provisions of MARPOL 73/78 and possible amendments thereto.
Reception facilities for residues.

Oil discharge and control systems, including those for light refined oils.

Updating of specifications and manual for crude oil washing systems and dedicated clean ballast tanks.

Updating of procedures for the control of ships and certificates and the control of discharges from ships.

Surveys and certification of ships under MARPOL 73/78

Penalties for infringement of convention provisions.

Casualty investigations in relation to marine pollution

Promotion of regional arrangement for combating marine pollution

Development and updating of the anti-pollution manual

Identification of the source of discharged oil.

Reporting system of incidents to ships causing pollution or threat of pollution.

Identification of particularly sensitive sea areas.

Etc...
The role of IMO in assisting Developing Countries

One of the principal functions of IMO is to provide technical assistance to developing countries.

In the field of marine environment protection, technical assistance programmes cover such areas as:

Advisory services
Fellowships
Seminars, workshops and training courses
Meeting of government experts
Preparation of manuals and training materials

Drafting of national laws and regulations to give effect to the conventions
Administrative arrangements required for survey, certification and enforcements of conventions
Establishment of system for the discharge of oil in contravention of convention and procedures for subsequent legal action

Advice on the capacity and type of reception facilities for oily wastes required for the implementation of pollution conventions
Advice on the types and quantities of oil combating equipment and material, and the use of chemical dispersant
Preparation of national contingency plans

The advisory services are normally undertaken by inter-regional advisers and consultants

An adviser on marine pollution works at IMO headquarters (London)
A regional adviser for Latin America stationed in Santiago (CHILI)
A consultant on marine pollution for Wider Caribbean is in Porto Rico
A regional consultant on marine pollution for Central America is stationed in Panama.
Reunions and symposia are an effective mean for promoting the implementation of convention

IMO has already organized many technical seminars, symposia, workshops and training courses e.g:

Acapulco Symposium on marine environment 1976

Seminar (regional) on tanker safety and pollution prevention BRAZIL 1980

Seminar (national) on marine pollution prevention control and response THAILAND 1981

Seminar on tanker safety and pollution prevention (regional) KENYA 1981

Course on survey under Annex I of Marpol 73/78 (international) SWEDEN 1983

Symposium on marine pollution CHINA 1980

On-scene co-ordinators workshops GUAM 1982

Course on survey under Annex I of Marpol 73/78 (international) SWEDEN 1984

Seminar on reception facilities LONDON (IMO) 1984
The United Nations Environment Programme is the United Nations organization concerned with the protection of the environment. In the marine field, it encourages and supports the development and implementation of plans to prevent oil pollution. This involves promoting international and regional conventions and guidelines for assessing and monitoring the state of pollution, supporting training schemes and providing a focal point for the exchange of information. In the exercise of these functions, UNEP works in close co-operation with other United Nations agencies and non-governmental organizations.

Through its initiative, and with the support of interested governmental and non-governmental organizations, a number of regional plans have been elaborated and have been or are being established in many parts of the world. The idea behind these regional sea plans is to help states to protect their environment through a co-ordinated development of their resources.

The International Oil Pollution Compensation Fund came into force in 1978. It is based on the 1971 Fund Convention. IOPCF is financed by contributions from receivers of crude oil or heavy fuel oil within the territory of the contracting states in proportion to the quantities which have been carried by sea. The fund is administered by a secretariat, an executive Committee and an Assembly, the latter comprising representatives of all contracting states.

It applies only to clearance costs and not to preventative measures. It principal function is to provide additional compensation for clean up and for people who have suffered from oil pollution damage where the total exceed shipowners' legal liability under the Civil Liability Convention 1969 (CLC 69). Further, the IOPCF relieves shipowners of part of the financial burden imposed by the CLC 69.
PROTECTION AND INDEMNITY CLUBS ( P&I CLUBS )

Protection and Indemnity Clubs are mutual insurance associations for shipowners. Their function is to cover their members against third party liability which they may incur in the course of their operations and which would not be covered by ordinary hull and cargo insurance. The Clubs cover almost all the world’s ocean-going tanker fleet. Insurance is provided for a wide range of liabilities including liability for oil pollution.

The P&I Clubs have a common pool in which they reinsure their liability, thereby spreading the risk in case of a major disaster such as an oil spill.

OIL COMPANIES INTERNATIONAL MARINE FORUM ( OCIMF )

The oil Companies International Marine Forum is an association of oil companies transporting crude oil and oil products by sea including their loading and discharging. Essentially concerned with the safe conduct of these operations and the protection of the marine environment from pollution, it represents its membership before inter-governmental, governmental and other organizations. It sponsors and conducts important research programmes concerned with oil transport and terminals, and has made a substantial contribution to the improvement of tanker safety.

INTERNATIONAL PETROLEUM INDUSTRY ENVIRONMENTAL CONSERVATION ASSOCIATION ( IPIECA )

The International Petroleum Industry Environmental Conservation Association is an association of oil companies and related organizations. It function is to act as a focal point for communication and consultation between the petroleum industry and the United Nations Environment Programme and other governmental bodies on the impact of petroleum operations on the environment.
V-1-7 OIL COMPANIES INSTITUTE FOR MARINE POLLUTION COMPENSATION LIMITED CRISTAL

The Oil Companies Institute For Marine Pollution Compensation administers a pollution compensation arrangement known as CRISTAL (Contract Regarding An Interim Supplement to Tanker Liability for Oil Pollution). This is a voluntary agreement among oil companies which contribute to a central fund on the basis of crude and fuel oil received by them by tanker. CRISTAL supplements the compensation for pollution damage available under TOVALOP, the Civil Liability and national legislation. In broad terms, it is a voluntary counterpart of the IOPC Fund.

V-1-8 INTERNATIONAL TANKERS OWNERS POLLUTION FEDERATION LIMITED

The International Tanker Owners Pollution Federation is an association of tanker owners who between them own almost all the world's tankers. Its' functions are to administer TOVALOP (Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution) to provide consultancy services on contingency planning; to provide technical advice on oil spills, to conduct post-spills surveys and to maintain a comprehensive information service on oil pollution. Its' most important activity today is to provide emergency advice at the scene of oil spills. In view of its' wide experience, ITOPF is recognised as a leading centre of expertise in this field.

V-1-9 INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES

This is an organization of classification societies recognised by most governments. The organization contributes and plays a major role on aspects related to safety of ships and marine pollution prevention.
V-1-10 Oil Industry International Exploration and Production Forum

The Oil Industry International Exploration and Production Forum is an Association of Oil companies having an interest in offshore oil exploration and production. With a strong commitment to the protection of the environment and the promotion of safety it represents its membership before inter-governmental, governmental and other organizations on all aspects relating to exploration and drilling for crude oil and natural gas as well as their production, treatment, storage and pipeline transport.

V-1-11 International Association of Drilling Contractors

The International Association of Drilling Contractors is primarily concerned with the interests of worldwide drilling contractors engaged in both onshore and offshore operations. In addition to drilling contractors, its membership includes oil and gas producing companies and manufacturers of machinery and equipment. It makes a significant input to the work of inter-governmental, governmental and other industry organizations on drilling matters. Concerned with the protection of the marine environment and the promotion of safety, it sponsors a number of educational programmes on the prevention of blowouts and general training of those involved in the drilling field.

V-1-12 Offshore Pollution Liability Association Limited

The Offshore Pollution Liability Association Limited is responsible for the administration of the Offshore Pollution Liability Agreement. This is an oil industry voluntary agreement under which operators active in exploration and production accept strict liability for pollution damage and costs of remedial measures. Parties to the agreement guarantee that in event of individual default, claims arising from an incident will be met. Originally concerned only with oil spills occurring in the United Kingdom offshore production sector it applies now to countries in North Western Europe where offshore operations take place.
INTERNATIONAL CHAMBER OF SHIPPING

The International Chamber of Shipping is an organisation of national shipowners' associations. Its members represent some two thirds of the world's merchant tonnage. The main aim of ICS is to promote the interests of its members by providing a forum for the discussion of matters of mutual concern, by seeking to co-ordinate members' views, and by representing those views nationally and internationally. The governing body of ICS is the full membership, which meets annually. The general running of affairs between Annual meetings is conducted by an elected Executive Committee. The work of ICS is carried out by its specialist committees whose one deals with Marine Pollution.

INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS

The International Association of Independent Tanker Owners is a unique body, in that it is concerned solely with tankers and combined carriers and only independent tanker owners are eligible for membership. INTERTANKO is campaigning for improved safety and pollution control; thus, it is actively in market tanker, safety and cleaner seas. INTERTANKO has stressed the problem of lack of shore reception for oily wastes, promoted further ratification of MARPOL, particularly by the oil exporting--and ensured a fair division of liability for oil pollution compensation between cargo and shipowning interests.
States within specific regions have recognized that the work of international organizations dealing with marine environment is very important and useful but they felt that the best approach to really tackle the threat of marine environment pollution is to be organized and draw Action Plans in taking into account recommendations of these organizations.

V-2-1 Regional Organization for the Protection of Marine Environment (KUWAIT)

The function of this organization is to assure the effective implementation of the Kuwait Regional Convention for the protection of the marine environment to achieve the objectives of the development and environmental component of the Action Plan which aims to achieve the following:

- Assessment of the state of the environment including socio-economic development activities and of the needs of the region in order to assist governments to cope properly with environmental problems.

- Development of guidelines for the management of those which have an impact on the environment.

- Development of legal instruments providing the legal basis for co-operative efforts to protect and develop the Region.
The organization has been established by the following contracting States in Kuwait:

BAHRAIN
IRAN
IRAQ
KUWAIT
OMAN
QATAR
SAUDI ARABIA
UNITED ARAB EMIRATES

The organization consists of the following organs:

A Council

A Secretariat

A Judicial Commission for the Settlement of disputes

The Organization through the Council supervises the activities of the Marine Emergency Mutual Aid Centre established as provided in Article III of the Protocol concerning Regional co-operation in combating pollution by oil and other harmful substances in cases of emergency.

The objectives of the Centre shall be (Article III-2):

To strengthen the capacities of the contracting states and to facilitate co-operation among them in order to combat pollution by oil and other harmful substances in cases of marine emergencies.
To assist contracting States, which so request, in the development of their own national capabilities to combat pollution by oil and other harmful substances and to co-ordinate and facilitate information exchange, technological co-operation and training.

To initiate operations to combat pollution by oil and other harmful substances at the regional level (Possibility)

The functions of the centre (Article III-3) shall be:

- To collect and disseminate to the contracting States information.

- To assist the contracting States (Laws, procedures, Preparation of contingency plans etc...)

- To develop and maintain a communication/information system

- To prepare inventories of the available personnel, material and other equipments for marine emergency response

- To establish and maintain liaison with competent regional and international organizations for the purposes of obtaining and exchanging scientific and technological information and data.

- To prepare periodic reports on marine emergencies.

The marine Emergency Mutual Aid Centre is located in BAHRAIN
Action plans are established to help States within specific regions to protect their environment communally.

Action plans exist for the following regions:

Mediterranean
West and Central Africa
Wider Carribean
Kuwait
Red Sea - Gulf of Aden
East Asian seas
South East Pacific
East Africa
South West Atlantic
South West Pacific

These action plans are sustained by the United Nations Environment Programme (UNEP).

The MEMORANDUM of UNDERSTANDING on PORT STATE CONTROL
(Paris Memorandum)

It is a sort of action plan signed in Paris on 26 January 1982 by 14 European states with the aim of harmonizing procedures and guidelines for the control of ships entering their ports in order to permit them to exercise better actions on sub-standard ships and therefore lead to reduce the threat of pollution.

States concerned are: Belgium, Denmark, Finland, France, Germany (west), Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom of Great Britain and Northern Ireland.

Took effect on 1 July 1982
Pollution while occurring in any State may cause serious damages if there are no existing structures able to lead the operations; taking into consideration that fact some countries have established technical bodies to deal with the prevention and control (fighting) of pollution; therefore I would like to present what it has been done in such countries as NORWAY, GREAT BRITAIN and GABON.

NORWAY

The Governmental Action Control Group is in the first place the person responsible when an accident or a disaster occurs.

One of the main objectives of the Governmental Action Control Group (GACG) is to meet the need for a single body which incorporates all public institutions involved if a major oil pollution occurs.

The need for such body has been recognized as obvious.

Any action initiated by one authority may well affect the interests and activities of another authority therefore the measures must be coordinated.

In addition to the need for coordination in the event of serious accidents there is also a need for a body with extensive powers so that any necessary measures can be initiated quickly without delay due to formalities.
The Governmental Action Control Group consists of:

- The State Pollution Control Authority (Chairman)
- The Petroleum Directorate
- The Maritime Directorate
- The Defence
- The Chief of Police in Stavanger, in the event of accidents South of Latitude 85° N

According to Paragraphs 9 to 13 of the Royal Decree of 19 November 1982, the main duties of the GACG is:

To maintain and if necessary coordinate the measures initiated by the various expert agencies and those responsible for the accident.

To advise the different expert agencies.

To serve as a channel of contact between the responsible for accident and the Ministry.

To pass information from experts.

To provide additional resources to the polluter for the accident over and above those at the disposal of the expert agencies.
In peacetime the steering guidelines for the Activity of the GACG is to:

- Influence both the private and governmental agencies to improve their preparedness to combat accidents.
- Strengthen governmental control in the efficient handling of accidents.
- Be prepared to take over any operative command function

The Petroleum Directorate, the Maritime Directorate or the State Pollution Control Group may demand that the GACG is convened in the case of any accident which causes or can cause serious oil pollution damage at sea. It, if the circumstances so dictate, takes over command of the whole or parts of the operation. If the Governmental Action Control Group does assume command of an operation it has to be for one of the following reasons:

- The responsible for the accident is himself incapable of directing the operation.
- It is impossible to determine who is actually responsible

The GACG has three main areas of interface with:

- The government and other relevant expert Authorities
- The operating companies and shipowners
- The Mass Media
The Governmental Action Control Group is the body whose function is to make sure that the actions initiated comply with Norwegian national interests.

The GACG through meeting and exercises meet the other parties responsible for preparedness and discuss their emergency plan. It has to prepare the cooperation between different parties responsible for undertaking actions. It meets 4 to 6 times per year.

Distribution of responsibility between the different Authorities.

1- Petroleum Directorate

The Petroleum Directorate is responsible for ensuring that the necessary measures are implemented on installations on the Continental Shelf and has the right to issue instructions in pursuance of the legislation relating to the continental shelf, and associated regulations.

2- The Maritime Directorate

The maritime Directorate is responsible for ensuring that action is taken and has the right to issue instructions in pursuance of the regulations and in accordance with the Oil Pollution Act and the Intervention Convention, with regard to:

- Stop or limit discharges from ships
- Reduce the danger of fire and explosion on board ships
- The measurements of gas on board and in the vicinity of ships
- The implementation of emergency off-loading and transfer of ships to an emergency port or beaching place
3- The State Pollution Control Authority

The state Pollution Control Authority is responsible for ensuring that the necessary action is taken and it has the right to issue instructions in pursuance of the legislation relating to the Continental shelf, the Pollution Control Act and the Intervention Convention with regard to:

- The limitation, collect and removal of oil.

The State Pollution Control Authority exercises the function of Secretariat for the GAGG and it is responsible for the Action Centre.

4- The main Rescue Stations

There are two main Rescue Coordination Centres - at Sola and Bodo. Each is responsible for its own sea area. These stations direct and coordinate rescue operation.
In the United Kingdom, the Department of Trade Marine Division, which is basically a ship survey and coastguard organization, is responsible for oil spill operations at sea. With regard to casualty responses, the Department has powers of intervention if there is a clear and imminent threat of pollution to UK coastal waters and beaches, and if in the view of the Department appropriate action is not put in hand by owners and their agents.

The Department of Trade has set up a specialist Unit known as the Marine Pollution Control Unit.

The Marine Pollution Control Unit consists of a London-based staff plus Marine Pollution Control Officers located on the coast. The Marine Pollution Control Unit relies on two major sub-units of the Department of Trade, viz. Her Majesty's Coastguard and the Marine Survey Service.

The COASTGUARD maintains a 24-hour watch and has responsibilities for search and rescue. It is organized on the basis of 6 regions, each under a Regional Controller, and operates on the coast from Marine Rescue Coordinating Centres or Marine Rescue subcentres.

The Marine Survey Service is responsible for the safe operation of ships using British ports; it is organized in districts, each under a Principal Officer, and operates from Marine Offices.
Marine oil spills are reported to Coastguard by civil and naval vessels, civil and military aircraft and others. On receiving reports and having due regard to its overriding responsibility for Search and Rescue, the Coastguard will:

- Make an initial assessment of Marine Pollution threat

- Report to Marine Pollution Control Unit (MPCU)

- In the event of a marine casualty commit preplanned first line Counter-Pollution resources according to established criteria if contact cannot be made with MPCU within 15 mn

- Assume local command of operation on the coast

- In the event of an operational discharge incident, continue to monitor and assess reports and to obtain any available information on the identity of suspects but not to mount any counter pollution response unless directed to do so by department of MPCU.

The Marine Pollution Control Officers have been placed under the local administration of the Marine Survey Principal Officers, but they are responsible to the Director of MPCU for all counter-pollution matters. They are considered to be the local MPCU counter-pollution experts in respect of response to oil on the sea.

Although Department of Trade takes the lead in response to pollution and the threat of oil pollution associated with shipping incidents, other Department or Organizations are involved.
The Department of the Environment coordinates the activities of local authorities in respect of inshore water and beaches clearance.

The Department of Energy has the lead role in respect of actions taken to stop the release of oil from offshore oil installations.

The Warren Spring Laboratory of the Department of Industry will be available as required to supply to MPCU advice, resources and personnel in the event of an emergency.

The Ministry of Defence will assist in every way possible within its own framework of priorities.

The Nature Conservancy Council provides advice to MPCU on the impact of oil add/ or dispersants on flora and fauna and other matters.
The gabonese coast is 800. Km long and particularly low. The principal winds are South West and along the coast the current of Benguela is orientated North.

The risk of pollution is largely potential in Gabon due to many factors:

- Important tankers routes not far from the coast.
- Existence of loading and discharging ports and loading terminals for tankers.
- Existence of an offshore oil exploration and exploitation industry.

The hydrological and meteorological conditions stated above tend to orientate the oil slick towards the coast.

The body responsible for dealing with the problem of pollution of the Environment in general is a Ministry: until last year (1984) it was the ministry of "Enseignement Superieur, de la Recherche Scientifique, de l'Environnement et de la Protection de la Nature. Since that time it is now the ministry of the Environment.

The general directorate of Environment created in 1981 has for tasks to give advice to the Minister concerning the elaboration of a national environmental policy moreover it has to issue regulations for the protection of environment and assure the organization of symposia or other meetings; it participates to international meetings organized by the United Nations Environment Programme (UNEP).

The ANTI-POLLUTION NATIONAL CENTRE is a special structure under the supervision of the Ministry of Environment; it was created by Decree on 9 April 1977.
It has principally for tasks to carry out researches and studies towards the prevention of pollution and to evaluate the impact of the pollution while occurring moreover it has to list the suitable response equipments. It assure the diffusion of information as regard the environmental situation of the country.

The Centre is a pure scientific structure.

Other Ministries are concerned with the problem of pollution; thus, the Ministry of Merchant Marine which was created in January 1982 deals with all matters regarding shipping including pollution from ships. It issues regulations in conformity with the provisions of international conventions concerning pollution from ships and it has in charge the supervision of their effective implementation and the survey and inspection of ships and all matters relating to ship. It represents the Country to International Maritime Organization besides a permanent representative has been appointed to this organization.

The Ministry of Defence is the supplier of equipments and personnel for response in case of important pollution, it will have the charge to carry out the different operations required.

The prevention and Control of pollution is considered in Gabon as having priority; a National Colloquium on the environment was organized in Makokou from 4 to 9 May 1981.

The presidential Decree N°00360/PR/MESRSEPN 9 April 1981 has instituted a National Day of the Environment: every year on 5 June. It has also been instituted in June 1984:

A National Day of the Sea (To be celebrated the fourth Sunday of September every year.
REFERENCES:

1- Assurance Foreningen Skuld (OSLO 1983)
   Marine Pollution

2- The Governmental Action Control Group.
   EMO Conference 83 1 June 1983
   Stavanger (Norway)
   Lecture by Nils Petter WEDEGE

3- The International Oil Pollution Compensation Fund
   and its activities -
   Dr GANTEN. (Director)

4- Final Act of the Kuwait Regional Conference
   1978 UNEP
CHAPTER VI
MEASURES TAKEN TOWARDS THE PREVENTION OF POLLUTION

The work of international bodies relating to the prevention and control of marine pollution culminates in the formulation of international conventions and similar multilateral instruments, codes of practice, recommendations to governments and other guidelines or manuals. Some conventions contain technical requirements concerning ships and dispositions relating to Reception Facilities.

VI-1- INTERNATIONAL and REGIONAL CONVENTIONS

VI-1-1 International Conventions

VI-1-1-1 The International Convention For the Prevention of Pollution of the SEA by Oil. (OILPOL 54)

The first major step towards the international control of marine pollution was taken in 1954 when a conference held in London adopted the International Convention for the Prevention of Pollution of the sea by oil.

The principal object of OILPOL was the protection of the seas from oil pollution. OILPOL 54 was amended in 1962 and 1969 (In force) and also in 1971 but the amendments are not in force; the convention consists of 21 articles and one annex which gives the form of the oil record book. Technical requirements are all given in the articles. OILPOL applies to ships registered in any of the territories of a contracting party and to unregistered ships having the nationality of a contracting party.
The convention applies to Tanker of 150 tons gross tonnage or more and other ships of 500 tons gross tonnage or above except ships in whaling industry, naval ships, ships navigating the Great Lakes of North America

OILPOL prescribes prohibited zones, extending to at least 50 miles from the nearest land, within which the discharge of oil or oily mixture is prohibited.
The discharge at sea of oil or oily mixture is prohibited except when the following conditions are all satisfied:
For a ship other than a tanker:
The ship is proceeding en route;
the instantaneous rate of discharge of oil content does not exceed 60 litres per mile;
the oil content of the discharge is less than 100 parts per 1,000,000 parts of mixture;
the discharge is made as far as practicable from land.

For a tanker:
The tanker is proceeding en route;
the instantaneous rate of discharge of oil content does not exceed 60 litres per mile;
the total quantity of oil discharged on a ballast voyage does not exceed 1/15,000 of the total carrying capacity;
the tanker is more than 50 miles from the nearest land.

However, the discharge of oil or oily mixture from a ship is permitted when it is for the purpose of securing the safety of a ship, preventing damage to a ship or cargo, or saving life at sea

In the convention, the following terms are determined as:
Oil: Crude oil, fuel oil, heavy diesel oil and lubricating oil.

Heavy diesel oil: Diesel oil other than those distillate of which more than 50 per cent by volume distils at a temperature not exceeding 340° C.

When tested by A.S.T.M Standard Method D 86/59
Oily mixture: A mixture which any oil content

The convention requires contracting parties to take all appropriate steps to promote the provisions of reception facilities. Every ship has to carry on board an oil record book of specified form and to record such operations as ballasting, deballasting and cleaning of cargo and fuel oil tanks, discharge of oily residues; it also provides for inspection of the oil record book by the officials concerned with controlling the observance of the convention. Each contracting party shall determine in its territory which are the ports and oil terminal (loading) suitable to be provided with reception facilities.

In 1971, further amendments were adopted which afforded more protection to the Great Barrier Reef of Australia and also limited the size of tanks in oil tankers but these amendments are not yet in force.

Far reaching developments in modern industrial practices have introduced the need for further action on a much larger scale and the enormous growth in the maritime transport of oil and the size of tankers and also disasters such as the Torrey Canyon disaster (1967) made the OILPOL 54 as amended 62-69 no longer adequate therefore the international conference held in London in October 1973 adopted a new convention.

VI-1-1-2 International convention for the Prevention of Pollution from ships 1973 (MARPOL)

The international convention for the prevention of pollution from ships adopted in October 1973 came into force on 2 October 1983 to replace OILPOL convention.

The new convention covers all technical aspects of pollution from ships, except disposal of land generated wastes into the sea by dumping.
The convention applies to ships of all types including hydrofoil boats, air-cushion vehicles, submersibles, floating crafts and fixed or floating platforms operating in the marine environment. The convention does not however apply to pollution directly arising out of the exploration and exploitation of sea bed mineral resources.

MARPOL consists of articles, two protocols dealing respectively with reports on incidents involving Harmful substances and Arbitration, and five different annexes which contain regulations for the prevention of:

ANNEX I POLLUTION BY OIL
ANNEX II POLLUTION BY NOXIOUS LIQUID SUBSTANCES CARRIED IN BULK
ANNEX III POLLUTION BY HARMFUL SUBSTANCES CARRIED BY BULK IN PACKAGED FORMS, OR IN FREIGHT CONTAINERS, PORTABLE TANKS OR ROAD AND RAIL TANK WAGONS
ANNEX IV POLLUTION BY SEWAGE FROM SHIPS
ANNEX V POLLUTION BY GARBAGE FROM SHIPS

Annexes I and II are mandatory whereas Annexes III, IV and V are optional.
States ratifying or acceding to the convention must therefore give effect to the provisions of Annex I and Annex II while it will be in force and may opt out any of Annexes III, IV and V.

In March 1977, the United States, after a series of tanker accidents in or near United States coastal waters during the 1976–1977 winter requested IMCO now IMO to take international action to improve tanker safety and pollution prevention in order to strengthen the SOLAS 74 and MARPOL 73 convention and to provide more effective regulatory regimes for oil tankers.
In February 1978, the international Conference on Tanker Safety and Pollution Prevention (TSPP) was convened. The TSPP Conference adopted two instruments commonly referred to as the Solas Protocol and Marpol Protocol, the latter has been merged in Marpol Convention with the result that the two become one instrument for ratification purposes.

Marpol 73/78 applies to all ships entitled to fly the flag of a party to the convention and ships not entitled to fly the flag of a party but which operate under the Authority of a party.

ANNEX I  Pollution by oil (Prevention)

Oil means petroleum in any forms including crude oil, fuel oil, sludge, oil refuse and refined products (other than petrochemicals).

Oil fuel means any oil used as fuel in connexion with the propulsion and auxiliary machinery of the ship in which such oil is carried.

A new and important feature of Marpol 73/78 is the concept of special areas. These specified areas are seas which are considered to be particularly vulnerable to pollution and which need special mandatory methods for being prevented from pollution thus oil discharges have been completely prohibited with minor and well defined exceptions.

The special areas recognized by the convention (Regulation 10) are:

BALTIC SEA
BLACK SEA
THE "GULFS"
THE MEDITERRANEAN SEA
THE RED SEA

In these areas discharge, as it is said above, of oil from ships is prohibited.
For the purposes of the convention a distinction is made between ships;
There are: New ships, existing ships and new oil tanker.

<table>
<thead>
<tr>
<th>New ship</th>
<th>New oil tanker</th>
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<tbody>
<tr>
<td>Building contract: after 31/12/75</td>
<td>after 1/06/79</td>
</tr>
<tr>
<td>Keel laid: after 30/06/76</td>
<td>after 1/01/80</td>
</tr>
<tr>
<td>The delivery: after 31/12/79</td>
<td>after 1/06/82</td>
</tr>
</tbody>
</table>

With a major conversion

| Rebuilding contract: after 31/12/75 | after 1/06/79 |
| Construction work begun: after 30/06/76 | after 1/01/80 |
| Completed: after 31/12/79 | after 1/06/82 |

Existing ships or oil tankers are ships or oil tankers which are not new ships or new oil tankers.

Crude oil tanker means an oil tanker engaged in the trade of carrying crude oil.

Product carrier means an oil tanker engaged in the trade of carrying oil other than crude oil.

Marpol 73/78 maintains substantially similar discharge criteria to those specified in Oilpol for the tankers:
regulation 9 states: Any discharge into the sea of oil or oily mixtures from oil tanker shall be prohibited except when all the following conditions are satisfied:
The tanker is not within a special area; the tanker is more than 50 nautical miles from the nearest land; the tanker is proceeding en route; the instantaneous rate of discharge of oil content does not exceed 60 litres per nautical mile; the total quantity of oil discharged into the sea does not exceed for existing tankers 1/15,000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers 1/30,000 of the total quantity of the particular cargo of which the residue formed a part the tanker has in operation an oil discharge monitoring and control system and a slop tank arrangement.

For a ship of 400 tons gross tonnage and above other than an oil tanker and from machinery space bilge water excluding cargo pump room bilges of an oil tanker unless mixed with oil containing any discharge into the sea shall be prohibited except when the following conditions are satisfied:

- The ship is not within a special area
- The ship is more than 12 nautical miles from the nearest land
- The ship is proceeding en route
- The oil content of the effluent is less than 100 parts per million
- The ship has in operation and oil discharge monitoring and control system, oily water separating equipment, oil filtering system or other installations required

In the case of a ship of less than 400 tons gross tonnage other than oil tanker whilst outside Special area she has to be equipped as far as practicable and reasonable with installations to ensure the storage of oil residues on board and their discharge to reception facilities or into the sea.

The provisions concerning the control of discharge of oil does not apply to the discharge of clean or segregated ballast and the provisions concerning the discharge from ships of 400 tons gross tonnage and above other than an oil tanker does not apply to the discharge of oily mixture which without dilution has an oil content not exceeding 15 parts per million
However, a ship while operating in the sea even in a special area can discharge oil or oily mixture when:

The discharge is necessary for the purpose of securing the safety of a ship or saving the life at sea.

The discharge of substances containing oil approved by the Administration are utilized for the purpose of combating specific pollution incidents in order to minimize the damage from pollution.

Marpol 73/78 has introduced certain requirements for the construction and equipment of ships with respect to the prevention of operational discharges of oil and the mitigation of uncontrolled release of oil. The main features of constructional requirements introduced by the convention are the following:

SBT : Segregated ballast tank

CBT : Dedicated clean ballast tank

COW : Crude oil washing system

IGS : Inert gas system (It is a requirement contained in Protocol 78 of Solas 74 and must be fitted with COW)

PL : Protective location of SBT

OILY WATER SEPARATORS EQUIPMENT

OIL DISCHARGE MONITORING and CONTROL SYSTEMS
SBT are tanks which are reserved exclusively for the carriage of ballast water.

COW: On existing ships certain cargo tanks can be reserved solely for the carriage of water ballast. This system is only a temporary solution.

COW: It is a system whereby Crude oil, instead of water, is used to wash the residues left clinging to the tanks’ walls after the discharge of cargo oil.

IGS: It is a system to reduce the oxygen content of the atmosphere in a cargo tanks during and after discharge of cargo oil in order to eliminate the risk of explosion.

PL: It is the requirement that SBT must be arranged in such locations as to provide protection of cargo tanks against rupture in the event of grounding or collision.

SLOP TANK: Means a tank specifically designated for the collection of tank drainings, tank washing and other oily mixtures.

More explanatory details as concern these technical requirements will be given further.
Ships have to be provided respectively with:

SBT New oil tankers of 20,000 DWT and above
New product carrier of 30,000 DWT and above

COW New crude oil tanker of 20,000 DWT and above

SBT or COW Existing crude oil tanker of 40,000 DWT and above

CBT Existing crude oil tankers of 70,000 DWT and above
until October 1985
Crude oil tankers of 40,000 DWT and above but below 70,000 DWT until October 1987

SBT or CBT Existing product carriers of 40,000 DWT and above

PL New crude oil tanker of 20,000 DWT and above
New product carrier of 30,000 DWT and above

SLOP TANK Oil tanker of 150 tons gross tonnage and above
New oil tankers of 70,000 DWT and above (Two slop tanks at least)

OILY WATER SEPARATING EQUIPMENT
or FILTERING SYSTEM Any ship of 400 tons gross tonnage and above

OIL DISCHARGE MONITORING AND CONTROL SYSTEM Any ship of 10,000 tons gross tonnage and above
Any oil tanker which is not required to be provided with segregated ballast tanks in accordance with regulation 13 of Marpol 73/78 concerning segregated ballast tanks, dedicated clean ballast tanks and crude oil washing may however be qualified as a segregated tanker.

An oil tanker operating with dedicated clean ballast tanks has to be fitted with adequate tank capacity and be equipped with an oil content metre and provided with a dedicated clean ballast tank operation Manual.

Except as provided in paragraph (2) of regulation 14 (Segregation of oil and water ballast and carriage of oil in Forepeak tanks), in new ships of 4,000 tons gross tonnage and above other than oil tankers and in new oil tankers of 150 tons gross tonnage and above, no ballast water shall be carried in any fuel tank.

Oil tanker of 150 tons gross tonnage shall be provided with a Slop Tank but new oil tankers of 70,000 tons deadweight and above with at least two slop tanks with the capacity necessary to retain the slops generated by tank washing oil residues and dirty ballast residues.

Any ship of 400 tons gross tonnage and above shall be fitted with an oily water separating equipment or filtering system but for ships of 10,000 tons gross tonnage in addition they must have an oil discharge monitoring and control system For existing ships these requirements shall apply from 1986.

Tanks for oily residues (sludges) must be provided in ship of 400 tons gross tonnage and above having to receive oily residue.

In new ships, such tanks shall be designed and constructed so as to facilitate their cleaning and the discharge of residues to reception facilities.
Every oil tanker of 150 tons gross tonnage and above and every ship of 400 tons gross tonnage and above other than an oil tanker shall be provided with an Oil Record Book.

According to the regulation 12 (Reception Facilities), reception facilities shall be installed:
- In all ports and terminals in which crude oil is loaded into oil tankers where such tankers have immediately prior to arrival completed a ballast voyage of not more than 72 hours or not more than 1,200 nautical miles.
- In all ports or terminals in which oil other than crude oil in bulk is loaded at an average quantity of more than 1,000 metric tons per day.
- In ports having ship repair yards or tank cleaning facilities
- In all ports in respect of oily bilge waters and other residues which cannot be discharged at sea
- In all ports and terminals which handle ships provided with the sludge tanks
- In all loading ports of bulk cargoes in respect of oil residues from combination carriers which cannot be discharged at sea.

With the aim of reducing the consequence of pollution, this annex I contains dispositions which limit the size and arrangement of cargo tanks and criteria concerning subdivision and stability.

Moreover the regulation 21 of this annex I (Special requirements for Drilling Rigs and other Platforms) provide that fixed and floating drilling rigs when engaged in the exploration, exploitation and associated offshore processing of sea bed mineral resources and other platforms shall comply with the requirements of the dispositions relating to ships of 400 tons gross tonnage and above other than oil tankers, except that:
They shall be equipped as far as practicable with the installations required in regulation 16 (Oil Discharge Monitoring and Control System and Oily-Water separating Equipment) and in regulation 17 (Tanks for Oil Residues -Sludges-)

They shall keep a record of all operations involving oil or oily mixture discharges, in a form approved by the Administration.

In any special areas, the discharge into the sea of oil or oily mixture shall be prohibited except when the oil content of the discharge without dilution does not exceed 15 parts per million.

The first set of amendments to Annex I has been adopted by IMO’s Marine Environment Protection Committee, 20th Session in 1984; these amendments are intended not only to result in an improvement in the existing provisions but also to provide a practical solution to the problems involved in the implementation of the Annex I.

The main points of the amendments are as follows:

Regulation 10 - Method for prevention of oil pollution from ships while operating in special Areas

The amendments introduce requirements for oily water separating equipment and a device to stop discharge automatically once the oil content of the mixtures being discharged exceed 15 ppm.
Regulation 13 - Segregated Ballast Tanks, Dedicated Clean ballast tanks and Crude oil washing

Changes have been made to the section which deals with the carriage of ballast water in cargo tanks.

Regulation 14 - Segregation of Oil and Water Ballast and Carriage of Oil in Forepeak Tanks

The amendments ban the carriage of oil in the forepeak tank or a tank forward of the collision bulkhead in new tankers.

Regulation 20 - Oil Record Book

The format of the existing Oil Record Book is changed. Non tankers will have to carry an Oil Record Book Part I (Machinery Space Operations). Tankers will additionally have to carry Part II (Cargo/Ballast Operations). The amendments give details of the various operations which have to be recorded.

Regulation 21 - Special Requirements for Drilling Rigs and other Platforms.

Outside Special Areas and more than 12 nautical miles from land the discharge into the sea of oily mixtures is banned when the oil content reaches 100 ppm or more (within these areas the limit is 15 ppm)

Regulation 22 - Damage assumptions
This regulation is intended to ensure that tankers can survive assume side or bottom is damaged to an extent which is specific on the basis of the ship's length.

The Amendments are expected to enter into force on 7 January 1986.

ANNEX II  CONTROL OF POLLUTION BY NOXIOUS LIQUID SUBSTANCES IN BULK

This Annex sets out detailed requirements for the discharge criteria and measures for control of pollution by Noxious liquid substances carried in bulk. Noxious liquid substances are divided into four categories (Appendix I) depending upon their hazard to marine resources, human health and other legitimate use of the oceans.

CATEGORY A: Substances which are liable to produce a hazard to aquatic life or human health; or which are highly or moderately toxic to aquatic life; justifying the application of stringent anti-pollution measures.

CATEGORY B: Substances which are liable to produce tainting of the sea food; or which are moderately or slightly toxic to aquatic life; requiring special anti-pollution measures.

CATEGORY C: Substances which are slightly or non-toxic to aquatic life; requiring special operational measures.
CATEGORY D: Substances which are practically non-toxic to aquatic life but present a recognizable hazard to either marine resources or human health or cause minimal harm to amenities and other legitimate uses of the sea and therefore require some attention in operational conditions.

The list of Noxious Liquid Substances carried in bulk is given in the Annex.

The discharge criteria for Noxious liquid substances are determined in relation to the categories of substances. In any case no discharge of residues containing noxious substances is permitted within 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

Special areas in which strict restrictions are applied for the discharge of noxious liquid substances are:

The Baltic Sea
The Black Sea

The discharge into the sea of substances in Category A, B, C and D outside Special Areas shall be prohibited except when all the following conditions are satisfied:

The ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self propelled;

the discharge is made below the waterline, taking into account the location of the seawater intakes;

the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.
In addition for Category B:

The procedures and arrangements for discharge are approved by the Administration.
The concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million.

The maximum quantity of cargo discharged from each tank and its piping system does not exceed the greater of 1 cubic metre or 1/3,000 of the tank capacity in cubic metres.

In addition for Category C:

The procedures and arrangements for discharge are approved by the Administration.
The concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 10 parts per million.

The maximum quantity of cargo discharged from each tank and its piping system does not exceed the greater of 3 cubic metres or 1/1,000 of the tank capacity in cubic metres.

In addition for Category D:

Mixtures are of a concentration not greater than one part of the substance in ten parts of water.
The discharge into the sea within special areas of substances in Category A, B, C and D shall be prohibited except when all the conditions as stated above and concerning the discharge outside special areas are satisfied and in addition for:

Category B: The tank has been washed after unloading with a volume of water of not less than 0.5 per cent of the total volume of the tank, and the resulting residues have been discharged to a reception facility until the tank is empty.

The concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million.

Category C: The concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million.

The maximum quantity of cargo discharged from each tank and its piping system does not exceed the greater of 1 cubic metre or 1/3,000 of the tank capacity in cubic metres.

However the discharge criteria shall not apply to:

The discharge for the purpose of securing the safety of ship or saving life at sea.
The discharge resulting from damage to ship or its equipment

The discharge when being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution.
Any such discharge shall be subject to the approval of any government in whose jurisdiction it is contemplated the discharge will occur.

With regard to construction and equipment, all Chemical Tankers are required to comply with all the provisions of the Code for Construction and Equipment of ships carrying dangerous chemicals in bulk (Bulk Chemical Code); this Code has now been superseded by the International Bulk Chemical Code (IBC Code) applicable to new chemical tankers.

ANNEX III
PREVENTION OF POLLUTION BY HARMFUL SUBSTANCES CARRIED BY SEA IN PACKAGED FORMS, OR IN FREIGHT CONTAINERS, PORTABLE TANKS OR ROAD AND RAIL TANK WAGONS:

Such carriage of harmful substances is prohibited except when the dispositions of this Annex concerning packaging, marking, and labelling, documentation, stowage, quantity limitations and other aspects are followed.

Packaging: It shall be adequate therefore packages shall be durably marked with the correct technical name and further marked with a distinctive label or stencil of label indicating that the contents are harmful
In all document the correct technical name shall be used. The shipping document shall include a Certificate or declaration certifying that the shipment is properly packed, named and labelled, and in proper condition.

Each ship carrying harmful substances has to be provided with a special or manifest setting forth the harmful substances on board and the location thereof; a detailed stowage plan may be used in place of such special list or manifest. Copies of such documents shall also be retained on shore by the owner of the ship or his representative until the substances are unloaded.

With respect to certain harmful substances, as may be designated by the government of a party to the convention, the master or the owner of the ship has the obligation to notify the appropriate port Authority of the intent to load or unload such substances at least 24 hours prior to such action.

Annex III as at 19 July 1984 has been ratified by 20 states which represents a percentage tonnage of 33.49 but the percentage tonnage required is 50 for the entry into force (Article 15 of Marpol)

ANNEX IV PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS

The aim of this annex is to regulate the discharge, at sea from ships, of sewage; it applies to:

- New ships of 200 tons gross tonnage and above.
- New ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons.
- New ships which do not have measured gross tonnage and are certified to carry more than 10 persons.
- Existing ships of 200 tons gross tonnage and above 10 years after the date of entry into force of this annex.
- Existing ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons, 10 years after the date of entry into force of this annex.

- Existing ships which do not have a measured gross tonnage and are certified to carry more than 10 persons, 10 years after the date of entry into force of this annex.

The discharge of Sewage into the sea is prohibited except when:

The ship is discharging comminuted and disinfected sewage using a system approved by the Administration and the discharge is made at a distance of more than 4 nautical miles from the nearest land, and for not comminuted and disinfected sewage at a distance of more than 12 nautical miles from the nearest land; the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is proceeding at not less than 4 knots and en route; the rate of discharge shall be approved by the Administration.

The ship has in operation an approved Sewage treatment plant which has been certified by the Administration.

The ship is situated in the waters under the jurisdiction of a State and is discharging sewage in accordance with such less stringent requirements as may be imposed by such State.

However, the regulations for the prevention of pollution by sewage from ships shall not apply to:

The discharge of sewage resulting from damage to a ship or its equipment.
The discharge of sewage from ship for the purpose of securing the safety of a ship and those on board or saving the life at sea

The government of each party to the convention undertakes to ensure the provision of facilities at ports and terminals for the reception of sewage.

As at 19 July 1984 Annex IV has been ratified by 19 states representing a percentage tonnage of 28.94

ANNEX V  PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS

The aim of this annex is to regulate the discharge of garbage at sea from ships, it applies to all ships.

The disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags is prohibited;

The disposal into the sea of the following garbage shall be made as far as practicable from the nearest land but in any case is prohibited if the distance from the nearest land is less than:

- 25 nautical miles for dunnage, lining and packing materials which will float.

- 12 nautical miles for food wastes and other garbage including paper products, rags, glass, metal, bottles, crockery and similar refuse.
Disposal into the sea of garbage may be permitted when it has passed through a comminuter or grinder and made as far as practicable from the nearest land but in any case is prohibited if the distance is less than 3 nautical miles.

Within special areas: Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea and the "Gulfs", the disposal of the following is prohibited:

All plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags.

All other garbage, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials.

However, the disposal of food wastes is permitted when it is made at a distance from land not less than 12 nautical miles.

As required in other Annexes, Reception Facilities shall be made available in ports and terminals for the reception of garbage.
International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties, 1969 

and 

Protocol relating to Intervention on the High Seas in cases of pollution by substances other than Oil, 1973

The scope of the Convention and Protocol comprises the area of the High Seas that is the area beyond the outer limit of the territorial sea or, if and when the Exclusive Economic Zone is generally recognized the area beyond it.

Parties may take such measures on the high seas as may be necessary to prevent, to mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil. The related interest include commercial fishing and tourist interests, the health of the coastal population and the conservation of living marine resources and of wild life.

The Protocol extends the Convention to cases of pollution by substances other than oil which are liable to cause serious damage.

Entry into force of the :

Convention : on 6 May 1975 
Protocol : on 30 March 1983
The purpose of CLC 69 is to provide uniform international rules and procedures for determining questions of liability and providing adequate compensation to persons who suffer damage caused by the escape or discharge of oil from ships.

Article 2 of the Convention provides that the Convention applies exclusively to pollution damage caused in the territory including the territorial sea of a contracting state and to preventive measures taken to prevent and minimize such damage. It should be noted however that the convention also covers damage caused in the area outside the territorial sea by preventive measures designed to prevent or minimize pollution damage inside the territorial sea.

The convention applies only to pollution caused by ships; a ship is a sea going vessel "actually carrying oil in bulk as cargo.

Damage caused by non persistent oil is not covered by CLC 69 therefore, spills of gasolene, light diesel oil, kerosene are not construed to be within the scope of CLC.

Damage caused by a spill of non persistent bunker oil or by a spill from a tanker during a ballast voyage is not regarded as being covered.

The Civil Liability Convention is based on five main principles:

- The convention is applicable when the territory( including the territorial sea ) of a contracting state is contaminated. This disposition has been extended to the exclusive economic zone (Diplomatic Conference April/ May 1984)
The liability is imposed only on the owner of the ship i.e. neither the servant or agents or other persons are liable under the convention.

The convention imposes strict liability upon the owner with only very few exceptions from liability.

The owner is entitled to limit his liability up to a certain amount if the incident has not occurred as a result of his personal actual fault or privity.

The owner has to insure his liability.

The Convention excludes damage caused by explosion or fire.

Entry into force: 19 June 1975
VI-1-1-5


The Fund Convention is supplementary to the Civil Liability Convention. Its main purpose is to ensure the availability of additional compensation in cases where the protection afforded by CLC 69 is inadequate.

The international oil pollution Fund (IOPC) is contributed to by companies in states parties to the convention who receive crude and fuel oil which have been carried by sea. Further, the IOPC Fund relieves shipowners of part of financial burden imposed by the Civil Liability Convention 1969.

Thus IOPC Fund pays additional compensation in respect of pollution including preventive measures taken to prevent or minimize such damage caused on the territory of a contracting state to the Fund Convention.

IOPC Fund is relieved of this obligation only if it proves that the damage resulted from an act of war or other hostilities or if the claimant can not prove that the damage resulted from an incident involving one or more ships.

The Fund pays to a shipowner who has been held liable under CLC 69 an certain amount fixed by the Fund for each ton of the ship’s tonnage.

But it is exonerated from its obligation to pay indemnification to the shipowner if it can prove that, as a result of the actual fault or privity of the owner the ship causing the incident did not comply with such international Conventions as:

- OILPOL 54/69
- SOLAS 74
- LOAD LINE 1966
- COLLISION Prevention 1972

Entry into force: 16 October 1978

The convention requires that every contracting state has to draw up regulations to prevent pollution of the seas by the discharge of oil from pipelines or resulting from the exploration and exploitation of the Seabed and its subsoil.

Entry into force  30 September 1962

VI-1-1-7  Geneva Convention On the Continental shelf

The Continental Shelf Convention embodies a number of rules designated to ensure safety of offshore operation and prevention of pollution. The coastal state shall undertake in the safety zones around shelf installations all appropriate measures for the protection of the living resources of the sea from harmful agents.

Entry into force  10 June 1954

VI-1-1-8  Convention On Civil Liability for Oil Pollution Damage resulting from exploration for exploitation of Seabed Mineral resources  1976.

The Convention applies to pollution damage resulting from an incident which occurred beyond the coastal low water line at an installation under the jurisdiction of a controlling state, it applies also to preventive measures whenever taken to prevent or minimize such pollution damage.
The operator of an installation is made liable for any pollution damage arising from an incident involving his installation. Liability is strict; to cover his liability the operator is required to carry insurance.

The Convention was mainly prepared by nine states: Belgium, Denmark, France, West Germany, Ireland, Netherlands, Norway, Sweden and the United Kingdom.

VI-1-1-9  Convention For the Prevention of Marine Pollution by Dumping from Ships and Aircraft -Oslo 1972

The Convention applies to the High Seas and the territorial seas which are situated within specified parts of the Atlantic and Arctic oceans and their dependent seas. North of 36°N, between 42°W and 51°E.

The pattern of control established by the Convention has four basic elements:

- A requirement that no substance or material may be dumped without the approval of the National Authorities

- No such approval may be given for specified highly hazardous substances which are listed in a so called "Black List"

- As regards other specified substances and materials requiring special care (Listed in a so called "Grey List") there is a requirement that significant quantities may be dumped only if the National Authorities have issued a permit having regard to specified precautionary requirements.
- Any contracting party shall establish a special Commission which has to be consulted while harmful substances cannot be disposed on land without unacceptable danger.

- Each contracting party shall keep and transmit to the Commission records of the nature and the quantities of the substances and materials dumped under permits or approvals issued by that contracting party, and of the dates, places and method of dumping.

Entry into force: on 7 April 1974

VI-1-1-10 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter -1972
(London Convention)

The London Convention is a global effect though, of course, only in relation to states parties. The pattern of control is similar to that established in the Oslo Convention for the North East Atlantic.

The Convention contains a general prohibition against dumping of any wastes or other matter in whatever form or condition except as otherwise specified.

There is a complete prohibition of the dumping of substances listed in a so called "black list".

The substances considered as highly hazardous are:
- Organohalogen compounds
- Mercury and Mercury compounds
- Cadmium and cadmium compounds
- Persistent plastic and other synthetic material
- High level radio-active wastes or other high level matter defined by the International Atomic Energy Agency as unsuitable for dumping at sea
- Material in whatever form (e.g. solids, liquids, semi-liquids, gases or in a living state) produced for biological and chemical warfare.

There is a second category of substances and material listed in a so-called "grey list" which require a special permit to be dumped at sea:

- Wastes containing significant amounts of matters listed below:
  Arsenic
  Lead
  Cooper
  Zinc
  Organosilicon compounds
  Fluorides
  Pesticides
  Acids

- In the issue of permits for the dumping of large quantities of Acids and Alkalis, consideration shall be given to the possible presence of the following additional substances:
  Barium
  Chromium
  Nickel

- Containers, scrap metal and other bulky wastes liable to sink to the sea bottom which may present a serious obstacle to fishing or navigation.

- Radioactive wastes or other matter not included in "black list."

Entry into force: 30 August 1975
VI-1-2 Regional Conventions and agreements

VI-1-2-1 Convention for the Prevention of Marine Pollution from Land based Sources 1974
    ( Paris Convention )

Through this regional instrument, states parties undertake to combat marine pollution from land based sources by adopting individually and jointly the measures prescribed in the convention.

In particular, the parties undertake to eliminate pollution by substances listed in "black list" and to limit strictly pollution by substances in "grey list".

Its geographical scope is:
    North of 36° N between 42 W and 51 E
    Except Baltic Sea and Mediterranean Sea.

VI-1-2-2 Convention On the Protection of the Environment between DENMARK, FINLAND,
    NORWAY and SWEDEN 1974
    ( Stockholm Convention )

The Convention provides for a system of co-operation for combating pollution of sea by Hydrocarbons.

Entry into force: 16 October 1971
VI-1-2-3  Convention on the Protection of the Marine Environment of the Baltic Sea Area  1974  (Helsinki Convention)

This convention covers the Baltic Area as the Baltic Sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance to the Baltic Sea; it does not include the internal waters of the contracting parties.

The fundamental obligations accepted by states parties is to:

- Counteract the introduction into the area of hazardous substances
- Control and minimize land based pollution
- Take measures to prevent pollution from ships and crafts
- Prevent or in some cases control dumping
- Take measures to prevent pollution of sea-bed and subsoil
- Co-operate with the other parties in the framework of the Commission established by the Convention

Entry into force: 3 May 1980
Convention for the Protection of the Mediterranean Sea against Pollution 1976
(Barcelona Convention)

This convention has for aim to protect the Mediterranean sea against various forms of pollution.

It is completed by Protocols:

- Protocol for the prevention of pollution of the Mediterranean sea by dumping from Ships and Aircraft 1976

- Protocol 2, Co-operation in combating pollution of the Mediterranean Sea by Oil and other Harmful substances in case of Emergency 1976

- Protocol 3, Protection of the Mediterranean Sea against pollution from Land based sources 1980

- Protocol 4, Mediterranean specially protected Area 1980

The Convention and Protocols 1 and 2 entered into force on 13 February 1978
VI-1-2-5  Kuwait Regional Convention for the Co-operation on the Protection of the Marine Environment from Pollution 1978 and Protocol concerning regional co-operation in combating pollution by oil and harmful substances in cases of emergency 1978

This Convention is broadly similar to the Barcelona Convention and it concerns only the following states:

BARHAIN, IRAN, IRAQ, KUWAIT, OMAN, QATAR, SAUDI ARABIA and UNITED ARAB EMIRATES.


The geographical coverage of the Convention is defined as the Marine Environment, Coastal zones and related Inland waters falling within the jurisdiction of the states of the west and central african region, from Mauritania to Namibia.

The convention and protocol are broadly similar to those adopted for the Mediterranean and Kuwait region.
VI-1-2-7 Convention for the Protection of the Marine Environment and Coastal Areas of the South Pacific (Lima Convention 1981)

   (Jeddah Convention February 1982)

VI-1-2-9 Agreement on Regional co-operation in combating Pollution of the South East Pacific by Hydrocarbons and other Harmful substances in cases of emergency 1981

VI-1-2-10 Bonn Agreement for the co-operation in dealing with Pollution of the North Sea by oil (9 June 1969)
VI-2 INTERNATIONAL VOLUNTARY AGREEMENTS

When the Torrey Canyon grounded in 1967, there were no adequate international agreements concerning compensation; moreover no arrangements existed under international law to provide damage compensation to coastal States suffering serious problems.
Recognizing the lack of suitable arrangements and sensitive widespread concern for the Environment at the time, the tanker owners and the oil industry set up voluntary schemes to compensate for clean-up costs and damages incurred at future incidents.

VI-2-1 Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution damage.
( TOVALOP )

Tovalop is a voluntary agreement between tanker owners

It applies to laden or unladen tankers

Tovalop includes Bareboat charterers

It includes Pollution from bunker oil of unladen tankers

Tovalop covers pre-spill preventive measures

It is subject to strict liability ( minor exceptions )
TOVALOP came into force in 1969

It is administered by the International Tankers Owners Pollution Federation (ITOPF) but the Federation does not itself provide compensation. Owners who become a party to Tovalop usually insure their obligations either with the Protection and Indemnity (P and I) clubs or through the International Tanker Indemnity Association (ITIA), an organization set up specially for insuring oil pollution liabilities.

VI-2-2  Contract Regarding Interim Supplement to Tanker Liability for oil pollution. 
( CRISTAL )

Cristal was set up in 1971, and amended on 1 January 1978.

It is an Agreement between Cargo owners

Cristal is a complementary instrument to Tovalop

It pays compensation if oil involved is owned by oil company party to Cristal and if tanker involved is party to Tovalop

Cristal applies to reasonable actions taken to prevent pollution in addition to clearance caused in dealing with any pollution which arises from accidents.

It is administered by the Oil Companies Institute for Marine Pollution Compensation
The development of offshore oil production involves the risk of spillage and compensation regimes exist which are similar to those in the shipping industry. All offshore operators currently active on the United Kingdom of Great Britain continental shelf are party to a voluntary compensation scheme known as the Offshore Pollution Liability Agreement under which they accept strict liability (with certain exceptions) for the costs of pollution damage and remedial measures arising from exploration or production operation. This agreement has now been extended to the offshore operations within the jurisdiction of Denmark, the Federal Republic of Germany, France, Ireland, The Netherlands and Norway.

The Offshore Pollution Liability Agreement is administered by the Offshore Pollution Liability Association.
VI-3

THE MAIN CONSTRUCTIONAL REQUIREMENTS

The main requirements for the prevention of pollution as regard the equipment of ships are the following:

SBT : (Segregated Ballast Tanks) Tanks reserved exclusively for the carriage of water ballast.

CBT : (Dedicated Clean Ballast Tanks) Certain cargo tanks which can be reserved solely for the carriage of water ballast.

COW : (Crude oil washing) To wash with oil instead of water

IGS : (Inert Gas System) To reduce the oxygen content of the atmosphere in cargo tanks.

Oily water separating equipment

Oil discharge monitoring and control systems

The main features of these constructional requirements are as it can be seen very important for the reduction of oil pollution.
Segregated Ballast Tanks

This concept requires that tankers should have sufficient tanks to be able to reserve some for ballast water alone. Under normal circumstances ballast water would not be carried in cargo tanks and there would be no mixture of oil and water. The most obvious way of avoiding the need for oil water separation and its risks that oil contaminated water will be discharged to the sea is to avoid mixing the oil and water in the first place. In a segregated ballast tanker such mixing is prevented by providing separate tanks and pumping arrangements for cargo and ballast. The capacity of the segregated ballast tanks shall be determined that the ship may operate safely on ballast voyages without having recourse to the cargo tank for water ballast. This of course imposes a very serious reduction in the cargo carrying capacity of the ship. Although, the segregated ballast tank does not entirely avoid mixing oil with water, it does substantially reduce the risk; therefore segregated ballast tank is called for under Marpol 73/78.

Dedicated Clean Ballast Tank

The Dedicated Clean Ballast Tank is an adequate tank dedicated solely to the carriage of clean ballast. The Dedicated Clean Ballast Tank is a fundamentally simple system which does not require separate pipes and pumps, it was incorporated in Marpol Convention as an alternative to Segregated Ballast Tank for existing Crude oil Carriers above 40,000 Tons Deadweight.
The ballast carried in CBT shall from the accidental pollution point of view be carried in wing tanks, however the Administration may permit the use of centre tanks where it can be shown that significant advantages can be obtained in respect of hull stresses, tank volume and piping arrangements.

At its 12th session the IMO Assembly adopted revised specifications for oil tankers which are fitted with CBT (issued under Resolution 495 (XII))

An oil tanker operating with CBT shall be equipped with an oil content meter approved by the Administration and provided with a dedicated clean ballast tank operation manual.

VI-3-3 Crude Oil Washing System

Washing of cargo tanks with crude oil instead of water was initially developed during the first part of the 1970 year as a mean for reducing the amount of cargo and sediment remaining onboard after a conventional discharge.

The technique was primarily employed to large tankers already equipped with fixed tank washing machines and inert gas.

A proposal that all large tankers should have COW was put forward in the 1978 Tanker Safety and Pollution Prevention Conference.

Crude oil washing was then introduced as an alternative procedure for reducing the amount of oily waste being handled onboard. Crude oil washing under Marpol regulations is an operational method intended to give the same protection to the environment as the installation of Segregated ballast tank.
An installation for Crude oil washing must be a fixed installation.
The machines must be permanently installed in desk or be installed in submerged positions closer to the tank bottom and the number of washing machines in a tanker may vary from about 50 to 100 or more because the cleaning effect of the Cow installations depends largely on the number of machines in each tank and their location. The basic requirement is that a minimum of 90 per cent of the horizontal surfaces and 85 per cent of the vertical surfaces in each tank must be hit by direct jets of the washing machines. The areas which are most difficult to clean are normally those below a horizontal girder.

The Cow machines are supplied with Crude oil from a permanently installed distribution piping system which is made of steel or equivalent material.
As safety measures there must be no connections between the Cow system and the engine room.

The specifications of Marpol 73/78 allow the use of various types of Cow machines. The main types of deck mounted machines are Programmable Single Nozzle machines and Non Programmable Twinnozzle machines but because of the fact that certain areas cannot be reached the jets from the deck mounted machines for submerged installations are used.

Example of washing machines:

- GUNCLEAN
- VICTOR PYRATE
- BUTTERWORTH

Any washing machine prior to its installation shall be approved by the Administration.

The effectiveness of the Crude oil washing depends on a number of variable factors such as the type of oil, its temperature and viscosity, its sediment content, the length
The length of the voyage and the length of the cleaning operation

The practical conduct of the Cow cleanliness on ballast tests requires that a surveyor travels with the ship for the period of about one week or more to witness the various steps of the operation and to perform the actual inspections.

VI-3-4 Inert Gas System

An Inert Gas system means an inert gas plant and inert gas distribution together with means for preventing backflow of cargo gases to the machinery spaces, fixed and portable measuring instruments and control devices.

With an inert gas system the protection against a tank explosion is achieved by introducing inert gas into the tank to keep the oxygen content low and reduce to safe proportions the hydrocarbon gas concentration of the tank atmosphere.

The inert gas system should be used during the full cycle of tanker operation:

- Inerting of tanks
- Discharge of water ballast
- Loading
- Loaded condition
- Cargo discharge
- Crude oil washing
- Ballasting of cargo tanks
- Ballast condition
- Tank cleaning
- Purging prior to gas freeing
- Gas freeing
- Tank entry
- Re-inerting after tank entry.
All tankers operating with a cargo tank cleaning procedure using Crude oil washing shall be fitted with an inert gas system.

Regulation 13 B of the Marpol Protocol requires that every tanker applying the crude oil washing system shall be provided with an inert gas system in accordance with regulation 60 of Chapter II-2 of the International Convention for the Safety of Life at Sea 1974 as modified by the Protocol of 1978.

Regulation 62 of Chapter II-2 of Solas 74 as modified 78 requires that the Inert gas system shall be capable of supplying inert gas at a rate of at least 125 per cent of the maximum rated capacity of the cargo pumps.

The oxygen level in the cargo tanks during Crude oil washing should not exceed 8 per cent by volume and the oxygen level in the inert gas being delivered to the tanks shall not exceed 5 per cent by volume.

A reliable oxygen monitoring device is therefore essential.

VI-3-5 Oily-water separating equipment or an Oil filtering system

Oily-water separating equipment or the oil filtering system as required by Marpol Convention shall be of a design approved by the Administration and shall ensure that any oily mixture discharged into the sea after passing through the separator or filtering systems have an oil content of less than 100 parts per million. It applies to ships of 400 Tons gross tonnage and above but less than 10,000 Tons gross tonnage; for ships of 10,000 Tons gross tonnage the discharge from the separating system will have an oil content which does not exceed 15 parts per million.

For existing ships the requirement shall apply from 2 October 86.
Only few instruments for analysing the oil content in tanker bellast water have so far received certificate of type test to the specifications of the International Maritime Organization (IMO).

The different principles employed and other features of these instruments are summarized below.

**Ultraviolet Fluorescence:**
- BARELY system
- BABCOK system

**Turbity metres:**
- ITT oil content metre (OILCON)
- SERES

**Light absorption and gas measurement**
- SALWICO (SALEN and WICANDER)

**Infra red absorption**
- OILI (Finland)
Marpol 73/78 has introduced the requirement for oil content monitoring and control system for monitoring the effluent of oily water from the cargo tank area in tankers of 150 Tons gross tonnage and more and in ships other than tankers of 10,000 Tons gross tonnage and in those carrying ballast water in bunker unless they have a 15 ppm filtering system with alarm.

The oil content monitoring and control system is considered to be one of the fundamentals of the Convention.

The basic requirement is that all discharges of oily water other than clean ballast should be monitored and recorded. A vessel should not be allowed to commence its next voyage without the monitor being operable, unless it is proceeding to a repair port.

The system consists essentially of:

An oil content metre able to analyze the relative content of oil in the water stream, expressed in parts per million (ppm).

A flow metre able to measure the flow rate of oily water through the discharge pipe.

An overboard valve control system able to stop the discharge when the permissible limit is reached.
Part XII of the new Convention, consisting of 26 articles, is the first attempt to provide a comprehensive framework of conventional rules covering all sources of marine pollution; very extensive regulations on protection and preservation of the marine environment are inserted in that part XII.

Article 192 embodies a general obligation, whereby states have the obligation to protect and preserve marine environment. It is further stated in article 193 that states have the sovereign right to exploit their natural resources, pursuant to their environmental policies in accordance with their duty to protect and preserve the marine environment in honouring this obligation states have a duty to use the best practicable means at their disposal and in accordance with their capabilities (article 194).

Article 194-2 states that states shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other states and their environment.

The measures taken shall deal with all sources of pollution of the marine environment; these measures shall include, inter alia, those to minimize to the fullest possible extent:

- The release of toxic, harmful or noxious substances especially those which are persistent, from land based sources, from or through the atmosphere or by dumping.

- Pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation, and manning of vessels.
- Pollution from other installations and devices operating in the marine environment

The states are placed under an obligation to tackle pollution through the adoption of national legislation and the establishment of global and regional rules, a combination of national legislation and international norms.

National legislation must ensure that dumping is not carried out without the permission of the competent national authority. Moreover, dumping within the territorial sea or the exclusive economic zone or onto the continental shelf may not be carried out without the express prior approval of the coastal states.

Article 211 concerning pollution from vessels includes two provisions on the exclusive economic zone:

- The coastal state may adopt laws and regulations giving effect to generally accepted international rules, thus making these rules enforceable in the exclusive economic zone (EEZ).

- Where the normal international rules are inadequate to meet the special oceanographical and ecological circumstances, provision is made for especially vulnerable areas of the EEZ subject to stringent safeguards to be applied by the competent International Organization; the coastal state may adopt special mandatory measures implementing international norms applicable to such special area.

Provision is made to ensure that incidents involving or threatening discharges will be promptly notified to states which may be affected.
According to the Convention, States shall directly or through competent International Organizations promote programmes of scientific, educational, technical and other assistance to developing states for the protection and preservation of the marine environment and the prevention, reduction and control of marine pollution; such assistance shall include:

- Training of scientific and technical personnel
- Facility for participation in relevant International programmes
- Supply with necessary equipment and facilities
- Enhancing of their capacity to manufacture such equipment
VI-5 LEGAL PROVISIONS OF SOME STATES

VI-5-1 ALGERIA

Maritime Code: (Paragraph v) The Police of Pollution
Order of 23 October 1976

VI-5-2 FRANCE

The Safety of Life, Crew accommodation and Prevention of Pollution—№ 83-581 5 July 1983

Decree on Safety of Life, Crew accommodation and Prevention of Pollution № 84-810 30 August 1984

Order fixing the Rules for application of the Law and the Decree — 27 December 1984

VI-5-3 GREECE

Pollution — Prevention of Pollution ACT

VI-5-5 IRAN

Protection of Sea and Frontier Rivers against Pollution by Oil Act — 1976
VI-5-5 ISRAEL

Prevention of Seawater Pollution by Oil Ordinance - 1980.

VI-5-6 KUWAIT

Prevention of Pollution of navigable waters by Oil Law - 1964.

VI-5-7 NORWAY

Act concerning Protective measures against Damage from Oil Pollution of 6 March 1970
Entry into force 1 December 1970

VI-5-8 OMAN

Marine Pollution Law 1974

VI-5-9 SWEDEN

Act On measures against Water Pollution from Ship.
(1980: 424) with Amendments 1983: 57, 58, and 463
Ordinance 1980: 789 On measures against Water Pollution from ship with Amendments 1982: 649
1983: 59 and 465 and 1984: 27Q
VI-5-10 SAINT-VINCENT AND THE GRENADINES

Maritime Areas Act - 1983 Art 20-21

VI-5-11 UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

The Merchant Shipping (Prevention of oil Pollution) Order 1983

The Merchant Shipping (Prevention of oil Pollution) Regulation 1983, made under the 1983 Order; it gives effect to all provisions of Annex I of Marpol 73/78 with the exception of regulation 12 (reception facilities)

The Merchant Shipping Prevention of Pollution (reception facilities) Order 1984; it gives effect to both regulations of Annex I and regulation 7 of Annex II of Marpol 73/78.

In force since 25 July 1984

VI-5-12 UNITED STATES OF AMERICA

Marpol 73/78 with its Annex I was ratified by the UNITED STATES on August 12, 1980. MARPOL

The first step in implementing was accomplished by enactment of the Act to Prevent Pollution from ships on October 21, 1980
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   Prof. STUBBERUD (WMU)

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CHAPTER VII RECOMMENDATIONS

The prevention and control of Marine Pollution is a prerequisite for the reduction of Pollution but this can only be met if some measures are taken thus any State which wants to attend this goal should undertake the following:

1- Establishment of an effective Maritime Administration.

An effective Maritime Administration provides the government with the machinery which would enable it to satisfactorily and efficiently undertake those functions which are embodied within the country's Merchant Shipping Legislation; these functions would include the implementation of the requirements of international prevention pollution conventions and other conventions and national Rules and regulations.

Such Administration should be responsible for providing and organising the appropriate facilities for the survey and certification of ships, and the training, examination and certification of ship's masters, engineers and other maritime personnel, and for organising the Port state Control.

2- National Maritime Legislation

An up-to-date Merchant Shipping Legislation with precise dispositions as regard prevention of pollution from "ships" is a condition precedent to the effective enforcement of appropriate maritime Safety and Prevention of pollution standards.

The primary objectives of that Legislation needs to be developmental, regulatory and in conformity with relevant international and conventions; besides the Legislation needs to be clearly and precisely worded with effective sanctions and capable of promoting a helpful law-abiding atmosphere.
3- To Empower Classification Societies

No Administration can fulfill all its obligation under the convention without employing Classification Societies to act on its behalf. The state has decisions to make on the extent to which duties have to be undertaken by its directly employed surveyors and those which have to be delegated to Classification Societies therefore it has to determine by issuing an Decree or whatever legal regulation to whom its delegates some of its functions.

The major Classification Societies are:

*DET NORSKE VERITAS* (NORWAY)
*BUREAU VERITAS* (FRANCE)
*LLOYD’S REGISTER OF SHIPPING* (GREAT BRITAIN)
*GERMANISCHER Lloyd* (WEST GERMANY)
*USSR REGISTER OF SHIPPING* (USSR)
*REGISTRO ITALIANO NAVALE* (ITALY)
*POLISH REGISTER OF SHIPPING* (POLAND)
*NIPPON KAIJI KYOKAI* (JAPAN)
*AMERICAN BUREAU* (USA)

4- Training

It is quite obvious that even if the Administration is well organised (or structured) it cannot fulfill its tasks and meet its objectives if it has not at its disposal a skill and well trained personnel; therefore the Administration has to define and follow a suitable policy of training of personnel (ashore and onboard). That can be sustained and accomplished by: The establishment of Maritime Schools for low and middle level primarily. Moreover it is important to take into consideration the existence of the WORLD MARITIME UNIVERSITY.
The World Maritime University is based in Malmö (SWEDEN), it is one of the most exciting and ambitious projects ever undertaken by the International Maritime Organization.

The purpose of the University is to provide advanced training for senior personnel initially from developing countries only but now open to developed countries. There is no comparable institution anywhere in the world.

The aim of the World Maritime University can be best stated by quoting its charter which says:

"The World Maritime University shall be the International Maritime Training Institution for the training of senior specialist maritime personnel in various aspects of Maritime Safety, the Protection of the Marine Environment and the efficiency of international shipping, in furtherance of the purposes and objectives of the International Maritime Organization as a specialized Agency of the United Nations."

5- Ratification of International Conventions

The ratification of international Conventions is very important because it gives the opportunity to exercise an effective control on foreign vessels within the jurisdictional zones and to take any necessary measures to prevent these ships to sail if they are sub-standards (see Annex 11)

6- Participation in international meetings

Active participation in meetings such as conferences, seminars, symposia, workshops etc... gives the possibility to acquire rapidly knowledge and experience through discussion and consultation during the sessions, both formal and informal.
Personal contacts are established with colleagues from other countries leading to better understanding and co-operation and moreover an active participation permit to be well aware of the provisions of the conventions, guidelines, codes and manuals etc... therefore it will be easier to make the conventions ratified and to implement them.

7- Information

A substantial place shall be reserved in TV, Radio and schools programmes concerning the prevention of pollution and the consequences in marine environment when it occurs; these informations can be reproduced as articles in newspapers or circulate either as booklets or brochures. The organization of national symposia, colloquia, seminars is necessary.

8- Inter-regional co-operation

Contacts have to be established with neighbouring countries in view of organizing meeting for exchange of informations about respective experiences, of harmonizing legislations and to see in common what should be undertaken in cases of tremendous pollution.

9- Contingency Plan.

It should be borne in mind that whilst an effective Administration has been established the threat of pollution is still existing therefore a Contingency Plan whose aim is to provide a timely and adequate response when pollution incidents occur so as to minimize damage to the environment has to be elaborated.
The national Contingency Plan must set up the procedures whereby all agencies, whether government or industry capable of making a contribution can marshall their resources in a rapid response, commanded and co-ordinated by a designated authority which has to be assisted by a well qualified and trained staff.

There are many factors which need to be taken into account in considering the nature and scope of a country's contingency plan. These include:

- Assessment of the nature and size of the threat to which the country is likely to be subjected.

- The geographical features of the country.

- The environmental impact of any pollution.

- The structure of government and national subdivision

- The availability of suitable existing organization including those in industry and in neighbouring countries.

National Contingency Plan should contain a number of basic elements to ensure maximum benefit viz:

1- Designation of the competent Authority for dealing with spills at sea, of oil and other harmful substances, and definition of its role.
2- Description of the national oil spill and harmful substances response organization.

3- Identification of the likely sources of pollution, vulnerable resources at risk and priorities for protection.

4- Existing resources and strategies for combating pollution if any, and the size of pollution which can be dealt with at the national level.

5- Meteorological conditions prevailing in the area.

6- Identification of logistic support facilities available for any international response.

For response to oil spills some special devices and products can be used:

1- BOOMS: Mechanical barriers that extend above and below the water surface to contain and concentrate spilled oil for recovery and to herd spilled oil into areas where recovery is easier to conduct; they are deployed from ships and used in a mobile mode. Booms are also used to prevent oil spills or chronic pollution from impacting commercially valuable areas in this case they are moored and used in a stationery mode.

2- Dispersants: Products which accelerate the natural process of slick dispersal; they must be used with care.
3- SKIMMERS: Mechanical means for collecting spilled oil from the surface of the water without altering the chemical or physical properties of the oil.

Different types of skimmers are used:

- Centrifugal or Vortex skimmers
- Oleophilic skimmer
- Vacuum skimmer
- Weir skimmer: The basic weir of all is that developed by ESSO Research Centre and known as the Self-Levelling Unit for Removing Pollution (SLURP).

The assistance of IMO for the establishment of the contingency plan can be required and consequently provided. However there is the possibility to afford the various publication prepared by the Marine Environment Committee of IMO which provide guidance to governments, on way of establishing response organization and preparing Contingency plan and dealing with spills at sea.

These publications are the following:

1- Anti-Pollution Manual (five sections)

- Prevention
- Contingency Planning
- Salvage
- Methods for dealing with spillages of oil
- Legal Aspects
2- IMO/UNEP Guidelines on Oil spill dispersant application and Environmental Considerations (1982)

3- Guidelines on the provision of Adequate Reception Facilities in the ports (four parts)
   - Oily wastes
   - Residues and mixtures containing noxious liquid substances
   -- Sewage
   - Garbage

4- Guidelines for international Oil spill Contingency Plans (1983)

5- Manual for spillage other than oil (under preparation)
REFERENCES:

Establishment/Administration of Maritime Affairs in Developing Countries
Prof. VANSHISWAR - WMU 1984
CONCLUSION

This study emphasized the idea that Pollution in Marine Environment is the task of all Countries either alone or organized in International bodies.

The work realized as today is by far important and great and already its impact can be seen: The amount of oil entering into the sea due to maritime transportation activities has been reduced; the reason for such improvement is the application of international Conventions especially Oilpol 54 as amended in 1969 and Marpol 73/78 these conventions have astringent provisions relating to the discharge of oil at sea.

The ships are safer than before, crews are better trained and more skill. Almost everywhere it has been established Administration dealing with pollution however they are, as it concerns some of them, not sufficiently efficient (because of the lack of proper equipments).

There has been an increasing awareness by the masters and crews, shipowners and operators of the existence of international conventions and a need to observe international rules especially as surveillance and control of illegal discharges have been considerably tightened in many countries and infringement severely punished.

The increased use of Crude oil washing has made a significant contribution to the potential reduction of oil discharge.
But it should be noted that the emphasis has been made more on oil pollution than on other pollution thus as far as Marpol 73/78 is concerned out of five Annexes only one is in force: Annex I (Oil).
Moreover many states have not ratified some important conventions that causes some difficulties for their implementation.

Ratification of IMO Convention (At July 1984)

<table>
<thead>
<tr>
<th>IMO Members</th>
<th>126</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Conventions</th>
<th>Members having ratified</th>
<th>Members not having ratified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marpol 73</td>
<td>14</td>
<td>112</td>
</tr>
<tr>
<td>Marpol Protocol</td>
<td>30</td>
<td>96</td>
</tr>
<tr>
<td>Intervention 69</td>
<td>46</td>
<td>80</td>
</tr>
<tr>
<td>Intervention Protocol 69</td>
<td>17</td>
<td>109</td>
</tr>
<tr>
<td>Civil Liability 69</td>
<td>51</td>
<td>75</td>
</tr>
<tr>
<td>Fund</td>
<td>28</td>
<td>98</td>
</tr>
<tr>
<td>Dumping 72</td>
<td>48</td>
<td>78</td>
</tr>
<tr>
<td><em>(Amended 78)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Moreover it is not a secret that the continuing lack of adequate Reception Facilities in many areas of the world is a matter of great concern to ship operators. The subject is one which the International Maritime Organization (IMO) has to highly regard as justifying an increased effort to bring about an effective and lasting improvement.

But as a matter of fact it can be said that a lot has been done towards the improvement of prevention and control of Marine Pollution in general but also a lot rests to be done.

EVERYONE SHOULD HAVE:

"THE MARINE ENVIRONMENT PRESERVATION"
REFLEX

THEREFORE THE MARINE ENVIRONMENT WILL BE POSSIBLY PRESERVED FOREVER FROM POLLUTION
PREVENTION AND ABATEMENT OF MARINE POLLUTION FROM SHIPS

POLLUTION PREVENTION AND ABATEMENT

OPERATIONAL POLLUTION
- DISCHARGE CONTROL
  - DISCHARGE CRITERIA
  - DESIGNATION OF SPECIAL AREA
  - RECEPTION FACILITIES
- CONSTRUCTION & EQUIPMENT
  - SBT
  - CBT
  - COW
  - SEPARATOR
  - MONITOR

ACCIDENTAL POLLUTION
- PREVENTION
  - CONSTRUCTION & EQUIPMENT
  - NAVIGATION
  - CARGO HANDLING
  - CREW TRAINING
- COMBATTING POLLUTION
  - REGIONAL ARRANGEMENTS
  - ANTI-POLLUTION MANUAL
  - RIGHT OF INTERVENTION BY COASTAL STATES
- LIMITATION OF OIL SPILL
  - DAMAGE STABILITY
  - PROTECTIVE LOCATION OF SBT
- LIABILITY & COMPENSATION
ANNEX II

STATUS OF INTERNATIONAL CONVENTIONS RELATING TO MARINE POLLUTION OF WHICH IMO IS DEPOSITARY OR IS RESPONSIBLE FOR SECRETARIAT DUTIES

Note by the Secretariat

1. This document sets out in Annex I a consolidated list showing the status as at 19 July 1984 of the following Conventions and other instruments in respect of which IMO is depositary or is responsible for Secretariat duties:

(1) International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended:
   Entry into force: 26 July 1958
   Entry into force of 1962 Amendments: 18 May and 26 June 1967
   Entry into force of 1969 Amendments: 20 January 1978
   (a) 1971 (Great Barrier Reef) Amendments: not yet in force
   (b) 1971 (Tanks) Amendments: not yet in force

(2) International Convention relating to Intervention on the High Seas In Cases of Oil Pollution Casualties, 1969:
   Entry into force: 6 May 1975

(3) International Convention on Civil Liability for Oil Pollution Damage, 1969:
   Entry into force: 19 June 1975

(4) International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971:
   Entry into force: 16 October 1978

   Entry into force: 2 October 1978

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For reasons of economy, this document is printed in a limited number of copies.
(6) Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973:

Entry into force: 30 March 1983

(7) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972:

Entry into force: 30 August 1975

(a) 1978 Amendments on procedures for the settlement of disputes:

Not yet in force.

(b) 1978 Amendments on the prevention and control of pollution by incineration of wastes and other matter:

Entry into force: 11 March 1979

(c) 1980 Amendments to the Annexes to the Convention concerning the list of substances:

Entry into force: 11 March 1981
(Except for Japan)

(8) Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973:

Entry into force: 2 October 1983


3. Any additional information regarding the status of the above listed instruments will be reported to the Committee during the session.

***
## Annex XIII

### Status of MARPOL 73/78 (as at 19 July 1984)

<table>
<thead>
<tr>
<th>State</th>
<th>Annexes I and II</th>
<th>Annexes III and V</th>
<th>Annex IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahamas</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Denmark</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Finland</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>France</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gabon</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>German Democratic Republic</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Germany, Federal Republic of</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Greece</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Israel</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Japan</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lebanon</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Liberia</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Oman</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Peru</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>St. Vincent and Grenadines</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Spain</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tunisia</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>USSR</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

| Total Number                  | 30 | 20 | 19 |
| Percentage Tonnage            | 70.21 | 33.49 | 28.94 |
Table 2
CONTROL OF DISCHARGE OF OIL UNDER MARPOL 73/78

Table 2.1
Control of Discharge of Oil from Cargo Tank Areas of Oil Tankers

<table>
<thead>
<tr>
<th>Sea Areas</th>
<th>Discharge Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within a SPECIAL AREA*</td>
<td>NO DISCHARGE except clean** or segregated ballast</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Within 50 nautical miles from land</td>
<td>NO DISCHARGE except clean or segregated ballast</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Outside a SPECIAL AREA</td>
<td>NO DISCHARGE except either:</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(a) clean or segregated ballast; or</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(b) when:</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(1) the tanker is en route; and</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(2) the instantaneous rate of discharge of oil does not exceed 60 litres per</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>nautical mile; and</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(3) the total quantity of oil discharged does not exceed 1/15,000 (for existing</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>tankers) or 1/30,000 (for new tankers) of the total quantity of cargo which was</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>carried on the previous voyage; and</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>(4) the tanker has in operation an oil discharge monitoring and control system</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>and slop tank arrangements as required by Regulation 15 of Annex I of MARPOL</td>
</tr>
<tr>
<td><img src="image" alt="Image" /></td>
<td>73/78.</td>
</tr>
</tbody>
</table>

* Special area requirements take effect in the Mediterranean Sea, Black Sea and Baltic Sea areas from the day of entry into force of MARPOL 73/78 and for the Red Sea and Gulfs areas from the date established by IMO.

** "Clean ballast" is the ballast in a tank which has been so cleaned that the effluent therefrom does not create a visible sheen or the oil content exceed 15 ppm (for the precise definition of "clean ballast", see Regulation 1(16) of MARPOL 73/78.
<table>
<thead>
<tr>
<th>Sea Areas</th>
<th>Ship Type &amp; Size</th>
<th>Discharge Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 12 nautical miles from</td>
<td>Oil Tankers of all sizes and other ships ≥ 400 grt</td>
<td>NO DISCHARGE except when the oil content of effluent without dilution does not exceed 15 ppm</td>
</tr>
<tr>
<td>land</td>
<td>Other ships ≤ 400 grt</td>
<td>The condition for ships 400 grt apply as far as practicable and reasonable</td>
</tr>
<tr>
<td>Outside a SPECIAL AREA*</td>
<td></td>
<td>NO DISCHARGE except when either:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) the oil content of effluent does not exceed 15 ppm; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) (1) the ship is proceeding en route; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) the oil content of the effluent is less than 100 ppm; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) the ship has in operation an oil discharge monitoring and control system, oily-water separating or filtering equipment or other installation required by Regulation 16 of Annex I of MARPOL 73/78; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) for oil tankers the bilge water does not originate from cargo pump room bilges or is not mixed with oil cargo residue.</td>
</tr>
<tr>
<td></td>
<td>Other ships ≤ 400 grt</td>
<td>The conditions for ships 400 grt apply as far as practicable and reasonable</td>
</tr>
</tbody>
</table>
## Table 2.2

Control of Discharge of Oil from Machinery Spaces of all Ships

<table>
<thead>
<tr>
<th>Sea Areas</th>
<th>Ship Type &amp; Size</th>
<th>Discharge Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anywhere</td>
<td>Oil tankers of all sizes and other ships ≥ 400 grt</td>
<td>NO DISCHARGE except when:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) the ship is proceeding en route; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) the oil content of effluent without dilution does not exceed 15 ppm; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) the ship has in operation oil filtering equipment with automatic 15 ppm stopping device; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4) for oil tankers the bilge water does not originate from cargo pump room bilges or is not mixed with oil cargo residue.</td>
</tr>
<tr>
<td>Within a SPECIAL AREA*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 12 nautical miles from land</td>
<td>Ships &lt; 400 grt other than oil tankers</td>
<td>NO DISCHARGE except when the oil content of effluent without dilution does not exceed 15 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 12 nautical miles from land</td>
<td></td>
<td>NO DISCHARGE except when either:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) the oil content of effluent without dilution does not exceed 15 ppm; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) (1) the ship is proceeding en route; and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) the oil content of the effluent is less than 100 ppm.</td>
</tr>
</tbody>
</table>

* For application of Special Area requirements see the footnote on Table 2.1.
### Table 3

**SBT, CBT, COW, IGS and PL Requirements**

<table>
<thead>
<tr>
<th>Type of oil tanker</th>
<th>Deadweight (t)</th>
<th>Existing ship</th>
<th>New ship under MARPOL 73 but existing ship under PROTOCOL 78</th>
<th>New ship under PROTOCOL 78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude oil tanker</td>
<td>DW $\geq$ 70,000</td>
<td>IGS SBT/CBT*/COW</td>
<td>IGS, SBT</td>
<td>IGS SBT</td>
</tr>
<tr>
<td></td>
<td>70,000 $&gt;$ DW $\geq$ 40,000</td>
<td></td>
<td>IGS SBT/CBT*/COW</td>
<td>SBT PL</td>
</tr>
<tr>
<td></td>
<td>40,000 $&gt;$ DW $\geq$ 20,000</td>
<td>IGS**</td>
<td>IGS**</td>
<td>COW</td>
</tr>
<tr>
<td></td>
<td>20,000 $&gt;$ DW</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Product carrier</td>
<td>DW $\geq$ 70,000</td>
<td>IGS SBT/CBT</td>
<td>IGS, SBT</td>
<td>IGS SBT</td>
</tr>
<tr>
<td></td>
<td>70,000 $&gt;$ DW $\geq$ 40,000</td>
<td></td>
<td>IGS SBT/CBT</td>
<td>SBT PL</td>
</tr>
<tr>
<td></td>
<td>40,000 $&gt;$ DW $\geq$ 30,000</td>
<td>IGS**</td>
<td>IGS**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30,000 $&gt;$ DW $\geq$ 20,000</td>
<td>IGS**</td>
<td>IGS**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20,000 $&gt;$ DW</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* CBT is an interim measure accepted for a limited period, i.e. two years (DW $\geq$ 70,000) or four years (70,000 $>$ DW $\geq$ 40,000) after the date of entry into force of MARPOL 73/78. For product carriers, CBT is accepted for an indefinite period.

** If fixed high capacity washing machines are fitted.

### Definition of New Ship

<table>
<thead>
<tr>
<th></th>
<th>MARPOL 73</th>
<th>PROTOCOL 78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building contract</td>
<td>31/12/75</td>
<td>1/6/79</td>
</tr>
<tr>
<td>Keel laying</td>
<td>30/6/76</td>
<td>2/2/80</td>
</tr>
<tr>
<td>Delivery</td>
<td>31/12/79</td>
<td>1/6/82</td>
</tr>
</tbody>
</table>
### Table 4
LIST OF CODES AND GUIDELINES FOR
THE IMPLEMENTATION OF MARPOL 73/78

<table>
<thead>
<tr>
<th>Articles</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures for the Control of Ships and Discharges under Annex I of MARPOL 73/78</td>
<td>MEPC 18/18 (for submission to the Assembly)</td>
</tr>
<tr>
<td>Interim Guidelines for Reporting Incidents involving Harmful Substances</td>
<td>Resolution A.447(XI)</td>
</tr>
</tbody>
</table>

**Annex I**

<table>
<thead>
<tr>
<th>Articles</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines for Surveys under Annex I of MARPOL 73/78</td>
<td>Resolution MEPC 11(18)</td>
</tr>
<tr>
<td>Unified interpretation and proposed amendments of Annex I of MARPOL 73/78</td>
<td>MEPC/Circ.97 and Corr.1 and 99 (IMO Publication 1972)</td>
</tr>
<tr>
<td>Revised forms of the IOPP Certificate and Oil Record Book</td>
<td>MEPC/Circ.99</td>
</tr>
<tr>
<td>Guidelines on the Provision of Adequate Reception Facilities in Ports - Part I (Oily Wastes)</td>
<td>IMO Publication 1976</td>
</tr>
<tr>
<td>Recommendation on International Performance Specifications for Oily-Water Separating Equipment and Oil Content Meters</td>
<td>Resolution A.393(X)</td>
</tr>
<tr>
<td>Recommendation concerning the Installation of Oily-Water Separating Equipment under MARPOL 73/78</td>
<td>Resolution A.444(XI)</td>
</tr>
<tr>
<td>Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers</td>
<td>Resolution A.496(XII)</td>
</tr>
<tr>
<td>Specifications for Oil/Water Interface Detectors</td>
<td>Resolution MEPC.10(18)</td>
</tr>
<tr>
<td>Revised Specifications for the Design, Operation and Control of Crude Oil Washing Systems</td>
<td>Resolution MEPC.5(XIII)</td>
</tr>
</tbody>
</table>

Reference
  Resolution MEPC.3(XII)

- Revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks (including standard format for CBT Operation Manual)
  Resolution A.495(XII)

- Specifications for the Design, Installation and Operation of a Part-flow System for Control of Overboard Discharges
  MEPC/Circ.97. Appendix 5 (IMO Publication 1982)

Annex II

- Guidelines on the Provision of Adequate Reception Facilities in Ports - Part II (residues and mixtures containing noxious liquid substances)
  IMO Publication 1980

- Standards for Procedures and Arrangements called for by Annex II of MARPOL 73/78
  MEPC 18/18, Annex 3 (for submission to the Assembly)

- Code for the Construction and Equipment for Ships Carrying Dangerous Goods in Bulk (BCH Code)
  Resolution A.212(VII)

- International Code for the Construction and Equipment for Ships Carrying Dangerous Goods in Bulk (IRC Code)
  Resolution MSC.4(48) (To be revised by MEPC)

Annex III

- Inclusion of pollutants in the International Maritime Dangerous Code
  MEPC.Circ.78 (To be revised)

Annex IV

- Recommendations on International Effluent Standards and Guidelines for Performance Tests for Sewage Treatment Plants
  Resolution MEPC.2(VI)

- Guidelines for Type Testing and Approval of Sewage Treatment Systems
  (Under preparation)

- Guidelines for Surveys under Annex IV of MARPOL 73/78
  (under preparation)
Annex V

- Guidelines on the Provision of Adequate Reception Facilities in Ports - Part III (Sewage)  
IMO Publication 1978

- Guidelines on the Provision of Adequate Reception Facilities in Ports (Part IV (Garbage)  
IMO Publication 1978

***
## NATURE DE L’ÉVÉNEMENT

<table>
<thead>
<tr>
<th>Événement</th>
<th>Numéro</th>
</tr>
</thead>
<tbody>
<tr>
<td>S’agit-il</td>
<td>1. D’un rejet volontaire</td>
</tr>
<tr>
<td>D’une pollution suite à un accident de mer</td>
<td>2. D’un déversement intempestif</td>
</tr>
<tr>
<td>D’une pollution ayant une autre origine</td>
<td>3. D’une pollution suite à un accident de mer</td>
</tr>
</tbody>
</table>

Dans le cas d’une pollution consécutive à un autre événement

### NATURE DE LA POLLUTION

<table>
<thead>
<tr>
<th>Hydrocarbures : bruts</th>
<th>Gaz liquéfiés : GNL</th>
<th>Autres : liquides</th>
<th>GNL</th>
<th>GPL</th>
<th>Autres : liquides</th>
</tr>
</thead>
</table>

### PRÉCISIONS CONCERNANT LA POLLUTION

<table>
<thead>
<tr>
<th>Conditionnement de la pollution (code OMCI)</th>
<th>Si vrac : 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Une nappe ou un sillage</td>
<td>2. Des nappes</td>
</tr>
<tr>
<td>4. Plaques solides ou billes</td>
<td>5. Décoloration des eaux</td>
</tr>
</tbody>
</table>

### APPARITION DE LA POLLUTION

<table>
<thead>
<tr>
<th>Quantités déversées</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unité 1 : Tonne</td>
</tr>
<tr>
<td>3.1000 T</td>
</tr>
</tbody>
</table>

### UNITÉ (CODE CI DESSUS)
### ZONE ATTEINTE OU CONCERNÉE

**LITTORAL**

<table>
<thead>
<tr>
<th>Localisation géographique (carroyage CROSS)</th>
<th>Type de lieu menacé ou atteint (1)</th>
<th>Heure</th>
<th>Jour</th>
<th>Mois</th>
<th>Météo dominante</th>
<th>Vent force</th>
<th>Vent direction</th>
<th>Longueur de côte (en km)</th>
</tr>
</thead>
</table>

**EN MER**

<table>
<thead>
<tr>
<th>Localisation géographique (carroyage CROSS)</th>
<th>Distance à la côte (4)</th>
<th>Heure</th>
<th>Jour</th>
<th>Mois</th>
<th>Météo dominante</th>
<th>Vent force</th>
<th>Vent direction</th>
<th>Surface</th>
</tr>
</thead>
</table>

### NEUTRALISATION, TRAITEMENT ENTREPRIS

1. ACTION ENTREPRISE
   - 1.Oui
   - 2. Non

2. PLAN POLMAR
   - 1.Oui
   - 2. Non

3. PRODUITS
   - 1.Oui
   - 2. Non

   - Quantités en tonnes
   - 112
   - 115
   - 118

4. RECUPÉRATION EN SURFACE
   - 1.Oui
   - 2. Non

   1. Système dynamique
   - 122
   - 123

   2. Système fixe
   - 126
   - 127

   - Code : 1. Tonne
   - 2. m3
   - 3. 1000 T
   - 4. 1000 m3

5. BARRAGES
   - 1.Oui
   - 2. Non

   - Kilomètres déployés

6. TRANSFERT POMPAGE DE CARAISOIN
   - 1.Oui
   - 2. Non

   1. En surface
   - 135
   - 136

   2. Au fond
   - 139
   - 140

7. REPECHAGE DE COLIS OU CONTENEURS
   - 1.Oui
   - 2. Non

   1. En surface
   - 141
   - 145

   2. Au fond
   - 147
   - 149

8. NETTOYAGE DE SITE
   - 1.Oui
   - 2. Non

9. ÉVACUATION DE POPULATION
   - 1.Oui
   - 2. Non

   - Nombre d'habitants évacués (en centaines)

### ESTIMATION DES QUANTITÉS RESTANTES EN MER À LA FIN DES OPÉRATIONS DE NEUTRALISATION OU DE RECUPÉRATION

<table>
<thead>
<tr>
<th>Unité (code ci dessus)</th>
<th>Quantité</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OBSERVATIONS

Le Chef de Centre

Visa

Le Chef de Quartier
REPORT ON INSPECTION IN ACCORDANCE WITH THE MEMORANDUM OF UNDERSTANDING ON PORT STATE CONTROL

1. (…name of issuing country…)

2. NAME OF SHIP

3. TYPE OF SHIP

4. FLAG OF SHIP

5. CALL SIGN

6. GROSS TONNAGE

7. YEAR OF BUILD

8. PLACE AND DATE OF INSPECTION

9. NATURE OF DEFICIENCY

10. ACTION TAKEN

______________

______________

______________

______________

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______________

______________

______________

______________

______________

______________

______________

(…issuing authority……………), place and date…………………….

DISTRICT OFFICE

Tel:………………

Name and signature…………………….

Duly authorized surveyor of

(…ISSUING AUTHORITY…)

---

Maritime Authorities of Belgium, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland have concluded a Memorandum of Understanding harmonizing the procedures on Port State Control.

This Port State Control is based upon the international conventions on safety, the protection of the environment and living and working conditions on board ships as adopted by the International Maritime Organization and the International Labour Organization.

If this inspection report does not contain any remarks under the heading "nature of deficiency" the above Maritime Authorities will seek to avoid to inspect the ship again for a period of six months after the date this report was issued, unless there are clear grounds for another inspection.
### MAJOR MARPOL 73/78 VIOLATIONS FOR WHICH SHIPS WERE DETAINED

<table>
<thead>
<tr>
<th>ON</th>
<th>SHIP'S NAME</th>
<th>FLAG</th>
<th>TYPE OF VIOLATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>CARIBBEAN CORAL</td>
<td>LIBERIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>'WORLD FREERPORT'</td>
<td>LIBERIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>MANABI</td>
<td>EQUADOR</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>HAI JUNG</td>
<td>SOUTH KOREA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>IONIA</td>
<td>GREECE</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>BALDER CARRIER</td>
<td>LIBERIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>JADE BOUNTY</td>
<td>BERMUDA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>MERMAID I</td>
<td>PANAMA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>PONTOKRATIS</td>
<td>GREECE</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>LAKE ANNE</td>
<td>NORWAY</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>TAMA CARIBBEAN</td>
<td>PANAMA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>ALISON</td>
<td>BRAZIL</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>LAGOVEN GUANCO</td>
<td>VENEZUELA</td>
<td>IOPP CERTIFICATE</td>
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<tr>
<td>83</td>
<td>SONORA</td>
<td>MEXICO</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>GRAZIELA FERRAZ</td>
<td>BRAZIL</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>RO-RO MANHATTAN</td>
<td>FRANCE</td>
<td>IOPP CERTIFICATE</td>
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<td>83</td>
<td>HVITA</td>
<td>SPAIN</td>
<td>IOPP CERTIFICATE</td>
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<tr>
<td>83</td>
<td>RODRIGO TORREALBA</td>
<td>BRAZIL</td>
<td>IOPP CERTIFICATE</td>
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<tr>
<td>83</td>
<td>MEERDRECHT</td>
<td>NETHERLANDS</td>
<td>IOPP CERTIFICATE</td>
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<td>83</td>
<td>JAYAKARTA</td>
<td>INDONESIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>LARA</td>
<td>VENEZUELA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>VIKING EAGLE</td>
<td>SINGAPORE</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>83</td>
<td>GALLEON HONOR</td>
<td>PHILIPPINES</td>
<td>STABILITY</td>
</tr>
<tr>
<td>AN</td>
<td>AHMAD AL-FATEH</td>
<td>KUWAIT</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>AN</td>
<td>IRVING NORDIC</td>
<td>CANADA</td>
<td>STABILITY</td>
</tr>
<tr>
<td>AN</td>
<td>EASTERN VENTURE</td>
<td>LIBERIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>AN</td>
<td>IRVING NORDIC</td>
<td>CANADA</td>
<td>EQUIPMENT REQUIREMENT</td>
</tr>
<tr>
<td>AN</td>
<td>CROWN ATLAND</td>
<td>SWEDEN</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>AN</td>
<td>DARYA KAMAL</td>
<td>HONG KONG</td>
<td>EQUIPMENT REQUIREMENT</td>
</tr>
<tr>
<td>AN</td>
<td>ATLANTIC SUPERIOR</td>
<td>CANADA</td>
<td>EQUIPMENT REQUIREMENT</td>
</tr>
<tr>
<td>AN</td>
<td>KOREAN AMETHYST</td>
<td>SOUTH KOREA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>AN</td>
<td>VIKING GULL</td>
<td>SINGAPORE</td>
<td>STABILITY</td>
</tr>
<tr>
<td>EB</td>
<td>TASMANIA</td>
<td>LIBERIA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>EB</td>
<td>MERMAID I</td>
<td>PANAMA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>EB</td>
<td>DANAH</td>
<td>KUWAIT</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>EB</td>
<td>MORNING LIGHT</td>
<td>NORWAY</td>
<td>STABILITY</td>
</tr>
<tr>
<td>EB</td>
<td>MORNING LADY</td>
<td>NORWAY</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>EB</td>
<td>VIKING OSPREY</td>
<td>SINGAPORE</td>
<td>STABILITY</td>
</tr>
<tr>
<td>EB</td>
<td>CORAL GABLES</td>
<td>CYMEN IS.</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>IAR</td>
<td>ARIADNE</td>
<td>GREECE</td>
<td>EQUIPMENT REQUIREMENT</td>
</tr>
<tr>
<td>IAR</td>
<td>HYUNDAI CON SIX</td>
<td>SOUTH KOREA</td>
<td>IOPP CERTIFICATE</td>
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<td>IAR</td>
<td>HONESTY</td>
<td>PANAMA</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>IAR</td>
<td>IVER HERON</td>
<td>NORWAY</td>
<td>IOPP CERTIFICATE</td>
</tr>
<tr>
<td>IAR</td>
<td>MADRO</td>
<td>EQUADOR</td>
<td>IOPP CERTIFICATE</td>
</tr>
</tbody>
</table>
The information below is a brief summary of a complex subject and is intended neither as an authoritative statement of the content of the treaty or compensation system described, nor as a substitute for sources of national or international law applicable in any particular instance. Users of the Manual are advised that they must in any case consult the definitive texts themselves.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Civil Liability Convention (International Convention on Civil Liability for Oil Pollution Damage, 1969)</th>
<th>TOVALOP¹ (Tanker Owners' Voluntary Agreement concerning Liability for Oil Pollution Damage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes a uniform international regime under which owners of ships carrying oil in bulk as cargo have strict liability for pollution damage resulting from the escape or discharge of oil, including liability for the cost of preventive measures to mitigate such damage.</td>
<td>Provides that tanker owners (&quot;owner&quot; includes bareboat charterer) will compensate persons (including governments) who sustain pollution damage resulting from the escape or discharge of oil, including persons who take preventive measures to mitigate such damage. Also provides that owners will pay compensation for costs incurred by any person in taking measures to remove the threat of a discharge of oil, even if no discharge occurs. Basis of liability is strict, as under the Civil Liability Convention.</td>
<td></td>
</tr>
</tbody>
</table>

| Liability Limits² | $160/convention ton – not to exceed $16.8 million per incident absent actual fault or privity of owner. | $160/convention ton. Maximum $16.8 million per incident. |

<table>
<thead>
<tr>
<th>Defences</th>
<th>War, hostilities</th>
<th>As the Civil Liability Convention.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exceptional natural phenomenon (Act of God).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intentional Act or Omission by third party</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negligence or wrongdoing by any government (misadministration of lights/navigational aids).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administration</th>
<th>Government agencies of Contracting States</th>
<th>International Tanker Owners' Pollution Federation Limited.</th>
</tr>
</thead>
</table>

| Financial Responsibility | Vessel must be certified by a Contracting State as having sufficient financial coverage for convention liability. | Must be established and maintained to the satisfaction of the Federation. |

| Claims Procedure | Actions brought in courts of Contracting States. Court determines appointment and distribution of award. | Claim registered with tank vessel owner within one year. If claim disputed, International Chamber of Commerce arbitration. |

2 The limits in the Convention are specified in gold Poincaré francs (pending the entry into force of the 1976 Protocol to the Convention which replaces gold Poincaré francs by Special Drawing Rights as defined by the International Monetary Fund) but are, for convenience, expressed above in roughly equivalent figures in United States dollars. The limits in the TOVALOP Agreement are specified in United States dollars.
The information below is a brief summary of a complex subject and is intended neither as an authoritative statement of the content of the treaty or compensation system described, nor as a substitute for sources of national or international law applicable in any particular instance. Users of the Manual are advised that they must in any case consult the definitive texts themselves.

<table>
<thead>
<tr>
<th>Fund Convention (The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971)</th>
<th>CRISTAL (Contract Regarding Interim Supplement to Tanker Liability for Oil Pollution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PURPOSE</strong></td>
<td></td>
</tr>
<tr>
<td>• Supplements the Civil Liability Convention to assure adequate compensation to parties suffering pollution damage.</td>
<td>• Supplements the Civil Liability Convention, TOVALOP or other sources of compensation to assure adequate compensation to parties suffering pollution damage. Also applies in the case of threat removal.</td>
</tr>
<tr>
<td>• Also indemnifies tanker owners for part of their liability under the Civil Liability Convention.</td>
<td>• Also indemnifies tanker owners for part of their liability under the Civil Liability Convention, TOVALOP or national or local law.</td>
</tr>
<tr>
<td><strong>STATUS</strong></td>
<td></td>
</tr>
<tr>
<td>• International treaty: entry into force on 16 October 1978.</td>
<td>• An agreement among cargo owners in effect since 1971 and most recently amended 1 June 1978.</td>
</tr>
<tr>
<td><strong>SCOPE</strong></td>
<td></td>
</tr>
<tr>
<td>• Contracting States territory and territorial seas although discharge may have occurred elsewhere.</td>
<td></td>
</tr>
<tr>
<td>• Vessels flying the flags of Contracting States to the Civil Liability Convention.</td>
<td>• Territory or territorial seas of any State, although discharge may have occurred elsewhere.</td>
</tr>
<tr>
<td>• Tanker must be owned (or bareboat chartered) to a Party to TOVALOP.</td>
<td></td>
</tr>
<tr>
<td><strong>OILS</strong></td>
<td></td>
</tr>
<tr>
<td>• Persistent hydrocarbon mineral oils whether carried as cargo or bunker, provided ship is carrying oil in bulk as cargo.</td>
<td>• Same as the Fund Convention.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fund Convention</th>
<th>CRISTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONDITIONS</strong></td>
<td></td>
</tr>
<tr>
<td>• A Party to the Fund Convention must also be a Party to the Civil Liability Convention.</td>
<td>• Oil must be owned or &quot;deemed&quot; owned by a Party to CRISTAL.</td>
</tr>
<tr>
<td>• Flag State must be a Party to the Fund Convention in order for shipowner to be paid indemnity.</td>
<td>• Tanker involved in incident must be enrolled in TOVALOP.</td>
</tr>
<tr>
<td>• Circumstances such that Civil Liability Convention imposes liability on tanker or would have done so if it had been applicable.</td>
<td></td>
</tr>
<tr>
<td><strong>DAMAGES</strong></td>
<td></td>
</tr>
<tr>
<td>• Pollution damage not adequately compensated under the Civil Liability Convention because of:</td>
<td>• Pollution damage not otherwise recoverable from tanker owner or any other source.</td>
</tr>
<tr>
<td>• no Civil Liability Convention liability;</td>
<td></td>
</tr>
<tr>
<td>• financial incapacity of the vessel owner;</td>
<td></td>
</tr>
<tr>
<td>• damages exceed Civil Liability Convention limits.</td>
<td></td>
</tr>
<tr>
<td><strong>METHOD OF FUNDING</strong></td>
<td></td>
</tr>
<tr>
<td>• Contributions by crude and fuel oil cargo receivers in Contracting States.</td>
<td>• Contributions by Parties to CRISTAL.</td>
</tr>
<tr>
<td>• Individual contributions assessed pro rata on amount of crude and fuel oil received in Contracting States which has been transported by sea.</td>
<td>• Individual contributions assessed pro rata based on amount of crude and fuel oil received by Parties to CRISTAL which has been transported by sea.</td>
</tr>
<tr>
<td><strong>FUND LIABILITY</strong></td>
<td></td>
</tr>
<tr>
<td>• Maximum $36 million aggregate with Civil Liability Convention compensation if any.</td>
<td>• Maximum $36 million aggregate with all other sources of compensation if any.</td>
</tr>
<tr>
<td>• Can be increased up to $72 million by the Assembly of the Fund.</td>
<td>• Can be increased up to $72 million by the Institute.</td>
</tr>
<tr>
<td>• Indemnifies owner for Civil Liability Convention liability over $120/ton or $10 million, whichever is less, but not in excess of $160/ton or $16.8 million, whichever is less.</td>
<td>• Indemnifies owner for Civil Liability Convention liability over $120/ton or $10 million, whichever is less, but not in excess of $160/ton or $16.8 million, whichever is less.</td>
</tr>
<tr>
<td>• Indemnifies owner for liability under any other legal regime than Civil Liability Convention in excess of $160/ton or $16.8 million, whichever is less.</td>
<td></td>
</tr>
</tbody>
</table>

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3 The limits in the Convention are specified in gold Poincaré francs (pending the entry into force of the 1976 Protocol to the Convention which replaces gold Poincaré francs by Special Drawing Rights as defined by the International Monetary Fund), but are, for convenience, provided by the Oil
<table>
<thead>
<tr>
<th>DEFENCES OF FUND</th>
<th>ADMINISTRATION</th>
<th>CLAIMS PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>War, hostilities. No proof of ship-source spillage. Intentional or negligent act of claimant.</td>
<td>Fund Convention Secretariat and Assembly (later comprising representatives of all Contracting States).</td>
<td>Brought against the Fund Convention in court of Contracting States in which damage occurred.</td>
</tr>
<tr>
<td>Exceptional natural phenomenon. Intentional act or omission by third party. Negligence of governments. Intentional or negligent act of claimant.</td>
<td>Oil Companies Institute for Marine Pollution Con-</td>
<td>Direct application to the Institute.</td>
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<tr>
<td>Fund Convention</td>
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</tbody>
</table>
ANNEX 12

FORM OF CERTIFICATE

INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE (1973)

Issued under the Provisions of the International Convention for the Prevention of Pollution from Ships, 1973, under the Authority of the Government of ________________________

(full designation of the country)

by ________________________

(full designation of the competent person or organization authorized under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973)

<table>
<thead>
<tr>
<th>Name of Ship</th>
<th>Distinctive Number or Letter</th>
<th>Port of Registry</th>
<th>Gross Tonnage</th>
</tr>
</thead>
</table>

Type of ship:

- Oil tanker, including combination carrier
- Asphalt carrier
- Ship other than an oil tanker with cargo tanks coming under Regulation 2(2) of Annex I of the Convention
- Ship other than any of the above

New/existing ship

Date of building or major conversion contract

Date on which keel was laid or ship was at a similar stage of construction or on which major conversion was commenced

Date of delivery or completion of major conversion

* Delete as appropriate.
PART A  ALL SHIPS

The ship is equipped with:

for ships of 400 tons gross tonnage and above:

(a) oily-water separating equipment* (capable of producing the effluent with an oil content not exceeding 100 parts per million)

(b) an oil filtering system* (capable of producing the effluent with an oil content not exceeding 100 parts per million)

for ships of 10,000 tons gross tonnage and above:

(c) an oil discharge monitoring and control system* (additional to (a) or (b) above) or

(d) oily-water separating equipment and an oil filtering system* (capable of producing the effluent with an oil content not exceeding 15 parts per million) in lieu of (a) or (b) above.

Particulars of requirements from which exemption is granted under Regulation 2(2) and 2(4)(a) of Annex I of the Convention:

Remarks:

* Delete as appropriate.
PART B  OIL TANKER

Deadweight ............... metric tons. Length of ship ............... metres.

It is certified that this ship is:

(a) required to be constructed according to and complies with
(b) not required to be constructed according to
(c) not required to be constructed according to, but complies with

the requirements of Regulation 24 of Annex I of the Convention.

The capacity of segregated ballast tanks is ..................... cubic metres and complies with the requirements of Regulation 13 of Annex I of the Convention.

The segregated ballast is distributed as follows:

<table>
<thead>
<tr>
<th>Tank</th>
<th>Quantity</th>
<th>Tank</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 This Part should be completed for oil tankers including combination carriers and asphalt carriers, and those entries which are applicable should be completed for ships other than oil tankers which are constructed and utilized to carry oil in bulk of an aggregate capacity of 200 cubic metres or above.

2 This page need not be reproduced on a Certificate issued to any ship other than those referred to in footnote 1.

3 Delete as appropriate.
THIS IS TO CERTIFY:

That the ship has been surveyed in accordance with Regulation 4 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, concerning the prevention of pollution by oil; and

That the survey shows that the structure, equipment, fittings, arrangement and material of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the applicable requirements of Annex I of the Convention.

This Certificate is valid until ..........................................................
subject to intermediate survey(s) at intervals of ...................................

Issued at. ..............................................................................

(place of issue of Certificate)

........................................................................
19. ...........................................................................

(Signature of duly authorized official
issuing the Certificate)

(Seal or stamp of the issuing Authority, as appropriate)

Endorsement for existing ships

This is to certify that this ship has been so equipped as to comply with the requirements of the International Convention for the Prevention of Pollution from Ships, 1973 as relating to existing ships three years from the date of entry into force of the Convention.

Signed ..........................................................

(Signature of duly authorized official)

Place of endorsement .................................

Date of endorsement .................................

(Seal or stamp of the Authority, as appropriate)

---

4 This entry need not be reproduced on a Certificate other than the first Certificate issued to any ship.

68
Intermediate survey

This is to certify that at an intermediate survey required by Regulation 4(1)(c) of Annex I of the Convention, this ship and the condition thereof are found to comply with the relevant provisions of the Convention.

Signed ........................................
(Signature of duly authorized official)

Place ...........................................

Date ...........................................

(Seal or stamp of the Authority, as appropriate)

Signed ........................................
(Signature of duly authorized official)

Place ...........................................

Date ...........................................

(Seal or stamp of the Authority, as appropriate)

Under the provisions of Regulation 8(2) and (4) of Annex I of the Convention the validity of this Certificate is extended until

Signed ........................................
(Signature of duly authorized official)

Place ...........................................

Date ...........................................

(Seal or stamp of the Authority, as appropriate)

The first Certificate issued
Annex 14

The existing Forms of Oil Record Books and Supplements are replaced by the following forms:

"FORMS OF OIL RECORD BOOKS"

OIL RECORD BOOK

Part I - Machinery space operations

(All ships)

Name of ship :

Distinctive number or letters :

Gross tonnage :

Period from: to:

Note: Oil Record Book Part I shall be provided to every oil tanker of 150 tons gross tonnage and above and every ship of 400 tons gross tonnage and above, other than oil tankers, to record relevant machinery space operations. For oil tankers, Oil Record Book Part II shall also be provided to record relevant cargo/ballast operations.
PLAN VIEW OF CARGO AND SLOP TANKS
(to be completed on board)

<table>
<thead>
<tr>
<th>Identification of the tanks</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Depth of slop tank(s):
(Give the capacity of each tank and the depth of slop tank(s)).
INTRODUCTION

The following pages of this section show a comprehensive list of items of machinery space operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with Regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items have been grouped into operational sections, each of which is denoted by a letter code.

When making entries in the Oil Record Book, the date, operational code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank space.

Each completed operation shall be signed for and dated by the officer or officers in charge. Each completed page shall be signed by the master of the ship.
LIST OF ITEMS TO BE RECORDED

(A) BALLASTING OR CLEANING OF OIL FUEL TANKS

1. Identity of tank(s) ballasted.
2. Whether cleaned since they last contained oil and, if not, type of oil previously carried.
3. Position of ship at start of cleaning.
4. Position of ship at start of ballasting.

(B) DISCHARGE OF DIRTY BALLAST OR CLEANING WATER FROM OIL FUEL TANKS REFERRED TO UNDER SECTION (A)

5. Identity of tank(s).
6. Position of ship at start of discharge.
7. Position of ship on completion of discharge.
8. Ship's speed(s) during discharge.
9. Method of discharge:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment;
   .3 To reception facilities.
10. Quantity discharged.

(C) DISPOSAL OF OIL RESIDUES (SLUDGE)

11. Quantity of residue retained on board for disposal.
12. Methods of disposal of residue:
   .1 To reception facilities (identify port);
   .2 Mixed with bunkers;
   .3 Transferred to another (other) tank(s) (identify tank(s));
   .4 Other method (state which).

(D) NON-AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES

13. Quantity discharged.
15. Method of discharge or disposal:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment;
   .3 To reception facilities (identify port);
   .4 To slop or collecting tank (identify tank).
(E) AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES

16. Time when the system has been put into automatic mode of operation for discharge overboard.
17. Time when the system has been put into automatic mode of operation for transfer of bilge water to collecting (slop) tank (identify tank).
18. Time when the system has been put to manual operation.
19. Method of discharge overboard:
   .1 Through 100 ppm equipment;
   .2 Through 15 ppm equipment.

(F) CONDITION OF OIL DISCHARGE MONITORING AND CONTROL SYSTEM

20. Time of system failure.
21. Time when system has been made operational.
22. Reasons for failure.

(G) ACCIDENTAL OR OTHER EXCEPTIONAL DISCHARGES OF OIL

23. Time of occurrence.
24. Place or position of ship at time of occurrence.
25. Approximate quantity and type of oil.
26. Circumstances of discharge or escape, the reasons therefor and general remarks.

(H) ADDITIONAL OPERATIONAL PROCEDURES AND GENERAL REMARKS
NAME OF SHIP: .................................................................

DISTINCTIVE NUMBER OR LETTERS: .................................

CARGO/BALLAST OPERATIONS (OIL TANKERS)/MACHINERY SPACE OPERATIONS (ALL SHIPS)

<table>
<thead>
<tr>
<th>Date</th>
<th>Code (letter)</th>
<th>Item (number)</th>
<th>Record of operations/signature of officer in charge</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

Signature of Master.................................................

* Delete as appropriate.
OIL RECORD BOOK

Part II - Cargo/ballast operations

(Oil tankers)

Name of ship: 
Distinctive number: 
or letters: 
Gross tonnage: 

Period from: to:

Note: Every oil tanker of 150 tons gross tonnage and above shall be provided with Oil Record Book Part II to record relevant cargo/ballast operations. Such a tanker shall also be provided with Oil Record Book Part I to record relevant machinery space operations.
LIST OF ITEMS TO BERecorded

(A) **LOADING OF OIL CARGO**
1. Place of loading
2. Type of oil loaded and identity of tank(s)
3. Total quantity of oil loaded.

(B) **INTERNAL TRANSFER OF OIL CARGO DURING VOYAGE**
4. Identity of tank(s)
   .1 From:
   .2 To:
5. Was (were) tank(s) in 4(1) emptied?

(C) **UNLOADING OF OIL CARGO**
6. Place of unloading.
7. Identity of tank(s) unloaded.
8. Was (were) tank(s) emptied?

(D) **CRUDE OIL WASHING (COW TANKERS ONLY)**
(To be completed for each tank being crude oil washed)
9. Port where crude oil washing was carried out or ship's position
   if carried out between two discharge ports
10. Identity of tank(s) washed.\(^1\) /
11. Number of machines in use.
12. Time of start of washing.
13. Washing pattern employed.\(^2\) /

---

\(^1\) When an individual tank has more machines than can be operated simultaneously, as described in the Operations and Equipment Manual, then the section being crude oil washed should be identified, e.g. No. 2 centre, forward section.

\(^2\) In accordance with the Operations and Equipment Manual, enter whether single-stage or multi-stage method of washing is employed. If multi-stage method is used, give the vertical arc covered by the machines and the number of times that arc is covered for that particular stage of the programme.
14. Washing line pressure.
15. Time completed or stopped washing.
16. State method of establishing that tank(s) was (were) dry.
17. Remarks. 3/

(E) BALLASTING OF CARGO TANKS
18. Identity of tank(s) ballasted.
19. Position of ship at start of ballasting.

(F) BALLASTING OF DEDICATED CLEAN BALLAST TANKS (CBT TANKERS ONLY)
20. Identity of tank(s) ballasted.
21. Position of ship when water intended for flushing, or port
tank ballast was taken to dedicated clean ballast tank(s)
22. Position of ship when pump(s) and lines were flushed to slop
tank.
23. Quantity of oily water resulting from line flushing transferred
to slop tanks (identify slop tank(s)).
24. Position of ship when additional ballast water was taken to
dedicated clean ballast tank(s).
25. Time and position of ship when valves separating the dedicated
clean ballast tanks from cargo and stripping lines were closed.
26. Quantity of clean ballast taken on board.

(G) CLEANING OF CARGO TANKS
27. Identity of tank(s) cleaned.
28. Port or ship's position.
29. Duration of cleaning.
30. Method of cleaning. 4/
31. Tank washings transferred to:
   .1 Reception facilities;
   .2 Slop tank(s) or cargo tank(s) designated as slop tank(s)
       (identify tank(s)).

3/ If the programmes given in the Operations and Equipment Manual are
not followed, then the reasons must be given under Remarks.

4/ Hand hosing, machine washing and/or chemical cleaning. Where
chemically cleaned, the chemical concerned and amount used should be
stated.
(H) DISCHARGE OF DIRTY BALLAST

32. Identity of tank(s).
33. Position of ship at start of discharge into the sea.
34. Position of ship on completion of discharge into the sea.
35. Quantity discharged into the sea.
36. Ship's speed(s) during discharge.
37. Was the discharge monitoring and control system in operation during the discharge?
38. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
39. Quantity of oily water transferred to slop tank(s) (identify slop tank(s)).
40. Discharged to shore reception facilities (identify port if applicable).

(I) DISCHARGE OF WATER FROM SLOP TANKS INTO THE SEA

41. Identity of slop tanks.
42. Time of settling from last entry of residues, or
43. Time of settling from last discharge.
44. Time and position of ship at start of discharge.
45. Ullage of total contents at start of discharge.
46. Ullage of oil/water interface at start of discharge.
47. Bulk quantity discharged and rate of discharge.
48. Final quantity discharged and rate of discharge.
49. Time and position of ship on completion of discharge.
50. Was the discharge monitoring and control system in operation during the discharge?
51. Ullage of oil/water interface on completion of discharge.
52. Ship's speed(s) during discharge.
53. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
54. Confirm that all applicable valves in the ship's piping system have been closed on completion of discharge from the slop tanks.
(J) DISPOSAL OF RESIDUEs AND OILY MIXTURES NOT OTHERWISE DEALT WITH

55. Identity of tank(s).
56. Quantity disposed of from each tank.
57. Method of disposal:
   .1 To reception facilities (identify port);
   .2 Mixed with cargo;
   .3 Transferred to another tank(s) (identify tank(s));
   .4 Other method (state which).

(K) DISCHARGE OF CLEAN BALLAST CONTAINED IN CARGO TANKS

58. Position of ship at start of discharge of clean ballast.
59. Identity of tank(s) discharged.
60. Was (were) the tank(s) empty on completion?
61. Position of ship on completion if different from 58.
62. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?

(L) DISCHARGE OF BALLAST FROM DEDICATED CLEAN BALLAST TANKS
(CBT TANKERS ONLY)

63. Identity of tank(s) discharged.
64. Time and position of ship at start of discharge of clean ballast into the sea.
65. Time and position of ship on completion of discharge into the sea.
66. Quantity discharged:
   .1 Into the sea; or
   .2 To reception facility (identify port).
67. Was there any indication of oil contamination of the ballast water before or during discharge into the sea?
68. Was the discharge monitored by an oil content meter?
69. Time and position of ship when valves separating dedicated clean ballast tanks from the cargo and stripping lines were closed on completion of deballasting.
NAME OF SHIP: .................................

DISTINCTIVE NUMBER OR LETTERS: .................................

CARGO/BALLAST OPERATIONS (OIL TANKERS)* / MACHINERY SPACE OPERATIONS (ALL SHIPS)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Code (letter)</th>
<th>Item (number)</th>
<th>Record of operations/signature of officer in charge</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

Signature of Master: .........................

* Delete as appropriate.*

W/0147V

***
GUIDELINES FOR THE CATEGORIZATION OF NOXIOUS LIQUID SUBSTANCES

Category A: Substances which are bioaccumulated and liable to produce a hazard to aquatic life or human health; or which are highly toxic to aquatic life (as expressed by a Hazard Rating 4, defined by a TLM less than 1 ppm); and additionally certain substances which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLM of 1 or more, but less than 10 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category B: Substances which are bioaccumulated with a short retention of the order of one week or less; or which are liable to produce tainting of the sea food; or which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLM of 1 ppm or more, but less than 10 ppm); and additionally certain substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLM of 10 ppm or more, but less than 100 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category C: Substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLM of 10 ppm or more, but less than 100 ppm); and additionally certain substances which are practically non-toxic to aquatic life (as expressed by a Hazard Rating 1, defined by a TLM of 100 ppm or more, but less than 1,000 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category D: Substances which are practically non-toxic to aquatic life; (as expressed by a Hazard Rating 1, defined by a TLM of 100 ppm or more, but less than 1,000 ppm); or causing deposits blanketing the seafloor with a high biochemical oxygen demand (BOD); or highly hazardous to human health, with an LD₅₀ of less than 5 mg/kg; or produce moderate reduction of amenities because of persistency, smell or poisonous or irritant characteristics, possibly interfering with use of beaches; or moderately hazardous to human health, with an LD₅₀ of 5 mg/kg or more, but less than 50 mg/kg and produce slight reduction of amenities.

Other Liquid Substances (for the purposes of Regulation 4 of this Annex)
Substances other than those categorized in Categories A, B, C and D above.
### Annex "A"

**LIST OF NOXIOUS LIQUID SUBSTANCES CARRIED IN BULK**

<table>
<thead>
<tr>
<th>Substance</th>
<th>UN Number</th>
<th>Pollution Category for operational discharge</th>
<th>Residual concentration (per cent by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Regulation 3 of Annex II)</td>
<td>(Regulation 5(1) of Annex II)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III Outside special areas</td>
<td>IV Within special areas</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>1089</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Acetic acid</td>
<td>1842</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Acetic anhydride</td>
<td>1715</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Acetone</td>
<td>1090</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Acetone cyanohydrin</td>
<td>1541</td>
<td>A</td>
<td>0.1</td>
</tr>
<tr>
<td>Acetyl chloride</td>
<td>1717</td>
<td>C</td>
<td>0.05</td>
</tr>
<tr>
<td>Acrolein</td>
<td>1092</td>
<td>A</td>
<td>0.1</td>
</tr>
<tr>
<td>Acrylic acid*</td>
<td></td>
<td>C</td>
<td>0.05</td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td>1093</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Adiponitrile</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Alkyl/benzene sulfonate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(straight chain)</td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>(branched chain)</td>
<td></td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Allyl alcohol</td>
<td>1098</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Allyl chloride</td>
<td>1100</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Alum (15% solution)</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Aminoethylethanolamine (Hydroxyethyl-ethylene-diame)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia (28% aqueous)</td>
<td>1005</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>iso-Amyl acetate</td>
<td>1104</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>n-Amyl acetate</td>
<td>1104</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>n-Amyl alcohol</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Aniline</td>
<td>1547</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

\* Asterisk indicates that the substance has been provisionally included in this list and further data are necessary in order to complete the evaluation of its environmental hazard, particularly in relation to living resources.
<table>
<thead>
<tr>
<th>Substance</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>1114</td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Benzyl alcohol</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzyl chloride</td>
<td>1738</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Butyl acetate</td>
<td>1123</td>
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<tr>
<td>sec-Butyl acetate</td>
<td>1124</td>
<td>D</td>
<td></td>
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<tr>
<td>n-Butyl acrylate</td>
<td></td>
<td>D</td>
<td></td>
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</tr>
<tr>
<td>Butyl butyrate*</td>
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<td></td>
<td>1832</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tallow</td>
<td></td>
<td>D</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>Tetraethyl lead</td>
<td>1649</td>
<td>A</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Tetrahydrofuran</td>
<td>2056</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetrahydronaphthalene</td>
<td>1540</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetramethylbenzene</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetramethyl lead</td>
<td>1649</td>
<td>A</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Titanium tetrachloride</td>
<td>1838</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>1294</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene diisocyanate*</td>
<td>2078</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethane</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>1710</td>
<td>B</td>
<td></td>
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<tr>
<td>Triethanolamine</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triethylamine</td>
<td>1296</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trimethylbenzene*</td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Tritolyl phosphate (Tricresyl phosphate)*</td>
<td></td>
<td></td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Turpentine (wood)</td>
<td>1299</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinyl acetate</td>
<td>1301</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinylidene chloride*</td>
<td>1303</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylenes (mixed isomers)</td>
<td>1307</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Asterisk indicates that the substance has been provisionally included in this list and that further data are necessary in order to complete the evaluation of its environmental hazards, particularly in relation to living resources.
LIST OF OTHER LIQUID SUBSTANCES CARRIED IN BULK

Acetonitrile (Methyl cyanide)  Olive Oil
tert-Amyl alcohol  Polypropylene glycol
n-Butyl alcohol  iso-Propyl acetate
Butyrolactone  iso-Propyl alcohol
Calcium chloride (solution)  Propylene glycol
Castor oil  Propylene oxide
Citric juices  Propylene tetramer
Coconut oil  Propylene trimer
Cod liver oil  Sorbitol
iso-Decyl alcohol  Sulphur (liquid)
n-Decyl alcohol  Tridecanol
Decyl octyl alcohol  Triethylene glycol
Dibutyl ether  Triethylenetetramine
Diethanolamine  Tripropylene glycol
Diethylene glycol  Water
Dipentene  Wine
Dipropylene glycol  
Ethyl alcohol  
Ethylene glycol  
Fatty alcohols (C_{12}-C_{20})  
Glycerine  
n-Heptane  
Heptene (mixed isomers)  
n-Hexane  
Ligroin  
Methyl alcohol  
Methylamyl acetate  
Methyl ethyl ketone (2-butanone)  
Milk  
Molasses  


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