

The Regional Organization for the
Conservation of the Environment
of the Red Sea and Gulf of Aden
(PERSGA)

*National Oil Spill Contingency
Plan
for Sudan*

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PERSGA - 'The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden' is an intergovernmental authority dedicated to the conservation of the coastal and marine environments in the region.

The Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention) 1982, provides the legal foundation for PERSGA. The Secretariat of the Organization was formally established in Jeddah following the Cairo Declaration of September 1995. The PERSGA member states are Djibouti, Egypt, Jordan, Saudi Arabia, Somalia, Sudan, and Yemen.

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THE NATIONAL OIL SPILL CONTINGENCY PLAN (ARABIC)

ABBREVIATIONS AND ACRONYMS

AASTMT	Arab Academy of Science, Technology and Maritime Transport
CLC	Civil Liability Convention
COLREG	Convention on the International Regulations for Preventing Collisions at Sea
Dwt	Dead weight tonnage
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
GEF	Global Environmental Facilities
GNPOC	Greater Nile Petroleum Operating Company
GPC	General Petroleum Company
GRT	Gross Registered Tonnage/Tons
HCENR	Higher Council for Environment and Natural Resources
IMO	International Maritime Administration
IOPC	International Oil Pollution Compensation Fund
IPIECA	International Petroleum Industry Environmental Conservation Association
ITMD	International Tyre Manufacturing and Distribution
ITOPF	International Tanker Owners' Pollution Federation
LPG	Liquefied Petroleum Gas
MAD	Maritime Administration Directorate
MARPOL	International Convention for the Prevention of Pollution from Ships
NC	National Coordinator
NCPC	National Contingency Planning Committee
NOSCP	National Oil Spill Contingency Plan
OILPOL	Oil Pollution Reporting Format
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
OSC	On Scene Commander
OSRL	Oil Spill Response Limited, Southampton, UK
P & I	Protection and Indemnity Association
PERSGA	Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
SAU	Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation
SDR	Special Drawing Right
SITREPS	Situation Reports
SOLAS	International Convention for the Safety of Life at Sea
SPC	Sea Ports Corporation
STCW	International Convention on Standards of Training, Certification and Watch Keeping for Seafarers
UNDP	United Nations Development Programme

PART A: NATIONAL STRATEGY

1 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

At present, the Sudan has no capacity to respond to oil spills in its territorial waters which could threaten its coastline and related interests. With the gradually increasing volume of shipping using Port Sudan, and the plans for the development of a new oil terminal at Gezirat Abdalla, it is important that the Sudanese authorities should establish a national system for responding to oil spills.

The purpose of this National Oil Spill Contingency Plan (NOSCP) is to provide such a national framework for responding to oil spills and protecting the coastal resources of the Sudan. The Government of the Sudan has approved responsibilities for action as follows:

- The Sudanese Maritime Administration Corporation (SMAC) is the national authority to be responsible for oil pollution preparedness and response;
- The new coastal Earth Station of the Sea Ports Corporation (SPC) is the national contact point to be responsible for the receipt and transmission of oil pollution reports;
- The SMAC is the authority which is entitled to act on behalf of the State to request international assistance and to decide whether to render assistance to another State when requested.

1.2 SCOPE AND CONTENT

This contingency plan describes the policy and procedures for the response to oil spills in the coastal waters of the Sudan, including the organisational relationship of the various bodies involved. The scope of this plan includes internal waters including ports, harbours, estuaries, bays and lagoons. On land, it includes the foreshore and any adjacent land affected by an oil spill.

The contingency plan is divided into three parts:

Part A: National Strategy

Part B: Operational Procedures

Part C: Data Directory

1.3 DEFINITIONS

In this Contingency Plan:

“Overall command” means the full responsibility for the direction of counter-pollution operations, both at sea and on land, during an oil pollution incident.

“Incident commander” means the person exercising overall command of an oil pollution incident. Depending on the circumstances, he may be the General Manager of the Sea Ports Corporation, the National Coordinator (i.e. the Captain in charge of the Maritime Administration Directorate) or the local On Scene Commander.

“Marine emergency” means any casualty, incident, occurrence or situation, however caused, resulting in substantial pollution or the imminent threat of substantial pollution to the marine environment by oil or other harmful substances including collisions, groundings and other incidents involving ships, including tankers, and including the presence of oil or other harmful substances in the marine environment arising from the failure of industrial installations or oil handling facilities.

“National Coordinator” (NC) means the Captain in charge of the Maritime Administration Directorate of SPC. He will be the Incident Commander in a Tier Two oil pollution incident and will assist the General Manager of SPC in a Tier Three oil pollution incident. He is responsible for nominating an On Scene Commander (OSC) to take command of response actions at the scene of the incident. Depending on the circumstances and location of the spill, the NC may in some circumstances act as the OSC himself. The NC will coordinate the activities of the various organisations involved in the response action including the subsequent clean-up operations. The NC has overall decision making responsibility in a Tier Two incident and will be supported by appropriate operational, administrative and scientific personnel. Where necessary, the NC will convene the National Contingency Planning Committee to assist him in the decision making process.

“On Scene Commander” (OSC) means the person named in the local oil pollution emergency plan, or the person nominated by the NC in the event of a Tier Two or Tier Three spill, to take command of response actions at the scene of the incident, both at sea and on land. The OSC has overall decision making responsibility for the tactical response to an oil pollution incident and should be supported by appropriate operational, scientific and administrative personnel.

“Oil pollution incident” means an occurrence or series of occurrences having the same origin, which results or may result in a discharge of oil and which poses or may pose a threat to the marine environment, to the coastline or related interests of the Republic of the Sudan, and which requires emergency action or other immediate response.

“Oil” means petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products.

“Counter pollution operations” means any action taken to prevent, monitor, reduce or combat pollution or the threat of an oil pollution incident at sea and any action to clean-up the shoreline which is contaminated by an oil pollution incident.

1.4 DISTRIBUTION OF THE NOSCP

All government bodies and private companies which have a role to play or which could be affected by an oil spill incident will receive a copy of the contingency plan. A list of the holders of the NOSCP is in Part C.

1.5 PLAN REVISION

The Maritime Administration Directorate of the Sea Ports Corporation will be responsible for issuing revisions to this plan whenever necessary and distributing amendments to all plan holders. Revisions to Parts A and B will only be issued when the amendments have been approved by the National Contingency Planning Committee. Amendments to Part C will be issued whenever there is a need to update the information therein.

It is the responsibility of all plan holders to notify the Maritime Administration Directorate of any changes in the telephone and fax numbers of the contact points listed in Part C.

1.6 FUNDING

A "Pollution Fund" will be established to fund the purchase of equipment, and to implement the necessary training programmes and other requirements of the Plan.

The Federal and State Ministries of Finance will contribute to the "Pollution Fund" beside all agencies participating in the implementation of the Plan.

The contribution will be designated by the National Contingency Planning Committee (NCPC).

2 LEGAL FRAMEWORK

The Sudan has no national legal framework for implementing this contingency plan. However, the Sudan is a Contracting Party to the “Emergencies” Protocol of the 1982 Jeddah Convention for the Conservation of the Red Sea and Gulf of Aden Environment. The measures described in this contingency plan will in effect honour the Sudan’s obligations under the Protocol of the Jeddah Convention.

2.1 THE REGIONAL CONVENTION FOR THE CONSERVATION OF THE RED SEA AND GULF OF ADEN ENVIRONMENT

The Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (the Jeddah Convention) was signed by the Democratic Republic of the Sudan on 14 February 1982. The Convention includes a Protocol concerning Regional Co-operation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency.

Under this Protocol, the Contracting Parties agree to co-operate in taking the necessary and effective measures to protect the coastline and related interests of one or more of the Parties from the threat and effects of pollution due to the presence of oil or other harmful substances in the marine environment resulting from marine emergencies (Article II (1)).

The Contracting Parties also endeavour to maintain and promote, either individually or through bilateral or multilateral co-operation, their contingency plans and means for combating pollution in the Red Sea and Gulf of Aden by oil and other harmful substances. These means shall include, in particular, available equipment, ships, aircraft and manpower prepared for operations in cases of emergency (Article II (2)).

2.2 OBLIGATION TO INFORM

There is also an obligation (Article V) on each Contracting Party to provide the Marine Emergency Mutual Aid Centre (the Centre) (not yet established), and the other Contracting Parties, with information concerning:

(a) its appropriate authority (or authorities) responsible for:

- Combating or otherwise operationally responding to marine emergencies;
- receiving and coordinating information on marine emergencies;
- coordinating available national capabilities for dealing with marine emergencies in general within its own Government and with other Contracting Parties.

(b) its laws, regulations and other legal instruments relating generally to matters addressed in the Protocol, including those concerning the structure and operation of the designated “appropriate authority” referred to above.

(c) its national marine emergency contingency plans.

Furthermore, the Contracting Parties have agreed (Article VI) to provide each other with information concerning:

- existing and new methods, techniques, materials and procedures relating to marine emergency response,
- existing and planned research, their results and development in the above-mentioned areas.

2.3 REPORTING OBLIGATIONS

Article VII places an obligation on each Contracting Party to direct its appropriate officials to require masters of ships, pilots of aircraft and persons in charge of offshore platforms and other similar structures operating in the marine environment and under its jurisdiction to report the existence of any marine emergency to the appropriate national authority (and to the Centre). This includes the substantial pollution of the marine environment by oil or other harmful substances, and the imminent threat of such pollution.

Any Contracting Party receiving such a report should promptly inform the following authorities:

1. the Marine Emergency Mutual Aid Centre (when it is established);
2. all other Contracting Parties;
3. the flag State of any foreign ship involved in the marine emergency concerned.

It is open to any Contracting Party which transmits information to the Centre or other Contracting Parties to specify that the information should not be divulged to any other person, government, public or private organisation without the specific authorisation of the former Contracting Party (Article IX).

2.4 OBLIGATION TO RESPOND

Article X requires that any Contracting Party faced with a marine emergency situation shall:

- (a) take every appropriate measure to combat pollution and/or rectify the situation;
- (b) immediately inform all other Contracting Parties (either directly or through the Centre) of any action which it has taken or intends to take to combat the pollution;
- (c) make an assessment of the nature and extent of the marine emergency (either directly or with the assistance of the Centre);
- (d) determine the necessary and appropriate action to be taken with respect to the marine emergency in consultation with other Contracting Parties, affected States and the Centre.

2.5 ASSISTANCE BETWEEN CONTRACTING PARTIES

Any Contracting Party requiring assistance in a marine emergency response may call for assistance directly from any other Contracting Party (or through the Centre). The

Contracting Parties to whom a request is made shall use their best endeavours within their capabilities to render the assistance requested (Article XI).

The assistance may include:

- personnel, material and equipment, including facilities or methods for the disposal of the recovered pollutant;
- surveillance and monitoring capacity;
- facilitation of the transfer of personnel, material and equipment into, out of and through the territories of the Contracting Parties.

2.6 OBLIGATIONS ON CONTRACTING PARTIES TO COOPERATE AND COORDINATE ACTIVITIES

Each Contracting Party has an obligation to establish and maintain an appropriate authority to carry out fully its obligations under the Emergencies Protocol and to co-operate and coordinate its activities with counterparts in the other Contracting Parties (Article XII). The Protocol defines the following as matters to which co-operation and coordination should be directed:

- distribution and allocation of stocks of materials and equipment;
- training of personnel for marine emergency responses;
- marine pollution surveillance and monitoring activities;
- methods of communication in respect of marine emergencies;
- facilitation of the transfer of personnel, equipment and materials involved in marine emergency responses into, out of and through the territories of the Contracting Parties;
- other matters to which the Protocol applies.

3 INSTITUTIONAL ARRANGEMENTS

3.1 ROLE OF SEA PORTS CORPORATION

The Sudanese Maritime Administration Corporation (SMAC), acting on behalf of the Government of the Republic of Sudan as a Contracting Party to the Jeddah Convention, will have responsibility for establishing a national system for responding promptly and effectively to oil pollution incidents. In particular:

- SMAC shall be the competent national authority for combating or otherwise operationally responding to marine emergencies including responsibility for oil pollution preparedness and response, designated in accordance with Article I of the Protocol to the Jeddah Convention.
- SMAC shall be the national operational contact point responsible for the receipt and transmission of oil pollution reports and coordinating information on marine emergencies.
- SMAC shall be the authority which is entitled to act on behalf of the Government of the Sudan to request assistance from external sources or to decide whether to render assistance when requested by a neighbouring State with whom it has bilateral or multilateral agreements.
- SMAC shall be the government agency responsible for the coordination of the Sudan's policy on oil spill response in international affairs.
- SMAC shall be responsible for preparing and implementing the National Oil Spill Contingency Plan for the Sudan.

3.2 NATIONAL CONTINGENCY PLANNING COMMITTEE

To assist it in its task, the SMAC shall be advised by a National Contingency Planning Committee (NCPC) composed of the following members:

- Secretary General of the Federal Higher Council for Environment and Natural Resources (Chairman)
- General Manager of the Sudanese Maritime Administration Corporation (Rapporteur)
- Captain in charge of Maritime Administration Directorate (*ex officio* the National Coordinator (NC))
- Secretary General of the Higher Council for Environment and Natural Resources – Red Sea Governorate
- The General Manager of SPC
- The Manager of Maritime Administration Directorate
- Chief of Port Police
- Chief of Civil Defence - SPC
- A representative of the Red Sea State
- A representative of the Red Sea Province

- Operations Manager of Port Sudan refinery
- General Manager of General Petroleum Company (GPC) representing the Ministry of Energy and Mining
- A representative of the petroleum products distribution companies in Port Sudan, to be elected from among themselves
- The Harbour Master of Suakin Port
- The General Manager of the oil terminal at Bashayer Port
- The Dean of the Marine Science Faculty, Red Sea University
- General Manager of Sudan Line
- Representative of the Navy
- Representative of Economic Security
- Representative of the Department of Environment
- General Directorate of Custom Police
- Director of Red Sea Fisheries Research
- Director of Fisheries
- Representative of each of the Petroleum and Petroleum Products Producing Companies

Terms of Reference

The terms of reference of the National Contingency Planning Committee shall be as follows:

1. To assist the SPC to develop and implement a comprehensive National Oil Spill Contingency Plan for Sudan's coastal waters;
2. To advise, cooperate and take any other action which may be appropriate in order to achieve the long term objective, *viz.* to enable the SPC, and other entities involved in the NOSCP, to respond appropriately to oil spills in Sudanese coastal waters;
3. To keep under review on a permanent basis the procedures of the NOSCP and make appropriate recommendations to SPC for keeping it up to date.
4. To define the responsibility of the polluter and to take the necessary measures for compensation and to follow the process of compensation.
5. To follow the training necessary for implementing the Plan.
6. To follow-up purchase of the equipment necessary for implementing the Plan.
7. To meet at least twice every year, except in emergency cases, at the invitation of the chairman or with the agreement of two third of the members.

3.3 RESPONSIBILITIES OF SUPPORT AGENCIES

3.3.1 Higher Council for Environment and Natural Resources

Because of its responsibility for coordinating national plans and policies on the environment, the Secretary General of HCENR will be the Chairman of the NCPC.

3.3.2 Ministry of Transport

The responsibilities of the Ministry of Transport will be carried out by the Sudanese Maritime Administration Corporation (SMAC).

3.3.3 Sea Ports Corporation

SPC will be responsible for formulation of contingency plans in its ports and provision of necessary equipment.

(3.3.4) General Maritime Operations Directorate

The General Maritime Operations Directorate will implement the formulated plans for oil combating.

(3.3.5) The Coastal Station of the Sea Ports Corporation

The SPC Coastal Station will play the role of the focal point and its responsibility lies in receiving reports of oil pollution incidents and transmission to relevant agencies in accordance with the communication plan shown in the attached map.

3.3.6 Port Police

The Port Police will be responsible for reporting any oil pollution observed in Sudan's territorial waters, in particular incidents occurring in the Wingate anchorage area, the Towartit anchorage area, the territorial waters out to the Sanganeb lighthouse, and the approaches to Suakin. The chief of police will ensure that the skippers of the police launch are aware of these surveillance responsibilities and will inform SPC immediately of any observed oil pollution using the appropriate OILPOL reporting format (Chapter B.1).

3.3.7 Civil Defence – SPC

The Civil Defence will be responsible for all onshore response and clean-up operations within the areas of jurisdiction of SPC in the ports of Port Sudan and Suakin and any port that will be established in future.

3.3.8 Sudan Shipping Line

The Sudan Shipping Line will be responsible for reporting any oil pollution observed in Sudan's territorial waters or on the high seas which might affect Sudan's coastline or related interests. The management of the Sudan Shipping Line will ensure that the masters of all vessels in its fleet are aware of these surveillance responsibilities and will inform SPC immediately of any observed oil pollution using the appropriate OILPOL reporting procedures and format (Chapter B.1).

3.3.9 The Navy

The Navy will be responsible for reporting any oil pollution observed in Sudan's territorial waters or on the high seas which might affect Sudan's coastline or related interests. The Navy command will ensure that its ships' captains are aware of these surveillance responsibilities and that they will inform naval headquarters immediately of any observed oil pollution. Naval HQ will inform SPC using the appropriate OILPOL reporting procedures and format (Chapter B.1).

3.3.10 The Customs Police

The Customs Police will be responsible for ensuring that all customs duties and import taxes will be waived in respect of the temporary importation of oil spill combating equipment which is brought into the Sudan to assist the SPC in mounting an effective response operation to a major oil spill.

3.3.11 Red Sea Province and Red Sea Governorate

In the event of oil pollution coming ashore outside the area of jurisdiction of the SPC, responsibility for dealing with clean-up operations when oil reaches the shoreline will rest primarily with the Red Sea Province, under the overall command of the Incident Commander (Chapter A.5). The Red Sea Province, in close co-operation with the Health Inspectorate of Port Sudan Town Council, will also be responsible for determining the sites for disposal of used oil and contaminated beach material which is not capable of being delivered to Port Sudan refinery for treatment.

A major oil spill will have political implications and it may then be necessary to mobilise political action at the highest level in order to ensure an effective national response and clean-up action. In such an event, the Commissioner or his Deputy should be co-opted on to the NCPC.

3.3.12 Port Sudan Town Council

The municipal authorities are responsible for waste disposal within the area of their jurisdiction. The final disposal of oil contaminated debris following an oil spill, e.g. oily beach sand, will need to be resolved in co-operation with the Health Inspectorate of Port Sudan Town Council and the Red Sea Province.

3.3.13 Port Sudan Refinery

Crude oils and oil-in-water emulsions which are recovered from the sea will usually be capable of being processed at the Port Sudan refinery. It will be necessary to liaise with the refinery on the acceptability of recovered oils for processing.

The Operations Manager will be a member of the NCPC.

3.3.14 Faculty of Marine Science, Red Sea University

The Faculty of Marine Science will fulfil the role of providing scientific advice to the NOSCP, especially advice on environmental matters in the event of a major oil spill.

The Dean of the Marine Science Faculty will be a member of the NCPC.

3.3.15 Marine Fisheries Administration and Red Sea Research Centre

The Marine Fisheries Administration and Red Sea Research Centre should be consulted on any fisheries related activities, in particular concerning the location of fish spawning grounds, shellfish culture areas and local fishing practice.

3.3.16 The Sudanese Petroleum Agency

The Sudanese Petroleum Agency (SPA) represents the Ministry of Energy and Mining in Port Sudan, Suakin and Bashayer Ports and supervises all oil activities. As such, SPA will be an important member of the NCPC and will represent the interests of the State petroleum sector, especially in the important decisions which will have to be taken on an equipment procurement programme. The General Manager will represent General Petroleum Company (GPC) on the NCPC.

3.3.17 Petroleum Products Distribution Companies

There are a number of petroleum companies based in Port Sudan with responsibilities for distributing refined petroleum products within the Sudan. Such companies have an important role to play in the NOSCP since it is likely that their refined products, or the crude oils from which they are produced, will be responsible for many of the oil pollution incidents in Sudanese waters. In particular, a major oil pollution incident involving a laden oil tanker may require the assistance of the oil industry's stockpile of equipment based at Southampton, UK. Both Mobil and Shell are shareholders in Oil Spill Response Ltd (OSRL) at Southampton and consequently have the authority to call on the resources of OSRL.

The petroleum products distribution companies will be invited to elect a representative to serve on the NCPC. The distribution companies will also be requested to contribute to the purchase of the national stockpile of equipment for the NOSCP.

3.3.18 Higher Council for Environment and Natural Resources - Red Sea Province

For its supervisory status on environmental affairs in the Ministry in the Red Sea Province, the Secretary General of the HCENR– Red Sea Governorate will be a member of the NCPC.

4 TIERED RESPONSE CONCEPT AND INITIAL RESPONSE PROCEDURES

A number of factors need to be taken into account in mounting the initial response action to an oil spill:

- the origin (or source) of the spill
- the geographical location of the spill
- the size of the spill
- the sensitivity of the areas threatened by the spill.

These factors, and in particular their relative importance to each other, can all be taken into account in the “tiered response” concept. This is a widely accepted operational concept that provides a convenient categorisation of response levels and a practical basis for oil spill contingency planning. Tiered response recognises three levels.

4.1 TIER ONE

Tier One is concerned with preparedness and response to a small spill within the capabilities of an individual facility or port authority. The type of incident typically involved would generally be associated with ship transfer of oil or bunkering operations at a jetty, pier or mooring and around waterside storage tanks. The response will be controlled by the company’s or the port’s operating procedures in accordance with its own site-specific oil pollution emergency plan. The response will be mounted using company or port authority personnel and company-owned or port-owned (or shared) oil spill combating equipment.

The Tier One emergency plan should recognise the need for local operators and port authorities to control events and to establish a rapid response capability aimed at quickly containing and, if possible, recovering the spilled oil. If this is achieved there will be no need to involve other parties apart from meeting any legal, information or notification requirements.

The upper limit - in terms of spill size - to a Tier One response for the purposes of the Sudanese National Oil Spill Contingency Plan will vary and will be specified in each site specific plan. The Tier One oil pollution emergency plans will form the foundation of the National Oil Spill Contingency Plan. It is likely that they will provide the first response in over 80% of oil pollution incidents. They will be site specific plans and will necessarily vary depending on the type and location of the facility concerned. It is envisaged that there will be three Tier One oil pollution emergency plans in Sudan:

1. the Port Sudan oil pollution emergency plan
2. the Suakin harbour oil pollution emergency plan
3. the oil terminal oil pollution emergency plan at Gezirat Abdallah.

The detailed arrangements for the three Tier One oil pollution emergency plans must be compatible with the NOSCP.

4.2 TIER TWO

By definition, Tier Two is concerned with preparedness and response to a spill that requires the coordination of more than one source of combating equipment and personnel (strike teams). In the Sudan, incidents necessitating a Tier Two response would typically be associated with shipping accidents (collisions and groundings) in ports and harbours, or in estuaries or coastal waters, or at the new terminal.

The concept of Tier Two recognises that an individual company or port authority has limited control over events (apart from mounting the initial response if the incident occurs within their area of jurisdiction) and the geographical area affected by the spill will necessarily be larger than in a Tier One case. In many cases, public amenities will be threatened.

In principle, SPC will take responsibility for coordinating the response to a Tier Two incident as soon as it has been alerted that the response action is beyond the capability of the Tier One oil pollution emergency plan.

4.3 TIER THREE

Tier Three is concerned with a major spill - in excess of 1,000 tonnes - requiring the mobilisation of all available national resources and, depending on the circumstances, may involve the mobilisation of assistance through sub-regional cooperation agreements with neighbouring countries or international assistance from the oil industry's support organisation at Southampton, UK (Oil Spill Response Limited) or other industry arrangements. In most cases the spill will involve a major accident involving a laden oil tanker.

Major oil pollution incidents often become high profile and politically sensitive. SPC will assume control of any Tier Three incident occurring within the Sudan's area of jurisdiction. To assist it in its task, SPC will convene the National Contingency Planning Committee to provide relevant assistance and advice.

5 INCIDENT COMMAND PROCEDURES

5.1 TIER ONE INCIDENT

The Incident Commander in a Tier One oil pollution incident will be the On Scene Commander (OSC) designated in the local oil pollution emergency plan of the respective port authority or oil terminal at which the incident originates.

He will be responsible for managing the response to the incident, and reporting to SPC, in accordance with the Notification Procedures of this Contingency Plan (Chapter B.1).

5.2 TIER TWO INCIDENT

The Incident Commander in a Tier Two oil pollution incident will be the National Coordinator (NC).

In the absence of the designated National Coordinator, his duties will be performed by the most senior official available in the Maritime Administration Directorate. In any particular incident the Captain in charge of the Maritime Administration Directorate may delegate his responsibilities as NC to a named official in writing and this decision should be promulgated to all concerned in the incident.

The NC will coordinate the national response to the incident from the SPC in Port Sudan. He will designate an On Scene Commander (OSC) to take charge of the response actions at the scene of the incident. In certain circumstances, he may decide to fulfil the role of OSC himself.

In the case of an incident which has originated within the area of responsibility of a local oil pollution emergency plan but has escalated beyond the capability of that facility to respond from its own resources, the NC will normally designate the local OSC to continue to direct operations for combating the pollution at sea and preparing shoreline protection. The NC will be responsible for mobilising additional resources from within the Sudan to be placed at the disposal of the OSC.

In the case of an oil pollution incident of unknown origin which has been reported to SPC, the NC will normally designate the facility nearest the scene of the observed pollution to respond to the spill and nominate its local OSC to direct counter pollution operations.

5.3 TIER THREE INCIDENT

The Incident Commander in a Tier Three oil pollution incident will be the General Manager of the Sea Ports Corporation or, in his absence, the National Coordinator.

In particular, the Incident Commander will be responsible for taking the decisions to mobilise resources (personnel and equipment) from outside the Sudan, either from neighbouring countries in the context of the Sudan's membership of the Jeddah Convention or, in close consultation with the petroleum sector in the Sudan, from the oil industry's stockpile of equipment based at Southampton, UK.

The Incident Commander will be responsible for briefing the Minister for the Environment and for all political ramifications of the incident. Ministers will not have an operational role.

The Incident Commander will chair the meetings of the National Contingency Planning Committee which will always be convened in the event of a Tier Three oil pollution incident.

The Incident Commander will be assisted by the NC who will take responsibility, in particular, for coordinating the operational response actions along the lines indicated in section 5.2. The NC will also act as Incident Commander in the absence of the General Manager of SMAC.

6 NATIONAL COMBAT STRATEGY

6.1 THE FATE OF OIL SPILLED AT SEA

When oils are spilt on the surface of the sea they undergo a series of changes which are collectively known as weathering. The following paragraphs summarise the characteristics of weathering for the purposes of defining Sudan's national combat strategy.

Most oils will initially spread rapidly. The rate of spread will be determined by the volume of oil spilt and the rate of its release. A large, sudden release of oil will spread more rapidly than a slow seepage. In the longer term, the rate of spread and the thickness of the oil film will be determined by the type of oil. The area of sea affected can be considerable as theoretically the oil will spread until its thickness is about 0.1 mm or less, depending on the pour point and viscosity of the weathered oil. This means that a spill of 1 tonne of oil will eventually result in a slick covering 14,000 m² (equivalent to a circle with a diameter of 130 m). In contrast, some oils which are carried in tankers as heated cargoes or waxy crude oils may solidify in contact with the sea and relatively thick layers of oil, or even lumps, may occur.

As the oil spreads, the lighter fractions evaporate, causing the viscosity of the oil to increase. During the process of evaporation and spreading, many oils will absorb sea water and, through wave action, this forms a viscous water-in-oil emulsion known as "chocolate mousse".

Some of the spilt oil will disperse naturally and the rate at which this occurs will depend on the oil type and the sea state. For example, light oils in heavy seas may disperse completely in a few days. Conversely, viscous oils, or those which form viscous emulsions when weathered, will not disperse to any great extent and may persist on the sea surface for weeks.

Evaluation of these factors, and in particular the properties of the oil which has been spilled, all have to be taken into account by the On-Scene Commander when deciding the most appropriate response action in an individual case. Nevertheless, certain broad statements concerning the Sudan's national combat strategy can be made.

6.2 COMBAT STRATEGY

The national combat strategy will be based on the following principles:

1. Terminate or reduce the outflow of oil from the source.
2. Where marine or coastal resources are not threatened, monitor the oil slick.
3. Attempt control and recovery of the oil at sea by use of mechanical means.
4. Apply dispersants only in accordance with the national policy for dispersant use.
5. Protect sensitive areas.
6. Shoreline clean-up.

6.3 ACTION TO TERMINATE OR REDUCE THE OUTFLOW OF OIL FROM THE SOURCE

The first priority of a ship's captain or the operator of an onshore oil handling facility must be to terminate the outflow of oil as rapidly as possible. In the case of port authorities or oil handling facilities, it is their responsibility:

- to identify the likely sources of oil pollution incidents in their operations and quantify the "most likely" and "worst case" spill scenarios in their Tier One oil pollution emergency plans;
- to ensure that the most efficient equipment is installed and environmental management systems are in place to minimise the likelihood of incidents occurring and in order to reduce their impact if they do occur.

The objective must be to recover the oil as close to the discharge source as possible in order to prevent widespread dispersal and to ensure maximum recovery.

6.4 MONITORING THE OIL SLICK WHERE MARINE OR COASTAL RESOURCES ARE NOT THREATENED

If no marine or coastal resources are threatened, the decision may be taken to leave the oil to disperse naturally. This is only an option where vessel-source pollution is involved or an oil slick is observed where the pollution source is unknown. Responsibility for monitoring and coordinating the response to such incidents will rest with SPC.

6.5 MECHANICAL RECOVERY OF OIL AT SEA

As a general principle, the mechanical recovery of oil at sea is the most favoured response action on the grounds that it causes the least damage to the environment. However, the feasibility of recovering oil by mechanical means will depend on the type and amount of recovery equipment available, weather conditions, the nature of the oil (e.g. its viscosity), as well as local conditions such as ease of access or the presence of debris. In practice, mechanical recovery will only be worthwhile if the depth of the oil layer can be increased by containing the spillage by the use of booms, thereby allowing equipment to operate at acceptable recovery rates.

6.6 APPLICATION OF DISPERSANTS

Natural dispersion is a slow process and cannot be relied upon to remove the threat from large oil slicks. The process can, however, be accelerated by the addition of certain chemicals (dispersants) to the oil. The dispersants work in two ways: they speed up the rate at which small droplets are formed in the water column and they reduce the tendency for the droplets to re-combine and rejoin the slick.

The process of weathering affects both the ability of oil to disperse naturally into the sea and the effectiveness of dispersants. The onset of resistance to dispersion could appear within hours of release or could be delayed by one or more days. As a general rule, fresh, free-flowing crude oils disperse most easily. However, chemical dispersion becomes increasingly difficult, if not impossible, with weathering. (Colour can be a useful indicator

of weathering: fresh oil is black whereas emulsions are usually brown, orange or yellow). Most oils form emulsions which are not amenable to dispersants after 48 hours.

It is not possible to apply dispersants to some of the medium grades or any of the heavy grades of fuel oils. Such oils are viscous even when fresh and dispersants will have no effect. These oils will not spread over the surface of the sea but will form sharply defined patches or lumps.

Attempts should not be made to use dispersants on iridescent oil sheens. Such slicks are extremely thin and attempts to apply dispersants will result in excessive overdosing. Although a nuisance because of their appearance and smell, such slicks are harmless and will disappear rapidly in moderate to rough weather. In ports and harbours they will be broken up by normal shipping activity.

Because dispersing oil plumes are hazardous to marine life, and dispersants can themselves damage marine organisms if not used appropriately, the use of dispersants will be strictly controlled by SPC under the NOSCP. Specific guidelines governing the use of dispersants in specific situations are set out in Chapter A.7.

6.7 PROTECTION OF SENSITIVE AREAS

Surveys of the entire Sudanese coastline should be carried out with the purpose, *inter alia*, of identifying areas of ecological sensitivity as well as areas of economic importance. It would then be possible to categorise the coastline into areas of high, medium and low sensitivity and create a ranking system to aid contingency planning.

Such a ranking system could be used as the basis for identifying appropriate protection strategies, including the provision of adequate and appropriate equipment and trained personnel. Further work may then be needed to identify those areas where floating booms or shoreline barriers could be used to good effect. This is likely to involve detailed current studies. Where it can be shown that booms can be deployed successfully, consideration could be given to installing fixed boom mooring points in order to protect highly sensitive resources.

6.8 SHORELINE CLEAN-UP

The priority of the national combat strategy is to deal with the oil at sea, preferably by mechanical recovery means but, where appropriate, by the use of chemical dispersants. The cost and length of time taken to complete beach cleaning and the time for recovery of the coastal environment will all be lessened if the spillage can be dealt with while still on the water.

Nevertheless, it is inevitable that in many cases oil spills will reach the shore. In such cases, it is highly desirable to minimise the amount of oil that reaches the shore and to limit the area of coastline affected. A sensitivity mapping survey, such as that described above could be used to identify “sacrificial beaches”, i.e. parts of the coastline where beach clean-up activities can be managed more successfully. Where feasible, floating oil should be deflected to such beaches in order to protect more sensitive resources.

7 POLICY ON THE USE OF DISPERSANTS

NATIONAL COMBAT STRATEGY

As a general principle, mechanical containment and recovery of oil at sea is the most favoured response action on the grounds that it causes the least damage to the environment. However, it is also the option most limited by wind, current and sea conditions. In some cases, therefore, the application of dispersants may be a viable response option. The following paragraphs define those circumstances and conditions under which the use of dispersants will be allowed in Sudanese coastal waters and clarifies those situations when dispersant use will be prohibited.

ADVANTAGES AND DISADVANTAGES OF USING DISPERSANTS

Some of the advantages and disadvantages of using dispersants in oil spill response are listed below.

ADVANTAGES

In contrast to containment and mechanical recovery, dispersants can be used in stronger currents and greater sea states.

Dispersants are often the quickest response method.

By removing the oil from the surface, dispersants help to stop the wind effect on the oil slick's movement that may otherwise push the surface slick towards the shoreline.

Use of dispersants reduces the possibility of contamination of sea birds and mammals.

Dispersants inhibit the formation of water-in-oil emulsions ("chocolate mousse").

Dispersants increase the surface area of oil that is available for natural degradation.

DISADVANTAGES

By introducing the oil into the water column, the process may adversely affect some marine organisms which would not otherwise be reached by oil.

If dispersion of oil is not achieved, the effectiveness of other response methods on oil treated by dispersants *may* decrease.

Dispersants are not effective on all types of oil under all conditions.

There is a limited time window when dispersants can be used effectively.

If used on shore, dispersants may increase the penetration of oil into the sediments.

Use of dispersants introduces an additional quantity of extraneous substances into the marine environment.

Water Depth Limits and Distance from the Shoreline

A number of field studies on the fate of oil and dispersed oil have been carried out internationally. These indicate that hydrocarbon concentrations beneath **untreated** oil slicks measure in the ppb (parts per billion). Under **dispersed** oil slicks, concentrations can be 20 - 50 ppm (parts per million) in the top 5 metres and at depths below approximately 10 metres hydrocarbon concentrations are < 1 ppm.

Mesocosm experiments indicate that the most significant effect of dispersants is an immediate increase in the hydrocarbon exposure to plankton. Acute effects have been observed, but many experiments involved long exposure times. In the open sea, dispersed oil would be diluted much more rapidly than it was in these experiments. Corals, seagrasses and invertebrates can be significantly affected by dispersed oil and full recovery of corals affected by dispersed oil may take up to 10 years.

It can be assumed that the use of dispersants will alter the fate of oil so that there is a greater initial effect in the water column than leaving the oil alone, and dispersed oil will also induce impacts in the nearshore subtidal zone.

In order to minimise environmental damage in shallow waters and the nearshore zone, SPC will not generally allow the use of dispersants:

- in water depths less than 10 metres;
- within 1 nautical mile (1.852 km) of the coastline or an area where the use of dispersants is prohibited (excluding the 10 metre water depth limit).

However, SPC reserves the right to assess each application to use dispersants on its merits.

NET ENVIRONMENTAL BENEFIT

The Sudanese authorities need to be satisfied that the use of dispersants will give the greatest overall benefit to the environment compared with other response options. The environmental effects of dispersed oil versus untreated oil have been analysed on the basis of recorded international field experiments comparing chemically dispersed and untreated oil. The conclusions, which form the basis of Sudanese policy on dispersant use, are summarised below for each ecological resource and economic activity (listed in alphabetical order). This covers both present activities and future activities that might be developed in the coastal region.

Aquaculture

It is undesirable for either untreated oil or dispersed oil to enter aquaculture ponds. Access can be temporarily shut off by closing pipes or sluice gates and the oil spill response should concentrate on removing oil from near the water intakes as quickly as possible. The priority should be for mechanical recovery but dispersant spraying may be an option provided that there is good potential for rapid dilution and removal of dispersed oil by water movements.

Birds

It is clear that the oiling of birds is disastrous for them, either because the oil destroys the insulating and water repelling properties of their plumage, or because of the toxic effects of the ingestion of oil, or because of the indirect effects of the destruction of habitats or food resources. However, the susceptibility of various groups of birds differs considerably. It is generally assumed that dispersion of oil slicks must be beneficial because it reduces the risk of direct fouling and the risk of birds ingesting oil. However, it is also known that dispersants increase the “wet-ability” of feathers which can lead to death by hypothermia. This suggests that direct accidental spraying of wildlife with undiluted dispersants will be harmful. As a general rule, dispersant spraying will not be allowed in areas of national and international importance for birds. However, decisions will be taken on a case by case basis taking into account all the relevant factors including the season of the year.

Coral reefs

Coral reefs are highly productive areas which support a diverse group of organisms, including many commercial fish species. Coral reefs are easily damaged if oiled, may take several decades to recover if killed, and are difficult or impossible to clean.

The susceptibility of coral reefs to oil damage depends on a number of factors: e.g. size of spill, type of oil, type and depth of coral reef, the local wave energy, the current stress of the corals, and others. In many cases oil slicks will float over reefs without causing damage to the submerged corals and associated organisms. The use of dispersants will not be allowed in shallow water over and near coral reefs because this would increase the exposure of the corals to oil droplets in the water column.

Fish

There is no evidence that oil slicks floating in the open sea above free-swimming fish have ever caused declines in fish populations. The net environmental benefit of using dispersants in open water conditions is neutral: dispersant spraying will not provide any advantages for the fish but neither are there likely to be deleterious effects if the dispersed oil is rapidly diluted in deep water. In shallow water, however, dispersed oil in the water column is more likely to reach concentrations where it may harm or taint fish, particularly young ones.

Dispersant spraying may be an option in open sea conditions. Dispersant spraying will not be allowed in shallow-water spawning and nursery areas.

Mangroves

Mangrove stands are highly productive areas and they provide habitats for a large variety of organisms as well as serving as a nursery ground for many fish and crustacean species. Mangrove trees commonly die when oiled thus resulting in loss of habitats for dependent species. Chemically dispersed oil has minor effects on mangroves compared with their sensitivity to more toxic undispersed crude oils. Damage is effected either through the coverage of breathing spores on the aerial root systems or through oil penetration of the sediments. Mangroves are often associated with coral reef ecosystems and these could be damaged by dispersed oil.

In general, dispersants will not be allowed within the vicinity of mangrove stands unless the Incident Commander judges that there will be a net environmental benefit taking all circumstances into account.

Marine mammals and turtles

Marine mammals are scarce in Sudanese waters and there is no documented evidence of oil spill impacts on dolphins or dugongs, whose main habitats are seagrass beds (see below). Turtles are vulnerable to oil, eggs laid in sandy beaches and juveniles swimming in surface waters being their most sensitive stages. Depending on the season and circumstances, dispersants will not be allowed close to known turtle nesting beaches because of the increased likelihood of oil being incorporated in sediments.

Ports and harbours

Sea conditions in ports, harbours and docks in industrial areas are generally calm. Conditions are therefore relatively good for containment and physical removal of the oil. Furthermore, most oil spills in port areas deriving from normal shipping activities will be of marine diesel (gas/oil), heavy fuel oil (e.g. bunker 6) or intermediates. Spills of gas/oil (commonly used in new vessels) will evaporate or disperse naturally; heavy fuel oils cannot be dispersed; and intermediate products will either evaporate or are not amenable to dispersion.

Dispersants will not be allowed within the confines of port areas. Consideration will be given to the use of dispersants in anchorage areas on a case by case basis.

Saltmarshes

Saltmarshes are extremely productive and are valuable habitats for many species, especially birds. Saltmarshes are oil traps and recovery times from oiling vary widely, from one or two years to decades. Thus the protection of saltmarshes (where they occur) is a high priority. The emphasis should be on booming the inlets to protect threatened marsh areas. Decisions on the applicability of dispersants as a response option will be taken on a case by case basis.

Seagrass beds

Seagrass beds are important nursery areas for reef fish and shrimps and are also feeding grounds for many fish, for Green Turtle and for dugong. They occur both intertidally and in shallow sub-tidal areas. Seagrass beds have not been mapped systematically in the Sudan.

There is a possibility that dispersed oil in the water column could affect submerged seagrasses more than oil slicks floating on the surface above. Dispersants will not be allowed in the vicinity of seagrass beds in shallow waters.

Shellfish

Oil slicks floating above shellfish areas are unlikely to harm them but exposure to oil - and possible tainting - are likely to increase if dispersed oil enters the water column. Dispersant application will not be allowed for the treatment of oil slicks in near-shore waters with shellfishery activities.

Tourist resources and amenity areas

Where they occur, recreational areas, such as bathing beaches and boat marinas, are important economically. Such areas are usually of low importance from the biological point of view. The appropriate response option, including the use of dispersants, will be evaluated on a case by case basis.

Water intakes

Water intakes for desalination plants or cooling systems may be damaged by the intake of oil-contaminated water. The use of dispersants close to water intakes of industrial facilities will increase the risk of oil passing under protective booms and entering the water intakes. The use of dispersants will not be allowed within the vicinity of water intakes.

Summary

A summary of the policy on the use of dispersants, based on its net environmental benefit analysis, is set out in Table 7.1.

Resource at risk	Acceptability of dispersants	Resource at risk	Acceptability of dispersants
Aquaculture	Case by case	Ports and harbours Anchorage areas	No Case by case
Bird areas	Generally no but on case by case basis	Salt-marshes	Case by case
Coral reefs	No	Seagrass beds	No
Fishing grounds	Open sea: case by case	Shellfish beds	No
Spawning grounds	No		
Mangroves	Generally no but on case by case basis	Tourist resources	Case by case
Marine mammals	Generally no	Water intakes	No

Table 7.1: Summary of the acceptability of the use of dispersants

Decision checklist on the use of dispersants

Due to weathering of the oil, there is a short “window of opportunity” for effective dispersant spraying. Its duration depends on a number of factors, notably the oil type, but is generally in the order of 24 hours and rarely lasts beyond 2 or 3 days. Most oils (with the important exceptions of heavy crude oils and fuel oils) can be successfully treated with dispersants in the first 4 to 6 hours of a spill. In order that dispersant spraying can begin as soon as possible, it is essential that the dispersant response option is decided quickly. A decision checklist is given overleaf.

DECISION CHECKLIST ON THE USE OF DISPERSANTS

No.	Question	Decision
1	Will the oil slick abate as a result of evaporation or natural dispersion?	
2	Is containment and mechanical recovery practicable? <ul style="list-style-type: none"> • Sea state? • Wind speed and strength? • Current speed and direction? • Equipment available? 	
3	Is the oil of a type and in a condition which is amenable to chemical dispersion?	
4	Is the slick in or approaching a “dispersant prohibition zone”?	
5	Will chemical dispersion be more detrimental than leaving alone and concentrating on shoreline protection?	
6	How effective is dispersant application likely to be? <ul style="list-style-type: none"> • Amount of oil spilled? • Amount of dispersant available? • Delivery method? • Response time? • Number of runs available per 24 hrs? • Estimated application coverage? 	
7	Is spotter aircraft available to monitor situation?	
8	Will there be simultaneous action on mechanical recovery (in a different part of the oil slick)?	
9	Have shoreline protection measures been initiated?	

8 SENSITIVE AREAS: PRIORITIES FOR PROTECTION

8.1 CORAL REEFS

Coral reefs should be considered priority areas for protection from oil spills due to their very high species diversity, their uniqueness and their considerable potential economic importance for the tourist industry and also for fisheries.

Extensive coral reefs are found the length of the Sudanese coast. The dominant reef type is the fringing reef extending almost continuously along the coast and which acts as a breakwater. Sanganeb Atoll has been designated as a national marine park.

Coral reefs are threatened by small chronic oil spills in particular, but larger acute oil spills may also affect coral reefs; the observed biological impacts of oil spills on reefs range from mass mortality of fish and invertebrates to apparently no ill effects. Generally oil floats over the reef. However oil components may come in contact with corals in a number of ways:

- Some reefs are exposed to the air during low tides. Oil can come in contact with corals and cause severe damage on such reefs
- Waves breaking on the reefs may create droplets of oil that are distributed into the water-column
- Weathering processes cause oil to sink
- Oil components can dissolve in water to some extent which exposes the corals to potentially toxic compounds. However, toxic concentrations are only encountered in the uppermost part of the water-column.
- Sand landing on an oil slick during sand storms can cause the oil to sink
- The use of chemical oil dispersants will increase the dispersion of the oil into the water, thus increasing the potential for contact with the corals.

Based on these considerations coral reefs can be ranked with respect to sensitivity as indicated in Table 8.1.

Degree of vulnerability	Reef Type
Very vulnerable reefs	A. Reefs on very shallow water where the reef edge and reef flats may be exposed to air during low tide. There is a high risk of direct contact between corals and oil and the reef can be severely damaged.
	B: Reefs in sheltered shallow waters where high concentrations of dissolved oil may persist for quite a long time.
	C. Reefs on shallow waters which are already stressed by pollution, sedimentation, tourism etc.
Reefs of medium vulnerability	Reefs on shallow water. High concentrations of dissolved toxic oil components may be encountered in the water around the corals beneath large fresh oil slicks on such reefs.
Reefs of low vulnerability	Reefs on deeper waters. Oil floats over the reef and dilution reduces oil concentrations around the corals to below acute toxic levels.

8.2 MANGROVES

Mangroves (*Avicennia marina*) are well known for being particularly sensitive to oil spills and should be considered priority areas for protection.

An FAO study carried out in 1995 identified a total of 13 mangrove areas along the Sudanese Red Sea coast, in particular along bays, lagoons and sheltered coastlines and on nearshore islets. Each area comprises several small stands, often less than 50 metres in width. The total area of mangroves is estimated to be in the region of 500 ha. The 13 areas identified are:

1. Halaib
2. Mohamed Qol
3. Arakiay
4. Halut
5. Kilo Tammania
6. Kalaneib
7. Hoshiri
8. Kuwai
9. Guwab / Marsa Haidoub
10. Eirim
11. Ashat
12. Tokar
13. Agig

Mangroves are highly productive ecosystems providing food and shelter for a large number of species. Over 30 different fish species are reported from the mangrove areas of the Sudan, several of them of commercial importance and dependent on the mangroves for at least part of their lifecycle. Mangroves are also essential habitats for numerous birds.

Mangroves typically grow in more or less anaerobic sediments. They receive oxygen through aerial roots protruding from the sediment surface. There are pores on the aerial roots through which oxygen passes. This root system makes mangroves highly susceptible to oiling. Oil slicks may enter mangroves when the tide is high and are deposited on the aerial roots and sediment surface as the tide recedes. The pores in the aerial roots become clogged by the oil and if many roots are oiled, the respiratory system collapses and the trees die. Mangroves can also be killed due to toxic effects of oil components, especially low boiling aromatics. The toxicity of oil gradually decreases because the toxic aromatics evaporate. Toxic effects therefore mainly arise from newly spilled oil.

Oil easily gets trapped in the mangroves and usually persists for a very long time. The oil is subject to microbial degradation which may be a rapid process in aerobic environments but if the oil is buried within fine anaerobic sediments, biodegradation proceeds very slowly.

8.3 SALTMARSHES

Saltmarshes are also sensitive to oil pollution. There are various types of saltmarsh vegetation. Reed marshes are dominated by *Phragmites australis* and *Typha domingensis*. Marshes are extremely productive and are valuable habitats for many species. They are essential habitats for numerous birds, both as roosting and breeding sites for resident species and stopover and feeding grounds for migrants.

8.4 FISHING AND SPAWNING GROUNDS

In general, all the shallow water areas (mersas) along the Sudanese coast are potential spawning grounds and this should be recognised in the event of an oil spill.

The only spawning ground for oysters is Dongonab Bay. The only mariculture activity in the Sudan is at Mohamed Qol where there are 8 oyster farms producing mother of pearl for export.

The coastline from about 50 km south of Suakin to the border with Eritrea is subject to high rainfall and is a good area for shrimp.

The two areas where trawl fishing is carried out - the Tokar delta in the south and Ofoul Bay in the north - are also priority areas for protection in the event of an oil spill.

8.5 HUMAN USE RESOURCES

Human use resources may also be at risk from oil spills. Primarily these will be the port facilities and other human use activities in the region of the most likely spill locations, i.e. Port Sudan harbour, Suakin port, the new oil terminal when it is built.

The position of all seawater intakes should be identified and mapped. Discussions should be held with the owners of the water intakes about the vulnerability to oil spills and the need for protection measures to prevent contamination.

9 OIL SPILL RISKS

9.1 IDENTIFICATION OF ACTIVITIES AND RISKS

The Sudan has no offshore oil development so all the oil spill risks are associated with shipping activities and notably tanker traffic, including that which will be associated with the new oil terminal.

According to statistics analysed by the International Tanker Owners' Pollution Federation (ITOPF), during the period 1974-96 the major causes of oil spills worldwide were as follows:

- loading and discharge operations from tankers:..... 70.7%
- bunkering operations:..... 12.5%
- groundings:..... 9.3%
- collisions: 7.5%

In global terms, less than 20% of recorded oil spills greater than 7 tonnes are more than 1,000 tonnes in size (Tier Three). Only 5% of recorded oil spills are greater than 10,000 tonnes.

9.2 TYPICAL SPILL SIZE: SHIPPING SECTOR

The different causes of oil spills are likely to result in different spill sizes. Table 9.1 shows the typical spill size arising from incidents involving ship operations.

Type of spill	Typical spill size (tonnes)
Operational spill (emptying of bilge water, oily waste water or ballast water)	< 2
Accidents during loading or unloading of oil cargo	< 10
Accidents during terminal operations of bunker oil	2 - 20
Accidents during terminal operations of crude oil	< 100
Ship collision with rupture of one bunker oil tank in cargo or bulk carrier (20,000 DWT)	500
Ship wreckage of cargo / bulk carrier (20,000 DWT) with release of all bunker oil	1,500
Ship collision with rupture of one tank in oil tanker (100,000 DWT)	7,500
Ship wreckage of oil tanker with release of total load	100,000

Table 9.1: Typical Spill Size: Shipping Sector

This indicates that the *most probable* spill size of an incident in Port Sudan or Suakin is unlikely to exceed 20 tonnes.

A major Tier Two or Tier Three oil spill in Sudan will therefore almost certainly involve a laden oil tanker. Table 9.2 shows the impact of tanker size on credible spill potential.

Typical tonnage (deadweight)	Slight grounding or collision (one wing tank)	Grounding with rupture of tanks (2 wing tanks + 1 centre tank)	Bunker fuel
30,000	700	3,000	1,350
50,000	1,100	5,000	5,200
70,000	3,000	12,500	2,300
100,000	5,500	21,000	7,000
200,000	10,500	45,000	8,300
240,000	15,000	60,000	12,000

Table 9.2: Impact of tanker size on credible spill potential (tonnes)
(Source: IPIECA)

It should be noted that oil spills can happen almost anywhere and at any time. There is no miracle cure and a major near-shore spill from a tanker will invariably have an impact on shorelines, unless winds and currents carry the oil out to sea where it can disperse and degrade naturally. Given Sudan's climatic regime and comprehensive reef system, this is unlikely to happen to a spill in near-shore waters. Although large instantaneous spills from tankers are exceptional, there are geographical areas that can be identified as higher risk and these are identified below:

1. The approaches to Port Sudan
2. The Wingate Reef anchorage area
3. The Towartit Reef channel

9.3 TYPES OF OIL LIKELY TO BE SPILLED

The most likely types of oil to be spilled are those which are imported at Port Sudan:

- Arabian light crude oil
- Iranian light crude oil
- Qatar marine crude oil
- Basra crude oil
- Libyan crude oil
- gas oil (diesel)
- mogas (petrol or gasoline)
- bunker fuel oils

9.4 PROBABLE FATE OF SPILLED OIL

Oceanography of the Red Sea

The Red Sea is characterised by its high salinity levels, which decrease southwards. The dissolved salts in the surface waters range between 38 and 41 parts per thousand (compared to 35 parts per thousand in the open oceans). Much higher values can be found in shallow lagoons and coastal depressions which trap high tides. This high salinity is due to the hot climate, which increases the rate of evaporation, and the absence of any rivers adding fresh water.

The surface sea temperatures in the northern part of the Red Sea range from approximately 20 °C to 26 °C. At Port Sudan the temperature range is between 26 °C to 30 °C, depending on the time of the year.

Tidal movements along the Red Sea coast in the Sudan are very small but are relatively easily affected by local winds due to the narrowness of the Red Sea compared with larger seas. The normal tides occur on a semi-diurnal basis with the whole sea oscillating around a point approximately at the latitude of Port Sudan. The maximal tidal ranges of only 50 cm are noted at the northern end of the Red Sea. In the central part (Sudan) there are virtually no daily tides.

However, seasonal variations in the water level of the Red Sea occur. In the summer, the mean water level in the central region is nearly a metre lower than in winter due to the influence of the change between summer and winter monsoon in the Indian Ocean.

The prevailing winds in the Red Sea coastal area are the trade winds that normally blow from a northerly or north-easterly direction. These winds are intensified in winter. At Port Sudan the **average** velocity of the North and Northwest trade winds is between 7-11 km/h, but during the winter the **maximum** velocity can be as high as 120 km/h.

In summer, however, the central and southern parts of the Red Sea fall under the influence of the south-westerly trade winds. Strong winds are uncommon in summer.

The currents of the Red Sea are more easily influenced by local and monsoon winds than those in large bodies of water. This is due to the narrowness of the Red Sea (only 306 km wide) and its irregular coastline. From November to April, surface currents flow northwards; for the rest of the year, surface currents flow southward.

The consequences of this oceanographic and meteorological situation are that any oil spills which occur in the southward moving shipping lane of the Red Sea, if they do not disperse naturally, are likely to be taken by wind and current in the direction of the Sudanese coast.

PART B: Operational Procedures

1 NOTIFICATION PROCEDURES

Reports of oil pollution at sea - and reports of marine accidents which have caused, or which threaten to cause, pollution - can come from a number of sources:

- as a result of planned surveillance activities
- through the observations of government agencies (e.g. port authorities, the navy, port police)
- from passing shipping or over-flying commercial aircraft
- from those responsible for the incident
- from the general public.

The Coastal Station of the Sea Ports Corporation is on call 24 hours a day. The radio operations room of the Marine Administration Directorate of SPC is the designated national contact point responsible for the receipt and transmission of oil pollution reports.

In order to operate effectively, the SMAC must:

- be alerted promptly to any spillages of oil or threatened spillages of oil
- be given adequate and accurate information
- have effective lines of communication with support agencies and the petroleum sector.

Reports from shipping

The International Maritime Organization (IMO) has a standard reporting format and procedures for reporting incidents on ships involving the loss - or likely loss - of dangerous goods, harmful substances and marine pollutants, including oil. Such reports should be submitted to the nearest coastal State.

Reports using the format in Chapter B.2 should be made to SPC, in accordance with this Contingency Plan, whenever oil (or other harmful substance) is observed at sea or whenever any ship is seen to be discharging oil (or other harmful substances). Ships of the Sudan Shipping Line are particularly requested to undertake surveillance responsibilities in this respect.

Reports from the Navy and Port Police

Both the Navy and the Port Police undertake regular surveillance patrols in Sudanese coastal waters. Reports using the format in Chapter B.2 should be made to SPC, in

accordance with this Contingency Plan, whenever oil (or other harmful substance) is observed at sea or whenever any ship is seen to be discharging oil (or other harmful substances).

Reports from aircraft

Arrangements should be made with Sudan Airlines to require pilots of aircraft to report to the appropriate air traffic control authority when substantial patches of oil are observed on the surface of the sea. Such reports will then be referred to the SMAC.

2 OILPOL: OIL POLLUTION REPORTING FORMAT

EXPLANATORY NOTE

This format is to be used by the reporting agency to inform SPC about an oil pollution incident, or the threat of an oil pollution incident. Every effort should be made to provide all the information requested. However, the notification of an incident to SPC should not be delayed simply because not all information is immediately available.

Identity code	Information to be provided	Explanation
A	CLASSIFICATION of Report: - Doubtful - Probable - Confirmed	Delete as appropriate
B	DATE & TIME IDENTITY	Date and time <u>pollution observed</u> Identity of observer/reporter
C	POSITION & EXTENT OF POLLUTION	If possible, state range and bearing of some prominent landmark or Decca position and estimated amount of pollution, e.g. size of polluted area; number of tonnes of oil spilled. When appropriate, give position of observer relative to pollution.
D	TIDE & WIND	Indicate speed and direction
E	WEATHER CONDITIONS & SEA STATE	Indicate as appropriate
F	CHARACTERISTICS OF POLLUTION	Give type of pollution, e.g. crude oil or otherwise. Give visual appearance, e.g. liquid oil; semi-liquid sludge; tarry lumps; weathered oil; discolouration of sea
G	SOURCE & CAUSE OF POLLUTION	e.g. from vessel or oil handling facility. If from a vessel, say whether as a result of apparent deliberate discharge or a casualty. If the latter, give a brief description. Where possible, give name, type, size, nationality and Port of Registry of polluting vessel. If vessel is proceeding on its way, give course, speed and destination (if known).

H	VESSELS IN THE AREA	Details of vessels in the area to be given if the polluter cannot be identified and the spill is considered to be of recent origin.
J	PHOTOGRAPHS & SAMPLES	State whether photographs have been taken and/or samples for analysis.
K	REMEDIAL ACTION	State any remedial action taken, or intended, to deal with the spillage.
L	POLLUTION FORECAST	Forecast of likely effect of pollution, e.g. arrival on beach with estimated timing.
M	OTHERS INFORMED	Name other individuals or agencies informed other than SPC.
N	OTHER INFORMATION	Give any other relevant information, e.g. names of other witnesses.

CONTACTING SMAC

SMAC should be contacted immediately by telephone:

Tel: 25660 or Mobile: 012310997

Written confirmation, using the OILPOL format, should be faxed as soon as possible to:

Fax: 31276

OILPOL REPORT FORMAT

This format is to be used to inform SMAC about an oil pollution incident, or the threat of an oil pollution incident. Every effort should be made to provide all the information requested. However, the notification of an incident to SMAC should not be delayed simply because not all information is immediately available.

Id code	Information to be provided	
A	CLASSIFICATION of Report: - Doubtful - Probable - Confirmed	
B	DATE & TIME IDENTITY	
C	POSITION & EXTENT OF POLLUTION	
D	TIDE WIND	
E	WEATHER CONDITIONS & SEA STATE	
F	CHARACTERISTICS OF POLLUTION	
G	SOURCE & CAUSE OF POLLUTION	

H	VESSELS IN THE AREA	
J	PHOTOGRAPHS & SAMPLES	
K	REMEDIAL ACTION	
L	POLLUTION FORECAST	
M	OTHERS INFORMED	
N	OTHER INFORMATION	

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Fax: 31276

3. RESPONSIBILITIES OF THE MEMBERS OF THE OIL SPILL RESPONSE TEAM

The following is a checklist of duties required of the oil spill response team. It defines the responsibilities of the National Coordinator in the event of a Tier Two or Tier Three oil pollution incident. It also constitutes a checklist for organisations establishing their own local oil pollution emergency plans.

National Coordinator

The National Coordinator (NC) means the Captain in charge of the Maritime Administration Directorate of SPC. He will be the Incident Commander in a Tier Two oil pollution incident and will assist the General Manager of SPC in a Tier Three oil pollution incident. He is responsible for nominating an On Scene Commander (OSC) to take command of response actions at the scene of the incident. Depending on the circumstances and location of the spill, the NC may in some circumstances act as the OSC himself. The NC will coordinate the activities of the various organisations involved in the response action including the subsequent clean-up operations. The NC has overall decision making responsibility in a Tier Two incident and will be supported by appropriate operational, administrative and scientific personnel. Where necessary, the NC will convene the National Contingency Planning Committee to assist him in the decision making process.

The duties of the NC include:

1. To assess the spill in the light of information received by telephone or the OILPOL reporting format, and define its potential impact and the probable spill area.
2. When he is not fulfilling the duties of On Scene Commander (OSC) himself, to nominate an OSC to take command of response actions at the scene of the incident.
3. To activate the procedures for mobilising SPC's resources.
4. To consider requests for assistance from the OSC and to coordinate the mobilisation of additional resources (personnel and equipment), if necessary from outside the Sudan.

On Scene Commander

The On Scene Commander (OSC) is the person named in the local oil pollution emergency plan, or is nominated by the NC in the event of a Tier Two or Tier Three spill, to direct the overall response operation both at sea and on land. The OSC has overall decision making responsibility for the tactical response to an oil pollution incident and should be supported by appropriate operational, scientific and administrative personnel. In some cases the duties of the OSC will be carried out by the National Coordinator. The duties of the OSC are:

1. To assess the spill and define its potential impact and the probable spill area.
2. To determine the level of response and the scale of the response team required (the potential explosive and fire hazard should also be considered).

3. To notify SPC by telephone or fax in accordance with the NOSCP notification procedures and to keep SPC informed of developments by means of regular Situation Reports (see below).
4. If the origin of the spill is unknown, to arrange for the collection of samples for identification.
5. To appoint Team Leaders to take command of the response actions at sea and for shoreline protection respectively.
6. To set up an Emergency Operations Centre (EOC).
7. To initiate and direct response measures to stop and contain the spill and to recover oil (both within and outside containment areas).
8. To determine whether to use dispersants in accordance with the NOSCP policy for the use of dispersants.
9. To activate the aerial application of dispersants if this is part of the response strategy.
10. To arrange for shoreline protection measures if the spill is likely to impact the coastline.
11. To ensure that the original spill area is recorded on a marine survey chart with date, time, wind velocity and direction, tides, and equipment mobilised (booms, vessels, et cetera). This chart should be updated as required.
12. To arrange for survey of the spill area by marine or aerial observations, including photographic or video records.
13. To arrange for a photographic record of:
 - the origin of the spill
 - the spill area
 - property damaged through the spill (boats, fishing nets, tourist amenities, and similar.)
 - impacted shorelines (beaches, rocks, walls, etc.)
 - the EOC action boards
 - spill clean-up equipment in use

This record may be needed as evidence in support of claims for compensation.

14. To initiate the appropriate level of documentation needed for effective cost recovery action. This will include the accurate logging of quantities of recovered oil and removed oily sand and beach material. The condition of all oil spill combating equipment should be known and recorded before the spill; the condition of the equipment on completion of the recovery operations should be recorded.
15. To organise daily debriefing sessions with all key members of the response team.
16. To ensure that situation reports (SITREPs) are provided at regular intervals (at least every 24 hours during response actions) and are transmitted by fax to SPC.
17. To ensure timely release of press notices through the Media Liaison Officer.
18. To prepare daily work plans, shift rosters for personnel, etc. with the Team Leaders.

19. To decide when to scale down and/or terminate the response activity. These decisions may be different for the marine and shoreline operations.
20. To ensure cleaning up and return of equipment in good order.
21. To prepare a report covering all aspects of the spill and response operation and submit a copy to SPC.

Marine Team Leader

The Marine Team Leader (MTL) is responsible for all waterborne activities undertaken in connection with the spill. His tasks will be related to the containment of the oil at sea, the spraying of dispersants from vessels where this has been approved by SPC, and the protection of the coastline by the deployment of booms. The duties of the MTL are:

1. To provide advice and recommendations to the OSC on offshore response tactics within the spill area.
2. To make recommendations to the OSC on the appropriate vessels and offshore oil spill response equipment needed. This may require the OSC or the NC seeking assistance from other equipment stockpiles.
3. To allocate boat crews and ensure the safety of personnel.
4. To advise the OSC regularly on the progress of the offshore operations and make recommendations on developments as they occur.
5. To ensure that adequate information is provided to the Administrative Supervisor who will maintain a documentary record of the spill.
6. To prepare for refuelling and servicing of equipment throughout the day and, after use, at night.
7. To regularly check that the deployment of vessels and equipment is being used to best possible effect.
8. To participate in the daily debriefing sessions.

Shore Team Leader

The Shore Team Leader (STL) is responsible for all activities undertaken on the foreshore for the protection of sensitive resources. He is also responsible for the coordination of shoreline clean-up activities, including the temporary and ultimate disposal of collected oil and waste materials. The duties of the STL are:

1. To provide advice and recommendations to the OSC on foreshore response tactics within the area affected by the spill.
2. To make recommendations to the OSC on the appropriate shoreline clean-up equipment needed, including manpower resources. This may require the OSC or the NC seeking assistance from other equipment stockpiles and response teams.
3. To organise shoreline clean-up teams and ensure the safety of personnel.
4. To ensure that all clean-up measures are undertaken with environmental considerations in mind. This means taking into account any clean-up guidelines (including prohibited techniques) issued by the appropriate authorities.
5. To ensure that temporary arrangements are made for the separate collection of oil which may be reprocessed and oil contaminated material.
6. To arrange for the transfer of oil to Port Sudan refinery for processing.
7. To arrange for the final disposal of any oil contaminated material in consultation with SPC, the Red Sea Province and Port Sudan Town Council.
8. To advise the OSC regularly on the progress of clean-up operations and make recommendations on developments as they occur.
9. To ensure that adequate information is provided to the Administrative Supervisor who will maintain a documentary record of the spill.
10. To prepare for refuelling and servicing of equipment throughout the day and, after use, at night.
11. To regularly check that the deployment of personnel and equipment is being used to best possible effect.
12. To participate in the daily debriefing sessions.

Administrative Supervisor

The Administrative Supervisor (AS) is responsible to the OSC for the provision of financial, record keeping, procurement and clerical services required in connection with the oil spill response. The AS will direct a team specifically tasked to provide clerical and administrative support. The size and complexity of the team will depend on the size and complexity of the spill. The duties of the AS are:

1. To keep account of all manpower, equipment and materials used in the response. He should ensure that he receives all necessary information for record keeping purposes from the MTL and the STL. He should compile daily record sheets of the manpower resources and equipment used at **each** separate location where personnel and equipment are deployed.
2. To maintain the action boards in the EOC with updated information on personnel and equipment deployed, etc.
3. To consult the NOSCP for information on additional equipment and resources which may be available if requested.
4. To arrange the delivery point for equipment and manpower resources brought in from outside. To arrange for the issue of all security passes and accommodation for assisting external personnel.
5. To check the condition of equipment brought in from outside on arrival and arrange storage area.
6. To arrange security protection for all equipment overnight where necessary.
7. To ensure that all business agreements are formalised (purchases, hiring, leases, etc.).
8. To set up a system for processing claims for damages, taking account of any advice from the appropriate authorities.
9. To obtain names and addresses of property owners affected by the spill (water frontages, boat owners, etc.) and details of the damage incurred.
10. To arrange entry to private or military property if required for shoreline protection or clean-up purposes.
11. To ensure that adequate medical resources are on hand and that the location of the nearest hospital and ambulance station are known.
12. To arrange fresh water supplies, food and drink facilities for all combating personnel.
13. To participate in the daily debriefing sessions.

Communications Supervisor

The Communications Supervisor (CS) is responsible for the coordination of all communications aspects connected with the spill. The duties of the CS are:

1. To obtain adequate communications equipment for distribution to personnel at sea and on shore and ensure that personnel know how to use them.
2. To appoint a VHF radio operator(s) at the EOC.
3. To ensure that effective communications links are maintained between the EOC and the on-scene coordination units.
4. To transmit and receive all radio messages as required by EOC personnel.
5. To ensure that all information is being logged.
6. To set up a communications network board.
7. To arrange radio battery replacement and overnight charging and repairs.
8. To ensure that the EOC radio is manned during all marine and onshore operations.
9. To participate in the daily debriefing sessions.

Scientific Adviser

The Scientific Adviser (SA) is responsible for providing the OSC with scientific expertise in respect of environmental issues and priorities. The duties of the SA are:

1. To assess the spill's potential impact on environmental resources.
2. To provide the OSC with a balanced assessment of environmental priorities within the area under threat.
3. To coordinate any external information received from outside scientific and environmental interests.
4. To assist in the designation of suitable disposal sites, taking account of environmental considerations.
5. To coordinate the cleaning of any birds and wildlife that are injured by the spill.
6. To compile a report on the environmental implications of the spill for inclusion in the spill report to be compiled by the OSC.
7. To coordinate any post-spill environmental monitoring studies that are required.
8. To participate in the daily debriefing sessions.

Media Liaison Officer

In the case of a large oil spill where public interest will be aroused, it will be necessary to appoint a Media Liaison Officer (MELO) to act as the focal point for all communications with the media. He will be responsible for coordinating all media statements and the issue of press releases. The duties of the MELO are:

1. To obtain SITREPs from the OSC and prepare a draft press release.
2. To arrange a press room for media representatives to work equipped with tables, telephones, fax machines and support information.
3. To ensure with the site security staff that the arrival of media representatives is reported to the MELO and that they are escorted to the press room.
4. To prepare material for press conference listing:
 - all desirable points for publication
 - points of doubtful value (note positive aspects)
 - undesirable points (questions to be avoided)
5. To arrange participants for press conference.
6. To keep OSC informed of scope of press briefings and report back on questions raised.
7. To arrange personal contact with and the release of information to private organisations (e.g. hotels threatened by the incident) and public bodies concerned.
8. To arrange for recorded copies of radio and television bulletins or comments on the incident.
9. To keep a press record book of all published reports on the incident in newspapers or journals.
10. To ensure that public warning notices are erected where necessary.

PART C: DATA DIRECTORY

CONTACT POINTS

Organisation	Responsible Official	Tel & Fax Nos.
Agip	Depot Superintendent	Tel: 23805 Fax: 29943
Customs – Red Sea	Director	Tel: 22609 Fax: 24559
Economic Free Zone	Manager	Tel: 26155 Fax: 29853
Electricity Power Station	General Manager	Tel: 22672
Civil Defence, (SPC)	Director	Tel (HQ): 24444 Tel (South Harbour): 25000
General Petroleum Company	General Manager	Tel: 22472
Higher Council of Environment & Natural Resources	Secretary General	Tel: 784 279 Fax: 787617
ITMD Tyre Manufacturing Company	Deputy General Manager	Tel: 22185
Marine Fisheries Administration	Director	Tel: 26162
Ministry of Environment & Rural Development	Secretary General	Tel: 773832 Fax: 471 437
Ministry of Agriculture, Animal Wealth & Irrigation	The Minister	Tel. 26922
Ministry of Transport, Khartoum	Secretary General	Tel.: 776855
Mobil	Terminal Manager	Tel: 24218/22619/23639 Fax: 24218
Navy	Navy Commander	Tel: 23776/23016/23035
P & I Club Representative	Manager	Tel: 27656/27641 Fax: 17660
Port Police	Director	Tel. 22128

Port Sudan Refinery	Operations Manager	Tel.: 23994/5 Fax: 24669
Environment and Food Health Department	Director	Tel: 23205
Red Sea Province	Commissioner	Tel: 22768
Red Sea Fisheries Research Centre	Director	Tel: 24667/29043
Red Sea University, Faculty of Marine Science	Dean	Tel: 22509 Fax: 27778
Sea Ports Corporation	General Manager	Tel: 24103/20400 Fax: 22258
Sea Ports Corporation	Head, Maritime Administration Directorate	Tel: 20554 Fax: 31276
Sea Ports Corporation	Deputy General Operation Manager	Tel: 22625 Fax: 22258
Shell	Installation Manager	Tel: 23129 Fax: 25261
Sudan Shipping Line	General Manager	Tel: 25323 Fax: 25778
General Tourism Directorate, -Red Sea	Director	Tel.: 31724
Ministry of Energy and Mining	Secretary General	Tel.: 774946

LIST OF RECIPIENTS OF THE NOSCP

AGIP	Port Police
Customs	Port Sudan Refinery
Civil Defence (SPC)	Environment and Food Health Department
General Petroleum Company	Red Sea Province
Higher Council for Environment and Natural Resources	Red Sea Fisheries Research Centre
Marine Fisheries Administration	Faculty of Marine Science – Red Sea University
Ministry of Environment and Rural Development	Sea Port Corporation
Ministry of Agriculture, Animal Wealth and Irrigation	Shell – Port Sudan
Ministry of Transport – Khartoum	Sudan Shipping Line
Mobil	Maritime Safety
Navy	Economic Directorate – Khartoum
El Neil Petroleum Company	Bashayer Port for Oil Export
Ministry of Energy and Mining	Suakin Port
	General Directorate for Tourism

*Protection of the Marine
Environment of Sudan from
Oil Pollution*

Notes and Recommendations

May 2003

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This section was prepared by:

Peter Hayward of Hayward Environmental Ltd., Jersey in 1998 (revised by PERSGA in 2003). All opinions expressed are the author's alone and their printing here does not necessarily imply the approval or acceptance of PERSGA or the Government of Sudan.

Executive Summary

Notes

THE ADMINISTRATIVE AND INSTITUTIONAL FRAMEWORK

In principle, there is no reason why the existing institutional framework in the Sudan should not be adequate for implementing the country's present regional commitments relating to marine pollution (i.e. the Jeddah Convention). The new draft law on the environment acknowledges that other Government Ministries with particular competence in certain fields may be responsible for developing environmental measures within their areas of competence. For example, the Ministry of Transport may be the appropriate Ministry to implement measures to prevent pollution from ships. A significant weakness in the present administrative and institutional framework is the lack of a strong, independent marine administration to undertake all the regulatory/inspection tasks that would be required if the Sudan were to accede to the MARPOL 73/78 Convention.

LEGAL FRAMEWORK FOR THE PREVENTION AND CONTROL OF MARINE POLLUTION

Although the Sudan has ratified a number of international Conventions and Protocols which are relevant to the protection of the environment in general, none - apart from the regional Jeddah Convention for the Conservation of the Red Sea and Gulf of Aden Environment - are concerned with protection of the marine environment. Although a new framework "umbrella" law for the protection of environment was signed in 2001, there is no comprehensive maritime law. Recommendations to strengthen the Sudan's legal framework by accession to a number of international treaties are suggested. However, the acceptance of international obligations is meaningless without national implementation and enforcement and, in order to be effective, there must be adequate institutional resources with trained personnel in sufficient numbers to enforce the legislation.

POLLUTION RISKS TO SUDAN'S MARINE AND COASTAL ENVIRONMENT

Installations

Port Sudan is the Sudan's largest port and accounts for the bulk of the country's import and export trade with about 1,000 ship calls per annum. Apart from ship-related pollution risks (e.g. discharges of garbage and oily wastes; bunkering activities), Port Sudan handles approximately 1.5 million tonnes of petroleum products annually and accidents involving tankers together with discharges from unloading operations constitute a continual and serious pollution risk. Other pollution sources include the oily discharges from Port Sudan refinery. A major source of oil pollution has been power station A which is situated in the innermost part of Port Sudan harbour. The ITMD tyre manufacturing company has evident problems with the management of its solid wastes, in particular the disposal of carbon black. Loose discharges constitute a significant health hazard and also pollute the beach.

Two recent developments pose potential pollution risks. The first is the new oil terminal at Gezirat Abd Alla (Bashayer Port for crude oil export) and the second is the new Economic Free Zone covering an area of 600 km² between Port Sudan and Suakin.

Port Reception Facilities

There are no port reception facilities in Port Sudan or Suakin. In the absence of such facilities, it seems likely that ship wastes are discharged outside the harbour areas, either in the anchorage area off Wingate Reef or in the Red Sea. Although it is the responsibility of the port authority to ensure that adequate reception facilities are provided, operational matters such as collection and disposal could be managed by private contractors, or could be handled by the Sea Ports Corporation (SPC), or by a combination of both. In brief, a complete waste management strategy for the ports needs to be prepared.

Maritime Traffic and Navigation Risk

Maritime traffic is the major commercial activity in the Red Sea coastal area of the Sudan. Port Sudan receives about 1,000 ship calls per annum, 11 % of which are laden oil tankers. There is a steady increase in container traffic and this activity is likely to increase with the implementation of a major expansion of Port Sudan's container handling capacity with the latest state of the art equipment. Suakin port is the base for regular passenger traffic to Jeddah (and occasionally to Suez) with about 250 ship calls per annum (1998) and a throughput of approximately 180,000 passengers. The trade is conducted by five roll on/roll off ferries.

The positioning and number of navigational aids on the approaches to Port Sudan are judged to be sufficient. The clearly marked, straight channel approaching Osman Digna Port at Suakin also presents no navigational hazards. In principle, there are no navigational problems with the Towartit Reef channel which is 3 miles wide, provides deep water and a sheltered environment. The Marine Operations Department of the SPC have identified a number of proposals to improve navigational safety most of which have been implemented as planned.

RESOURCES AT RISK FROM OIL POLLUTION

The Sudan's extensive coral reef system should be considered priority areas for protection from oil spills due to their very high species diversity, their uniqueness and their considerable potential economic importance, potentially for the tourist industry and also for fisheries. Mangroves are particularly sensitive to oil spills and the 13 areas on the Sudanese coast must be considered as priority areas for protection. Other resources which are sensitive to oil pollution are saltmarshes and the shallow water areas (mersas) along the Sudanese coast which are potential and actual fish spawning grounds.

There is, as yet, no active tourist industry which would be at risk from oil pollution. Of human use resources, the port facilities at Port Sudan and, to a lesser extent, Suakin are at risk from oil pollution incidents as are all seawater intakes.

OIL SPILL RESPONSE

The National Oil Spill Contingency Plan has been completed. Procedures for reporting the presence of oil spills in Sudanese coastal waters are now established as are the notification and reporting procedures.

The national response strategy for the Sudan is based on the “tiered response” concept with each oil handling facility being responsible for developing its own local “oil pollution emergency plan”. The lead agency for developing the NOSCP and responding to major oil spills is the Sea Ports Corporation with the Maritime Administration Directorate (MAD). A National Coordinator has been designated who will be given standing authority to coordinate the national response to a major oil spill.

Several organisations have stressed the need for adequate training if they are to be able to carry out their responsibilities under the NOSCP effectively. It is suggested that suitable training should be given by the Arab Academy of Science, Technology and Maritime Transport (AASTMT) at Alexandria.

In addition to the procedures and responsibilities described in the NOSCP, it is also necessary for the Sudan to establish an adequate level of pre-positioned oil spill combating equipment. Proposals for such an equipment stockpile are contained in Appendix 1.

Recommendations

The Government of the Sudan, and other bodies as appropriate, are invited to consider the following recommendations to reduce the occurrence and/or impact of oil pollution incidents:

- The Government of the Sudan should accede to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). Although this would entail obligations in establishing an effective marine administration and the provision of waste reception facilities in Sudan’s ports, it would also give the Government authorities greater control over pollution from ships, especially foreign ships.
- The Government of the Sudan should accede to Civil Liability Convention as amended by the Protocol of 1992. This would be without cost to the Government but would provide a substantial level of compensation in the event of an oil spill from a tanker.
- The Government of the Sudan should accede to the International Oil Pollution Compensation Fund as amended by the Fund Convention Protocol of 1992. This would greatly enhance the level of compensation payable in the event of an oil spill from a tanker. The annual contributions to the Fund would be paid by the persons (normally oil companies) that receive imports of crude oil and heavy fuel oil in a quantity exceeding 150,000 tonnes in a calendar year.
- The Government of the Sudan should accede to the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990 after adoption of the National Oil Spill Contingency Plan.
- The Government of the Sudan should accede to the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969, and its Protocol of 1973. This would give the Government of the Sudan the right to intervene on the high seas when necessary to protect Sudan’s coastline and related interests from oil spills or pollution from other hazardous substances.

- The Ministry of Transport should take action to strengthen the resources and status of the Maritime Administration Directorate in order to fulfil more effectively the functions of a National Maritime Administration.
- The Ministry of Transport should consider carefully the possibility of separating the Maritime Administration Directorate from SPC in order to avoid possible conflicts of interest - as was originally envisaged in the Maritime Act of 1961.
- Action should be taken during the rehabilitation of the main electricity power station (power station A) to prevent oil discharges, by adding a separator unit.
- The Ministry of Environment and Physical Development should ensure that the development of the Economic Free Zone is subject to strict Environmental Impact Assessment to ensure that all risks to the terrestrial and marine environment are clearly identified and that pollution control and other abatement measures are properly implemented.
- The ITMD tyre manufacturing company should address the problems with the management of its solid wastes, in particular the handling of carbon black, to remove the hazards to occupational health and pollution of adjacent beaches.
- The Sea Ports Corporation (SPC) should prepare a complete waste management strategy for the ports of Port Sudan and Suakin with a view to providing adequate reception facilities for ship-generated oily wastes, garbage and sewage.
- The Government of the Sudan is recommended to seek international funds to enable a comprehensive sensitivity survey to be carried out of the entire Sudanese coastline at intervals of approximately 5 km and as a separate but related task, to map comprehensively all known data about fishing activities.
- It is recommended that initial training provided under the NOSCP should focus on the following 3 components:
 1. basic training in the principles of oil spill combating and the use of equipment, to be provided by the supplier of equipment purchased;
 2. a management level course for representatives of all organisations which are concerned in the NOSCP, especially team leaders and On-Scene Commanders;
 3. a “train the trainers” course aimed at those who will be responsible for training operatives in the use of equipment.
- It is recommended that the Arab Academy for Science, Technology and Maritime Transport (AASTMT) in Alexandria should be invited to conduct the management level course and the “train the trainers” course.
- The Government of the Sudan is invited to consider procuring a basic package of oil spill combating equipment on the lines proposed in Appendix 1 and to agree upon a formula for sharing the purchase costs between the public and the private sector and between the shipping and the petroleum industries.

Administrative and Institutional Framework

Ministry of Environment and Physical Development

The Ministry of Environment and Physical Development was established in 1995 and is based in Khartoum. It is the Ministry ultimately responsible for all environmental affairs.

Higher Council of Environment and Natural Resources

The Higher Council of Environment and Natural Resources was founded in 1992, as part of the Sudan's follow-up to the Rio Conference, with the task of coordinating national plans and policies on the environment. The HCENR is not an implementing body.

Originally chaired by the President, the HCENR is officially chaired by the Prime Minister. However, with the creation of the Ministry of Environment and Physical Development, the Minister of Environment now acts as Chairman. The Council's membership is composed of 9 Government Ministers and is served by a Secretary-General and his department.

The HCENR's objectives are the sustainable utilisation, rational development and conservation of natural resources, undertaken through line Ministries and public bodies. Apart from steering through the new environment law, the HCENR has coordinated major projects on Strategic Planning (funded by UNDP, 1996-1999), on Climate Change (funded by GEF, 1998-2001) and on a Biodiversity Action Plan (funded by GEF, 1999-2000 [phase 1], and 2003 [phase 2]).

In view of its responsibilities, the HCENR is represented on the national committee established to oversee the implementation of the National Oil Spill Contingency Plan (NOSCP).

Ministry of Transport

The Ministry of Transport has responsibility *inter alia* for:

- sea ports
- river ports
- railways
- the Sudan Shipping Line (100% State owned)
- road transport

Sea Ports Corporation

The Sea Ports Corporation (SPC) is responsible for managing the ports of Port Sudan, Suakin and a jetty some 280 km to the north of Port Sudan at Oseif which is used for the export of iron ore. It is also responsible for a number of smaller jetties at mersas along the Sudanese coast which are used by small fishing boats. SPC is based in Port Sudan and has a total staff of over 5,000 excluding the Port Police and the Civil Defence Brigade.

In addition to the commercial operations of the ports, the SPC is also responsible for:

- marine operations
- Maritime Administration Directorate.

Marine Operations

The Director of the Marine Department also fulfils the role of Harbour Master. He has under his command the coastal radio station, the pilotage department and the marine operations department, which covers responsibility for tugs, the berthing of vessels, and lights and navigation aids.

Maritime Administration Directorate

The Directorate has a staff of four officers (plus two administration personnel and one staff in the Ministry of Transport, Khartoum) whose duties are:

- the inspection of ships for safety aspects (SOLAS Convention);
- the registration of Sudanese vessels (the ships of the Sudan Shipping Line, the port craft and fishing vessels);
- responsibilities for pollution;
- the certification of seafarers (signing on and signing off; issue of Seamen's Book);
- investigation of marine casualties.

There are no classification societies based in Sudan and consequently no surveys of vessels done in Sudan; these are carried out in Jeddah for Sudanese ships.

The absence of the Sudan as a Contracting Party to the MARPOL Convention has already been addressed. However, it is widely acknowledged that the prevention of marine pollution is closely linked with other standards governing the regulation of international shipping. In this respect, it is worth mentioning that the Sudan has only ratified the following international conventions relating to maritime transport:

- IMO Convention 1948 (but not the amendments of 1978)
- IMO Convention 1948, amendments 1993
- SOLAS Convention 1974 (but not the Protocols of 1978 and 1988)
- Load Lines Convention of 1968 (but not the Protocol of 1988)
- STCW Convention of 1978/1995
- COLREG Convention of 1972
- Tonnage Convention of 1965

- SAU Convention and Protocol of 1998

The duties of a marine administration (which are applicable to a number of marine conventions) can be summarised as follows:

Flag State duties (Sudanese registered vessels)

- defined duties under international conventions by own surveyors and by classification society surveyors
- non-convention duties including non-compulsory inspections, surveys and issue of certificates for domestic ships and ships below convention size

Port State duties (foreign ships)

- issue convention certificates on request
- Port State control by own surveyors and inspectors

Coastal State duties

- pollution: detect violations, prosecute, punish, clean-up
- safe operation of ships in port
- search and rescue

It is recommended that the Ministry of Transport take action to strengthen the resources and status of the Maritime Administration Directorate in order to fulfil more effectively the functions of a national marine administration.

Sudan Shipping Line

The Sudan Shipping Line is 100% government owned. The Sudan Shipping Line's fleet consists of:

- 4 general cargo vessels
- 2 roll on/roll off cargo vessels
- 1 passenger roll on/roll off ferry operating out of Suakin
- 1 livestock carrier
- 1 bunkering barge kept in Port Sudan harbour (now under repair)

Travelling beyond territorial waters, the ships of the Sudan Shipping Line are well placed to report on any observed floating oil, or any illegal discharges from other vessels, which could threaten Sudan's coastal interests with oil pollution. The Sudan Shipping Line undertakes a surveillance role and reports any observed oil pollution (see NOSCP 3.3.8).

Port Police

The Port Police has one launch which is used to patrol the Wingate anchorage area, the Towartit anchorage area, the territorial waters out to the Sanganeb lighthouse and Suakin. The Port Police are responsible for reporting any oil pollution observed in Sudan's territorial waters, in particular incidents occurring in the Wingate anchorage area, the

Towartit anchorage area, the territorial waters out to the Sanganeb lighthouse, and the approaches to Suakin (NOSCP 3.3.6).

Fire Brigade

The Fire Brigade is a component of the Civil Defence Force. It has pollution combating within its remit but it has experience or training in this field. There are over 100 Fire Brigade personnel trained in fire fighting; 15 are stationed at Suakin.

The Civil Defence are responsible for all onshore response and clean-up operations within the areas of jurisdiction of SPC in the ports of Port Sudan and Suakin and any port that will be established in future (NOSCP 3.3.7).

The Fire Brigade is always standing by whenever there is a tanker loading or unloading in the port. Twelve staff undertake the supervision of the unloading operation as regards having fire fighting apparatus ready and available.

The Navy

The Sudanese naval base operates out of Marsa Gwiyai, to the north of Port Sudan. The navy is equipped with small patrol boats which have a limited range within territorial waters. The Navy is responsible for reporting any oil pollution observed in Sudan's territorial waters or on the high seas which might affect Sudan's coastline or related interests. They inform naval headquarters immediately of any observed oil pollution. Naval HQ informs SPC using the appropriate OILPOL reporting format (NOSCP 3.3.9).

The navy can also supply manpower for clean-up operations in the event of a major spill.

The Customs

The full and active co-operation of the Customs authorities is necessary if there is a major oil spill incident and it is decided to call upon assistance from abroad, such as the petroleum industry stockpile held at Oil Spill Response Ltd, (OSRL) Southampton, UK. OSRL has the capability to mount a response to two 30,000 tonnes spills simultaneously.

The Customs Police are responsible for ensuring that all customs duties and import taxes will be waived in respect of the temporary importation of oil spill combating equipment which is brought into the Sudan to assist the SPC in mounting an effective response operation to a major oil spill (NOSCP 3.3.10).

Red Sea Province

A major oil spill will have political implications. In the event of oil pollution coming ashore outside the area of jurisdiction of the SPC, responsibility for dealing with clean-up operations when oil reaches the shoreline will rest primarily with the Red Sea Province, under the overall command of the Incident Commander (NOSCP 3.3.11).

Port Sudan Town Council

The municipal authorities are responsible for waste disposal within the area of their jurisdiction. The final disposal of oil contaminated debris following an oil spill, e.g. oily beach sand, will be resolved in co-operation with the Health Inspectorate of Port Sudan Town Council and the Red Sea Province.

Faculty of Marine Science, Red Sea University

The Faculty of Marine Science, Red Sea University, has about 9 staff including those in related disciplines and between 200-250 students in five classes (1998).

The Faculty of Marine Science fulfils the role of providing scientific advice to the NOSCP, especially advice on environmental matters in the event of a major oil spill. The Dean of the Marine Science Faculty is a member of the NCPC (NOSCP 3.3.14).

Marine Fisheries Administration and Red Sea Research Centre

The Marine Fisheries Administration and Red Sea Research Centre have much knowledge about fish spawning grounds, shellfish culture areas and local fishing practice. They will be consulted on any fisheries related activities in the event of a major oil spill (NOSCP 3.3.15).

Assessment of Sudan's Capability to Implement International and Regional Agreements relating to Marine Pollution

At present the only relevant regional Agreement to which Sudan is a Contracting Party is the 1984 Jeddah Convention for the Protection of the Red Sea and Gulf of Aden Environment and its Protocol Concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency. In order to give effect to its obligations under the Protocol to the Jeddah Convention Sudan has prepared a national contingency plan.

As is evident from chapter 2, there are many other international agreements to which the Sudan could become a party in the future, the ratification of which would provide benefits for the Sudan. In most cases, the consequences of ratification for the administration would be relatively minor and should be able to be accommodated without difficulty within the present institutional framework. The major problem would be the drafting of relevant national law to implement the international obligations and passing it through the necessary procedures in good time.

The most significant omission is the failure to ratify the MARPOL 73/78 Convention, the reason being that there are no port reception facilities in the Sudan. It is suggested that this current lack of reception facilities should not be used as a reason not to accede to MARPOL provided that there is good intention to remedy the deficiency in short time. A

more significant obstacle is the lack of a strong, independent, marine administration to undertake all the regulatory/inspection tasks of MARPOL and other IMO conventions.

It is strongly recommended that the Ministry of Transport:

1. take steps to strengthen the existing Maritime Administration Directorate;
2. consider carefully the possibility of separating the Maritime Administration from SPC in order to avoid possible conflicts of interest - as was originally envisaged in the Maritime Act of 1961.

Legal Framework for the Prevention and Control of Marine Pollution

International Conventions Ratified by the Sudan

The Sudan has ratified the following international Conventions and Protocols which are relevant to the protection of the environment, either as regards controlling potential sources of pollution or because they are aimed at the preservation of species or aspects of the environment:

- Convention Concerning the Protection of the World Cultural and Natural Heritage, 1974
- Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1982
- Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (the Jeddah Convention), 1984
- Protocol to the Jeddah Convention Concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency, 1984
- United Nations Convention on the Law of the Sea, 1985
- Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 1993
- Convention on Biological Diversity, 1995
- Convention on Climate Change, 1992
- Rotterdam Convention, Prior Informed Consent, 1998
- Stockholm Convention on Persistent Organic Pollutants – 2nd Convention, 2001
- Basel Convention for Noxious Waste, 2002

However, apart from the Jeddah Convention, none of the above treaties is primarily concerned with the protection of the marine environment. The international conventions summarised below provide obligations and benefits that are specifically focussed on the marine environment.

The Government of the Sudan is strongly recommended to consider the advantages of ratifying these conventions.

The International Convention for the Prevention of Pollution from Ships 1973/78

The International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978, is commonly referred to as MARPOL 73/78. In addition to the obligations placed on Contracting Parties in the body of the Convention, there are five additional Annexes with their associated Regulations, two of which are compulsory (Annexes I and II) whereas the others are optional. The Annexes cover:

- Annex I: Regulations for the Prevention of Pollution by Oil containing Regulations 1-26.
- Annex II: Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk, containing 14 Regulations.
- Annex III: Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (optional), containing 7 Regulations.
- Annex IV: Regulations for the Prevention of Pollution by Sewage from Ships (optional), containing 11 Regulations.
- Annex V: Regulations for the Prevention of Pollution by Garbage from Ships (optional), containing 7 Regulations.
- Annex VI: Regulation for Prevention of Air Pollution from ships (optional).

As its title implies, the aim of the MARPOL Convention is to prevent pollution from ships. It does not (in general) deal with the preparation for and response to pollution incidents from ships; these aspects are covered comprehensively by OPRC 1990. Nevertheless, ratification of MARPOL 73/78 is an important prerequisite to oil spill contingency planning in that the overall aims of MARPOL are to achieve the complete elimination of intentional or negligent pollution of the marine environment by oil and other harmful substances and the minimisation of the accidental discharge of such substances.

Those countries which have ratified the Convention are required to implement, in respect of their flagships and all other flagships in their waters and ports, the requirements of the Convention. It should be recognised that whereas Parties to MARPOL 73/78 have obligations, they also have privileges. Parties accept the obligation not to allow their ships to discharge wastes into the sea, in return for which they have the privilege of not being polluted by the ships of other Parties. If they are, and if the pollution occurs within their territorial waters, they can prosecute the offender. Even the ships of a non-Party to MARPOL 73/78 can be prosecuted for failing to comply with the Convention if apprehended in the territorial waters of a Contracting Party.

Article 4 of MARPOL 73/78 requires Contracting Parties to prohibit violations of the Convention and to take proceedings against offenders. They are required to:

- apply these to their own flagships wherever they may be;
- take proceedings against their own flagships if sufficient information and evidence of a violation is provided by another Party and inform that Party and IMO of the actions taken;
- take proceedings against other ships which commit a violation within their jurisdiction or inform the flag Administration and provide information and evidence of the violation; and

- make penalties adequate in severity to discourage violations of the Convention. The penalties shall be equally severe irrespective of where the violations occur (Article 4(4)).

In general, the MARPOL 73/78 provisions provide an important legal basis on which to prevent deliberate or negligent discharges of polluting substances from ships. However, the success or failure of the MARPOL provisions depends upon effective enforcement.

The Red Sea Special Area

One of the most significant features of MARPOL Annex I is the designation of certain enclosed or semi-enclosed sea areas as "special areas" in which discharges of oil or oily mixtures are totally prohibited. (It is also possible to designate special areas for the purposes of Annex II (Bulk Chemicals) and Annex V (Garbage), and the new Annex on Air Pollution will also contain provisions for special areas.)

The total prohibition of discharges of oil or oily mixtures in special areas implies that oil tankers operating within such areas must retain on board oil and oily mixtures, such as dirty ballast and tank washing water, and discharge it to shore facilities for subsequent treatment and disposal. In a 1987 amendment of Annex I, the Red Sea was designated as a "special area" under Regulation 10(7)(b) of that Annex.

In order to achieve this objective, there is a requirement that oil loading terminals and repair ports within special areas should be provided with reception facilities of adequate capacity. In the case of the Red Sea, Regulation 10(7)(b)(i) of Annex I of MARPOL 73/78 stipulates that such facilities should be provided as soon as possible. The actual text is as follows:

"The Government of each Party the coastline of which borders on the special areas undertakes to ensure that as soon as possible all oil loading terminals and repair ports within these special areas are provided with facilities adequate for the reception and treatment of all the dirty ballast and tank washing water from tankers. In addition all ports within the special area shall be provided with adequate reception facilities for other residues and oily mixtures from all ships. Such facilities shall have adequate capacity to meet the needs of the ships using them without causing undue delay."

Regulation 10(7)(b)(iii) is concerned with the procedure to be followed in establishing the date on which the requirements of Regulation 10(7)(b)(i) will enter into effect. This requires that the Parties concerned shall notify IMO of the measures they have taken. Upon receipt of sufficient notifications, IMO will establish the date from which the requirements of this Regulation in respect of the Red Sea shall take effect. Since IMO has not yet received any notifications of measures taken in the Red Sea, it is impossible to estimate when the date will be established on which the full benefits of Regulation 10 in terms of prohibition of discharges of oil or oily mixtures from any tankers and from ships over 400 GRT (Gross Registered Tonnage) will take effect. In the meantime, ships navigating in the Red Sea area, or loading in ports where reception facilities are not available, shall, until such time as the "Special Area" restrictions of Regulation 10 enter into force, comply with the requirements of Regulation 9 of Annex I; that is the discharge criteria generally applicable to ships and tankers when outside special areas.

However, even in the absence of an established date for the provision of "special area" reception facility requirements, requirements are contained in Regulation 10(7)(b)(vii) that States which are party to MARPOL bordering the Red Sea must comply with the Convention's general requirements for reception facilities, viz:

"at least the reception facilities as prescribed in Regulation 12 of this Annex shall be provided by 1 January 1977 or one year after the date of entry into force of the present Convention, whichever occurs later."

Since the Convention formally entered into force in October 1983, the reception facilities prescribed in Regulation 12 should have been available within the Red Sea area by October 1984. The principal requirements of Regulation 12 can be summarised as follows. Reception facilities shall be provided 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;
- all ports and terminals in which oil, other than crude oil in bulk, is loaded at an average quantity of more than 1,000 metric tonnes per day;
- all ports having ship repair yards or tank cleaning facilities;
- all ports and terminals which handle ships provided with the sludge tank(s) required by Regulation 17 of Annex I;
- all ports in respect of oily bilge-waters and other residues which cannot be discharged in accordance with Regulation 9 of Annex I; and
- all loading ports for bulk cargoes in respect of oil residues from combination carriers which cannot be discharged in accordance with Regulation 9 of Annex I.

Regulation 12 also stipulates that the capacity for reception facilities which must be provided at the various ports and terminals shall be sufficient to receive oil and oily mixtures and residues, including oily bilge-waters, which cannot be legally discharged in accordance with the provisions of Regulations 9 and 17. The reception facilities should be made available no later than one year from the date of entry into force of the Convention, i.e. by October 1984. Regulation 12 also provides that IMO should be informed of all cases where the provision of reception facilities is alleged to be inadequate.

The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990

The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC) provides the international legal framework for establishing national and multinational response systems to oil pollution incidents. The Convention entered into force on 13 May 1995.

The OPRC Convention was the response of the international community to the severity of oil pollution incidents in the 1980s, notably the Exxon Valdez spill. The aim of the Convention is to provide the framework for international co-operation for combating major oil pollution incidents. It recognises, *inter alia*, the importance of effective preparation for

combating oil pollution incidents, including the preparation of oil pollution contingency plans.

Article 6 of the Convention places a number of specific obligations on Contracting Parties as follows:

"Each Party shall establish a national system for responding promptly and effectively to oil pollution incidents. The system shall include as a minimum:

- (a) the designation of:
 - (i) the competent national authority or authorities with responsibility for oil pollution preparedness and response;
 - (ii) the national contact point or points, which shall be responsible for the receipt and transmission of oil pollution reports as referred to in article 4;
 - (iii) an authority which is entitled to act on behalf of the State to request assistance or to decide to render the assistance requested;
- (b) a national contingency plan for preparedness and response which includes the organisational relationship of the various bodies involved, whether public or private, taking into account guidelines developed by the Organization."

(The Organization referred to is the International Maritime Organization (IMO)).

In addition Article 6(2) imposes the following additional obligations:

"In addition, each Party, within its capability either individually or through bilateral or multi-lateral co-operation and, as appropriate, in co-operation with the oil and shipping industries, port authorities and other relevant entities, shall establish:

- (a) a minimum level of pre-positioned oil spill combating equipment, commensurate with the risk involved, and programmed for its use;
- (b) a programme of exercises for oil pollution response organisations and training of relevant personnel;
- (c) detailed plans and communication capabilities for responding to an oil pollution incident. Such capabilities should be continuously available; and
- (d) a mechanism or arrangement to co-ordinate the response to an oil pollution incident with, if appropriate, the capabilities to mobilize the necessary resources."

There is a requirement that information concerning, *inter alia*, the designation of the competent authorities and contact points, the pollution response equipment and the national contingency plan should be provided to IMO (Article 6(3)).

In addition to the comprehensive obligations to establish national systems for preparedness and response, as set out in Article 6, Article 3 identifies a number of potential pollution sources all of which are required to have "local" oil pollution emergency plans which are to be co-ordinated with the national system. These are:

- ships flying the flag of the Contracting Party, which are required to have on board a shipboard oil pollution emergency plan as required by and in accordance with the provisions adopted by IMO for this purpose (this refers to regulation 26 of Annex I of MARPOL 73/78, as amended);
- operators of offshore units. This means any fixed or floating offshore installation or structure engaged in gas or oil exploration, exploitation or production activities or loading or unloading of oil;
- port authorities;
- operators in charge of oil handling facilities, which includes oil terminals and pipelines.

Furthermore, Article 4 of the Convention specifies the procedures which shall be established for reporting without delay any event involving a discharge or probable discharge of oil from ships, offshore units, seaports and oil handling facilities to "the competent national authority". These reporting obligations are to be placed on the masters of vessels or those persons in charge of the offshore units, seaports and oil handling facilities regarding discharges or probable discharges from their *own* activities.

In addition, the masters of vessels and persons in charge of offshore units are required to report without delay *any* observed event at sea involving a discharge of oil or the presence of oil. The Contracting Party's maritime inspection vessels and aircraft, or other appropriate services, are also required to report such incidents and the pilots of civil aircraft should be requested to report any such observed events.

The OPRC Convention recognises the importance of mutual assistance and international co-operation in responding to oil pollution incidents. Consequently Article 5 stipulates that whenever a Contracting Party receives an oil pollution report, it shall assess the nature, extent and possible consequences of the incident and, without delay, inform all States whose interests are affected or are likely to be affected by such an incident.

The Convention (Article 10) also encourages Contracting Parties to conclude bilateral or multi-lateral agreements for oil pollution preparedness.

In conclusion, therefore, the OPRC Convention provides a comprehensive framework to prepare for and respond to an oil pollution incident. In particular it places obligations on the Contracting Parties:

- to establish national and regional systems for preparedness and response (Article 6);
- to require potential sources of pollution to prepare site-specific and vessel-specific oil pollution emergency plans (Article 3);
- to establish oil pollution reporting procedures (Article 4);
- to take appropriate action on receiving an oil pollution report.

The International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969

The International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 - commonly called the Intervention Convention - entered into force on 6 May 1975. A Protocol Relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other than Oil was done in 1973 and entered into force on 30 March 1983.

The Convention provides important powers to a Contracting Party to take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to its coastline or related interests from pollution, or the threat of pollution, of the sea by oil following a maritime casualty and which may reasonably be expected to result in major harmful consequences. The 1973 Protocol extends these powers to other harmful substances.

The term "related interests" is widely drawn and includes:

- maritime coastal, port or estuarine activities, including fisheries activities, constituting an essential means of livelihood of the persons concerned;
- tourist attractions of the area concerned;
- the health of the coastal population and the well-being of the area concerned, including conservation of living marine resources and of wildlife.

The absence of a definition as to what "measures" may be necessary gives the intervening State extensive flexibility and powers to take whatever measures it deems appropriate in the circumstances, and this could include such extreme measures as scuttling the casualty. Normally, before taking any measures, the intervening State will consult other States affected by the casualty, particularly the flag State, and also with the vessel owners where known. However, in cases of extreme urgency, the intervening coastal State may take measures immediately without prior notification or consultation. The IMO maintains a list of experts who can assist coastal States in assessing the need for intervention and in the determination of the appropriate courses of action.

An important restraint is that the measures taken by the coastal State shall be proportionate to the actual or threatened damage. Such measures shall not go beyond what is reasonably necessary to achieve the end of preventing, mitigating or eliminating the danger of pollution or the threat of pollution by oil. The measures shall cease as soon as that end has been achieved.

Provided the measures taken by the intervening State are within the scope of the Convention, no compensation shall be payable by the State concerned. However, compensation may be paid to the extent that the intervening State takes measures which exceed those reasonably necessary to achieve the end and which cause damage to others, notably the owner of the casualty. The Convention does provide for a conciliation and arbitration procedure to be followed in the event of a dispute as to whether the measures taken by the intervening State were in contravention of the Convention.

The Convention provides that no measures may be taken against warships or other ships owned and operated by a State and used only on government non-commercial service.

The Intervention Convention and its related Protocol were prepared in recognition of the need to protect the interests of coastal States against the grave consequences of a maritime casualty resulting in danger of oil pollution of the sea and shorelines. It was recognised that, under such circumstances, measures of an exceptional character to protect such interests might be necessary on the high seas and that these measures do not affect the principle of freedom of the high seas.

Intervention in national waters

Many administrations have enacted legislation giving the relevant Government authority the right to intervene in the event of a marine casualty occurring in national waters. In such cases the authority must have assessed the situation and concluded that the nature or degree of actions taken by the shipowner or his agents is not satisfactory. The authority can then either issue instructions or advice to the shipowner and his agents as to how they should proceed, or it can take direct operational control.

In all cases the master of the casualty vessel should take immediate action to ensure the safety of the crew and the preservation of the ship and cargo and will make arrangements, if necessary, for salvage. Arrangements for salvage are normally made with a professional salvage company. It should be recognised that the salvor's aim is to salvage the casualty successfully, whereas the administration must give priority to protection of the coastal environment and commercial resources.

Civil Liability Convention 1969

The International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC) lays down the principle of strict liability for shipowners and provides for a system of compulsory insurance.

General Principles

Scope of application

The CLC applies to oil pollution damage resulting from spills from tankers and suffered in the territory (including the territorial sea and exclusive economic zone (EEZ)) of a Contracting State. The only criterion for its applicability is where the damage occurred. The Flag State of the tanker and the nationality of the shipowner are irrelevant for determining the scope of application of the CLC.

The CLC also applies to measures ("preventive measures"), wherever they are taken, to prevent or minimise pollution damage in the territory, including the territorial sea, of a Contracting State.

Only damage caused by persistent oil such as crude oil, fuel oil, heavy diesel oil, lubricating oil and whale oil is covered by the Convention. Spills of non-persistent oil, such as gasoline, light diesel oil, kerosene, etc., do not fall within the scope of the CLC.

Spills of bunker oil from ships other than tankers are not covered by the CLC.

The CLC (and also the Fund Convention) only deal with oil pollution from ships. Pollution resulting from offshore operations fall outside the scope of both Conventions and compensation for such pollution damage would have to be governed by national law. Similarly, compensation for oil pollution damage not covered by the CLC (i.e. damage caused by ships other than tankers and damage caused by non-persistent oil) would have to be governed by national law.

Strict liability

The principle on which compensation is paid under the CLC (and also the Fund Convention) is based on "strict liability"; i.e. those parties who have suffered pollution damage from an incident do not have to prove that the shipowner/master/crew of the tanker was at fault in order to obtain compensation promptly. The shipowner may be exempted from liability only in a few particular cases (Article III):

- the damage resulted from an act of war or a grave natural disaster;
- the damage was wholly caused by sabotage by a third party; or
- the damage was wholly caused by the failure of authorities to maintain navigational aids.

The grounds for exemption are very limited and the shipowner will, therefore, be liable for pollution damage in almost all incidents which occur under normal circumstances.

Limitation of liability and compulsory insurance

The shipowner is, under certain conditions, entitled to limit his liability to an amount of 133 SDR (US\$ 200) per ton of the ship's tonnage or 14,000,000 SDR (US\$ 21 million), whichever is the less (SDR: Special Drawing Rights). In order to be entitled to limit his liability, the shipowner must establish a limitation fund by depositing the limitation amount with a court or by providing a guarantee for that amount acceptable to the court.

However, if a claimant proves that the incident occurred as the result of the personal fault of the shipowner, the owner will be deprived of the right to limit his liability.

Claims for pollution damage under the CLC can be made only against the registered owner of the tanker concerned. This does not preclude victims from claiming compensation outside the CLC from persons other than the owner. No claim can, however, be made against the servants or agents of the owner.

The owner of a tanker carrying more than 2,000 tonnes of persistent oil as cargo is obliged to maintain insurance to cover his liability under the CLC. When entering or leaving a port or a terminal installation of a State party to the CLC, a certificate of insurance is required and is required also for ships flying the flag of a State which is not party to the CLC.

Revision of the Civil Liability Convention and the Fund Convention

In 1984 a Diplomatic Conference held in London under the auspices of IMO adopted two Protocols to amend the CLC and the Fund Convention respectively. These Protocols provide higher limits of compensation and a wider scope of application than the Conventions in their original versions. By 1990, however, it had become clear that the 1984 Protocols would not enter into force since the required number of ratifications would not be obtained.

Consequently, another Diplomatic Conference, held in London in 1992, adopted two new Protocols amending the Conventions in order to ensure the viability in the future of the system of compensation established by these Conventions. The Diplomatic Conference based its activities on two draft Protocols elaborated within the IOPC Fund (International Oil Pollution Compensation Fund). The new Protocols retained the substantive provisions of the 1984 Protocols, but with lower entry into force provisions.

The entry into force requirements were fulfilled on 30 May 1995 and the 1992 Protocols therefore came into force with effect from 30 May 1996.

Higher limits for shipowners' liability

Under the 1992 Protocol to the CLC the limits of the shipowner's liability are changed by the introduction of the special liability limit for small vessels and by a substantial increase of the limitation amounts. The new limitation figures are:

- for a ship not exceeding 5,000 gross tonnage, 3 million SDR (US\$ 4.7 million);
- for a ship with a tonnage between 5,000 and 140,000 gross tonnage, 3 million SDR (US\$ 4.7 million) plus 420 SDR (US\$ 655) for each additional unit of tonnage;
- for a ship exceeding 140,000 gross tonnage, 59.7 million SDR (US\$ 93 million).

Other amendments effected by the 1992 Protocols

The 1992 Conference did not adopt new measures from those adopted in 1984; it simply made the entry into force conditions more achievable. In addition to the higher limits for shipowners' liability and higher compensation limits described above, the main amendments adopted by the 1992 Conference were the following:

- A simplified procedure for increasing the limitation amounts to the two Conventions.
- The geographical scope of application of both Conventions was extended to the exclusive economic zone (EEZ) established under the UN Convention on the Law of the Sea.
- Pollution damage caused by a spill of persistent oil from an unladen tanker will be compensated under the 1992 CLC and the Fund Convention.
- Reasonable expenses incurred for preventive measures are recoverable under the 1992 Conventions even when there is no spill of oil as a result of the incident, provided that there was a grave and imminent danger of pollution damage.

The 1992 Protocol to the CLC contains a new definition of the notion of "pollution damage". This retains the basic wording of the original definition but a phrase has been added to clarify that only the costs of reasonable measures to reinstate the contaminated environment are included in the concept of pollution damage.

Definition of “Pollution Damage” in the Civil Liability Convention and the Fund Convention

The 1992 Protocol to the CLC contains an amended wording of the definition of “pollution damage”. A proviso was added to the effect that compensation for impairment of the environment (other than loss of profit from such impairment) should be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken. The definition in the 1992 Protocol reads as follows:

“Pollution damage” means:

- (a) loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken;
- (b) the costs of preventive measures and further loss or damage caused by preventive measures.”

An Intersessional Working Group was established in 1994 to examine the criteria for the admissibility of claims for compensation and the procedures to be applied by the IOPC Fund. With regard to environmental damage claims, the Working Group agreed that, in order to be admissible for compensation, measures for reinstatement of the marine environment would have to fulfil the following criteria:

- the cost of the measures should be reasonable;
- the cost of the measures should not be disproportionate to the results achieved or the results which could reasonably be expected; and
- the measures should be appropriate and offer a reasonable prospect of success.

The Working Group considered that it would normally be necessary to carry out an in-depth study before any measures for reinstatement were undertaken. It also took the view that the admissibility of claims relating to costs for reinstatement of the environment would have to be kept under review by the IOPC Fund.

Many States have introduced a system of criminal or civil penalties for oil pollution from ships (including Egypt under Law No. 4 of 1994), as is their sovereign right. However, criminal and civil penalties for oil pollution from ships do not constitute compensation and do not therefore fall within the scope of the CLC and the Fund Convention. Damages of a punitive character, calculated on the basis of the degree of fault of the wrong-doer and/or the profit earned by the wrong-doer, are not admissible claims under the Conventions.

In summary, projects to reinstate the environment after an oil spill are eligible for reimbursement under the Conventions provided that the IOPC Fund agrees that they are reasonable. In practice, the IOPC Fund secretariat often relies on the staff of the International Tanker Owners Pollution Federation (ITOPF) to help them in determining reasonableness. There is a longstanding IOPC Fund policy that monetary damages calculated by theoretical formulae are not eligible for compensation.

The International Oil Pollution Compensation Fund

The Fund Convention was elaborated as a supplementary convention to the CLC. The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (the Fund Convention) set up an international organisation - the International Oil Pollution Compensation Fund (the IOPC Fund) - to administer the system of compensation created by that Convention. Only those States which have become Parties to the CLC can become Members of the IOPC Fund.

The main functions of the Fund Convention are to provide supplementary compensation to those who cannot obtain full and adequate compensation for oil pollution damage under the CLC, and to indemnify the shipowner for a portion of his liability under the CLC.

The IOPC Fund is financed by contributions from persons who receive crude oil and heavy fuel oil in Fund Member States.

Supplementary compensation

The IOPC Fund pays compensation to any person suffering oil pollution damage in IOPC Fund Member States if that person is unable to obtain full and adequate compensation under the CLC for one of the following reasons:

- No liability for pollution damage arises under the CLC because the owner can invoke one of the exemptions under that Convention.
- The owner is financially incapable of meeting his obligations under the CLC and his insurance is insufficient to satisfy the claims for compensation for pollution damage.
- The damage exceeds the owner's liability under the CLC.

Experience has shown that in most cases, the IOPC Fund becomes involved for the third reason, i.e. the damage exceeds the shipowner's limit under the CLC.

Of over 70 incidents dealt with by the IOPC Fund, only a few have given rise to claims in excess of the limit of compensation that applied to the incident (e.g. the Tanio incident in France in 1980, the Haven incident in Italy in 1991 and the Braer in 1993).

Contributions to the IOPC Fund

The payments of compensation and indemnification, as well as the administrative expenses of the IOPC Fund, are financed by contributions levied on any person who has received crude oil and heavy fuel oil ("contributing oil") in a quantity exceeding 150,000 tonnes in one calendar year in a Contracting State to the Fund Convention.

Contributing oil is counted for contribution purposes each time it is received at ports or terminal installations in a Fund Member State after carriage by sea. The term "received" refers to receipt into tankage or storage immediately after carriage by sea. The place of loading is irrelevant in this context; the oil may be imported from abroad, carried from another port in the same State, or transported by ship from an offshore production rig. Also oil received for trans-shipment to another port or received for further transport by pipeline is considered as received for contribution purposes.

There are both initial and annual contributions to the IOPC Fund. Initial contributions are payable when a State becomes a Member of the IOPC Fund. Annual contributions are levied to meet the anticipated payments of compensation by the IOPC Fund during the coming year (including administrative expenses). The amount of annual contributions is decided each year by the IOPC Fund Assembly. Every contributor pays a specified amount per tonne of contributing oil received.

Each Member State is required to report every year to the IOPC Fund the name and address of any person (normally an oil company) in that State who is liable to contribute to the IOPC Fund, as well as the quantity of contributing oil received by any such person. After the Assembly's decisions on the levy of annual contributions, the IOPC Fund issues an invoice to each contributor, normally due on 1 February of the following year. The contributions are payable by the individual contributors directly to the IOPC Fund; a State is not responsible for the contributions levied from contributors in that State unless it has voluntarily assumed such responsibility.

The level of contributions varies from one year to another since the payments of compensation will vary. In the past, contributions have varied from 0 to £28,701 for each 1 million tonnes of received contributing oil.

When the Fund Convention was adopted in 1971, the concept of an international fund was something new. There was no experience of the functioning of a system of this kind. Fears were expressed that the Fund Secretariat would have difficulties in collecting the money required for compensating victims. These fears have proved to be unjustified. Contributions are generally paid on time and there is only a negligible amount in arrears.

Higher limit of 1992 Fund's compensation

The limit of compensation payable by the IOPC Fund under the 1992 Fund Convention is increased to 135 million SDR (US\$ 210 million), including the compensation payable by the shipowner under the 1992 CLC Protocol.

The limit of compensation would be increased to 200 million SDR (US\$ 312 million) if there were three Member States of the 1992 Fund whose combined quantity of contributing oil received during a given year in their respective territories exceeded 600 million tonnes. This situation is unlikely to happen, however, as it would require the USA to become a member and this, in turn, is unlikely.

Claims against the IOPC Fund

The Fund can pay compensation to a claimant only to the extent that his claim is justified and meets the criteria laid down in the Fund Convention. To this end, a claimant is required to prove his claim by producing explanatory notes, invoices, receipts and other documents to support the claim. The IOPC Fund has issued a "Claims Manual" which gives basic information on how to present a claim against the IOPC Fund.

Usually payment will be made without recourse to the courts provided that the claims and documentary supporting evidence are clearly made. Compensation can only be paid to the extent that the claim is justified and meets certain criteria. Claims are acceptable for:

- clean-up operations at sea or on the beach, e.g. deployment of vessels, use of booms and dispersants and absorbents;

- reasonable preventive measures, e.g. placing booms along a threatened coast, use of dispersants at sea;
- damage to property for clean-up of such things as dirtied boats, fishing gear, piers, or their replacement if cleanup is impossible;
- economic loss for those who depend directly on earnings from coastal or sea-related activities, e.g. loss of earnings of fishermen, hoteliers, contamination of shellfish beds, etc;
- reasonable costs of measures taken to reinstate the environment.

P&I Clubs

Under the Civil Liability Convention, the owner of a tanker carrying more than 2,000 tonnes of persistent oil as cargo is obliged to maintain insurance to cover his liability under the CLC. When entering or leaving a port or terminal installation of a State Party to the CLC, a certificate of insurance is required. This certificate is required also for ships flying the flag of a State which is not Party to the CLC. This is because the Convention covers pollution damage suffered in the territory (including the territorial sea and EEZ) of a State party to the Convention. The Flag State of the tanker and the nationality of the shipowner are irrelevant for determining the scope of application of the CLC.

In practically every case, the shipowner takes his pollution liability insurance through a Protection and Indemnity Association, commonly called a P&I Club. Investigations, evaluations and settlement of claims for pollution damage are carried out by the shipowner's P&I Club.

In the event of a major incident, the investigation and evaluation of damage is carried out jointly by the IOPC Fund and the P&I Club. Surveyors are normally employed jointly by the P&I Club and the IOPC Fund for the survey of the incident and the cleanup operations. In most cases, the staff of the International Tanker Owners Pollution Federation Limited (ITOPF) is used for surveying purposes.

The surveyors appointed by the IOPC Fund and the P&I Club attend the spill as early as possible. They monitor the cleanup operation and report to the Director of the Fund and to the P&I Club on the manner in which the operations are carried out. They also advise authorities dealing with the spill response on the best methods of preventive measures or cleanup operations, to the extent that such advice is requested or appreciated by the authorities responsible for responding to the incident. The surveyors discuss with the authorities the procedures that have to be observed in order to facilitate the presentation of claims against the P&I Club and the IOPC Fund quickly and in a meaningful manner (e.g. accounting of expenses in a systematic way). Finally, the surveyors advise the authorities whether certain measures taken - or to be taken - may later be regarded by the IOPC Fund as not being "reasonable". This gives the opportunity of discussing the merits of certain measures before they are actually taken. In this way, disputes on the question of recovery of expenses incurred can often be avoided.

In the case of a major spill, the first part of any claim for compensation for pollution damage is settled by the P&I Club; the IOPC Fund makes up the balance subject to the ceiling on the limit of compensation. In practice, the victims of pollution damage seldom notice the difference because the negotiation and settlement of claims are carried out in very close co-operation between the P&I Club and the IOPC Fund.

International Convention on Hazardous and Noxious Substances and Limitation of Liability, 1996

Although this chapter concentrates on the international regime for compensation in relation to oil pollution, mention should be made of recent developments by the international community to develop:

- a draft international convention on liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea;
- a draft protocol to amend the Convention on Limitation of Liability for Maritime Claims 1976.

An International Conference on this subject was held at IMO Headquarters, London, in April 1996.

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, commonly called the London Convention (LC), entered into force in 1975. The policy towards sea disposal has shifted markedly in recent years and implementation of the LC by Contracting Parties is moving away from the controlled disposal of wastes at sea towards integrated land-based solutions for most wastes, although sea disposal is still acceptable for a few remaining categories of waste.

In accordance with these principles, and the priorities reflected in Agenda 21 adopted at the UN Conference on Environment and Development in Rio, the LC Contracting Parties are increasingly focusing on:

- guidance and assistance regarding waste disposal at sea for those substances and materials where land-based options are lacking (e.g. for dredged material and sewage sludge);
- improving the effectiveness of the Convention within the broader context of good waste management practice;
- promoting technical co-operation to actively assist States to deal with the transition problems of treating wastes on land which were formerly dumped at sea and, more importantly, assisting the much larger group of countries which are establishing their waste management policies without having resort to the sea disposal option.

In order to reflect these developments, the Contracting Parties embarked in 1992 on a full review of the provisions of the 1972 London Convention. As a first step, the Contracting Parties adopted in 1993 a few crucial amendments to the Annexes to the Convention, which entered into force on 20 February 1994. As a result, the list of materials which are no longer allowed to be disposed of at sea has been extended to:

- the dumping of industrial waste, with effect from 1 January 1996;
- the incineration at sea of industrial waste and sewage sludge;

- the dumping of low- and intermediate-level radioactive waste or other radioactive matter (the dumping of high-level radioactive waste had always been prohibited under the Convention).

The review process was completed at a Special Meeting of Contracting Parties held in London in November 1996 at which a 1996 Protocol to the London Convention was adopted. The main new elements of the 1996 Protocol, and their importance from the perspective of global protection of the marine environment, can be identified as follows:

1. Agreement in principle that Contracting Parties, according to their scientific, technical and economic capabilities, not only aim at prevention, but also at **reduction and, where practicable, elimination** of pollution of the sea from dumping and incineration activities. (Some States will take this to limit dumping activities; others will use this as a basis for remedial action following past dumping activities).
2. Agreement to include, as a basic provision, a **precautionary approach** to dumping and incineration at sea.
3. Acknowledgment of the value of the **"polluter pays" principle** as a cost allocation instrument when implementing the Protocol.
4. Acceptance of **"reverse listing"** instead of the traditional division into "black" and "grey" lists of substances. The consequence is that all dumping is strictly prohibited, with the exception of clearly defined waste categories.
5. Agreement to extend the area to which the Convention applies to the **"sea-bed and the sub-soil thereof"**. (It has been agreed that internal marine waters will not be included in the Convention).
6. Inclusion of the so-called **Waste Assessment Framework** as an Annex to the Convention. The Waste Assessment Framework is a practical and comprehensive procedure for managing waste in compliance with the Convention.
7. Agreement that Parties **"...shall not permit the export of wastes or other matter to other countries for dumping or incineration at sea"**, thereby enhancing the compatibility between the London Convention and the Basel Convention.
8. Broad agreement to strengthen implementation, (non-)compliance and enforcement provisions as a whole, thereby enhancing the credibility of the LC as an effective instrument to protect the marine environment.
9. Agreement to a substantial strengthening of the technical co-operation provisions, thereby providing incentives to developing countries and countries in transition to benefit from improved access to environmentally sound technologies and the transfer of know-how.
10. Agreement to offer a so-called **"grace period" of a maximum of 5 years** to new Parties to the Protocol to achieve full compliance with its specific provisions.
11. Agreement to include the **Settlement of Disputes arrangements** which were already accepted in 1978 but have never entered into force.

The Contracting Parties have agreed that the 1996 Protocol will supersede the existing Convention and a low threshold of ratifications is required for the 1996 Protocol to enter into force.

Ramsar Convention on Internationally Important Wetlands

The Sudan is not a signatory to the Ramsar Convention. This means that it is deprived access to the Wetlands Convention Fund which would provide some financial support for the management and conservation of Sudan's wetlands. Accession to the Convention would also entail certain obligations, viz. it would be necessary to draw up national inventories and to define the wetland areas by legislation.

Sudanese National Legal Framework for Environmental Protection

The national legal framework for protection of the environment in Sudan is acknowledged by all concerned to be weak. A study carried out with the help of UNEP in 1994 discovered over 120 references to environmental legislation over a wide range of topics (e.g. soils, pesticides, wildlife, etc.) and with authority spread among over 30 government bodies. Furthermore, there was no national coordination of environmental policy.

In an effort to remedy this situation, particularly in the light of obligations taken at the 1992 Rio Conference, the Higher Council of Environment and Natural Resources (HCENR) (see chapter 3) has taken the lead in drafting a new framework law for the environment. This is an "umbrella" law that clarifies the role of the Ministry of Environment and Physical Development as the competent Ministry responsible for coordinating all matters concerning the environment. However, the new law also acknowledges that other Government Ministries with particular competence in certain fields are responsible for developing environmental measures within their areas of competence, e.g. the Ministry of Transport as the appropriate Ministry to implement measures to prevent pollution from ships.

The law-making procedure is as follows: after drafting by the HCENR (or other appropriate body) the draft law is submitted to the Attorney General at the Ministry of Justice; after which it is submitted to the Council of Ministers; after which it is examined by the National Assembly; and finally it becomes law when it has been signed by the President. The draft law on the environment was signed by the President and came into force in 2001.

Maritime law: The Maritime Act of 1961 provides the legal basis for the registration of Sudanese ships and general regulations and control of merchant shipping. Article 2(4) of the Act states that a Maritime Administration Department shall be established directly under the supervision of the Ministry of Transport. This was not acted upon until 1989 when the Maritime Administration Directorate was established by a decree from the Minister of Transport, not as an independent body but under the authority and budget of the Sea Ports Corporation. The Maritime Act has no provisions concerning marine pollution.

The deficiencies of the Maritime Act are acknowledged by the Sudanese authorities. Back in 1978 an adviser from IMO recommended the establishment of a Maritime Administration under the Ministry of Transport and in 1983 a mission from an IMO legal adviser resulted in a draft legal instrument for a national maritime law. A meeting of concerned authorities was convened by the Sea Ports Corporation in 1992 and a draft law was prepared in 1997. This draft was reviewed in 2000 and submitted under the title "Sudanese Maritime Law 2000" to the Council of Ministers. However, even this draft law, even has no direct provisions concerning the prevention of pollution or implementation of

the MARPOL Convention, but it gave the Maritime Directorate the responsibility to prepare a separate 'Act for the Protection of the Marine Environment'.

The Port Sudan harbour uses the 1937 Port Regulations which were substantially amended in 1979 and have since been modified slightly. The Port Regulations touch upon pollution matters to a very limited degree. For example, it is forbidden to discharge kitchen wastes from vessels into the port's waters; the penalty for violation is 250 US dollars plus expenses incurred in clean-up which amount to 10 dinar per ton for normal cargo and 20 dinar per ton for dangerous and hazardous substances.

The Marine Fisheries Act (1937), administered by the Marine Fisheries Department, was amended in 1975 to ensure that no waste in any form which may be harmful to humans or animals should be discharged into the sea or near the coast. The Regulation also forbids the use of spear guns as well as prohibiting coral and shell collecting.

There is no legislation governing land use planning in the Sudan although the HCENR is trying to formulate a national land use policy. Such a policy, backed up by legislation, is necessary especially for the sustainable management of Sudan's coastal zone.

Evaluation of the Sudanese Legal Framework

Although there is evidence that the Government of the Sudan is politically willing to adopt new international obligations concerning the environment, particularly those emerging from the 1992 Earth Summit in Rio de Janeiro, it is also evident that there are significant gaps in the legal framework, particularly as regards measures to protect the marine environment.

The most important step that the Government could take would be to accede to the MARPOL 73/78 Convention. Although this would also entail obligations in the provision of waste reception facilities in Sudan's ports, it would also give the Government authorities greater control over pollution from ships, especially foreign ships.

The other international conventions which the Government could accede to would be the 1969 Intervention Convention, the 1992 Civil Liability Convention and the 1992 Fund Convention. Accession to the Intervention Convention would give the Government of the Sudan the right to intervene on the high seas when necessary to protect Sudan's coastline and related interests from oil spills.

Accession to the CLC would be without cost to the Government but it would provide a substantial level of compensation in the event of an oil spill from a tanker. Furthermore, this level of "insurance" could be enhanced still further by accession to the 1992 Fund Convention although there would be a small price to pay on the basis of "contributing receipts", calculated on imports of oil. Nevertheless, many States have found the contribution well worth paying and, given the huge quantities of oil which are transported through the Red Sea, the assurance for Sudan's coastal interests would surely be worth the price of membership of the Fund.

The process will not stop with the passage of the legislation. To be effective there must be adequate institutional resources with trained personnel in sufficient numbers to enforce the legislation.

Pollution Risks to Sudan's Marine and Coastal Environment

This chapter attempts to identify the different types and sources of pollution which threaten Sudan's coastal and marine environment. Most information is available about the oil sector.

Port Sudan Port

Port Sudan is the Sudan's largest port and accounts for the bulk of the country's import and export trade. Further details of the shipping characteristics are contained in chapter 5.

Port Sudan has 10 berths in the Main Quays on the northern shore of which 7 are for general cargo; 2 are multi-purpose but also have provision for the export of bulk liquids (berth No. 5A is used for the export of molasses which are pumped in from outside the perimeter of the port and berth No. 9 is used for the export of vegetable oils); and one berth for the import of cement into a silo.

On the Southern Quays of the port is a grain silo (berth No. 15) where wheat is imported and sorghum is exported.

Berth No. 16 is the berth for receiving petroleum products which are unloaded directly to pipelines taking the products to the petroleum companies' storage tanks and to the Port Sudan refinery. There are separate pipelines for gas oil (diesel fuel), gasoline (petrol), jet aviation fuel and liquid petroleum gas (LPG).

Oil products are exported at berths Nos. 18 and 19, taken directly by two pipelines from the tank farm of Port Sudan refinery. Berth Nos. 18/19 are multi-purpose: new container-handling cranes and equipment commenced operations in late 1997 and were officially opened by the President on 1 March 1998. Because of this competitive use, the SPC intends to extend the berth by 140 metres to the west.

Bunkering facilities

The bunkering station for fuel oil is between berth No. 16 and berth No. 18/19. Bunkering services are provided either by barge operated by the Sudan Shipping Line or by road tanker, a service offered by Mobil. (The bunkering vessel operated by the Sudan Shipping Line is currently out of service.) The Fire Brigade stands by during all bunkering operations.

Dammar Dammar Petroleum Terminal

This is a new construction, about 2 miles to the southeast of Port Sudan harbour. It is specialised for the export of petroleum products, mainly LPG, gas oil (diesel) and gasoline

(petrol). The terminal consists of one jetty connected through a pipeline with the main storage tank farms at the southern end of the town of Port Sudan. The pipeline lies on a pier 700 metre long. At the end is the jetty and the berth which can accommodate tankers up to 50 000 dwt. The terminal is planned to be operational by mid 2003.

Port Sudan Refinery

The Port Sudan refinery is situated about 5 km to the south of the tank farm at Port Sudan. It was built by Shell in the 1930s who withdrew in 1991 and the refinery is now government owned. It is the only coastal refinery in the Sudan and was originally built with the intention of refining all Sudan's imported crude oil to meet the national need for petroleum products. However, the refinery currently (1998) supplies about 80% of the country's needs for mogas (fuel for motor vehicles) and only about 50% of the demand for gas oil (diesel fuel). Similarly there is a shortfall in the supply of jet aviation fuel. These shortfalls are made good by imports authorised by the General Petroleum Company (GPC).

The refinery has been modified to process Sudanese crude oils. In the past it was processing Arabian, Iranian light, Qatar Marine, Basra and Libyan crude.

With the discovery and exploitation of Sudan's own crude oilfields at Heglig and Adariel, a small refinery has already been built at Al Obayyid and a major new refinery is being constructed at El-Gaily on the outskirts of Khartoum. As well as being constructed to modern standards, the new refinery will be more centrally placed to supply the Sudan's distribution network.

The long term future of the Port Sudan refinery is not settled, although there must be strong doubts as to its continuing viability especially given its age, condition and alleged production problems. However, one possibility mentioned was that it could export refined products based on continuing imported crude supplies. There is an intention to link the Port Sudan refinery by pipeline with the Heglig and Adariel oilfields.

Oily discharges

Although the refinery apparently operates a closed cooling water system based on town water supplies, there are considerable volumes of highly contaminated drainage water around the site. These drain ultimately to a lagoon which operates only on a gravity separation system. Surface oil is intended to be skimmed off but the skimmer system has been broken for a considerable time. Water is pumped out from the bottom of the lagoon on to the beach without further treatment or analysis.

A further problem is that during the rainy season (mid-November - February) the refinery site is subject to flooding. The oil in the lagoon and drainage ditches is then spread all over the flood plain leading to the sea. The refinery has taken steps to improve flood protection by building a small wall to protect the lagoon from flood waters which come down from the mountains in the hinterland.

The refinery is involved in the national contingency plan. Crude oils and oil-in-water emulsions which are recovered from the sea will usually be capable of being processed at the Port Sudan refinery. It will be necessary to liaise with the refinery on the acceptability of recovered oils for processing (NOSCP 3.3.13).

Electricity power stations

The power station (power station A) for Port Sudan is situated on the southern shore at the innermost part of the harbour. It was intended to produce 30 megawatts but has had considerable production problems. The power station runs on oil and used to consume 6 tonnes of fuel a day. It is currently being refurbished.

There is a longstanding history of oil pollution from the power station dating back to the 1980s when oily waste was discharged directly into the port. The waste oil was then collected in a 98 m³ holding tank, backed up by a second tank of 12 m³ and a third, covered tank of 4 m³. The waste oil was collected at no cost on either side by private collectors. Three 7 m³ tank trucks remove the oily waste each day. The oil was supplied to other industries as low grade fuel oil.

The problem of waste oil entering the harbour needs to be solved. The main holding tank has a plug at the bottom which is intended to allow the separated water to be discharged to the sea. There was no separator equipment with the result that considerable quantities of oil were discharged. The bay adjacent to the power station fronting the Institute of Marine Research is heavily polluted by oil which is of longstanding duration.

The power station has a seawater intake and consumed about 100 m³ per day. The seawater intake would normally be a high priority for protection in an oil spill contingency plan; in this case the power station is itself a likely cause of oil pollution.

The seawater, which is used for cooling purposes, used to reach a temperature of 87 °C maximum and was discharged at between 50-60 °C. As the ambient seawater temperature is in the region of 24 °C this constituted a source of thermal pollution to the marine environment.

There is a small power station immediately adjacent to the refinery (power station C) which receives its fuel oil from the refinery. Apparently waste oil is collected and removed by road tanker. However, it is evident that untreated waste water contaminated with oil is discharged by ditches to the beach.

Oil Distribution Companies

The Sudanese Petroleum Agency (SPA) represents the Ministry of Energy and Mining in Port Sudan, Suakin and Bashayer Ports and supervises all oil activities. As such, SPA is an important member of the NCPC and represents the interests of the State petroleum sector, especially in the important decisions which have to be taken on an equipment procurement programme.

There is one State-owned company, The General Petroleum Company (GPC), and a number of privately owned distribution companies with storage tanks for their products situated immediately outside the port. They receive supplies of petroleum products either directly by pipeline from berth No. 16 (imports) or from Port Sudan refinery after processing.

General Petroleum Company

GPC was responsible for ordering all crude oil imports, based on advice from Port Sudan refinery, and it also sells the refined products to the distribution companies. GPC

does not sell directly to consumers; only to distributors. The General Manager of SPA represents the General Petroleum Company on the NCPC.

Mobil

Mobil is engaged in both general distribution of petroleum products and the bunkering of ships at Port Sudan and Suakin. It has authority from GPC to import its own bunkering fuel and has a trade of 1,500-2,000 metric tonnes per annum. Bunkering is undertaken by road tanker on the quayside or inside the vessel in the case of ro-ro passenger ferries.

Shell

Shell is in the business of marketing fuels and lubricants. It receives its supplies from the Port Sudan refinery and by imports (about 3 shipments per annum). It has recently started a joint venture with Mobil to import jet aviation fuel (5 shipments of 3,000 metric tonnes). It also imports products on behalf of other authorised organisations (e.g. the UN).

Shell is also engaged in bunkering operations in Port Sudan but less extensively than Mobil. Shell has a direct pipeline to the jetty.

Company	Regular petrol	Gas oil (diesel)	Jet A1 fuel	Fuel oil e.g. ships	Kerosene	LPG
Shell	4,155	18,830	9,227	4,400	0	0
Mobil	2,800	10,500	5,925	4,450	0	0
Nile	1,900	4,500	0	3,000	1,900	150
Agip	1,750	8,200	0	105	1,000	120
Totals	10,605	42,030	15,152	11,955	2,900	270

The total storage tank capacity for the petroleum companies in Port Sudan by product

New Oil Terminal at Gezirat Abd Alla (Bashayer)

The site for the new oil terminal is at Gezirat Abd Alla, a bay in the O'Sheeri district about 24 km south of Port Sudan. The bay has a fine-grained sandy beach with shell particles and is backed by low-lying saltmarshes with camel-grazing scrubland. To seaward, the site has a shallow reef flat for about 150 m to the edge of the reef where it falls away steeply to deep water. Anchorage is afforded by the 3-mile wide channel between the shoreline and Towartit Reef. It has deep water and is sheltered from prevailing winds. The prevailing current is southwards. A risk assessment of operations has been carried out and a local oil pollution emergency plan prepared.

A new joint venture company, the Greater Nile Petroleum Operating Company (GNPOC), has been formed to manage the pipeline which will transport crude oil 1,500 km from the Heglig and Adariel oil fields to the Sudanese coast for export. (The joint venture consortium is made up of 50 % Chinese investment, 35 % Malaysian, 10 % State Petroleum Canada, and 5 % Government of Sudan).

GNPOC engaged a third party, internationally recognised consultancy firm to carry out an environmental impact assessment (EIA) of the pipeline project and to recommend appropriate environmental controls. The pipeline route crosses a national park as well as the Nile in two places.

Economic Free Zone

An Economic Free Zone is being established covering 600 km² between Port Sudan and Suakin. The first stage involves the development of a coastal strip measuring 20 km long and 1.8 km inland from the coast with sea access at Mersa Kuwai.

There are also ambitious plans to develop a huge container port for the Far East and Europe based on Mersa Kuwai. In the longer term, the developers plan for other industrial uses including a petrochemical works.

As these plans come to fruition, there are significant risks to both the terrestrial and marine environment. The development should therefore be subject to a strict EIA to ensure that all such risks are clearly identified and that pollution control and other abatement measures are properly implemented. Likely sources of pollution would include, at the least, thermal pollution from any freezer plants and power supplies, pollution from ships using the free zone port, garbage and dumping of waste materials, as well as destruction of habitat.

Other Industrial Uses

There are other industrial activities in the vicinity of Port Sudan which either have - or have the potential - to impact the marine environment. Most of this industrial development is located in the east town of Port Sudan.

ITMD tyre manufacturing company

ITMD is a Korean-owned company established in 1980 for the manufacture of motor vehicle tyres for the Sudanese market. It has constructed a pier about one half kilometre long at the end of which is a seawater intake. Consumption is 800 tonnes/day for cooling water purposes and, in addition, 270 tonnes/day to a desalination unit which is used for the production machines. The cooling water is an open system and the water is discharged to the sea at temperatures up to about 45 °C thus constituting a potential thermal pollution problem. There is evidence of oil pollution from discharge points which indicates that oil leaks are being picked up in the cooling process and discharged to the sea.

The company has problems with the management of its solid wastes. The most serious concerns the manual handling of carbon black, which is now delivered in containers having previously been a problem when handled loose at the port. Loose powder is a significant health hazard and also causes chronic pollution in the vicinity of the factory which is surrounded by residues of carbon black which also pollute the beach.

Tannery

A neighbouring tannery used to discharge its untreated wastes by means of a discharge pipeline directly to the sea. Tannery wastes contain many substances which are blacklisted in the international conventions owing to their toxicity and persistence in the marine environment. The tannery closed several years ago.

Port Reception Facilities

There are no port reception facilities in Port Sudan or Suakin.

Oily Wastes

The requirements for the provision of reception facilities for oily wastes as specified in the MARPOL 73/78 Convention have been described. However, it must be recalled that the Sudan, at present, is not a Party to this convention and is not therefore bound by its rules.

Oily wastes from ships can be divided into the following main groups:

- used lubricating oil
- fuel residues
- sludge
- oily bilge water
- dirty ballast water
- oily tank washings

All ships need to dispose of oil residues and oil sludge. At present it is understood that some vessels calling at Port Sudan engage a private contractor who collects the oily wastes in a road tanker. The final destination of the wastes is not known.

There is no known collection of oil residues and sludge at Suakin.

Oil tankers having dirty ballast water to dispose of will require a fixed reception facility. There is no need for ballast water reception facilities in Port Sudan as, on the whole, tankers are arriving with crude oil or refined petroleum products. In the past there was some flushing of cargo tanks using clean water from the harbour; but apparently this practice has been forbidden for a number of years.

Ships of the Sudan Shipping Line are equipped with oily water separators. The separated oil can be incinerated on board with the ship's fuel.

Bulk Chemicals

There is no trade in bulk chemicals in Port Sudan and thus no need for MARPOL Annex II reception facilities.

Garbage and Sewage

There is no authorised collection of garbage or sewage in either Port Sudan or Suakin although it is understood that some vessels engage private contractors to dispose of their garbage.

A potential problem in establishing a cost effective collection and disposal system for both oily wastes and garbage in the port is that, if the waste materials are to be used for commercial purposes (such as recycling), customs duty will be levied on the value of the material (the levy depends on the material but would normally be about 2 % of the value).

Inadequacy of Reception Facilities in the Sudan

In the absence of any port reception facilities, it seems likely that ships' wastes are discharged outside the harbour area, either in the anchorage area off Wingate Reef or in the Red Sea, and there is much anecdotal eye witness evidence to confirm this.

For a harbour, or oil terminal, to be fully provided with reception facilities which satisfy the requirements of MARPOL 73/78 it is not sufficient simply to provide some facilities. The facilities provided must be of sufficient capacity and appropriate design to enable all ships which may be expected to use the port to be able to do so without suffering any undue delay.

The reception facilities can be fixed installations or mobile conveyances, as appropriate. In assessing the type and capacity of the facilities needed, the port authority must take into account the number, type and sizes of vessels, and the trades they are engaged in. It is also necessary to take account of prospective changes; both changing ship designs and port operating practices will have an effect on the requirements for reception facilities.

The final disposal of the wastes and residues also needs to be carefully considered. It needs to be assessed whether ship generated wastes should be disposed of within the customs area of the port, or whether the question of waste disposal should be examined in the wider context of waste management for the town of Port Sudan, thus involving the municipal authorities. If the wastes are to be disposed of outside the port, the question of customs duty on the value of the waste needs to be examined to see whether it would be appropriate to exempt such wastes from duties if this leads to environmentally sound solutions.

The role of the SPC needs to be considered. Although it must be the responsibility of the port authority to see that adequate reception facilities are provided, operational matters such as collection and disposal could be managed by private contractors, or could be handled by SPC itself, or by a combination.

In brief, it is necessary to prepare a complete waste management strategy for the ports of Port Sudan and Suakin.

Maritime Traffic and Navigation Risk

Port Sudan

Maritime transport is the major commercial activity in the Red Sea coastal area of Sudan. In 1994/95 a total of 920 vessels called at Port Sudan harbour. In 1996, the number increased to 997 ship calls. Approximately 11 % of ship calls are laden oil tankers.

In addition, there was a total of 22,618 TEU (twenty equivalent units = TEU) containers imported in 1996 (266,341 tons) and 14,409 TEU exported (183,100 tons). (Note: containers are either 20 ft or 40 ft; the TEU unit is a means of compiling comparable statistics.)

Suakin

Suakin port is the base for a regular passenger traffic to Jeddah and, occasionally, to Suez. Suakin receives 250 ship calls per annum and handles about 180,000 passengers.

The trade is conducted by 5 roll on/roll off ferries ranging in size between 2,700 GRT and 6,400 GRT. The bulk of the trade is carried out by five ships:

Al Aboud	4,051 GRT
Al Salam	5,485 GRT
Al Barakat	6,390 GRT
Al Judi (Sudan Line)	6,419 GRT
Al Rasheed II	3,873 GRT

In addition to passengers, Suakin handles the following trade (exports to Saudi Arabia) in fresh produce:

Meat and fish: 240 tonnes

Fruit and vegetables: 360 tonnes

Livestock: One temporary berth has been constructed for exporting livestock. This is planned to be operational in the second half of 2003.

LPG: A temporary berth has been constructed at the entrance of the Suakin Channel for exporting LPG. The product is taken by LPG trucks and directly discharged through a jetty to the tankers.

There are also some imports from Saudi Arabia, notably motor vehicles (mostly of Japanese origin).

There are no official facilities for the collection of ships' wastes although it is understood that there is some collection by a private collector. The ultimate destination of the collected waste is not known.

Most ships take on their bunker fuel in Jeddah where it is cheaper. Occasionally ships use Mobil's services. As the ferries are ro-ro, the bunkering operation is carried out by road tankers discharging fuel into the vessels' fuel tanks from inside the vessel, thus more or less eliminating the risk of accidental marine pollution.

Approaches to Port Sudan

The immediate approach to Port Sudan is on a bearing of 305° which is marked by leading lights marking the mid-channel. The entrance to the harbour is marked by a fixed green light at Berth No. 1 and a flashing red at Berth No. 15. The approach to the inner harbour is on a bearing of 314° 18'. All vessels are guided by one of the SPC's thirteen pilots.

The outer approaches are marked, to port, by the automatic Port Sudan lighthouse followed by the solar beacon at Dammar Dammar. To starboard, the approach is marked by the Demitery beacon which has now been moved from its previous position on land to the edge of the shallow water, thus improving navigational safety. The beacons are visible at 3-4 miles.

Further offshore, the approach to Port Sudan is signalled by the manned lighthouse on Sanganeb Reef. The light is 50 m high and is visible for 19 miles.

Port Sudan is a naturally protected harbour sheltered from the winds and with no current. There is a 300 m turning space which is sufficient even for the larger vessels using the port. Manoeuvring of vessels is assisted by two tugs, with two tugs standing-by.

There are two anchorage areas for Port Sudan. The official area is the channel approximately 20 km to the south sheltered by North Towartit Reef. In practice, most vessels use the closer anchorage area to the north-east of Port Sudan at Silayet (Wingate Reefs). This can accommodate up to 11 ships in shallow water of between 11-33 m. Larger vessels sometimes anchor in the deeper waters of the channel to the west of the anchorage area which is still afforded protection by the reef. Most of the calling tankers and larger vessels do not use the anchorage area but heave-to offshore. They also tend to pick up the pilot further offshore than at the designated position.

Approaches to Suakin

The approaches to Osman Digna Port at Suakin were dredged in 1994. The previous zigzag channel has been replaced by a straight channel 190 m wide dredged to a depth of 12 m up to 40 m before the berth.

The approach to Suakin is marked by four beacons to starboard and five beacons to port. The clearly marked straight channel presents no navigational hazards.

The manoeuvring of vessels is assisted by one tug at Suakin. All vessel movements are advised by the pilot. It has already been noted that the bulk of the traffic at Suakin is just from five vessels which regularly use the port; this intimate knowledge of the port's navigational situation by the ships' officers reduces the likelihood of ship accidents.

The Towartit Reefs

The channel between the Towartit reef system and the shore is a designated anchorage area for Port Sudan although less frequently used than Wingate Reef. It is also the location for the oil loading terminal constructed at Gezirat Abd Alla.

In principle, there are no navigational problems with the Towartit Reef channel. It is 3 miles wide, provides deep water and a sheltered environment.

In order to improve safety of navigation, the Department of Marine Operations of SPC has placed four solar beacons to mark the Towartit Reef.

Risk Assessment

It would be reasonable to classify navigational risk in Sudanese waters into 3 potential risk areas:

- risk for ships in transit through the Red Sea shipping lanes
- risk for ships entering and leaving the ports of Port Sudan and Suakin
- risks where ships are joining or leaving traffic lanes

Historically the risk of a navigational accident in the Red Sea shipping lanes is low. The risk will increase where ships are joining or leaving the Red Sea traffic lanes. However, the greatest navigational risk must concern ships entering or leaving Port Sudan and, to a much lesser extent, Suakin. The risks of accident are, of course, reduced by the presence of pilots.

It is important to consider the types of accident which could occur. In brief, these are:

1. Powered grounding due to:
 - loss of control due to incapacitation of navigator
 - loss of control due to Less Than Adequate execution of navigation
 - loss of rudder control
 - loss of engine control
2. Ship collision
3. Drifting grounding

In the case of drifting or powered grounding, global statistics show that, where shipping lanes are close to coral reefs or islands, in about 70 % of incidents the hull is not penetrated. However, powered grounding on to coral reefs is likely to cause bottom penetration even with double hull tankers.

In the case of ship collisions, the cargo tanks of a single hull tanker will be penetrated if the colliding ship is above 70 m length and is travelling at 12 knots. A double-hulled tanker will be penetrated if the colliding ship is above 150 m length and travelling at 12 knots.

Resources at Risk from Oil Pollution

The position of all seawater intakes should be identified and mapped. Discussions should be held with the owners of the water intakes about the vulnerability to oil spills and the need for protection measures to prevent contamination.

Biological Resources

Coral Reefs

Coral reefs should be considered priority areas for protection from oil spills due to their very high species diversity, their uniqueness and their considerable potential economic importance for the tourist industry and also for fisheries. Extensive coral reefs are found the length of the Sudanese coast. The dominant reef type is the fringing reef extending almost continuously along the coast and which acts as a breakwater. Sanganeb atoll has been designated as a marine park.

Coral reefs are threatened by small chronic oil spills in particular, but larger acute oil spills may also affect them. Observed biological impacts of oil spills in reef areas range from mass mortality of fish and invertebrates to apparently no effects. Generally oil floats over the reef. However oil components may come in contact with corals in a number of ways:

- Some reefs are exposed to the air during low tides. Oil can come in contact with corals and cause severe damage on such reefs.
- Waves breaking on the reefs may create droplets of oil that are distributed into the water-column.
- Weathering processes cause oil to sink.
- Oil components can dissolve in water to some extent which exposes the corals to potentially toxic compounds. However, toxic concentrations are only encountered in the uppermost part of the water-column.
- Sand landing on an oil slick during sand storms can cause the oil to sink.
- The use of chemical oil dispersants will increase the dispersion of the oil into the water column, thus increasing the potential for contact with the corals.

Based on these considerations coral reefs can be ranked with respect to sensitivity as shown overleaf:

Degree of vulnerability	Reef Type
Very vulnerable reefs	A. Reefs in very shallow water where the reef edge and reef flats may be exposed to air during low tide. There is a high risk of direct contact between corals and oil and the reef can be severely damaged.
	B: Reefs in sheltered shallow water where high concentrations of dissolved oil may persist for long periods of time.
	C. Reefs in shallow waters which are already stressed by pollution, sedimentation, tourism etc.
Reefs of medium vulnerability	Reefs in shallow water. High concentrations of dissolved toxic oil components may be encountered in the water around the corals beneath large fresh oil slicks on such reefs.
Reefs of low vulnerability	Reefs in deeper waters. Oil floats over the reef and dilution reduces oil concentrations around the corals to below acute toxic levels.

Mangroves

Mangroves are well known for being particularly sensitive to oil spills and should be considered priority areas for protection.

An FAO study carried out in 1995 identified a total of 13 mangrove areas along the Sudanese Red Sea coast, in particular along bays, lagoons and sheltered coastlines and on nearshore islets. Each area comprises several small stands, often less than 50 metres in width. The total area of mangroves is estimated to be in the region of 500 ha. This is estimated to be about half the extent of mangroves in former times, due to excessive browsing by camels. The only species of mangrove tree in the Sudan is *Avicennia marina*.

Mangroves are highly productive ecosystems providing food and shelter for a large number of species. Over 30 different fish species are reported from the mangrove areas of the Sudan, several of them of commercial importance and dependent on the mangroves for at least part of their lifecycle. Mangroves are also essential habitats for numerous birds.

Mangroves typically grow in more or less anaerobic sediments. They receive oxygen through aerial roots protruding from the sediment surface. There are pores on the aerial roots through which oxygen passes. This root system makes mangroves highly susceptible to oiling. Oil slicks may enter mangroves when the tide is high and are deposited on the aerial roots and sediment surface as the tide recedes. The pores in the aerial roots become clogged by the oil and if many roots are oiled, the respiratory system collapses and the trees die. Mangroves can also be killed due to toxic effects of oil components, especially low boiling aromatics. The toxicity of oil gradually decreases because the toxic aromatics evaporate. Toxic effects therefore arise mainly from newly spilled oil.

Oil easily gets trapped in the mangroves and usually persists for a very long time. Although the microbial degradation of oil is a rapid process in aerobic environments, oil buried within the typically anaerobic sediments of mangroves biodegrades very slowly.

Saltmarshes

Saltmarshes are also very sensitive to oil pollution. There are various types of salt marsh vegetation. Reed marshes are dominated by *Phragmites australis* and *Typha domingensis*. Marshes are extremely productive and are valuable habitats for many species. They are essential habitats for numerous birds, both as roosting and breeding sites for resident species and stopover and feeding grounds for migrants.

The full distribution of saltmarshes in the Sudan has not yet been mapped.

Fishing and Spawning Grounds

In general, all the shallow water areas (mersas) along the Sudanese coast are potential spawning grounds and this should be recognised in the event of an oil spill.

The only spawning ground for oysters is Dongonab Bay. The only mariculture activity in the Sudan is at Mohamed Gol where there are 8 oyster farms producing mother of pearl for export.

The coastline from about 50 km south of Suakin to the border with Eritrea is subject to high rainfall and is a good area for shrimp. In this region, the Tokar delta, the shrimp potential has been estimated at 30 tonnes/annum although it is currently under-exploited.

Following a joint venture with Saudi Arabia to build about one hundred small five-metre fishing boats (3 crew), fish is exported from Port Sudan to Saudi Arabia every ten days or so. In all, there are estimated to be about 400 small fishing boats in Sudan and about 300 slightly larger boats of 9-10 m (with 4-5 crew).

A DANIDA (Danish International Development Assistance) study in 1989 estimated that there were about 1,500 artisanal fishermen living in 22 separate fishing communities along the coast. Eighty percent of fish are caught on hand-lines. The only areas where trawl fishing is carried out are the Tokar delta in the south and Ofoul Bay in the north.

Sensitivity Mapping Survey

Apart from coral reefs, mangroves and saltmarshes with their high biological productivity and ecological significance, it is also important to identify other beach types for the purpose of comprehensive oil spill contingency planning. Different beach types have different characteristics and stranded oil on the shorelines will therefore pose different clean-up problems and will warrant different priorities for protection.

It is recommended that international funds should be sought to enable a comprehensive sensitivity survey to be carried out of the entire Sudanese coastline at intervals of approximately 5 km. The objective would be to classify the beach types and identify priorities for protection. The survey would record all areas of biological significance and would also, as a separate but related survey, record all changes in land use along the coast. (A similar survey has been completed in Egypt for the purposes of the Egyptian National Oil Spill Contingency Plan). The opportunity would also be taken to carry out a simultaneous survey of any evidence of oil pollution to determine the extent to which the

coastline of the Sudan is affected by discharges of oil from passing tanker traffic engaged in washing their cargo tanks or other activities.

Such a task would greatly enhance the knowledge and resources of those responsible for the National Oil Spill Contingency Plan of the Sudan. It could also be of value to the State Ministry of Tourism (especially the information on beach types) in helping to identify sites of potential tourist developments.

A separate, but related, task is to map all known data about fishing activities to determine priorities for protection. The data would also be of assistance to the Maritime Fisheries Department. It is therefore recommended that international funding should be sought for this task also.

Tourist Resources

The tourist industry in the Sudan has yet to be developed. There are no hotels in Port Sudan which are developed to modern standards for the tourist trade, although the Red Sea Hotel is currently under reconstruction with this in mind.

There are inherent problems in developing the tourist trade: the lack of direct flights to Port Sudan from European destinations; unreliability of scheduled flights; difficulties in obtaining flight tickets without a visa; the difficulty in obtaining entry visas in advance; the lack of specially designed tourist resorts; inflated prices compared with alternative tourist destinations (e.g. Egypt's Red Sea coast). The State Ministry of Tourism is working on these problems and trying to achieve a coordinated approach with other government departments which are involved.

A designated tourist village has been established at Arousa about 200 km north of Port Sudan. It is understood that the tourist village is currently fairly dormant as regards foreign tourists although there may be some local tourist trade.

There is a limited season when the climate would be acceptable to European tourists: probably from October to May with the peak period being from December to February.

Diving

The activity which perhaps offers the greatest tourist potential is diving. Of all the Red Sea which can be toured by dive boats, the Sudan probably offers the greatest sensations of adventure as it still conceals most of its secrets. Sudan offers a seascape which is unquestionably one of the most beautiful and complete in the world.

There are two cruise routes for boats leaving Port Sudan. To the north: the wreck of the Umbria on Wingate Reef; Sanganeb; the wreck of the Blue Bell at Sha'ab Su'adi; Sha'ab Rumi (the location in underwater living pioneered by Jacques Cousteau in 1963). To the south there are the reefs and islets in the Suakin group.

However, attempts in the past to develop the diving potential have not been very successful.

Appendix 1: Oil Pollution Combating Equipment

For the purposes of the national contingency plan, it is proposed that the Sudanese authorities should plan for a national response capability of 1,000 tonnes. This would be the likely spill size in the event of a slight grounding or collision involving a 50,000 dwt oil tanker (such tankers visit Port Sudan approximately twice per month) and resulting in the rupture of one wing tank. Alternatively, the 1,000 tonne capability would be sufficient to respond to the total loss of bunker fuel from a 30,000 dwt vessel.

The 1,000 tonne capability should be regarded as the basic national stockpile which could be based at Port Sudan. It should be reinforced by supplementary equipment stockpiles at Suakin and at the new terminal at Gezirat Abd Alla.

The equipment proposals also assume that the response operation should be focused on the following operating environments:

unsheltered waters:	20%	200 tonnes
sheltered waters:	40%	400 tonnes
shoreline clean-up:	40%	400 tonnes

Unsheltered waters

The complete oil spill response unit for unsheltered waters (such as the approach to Port Sudan) would consist of the following equipment:

- one tug from Port Sudan SPC deploying a sweep boom system.
- one barge/working platform (reinforced glass-fibre or aluminium construction) to carry a minimum of 30m³ of recovered oil.
- four storage bladders suitable for towing (floating collapsible oil bags) of 30 m³ capacity each.
- one sweep boom system of approximately 200 m in length suitable for operation in the unsheltered water environment.
- one weir-type screw skimmer (nameplate capacity of 60 tonnes per hour) adaptable to a wide variety of oil viscosities. The pump should be versatile and must be able to be adapted as an offloading pump. The skimming unit must also be equipped with all hoses for successful operation and recovery.
- power pack: minimum 25 kW.
- two dispersant spraying arm sets for installation on board two of the SPC tugs at Port Sudan.

The rationale for the use of only one recovery unit is based on the use of a weir-type screw skimmer that has a nameplate capacity of 60 tonnes per hour, based on a skimmer derating formula of 20 % of the nameplate capacity:

Nameplate rating x 20 % x 12 hours would result in a 2 day capacity for recovery as follows:

$$60 \times 20 \% = 12 \times 12 \text{ hours} = 144 \text{ tonnes} \times 2 \text{ days} = 288 \text{ tonnes.}$$

In the open waters of the approach to Port Sudan, the fast application of dispersants may be a viable response option to a spill involving quantities of crude oil that is amenable to dispersant application. Hence the proposal that the SPC tugs should be equipped with sets of dispersant spraying arms.

Sheltered waters

The booming formula for containing oil in sheltered waters is calculated as follows:

$$B = 1.25 H$$

Where:

B = the amount of boom required to contain free-floating oil

H = the quantity of oil in sheltered waters.

Based on this formula, the quantity of boom required is: 500 metres.

H = 400 tonnes; therefore B = 400 x 1.25 = 500 metres.

The complete oil recovery unit for operation in sheltered waters would consist of the following equipment:

- one 12 metre sea truck equipped for skimming operations.
- one screw skimmer system with floating weir to adapt to a wide variety of oil viscosities. The pump should be versatile and must be able to be adapted as an offloading pump. The skimming unit must also be equipped with all hoses for successful operation and recovery.
- one barge/working platform (reinforced glass-fibre or aluminium construction) to carry a minimum of 30 m³ of recovered oil.
- four storage bladders suitable for towing (floating collapsible oil bags) of 30 m³ capacity each.
- power-pack: minimum 25 kW.

Shoreline clean-up

The booming formula for containing oil near the shoreline is calculated as follows:

$$B = 0.625 H$$

Where:

B = the amount of boom required to contain oil near the shoreline.

H = the quantity of oil in sheltered waters.

Based on this formula, the quantity of boom required is: 250 metres.

H = 400 tonnes; therefore $B = 400 \times 0.625 = 250$ metres.

The resources required for cleaning up the contaminated shoreline is based on the following formula. One tonne of oil will contaminate 45 metres of shoreline and one spill responder can treat 6 metres of shoreline per day. On the basis of these assumptions, 400 tonnes of oil-contaminated shoreline would cover 18,000 metres. This would take a team of 30 responders approximately 100 days to clean. Shoreline clean-up activity may be reduced if the impacted area is protected by materials such as absorbents and shoreline protection carpets, thus reducing the amount of contaminated shoreline to be cleaned. This is reflected in the equipment proposal below.

A complete set of shoreline treatment equipment would consist of the following:

- 250 metres of intertidal barrier boom to prevent recontamination of cleaned beaches.
- 3,000 metres of shore protection boom.
- 2,000 metres of absorbent boom.
- 2,000 metres of shoreline protection carpet.
- 1 beach cleaner of conveyor belt type with rubber scrapers and pre-settling tank.
- 1 hydraulic one-man operated rock cleaner with rotating brush, together with portable power pack.
- one pressure washer.
- 20 flexible storage tanks each of 15 m³ capacity.
- one trash-type pump, 3" diesel driven, plus hose sets.
- one peristaltic pump, diesel driven, plus hose sets.
- 30 sets of rakes, spades, sand shovels, forks and buckets.
- 1,000 PVC refuse sacks (100 litres capacity).
- 30 sets of protective clothing.

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MV Limburg burning off the southern coast of Yemen, October 2002; the hole opens through the double skin of the tanker (NEXEN Petroleum, Capt. R. Facey)

Manual shoreline clean-up of spilled oil (ITOPF)





كميات من الزيت انجرفت نحو الشاطئء إثر حادث تلوث بالزيت (ITOPF)



عمليات تنظيف الشواطئء الصخرية الملوثة بالزيت (ITOPF)