

THE NATIONAL OIL SPILL CONTINGENCY PLAN

OF

TRINIDAD AND TOBAGO

NOSCP January 31, 2013

ACKNOWLEDGEMENTS

The outline of this plan was developed for the Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean (ARPEL) under the title "How to Develop a National Oil Spill Contingency Plan" in association with the RAC/REMPEITC-Caribe.

This outline was modified by the Ministry of Energy and Energy Affairs (MEEA) to produce this National Oil Spill Contingency Plan.

Some material that is still relevant from the first finalized and Cabinet-approved NOSCP developed in 1977 was incorporated into this plan.

In addition, some of the material that was developed in the 2004 draft version of the plan developed in 2004 was also incorporated into the plan.

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POLICY STATEMENT

The Government of the Republic of Trinidad and Tobago (GORTT) is conscious of the need to preserve and protect human health and the natural environment from the ever-present risk of oil and chemical spills.

And whereas GORTT recognizes that these risks, to a large degree, can be posed by energy and associated energy operations both on land and offshore, including vessels, platforms, pipelines, ports and oil handling facilities.

GORTT is mindful of the importance of precautionary measures and prevention in avoiding oil pollution in the first instance, as well as that, in the event of an oil pollution incident, prompt and effective action is essential in order to minimize the damage which may result from such an incident.

GORTT emphasizes the importance of effective preparation for combating oil pollution incidents and the important role which the oil and shipping industries have in this regard.

GORTT is committed to ensuring that appropriate measures are taken in accordance with all relevant Local Legislation, Regulations and Standards, best industry practices and all relevant International Conventions acceded to, ratified or entered into force by GORTT.

GORTT shall therefore:

1. Assign the responsibility for the prevention, abatement and combating of oil pollution within the country's territory, including its Exclusive Economic Zone and for the clean-up of oil contaminated areas to the Ministry of Energy and Energy Affairs as the Lead Agency with the Trinidad and Tobago Coast Guard as the Response Agency;

2. Ensure that this National Oil Spill Contingency Plan set out to provide for a coordinated response action in minimizing the detrimental effects of oil spills on land and at sea is implemented, regularly updated and rehearsed;

3. Appoint Incident Command Staff comprising GORTT personnel, including a National Controller and two Deputies who will function as the initiators and coordinators of oil spill contingency planning and response for Trinidad and Tobago;

4. Assign the coordination of surveillance of the country's territorial waters, including its Exclusive Economic Zone for the timely detection of oil spills and other related emergencies to the Trinidad and Tobago Coast Guard;

5. Mandate that entities requiring the approval of the Ministry of Energy and Energy Affairs to undertake oil and gas operations, including but not limited to, oil, gas, petrochemical, storage and bunkering operations, must have the ability to manage their own Tier 1 spills and participate in a Tier 2 Oil Spill Response Organization (OSRO) with the assistance of the Ministry and Energy and Energy Affairs to mount an effective Area and National Oil Spill Response.

6. Ensure the availability of appropriate equipment and training of human resources for efficient response to, and containment, recovery and clean-up of oil spills in Trinidad and Tobago's marine and terrestrial areas;

7. Encourage and support research in oil spill response, especially in relation to prevention, containment and mitigation methods, including mechanical and chemical means.

....

Date

The Honourable Senator Kevin Ramnarine
Minister of Energy and Energy Affairs

PLAN AUTHORITY AND CUSTODIAN

Responsibility for development, updating of and amendments to this plan rests with the Ministry of Energy and Energy Affairs.

This Plan is to be kept current whenever changes to key agencies and/or personnel are made and at least reviewed annually. This plan shall also be revised based on experiences from actual incidents, drills and simulation exercises, to take into account any change in the hazard/threat, as well as changes in technology.

No revisions to the Plan can be made unless these are made through the Plan Authority or Plan Custodian who will ensure that the revised Plan is distributed to all Plan holders.

For this version of the Plan:

TITLE	**DESIGNATE**
The Authority/National Controller:	National Controller – Permanent Secretary, MEEA
1° Deputy National Controller:	Senior Petroleum Engineer, MEEA, Marc Rudder
2° Deputy National Controller:	Chief Mechanical Engineer (Ag.), MEEA, Ian Ramdahin
The Plan Custodian:	Senior Petroleum Engineer, MEEA, Marc Rudder

REVISIONS

This page should be completed and signed by the Honourable Ministers after each review of the plan has been completed. A copy of it should be sent to all relevant Ministries, Government Agencies and Oil and Gas Operators

DATE	REVISED PAGE NUMBERS	NAME, TITLE AND SIGNATURE

LIST of ACRONYMS

AC	Area Controller
AMPD	Average Most Probable Discharge
ARPEL	Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean
BOSCP	Bilateral Oil Spill Contingency Plan
BPTT	BP Energy Company of Trinidad and Tobago LLC
CAD	Civil Aviation Division
CARIBPOLREP	Caribbean Pollution Report
CARIRI	Caribbean Industrial Research Institute
CCA	Clean Caribbean and Americas
CDA	Chaguaramas Development Authority
CEC	Certificate of Environmental Clearance
CLC	Civil Liability Convention
COCATRAM	Central American Commission for Maritime Transport
COCG	Commanding Officer Trinidad and Tobago Coast Guard
DCA	Director of Civil Aviation
DMS	Director of Maritime Services Division
DNRE	Department of Natural Resources and the Environment (Tobago)
EEZ	Exclusive Economic Zone
ESZ	Ecologically Sensitive Zone
EIA	Environmental Impact Assessment
EMA	Environmental Management Authority
EOC	Emergency Operations Centre
ESI	Environmental Sensitivity Index
ESA	Environmentally Sensitive Areas
ETA	Estimated Time of Arrival
FEMA	Federal Emergency Management Agency (United States)
FSC	Finance/Administration Section Chief
FUND	International Oil Pollution Compensation Fund
GC-MS	Gas Chromatography-Mass Spectrometry
GIS	Geographic Information System
GORTT	Government of the Republic of Trinidad and Tobago
HAZOPER	Hazardous Waste Operations
ICT	Incident Command Team
HNS	Hazardous and Noxious Substances
IMA	Institute of Marine Affairs
IMO	International Maritime Organization
IOSC	International Oil Spill Conference
IPIECA	International Petroleum Industry Environmental Conservation Association
ITOPF	International Tanker Owners Pollution Federation Limited
ISB	In-Situ Burning
LSC	Logistics Section Chief

LIST of ACRONYMS

MEEA	Ministry of Energy and Energy Affairs
MOFA	Ministry of Foreign Affairs
MFP	Ministry of Food Production
MMPD	Maximum Most Probable Discharge
MOBEX	Mobilization Exercise (CCA)
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOH	Ministry of Health
MOT	Ministry of Transport
MOWI	Ministry of Works and Infrastructure
MSD	Maritime Services Division of the Ministry of Transport
MSRC	Marine Spill Response Corporation
NC	National Controller
NEBA	Net Environmental Benefit Analysis
NEOC	National Emergency Operations Centre
NGC	National Gas Company of Trinidad and Tobago
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration (US Federal Agency)
NOSCP	National Oil Spill Contingency Plan
NPMC	National Petroleum Marketing Company Limited
ODA	Overseas Development Administration
ODPM	Office of Disaster Preparedness and Management
OPRC	Oil Pollution Preparedness Response and Co-operation Convention
OSC	Operations Section Chief
O/SC	On-Scene Commander
OSH Agency	Occupational Safety and Health Agency
OSRL	Oil Spill Response Limited
OSRO	Oil Spill Response Organization
PAHs	Polycyclic Aromatic Hydrocarbons
P&I	Protection and Indemnity Club
PATT	Port Authority of Trinidad and Tobago
PETROTRIN	Petroleum Company of Trinidad and Tobago Ltd
POLREP	Pollution Report
PPE	Personal Protective Equipment
PS	Permanent Secretary
PSC	Planning Section Chief
PVC	Polyvinyl Chloride
RAC/REMPEITC	Regional Activity Centre/Regional Marine Pollution Emergency Information and Training Centre
RETOS	Readiness Evaluation/Excel Tool for Oil Spills
ROV	Remotely Operated Vehicle
RP	Responsible Party
SAR	Search and Rescue

LIST of ACRONYMS

SCUBA	Self-Contained Underwater Breathing Apparatus
SITREPS	Situation Reports
SOPEP	Shipboard Oil Pollution Emergency Plan
STK8	Stock 8 Form for formal reporting oil spills to the MEEA
SVOC	Semi Volatile Organic Compound
TEMA	Tobago Emergency Management Agency
THA	Tobago House of Assembly
TSPCA	Trinidad and Tobago Society for Prevention of Cruelty to Animals
TTAG	Trinidad and Tobago Air Guard
TTCG	Trinidad and Tobago Coast Guard
TTDF	Trinidad and Tobago Defence Force
TTFS	Trinidad and Tobago Fire Service
TTPS	Trinidad and Tobago Police Service
TTR	Trinidad and Tobago Regiment
UNEP	United Nations Environmental Programme
USCG	United States Coast Guard
VHF	Very High Frequency
VOC	Volatile Organic Compounds
WASA	Water and Sewerage Authority of Trinidad and Tobago
WCD	Worst Case Discharge

GLOSSARY OF TERMS

Average Most Probable Discharge	A discharge of the lesser of 50 barrels of oil or 1 percent of the Worst Case Discharge, whichever is lesser
Deep-water	Greater than 1000 feet water depth (based on diver versus ROV requirement)
Dispersants	Specially formulated agents that are sprayed at low dosages on slicks to enhance its natural mixing and biodegradation in surface waters.
Exclusive Economic Zone (EEZ)	In respect of Trinidad and Tobago comprises all areas of sea having as their innermost limits the outermost limits of the territorial sea, and as their outermost limits a line drawn seaward from the baseline from which the territorial sea is measured every point of which is at a distance of two hundred nautical miles from the nearest point of the baselines from which the breadth of the territorial sea is measured
Ecologically Sensitive Zone	An environmentally sensitive area not designated as such by the EMA under the ESA Rules but is considered to be relatively sensitive by another Government Organization
Facility	Something designed, built, installed, etc. to serve a particular function that as a component of operation involves the risk of an oil or chemical spill.
Flash Point	The lowest temperature at which the vapours above a volatile liquid form a combustible mixture with air.
In-Situ burning	A controlled ignition of oil, other hydrocarbon products, and oil spill debris at the site of the spill. For offshore spills the burning of the floating oil may occur with or without fire-resistant booms.
Leak	Accidentally lose or admit contents via a hole or crack
Maximum Most Probable Discharge	This is a medium discharge which is defined as a discharge of 700 barrels or 10 per cent of the worst case discharge, whichever is greater.
Oil	Oil means petroleum in any form including crude oil, fuel oil, sludge, oil refuse and crude oil refined products
Oil Handling Facility	In accordance with OPRC Regulations, it is a facility that presents a risk of an oil pollution incident and includes, inter alia, an oil terminal, pipeline, and any other facility handling oil but does not include an offshore installation.
Oil Pollution Incident	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 environment and which requires emergency action or other immediate response. This includes a spill that may have been contained within a bunded area or areas.
Operator	In relation to an oil-handling facility or an offshore installation a person having for the time being the management of such a facility or installation within Trinidad and Tobago.

GLOSSARY OF TERMS

Plan	A detailed proposal for doing or achieving something or an intention or decision about what one is going to do (Source: Oxford Dictionary)
Response Agency	"Response Agency" means the Government organization that normally provides on-scene coordination of the response to oil spills during times of national emergency.
Ship	Ship means any sea-going vessel of any type whatsoever or any floating craft including pleasure craft, fishing vessels, hydrofoil boats, air-cushion vehicles, submersibles, and fixed or floating platforms.
Responsible Party	Responsible Party. The RP of an incident is the person, business, or entity that has been identified as owning the vessel or facility that caused the spill. The term does not imply criminal negligence.
Ship	Ship means any sea-going vessel of any type whatsoever or any floating craft including pleasure craft, fishing vessels, hydrofoil boats, air-cushion vehicles, submersibles, and fixed or floating platforms.
Territorial Sea	In respect of Trinidad and Tobago comprises those areas of the sea as defined in Section 5 of the Territorial Sea Act, and in respect of any other State as recognized in international law
Tier 1 (T1) Spills	Small **local** oil spills where in-house response capability is adequate.
Tier 2 (T2) Spills	Medium-sized spills that can significantly impact the vicinity and an **Area** or **National** support for adequate spill response is required.
Tier 3 (T3) Spills	Large spills requiring substantial resources and support from **Regional** or **International** spill co-operatives to mitigate effects perceived to be wide-reaching, i.e., of regional or international significance.
Tier 2 OSRO	A contractor with Tier 2 level equipment and personnel with the resources and competence to respond to Tier 2 spills for all operators that are subscribed members of the base within a defined time-frame as established by the MEEA.
Viscosity	A measure of the resistance to flow that a liquid offers when it is subjected to shear stress; higher values indicate thicker, slower-moving materials. For example, gasoline has a lower viscosity than molasses.
Worst Case Discharge	(a) In the case of tanks, process equipment and storage reservoirs: $V_{wc} = V_1$ where V_{wc} = worst possible spillage volume, V_1 = maximum capacity of the largest tank, process equipment or storage reservoir. (b) In the case of permanently linked tanks, the sum of the maximum capacity of each tank must be considered. (c) In the case of pipeline, $V_{wc} = (T_1 + T_2) \times Q_1 + V_1$ where T_1 = time estimated for detecting the spillage, T_2 = time estimated between detecting and stopping the spillage and interrupting the transfer operation, and Q_1 = maximum flow of the pipeline operation and V_1 = Volume of oil remaining in the section of pipeline after stopping the spillage.

	(d) In the case of exploratory or development rigs $V_{wc} = V_1$ where V_{wc} = worst possible spillage volume, V_1 = estimated daily volume resulting from loss of well control (blow out) x 30 days (wells less than 10,000 ft) and x 45 days (wells greater than 10,000 ft). For estimated daily volume, known characteristics of the oil reservoir shall be used. If unknown, the characteristics of analogous cases must be used. (e) In the case of production platforms and rigs, $V_{wc} = (V_1 + V_2)$ where V_{wc} = worst possible spillage volume, V_1 = sum of maximum capacities of all storage tanks and pipelines on board and V_2 = estimated daily volume resulting from loss of well control (blow out) x 30 days. For deep-water platforms and rigs the multiplier factor is by 60 days instead of 30 days. (f) In the case of loading and offloading operations, $V_{wc} = (T_1 + T_2) \times Q_1$ (g) In the case of loading and offloading operations at production platforms, $V_{wc} = V_{1,}$ where V_1 = volume corresponding to the largest joint capacity of two adjacent storage tanks.

PREFACE

1.1. INTRODUCTION

This National Oil Spill Contingency Plan (Short title: NOSCP) has been prepared to relate at all levels to the Caribbean Island Oil Pollution Preparedness Response and Cooperation (OPRC) Plan – hereafter referred to as The Caribbean Plan. It also includes all aspects of oil spills on land. The Figure 1 below shows a Concession Map of Trinidad and Tobago showing the areas licensed to operators and the open areas for which this plan covers.

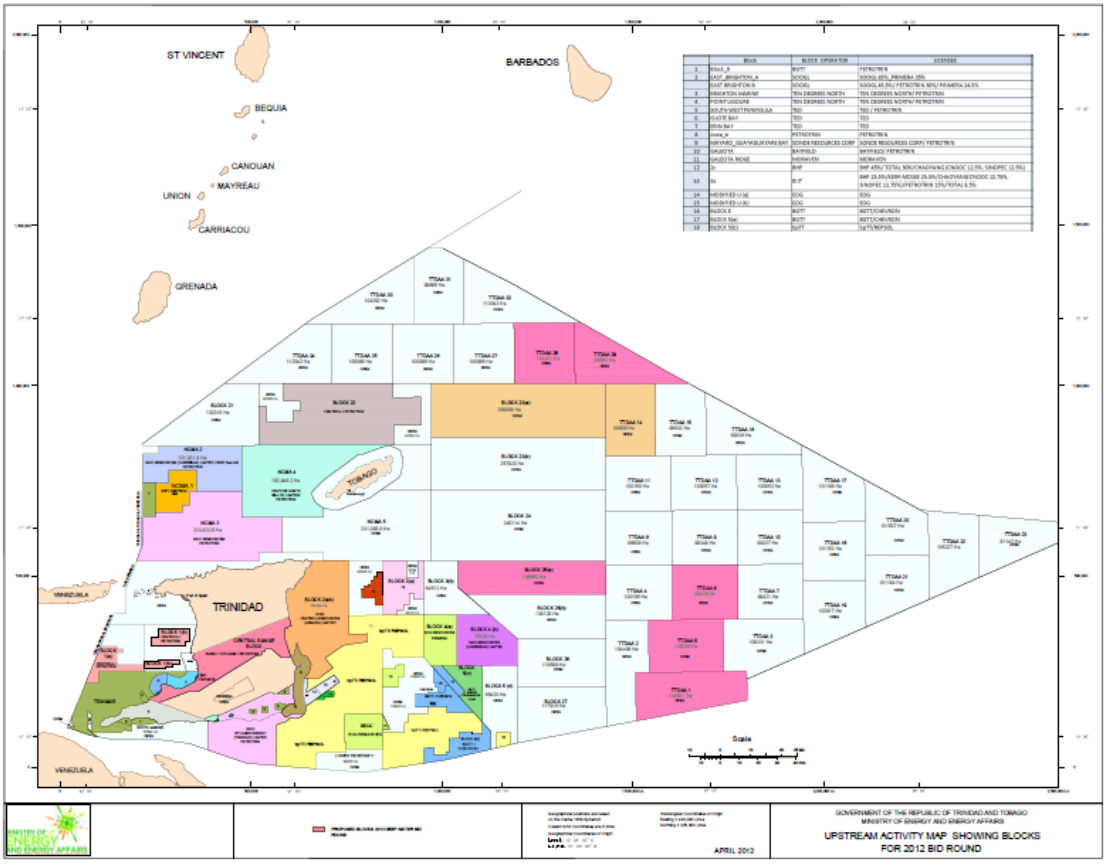


Figure 1: Concession Map of Trinidad and Tobago April 2012

The Caribbean Plan is designed to enhance an individual territory's ability to respond to a spill that is beyond its own capability and thereby establish the principle of mutual assistance.

The principle of Tiered or Level Response (See Fig. 2) applies, whereby:

- **Tier One Spills** are oil spills where in-house response capability is adequate. Impacts are low and in-house clean-up response is mandated. Tier 1 is site-specific and includes most shore-side industry with oil transfer sites, offshore installations, pipelines and all vessels from which a spill of oil is possible. Commercial ships are

required to have a shipboard oil pollution emergency plan (SOPEP). All operators are expected to be able to provide a full response to incidents on their sites.

- **Tier Two Spills** are small or medium-sized spills where significant impacts are possible and area or national support for adequate spill response is required. Inter alia oil and gas operators, oil and condensate-handling and transport facilities and vessels owners operating in Trinidad and Tobago's EEZ must maintain in addition to a Tier 1 clean-up response capacity, a Tier 2 response capability by subscription to a dedicated Tier 2 Oil Spill Response Organization (OSRO) resident in Trinidad and Tobago to handle spills that cannot be handled by in-house Tier 1 capabilities. The Tier 2 OSRO must be able to respond to a spill 24-hours a day, 7 days a week and must immediately mobilize upon notification of an oil spill.

- **Tier Three Spills** are normally large spills requiring substantial resources and support from regional or international oil spill co-operatives to mitigate effects perceived to be wide-reaching, i.e., of national or international significance. Oil and Gas operators that are in the business of oil and gas production and shipping of crude oil shall be required to obtain membership with a suitable Tier 3 oil spill equipment cooperative that can mobilize equipment into the country within at least 24 - 48 hours. The basis of operator plans for handling Tier 3 spills shall be based on the Worst Case Discharge as defined in the Glossary.



Figure 2: Tiers Defined (Source: IPIECA)

Tiers 1, 2 and 3 oil spill response capacity will be defined in terms of type of spill based on a risk assessment conducted or approved by the MEEA.

The plan does not in any way relieve authorities and agencies of their day-to-day operational and environmental responsibilities within the areas of their jurisdiction. All

oil and gas operators that fall with the brackets as per Table 1 will be required to possess or have immediate and unimpeded access to Tier 2 level equipment in Trinidad and Tobago at all times. In addition, all oil and gas operators must put arrangements in place to access Tier 3 level equipment mobilized within 24-48 hours of request.

Categories for size of spill shall be defined for marine pollution in Table 1 to order to indicate which entities are required to possess equipment, personnel and external arrangements, as a minimum, based on the potential spill size and also to assist in determination of the response mechanism and alerting procedures. **All operators must possess the ability to access in country equipment and personnel for handling a medium-sized spill.** This will be accomplished by a co-operative mechanism. Allowance will be made for the existence of more than one cooperative.

	Small Spill	**Medium Spill**	**Large Spill**
• **Bunkering/Ship-to-ship Transfers** • **Upsteam oil and gas operators** • **Refineries, etc.**	≤AMPD (the lesser of 50 bbls or AMPD)	>AMPD – 10% WCD (the greater of 700 bbls or 10% WCD)	10% WCD – WCD (>700 bbls or >10% WCD whichever is greater)

Table 1: Production or Handling-based Oil Spill Size System for Minimum Equipment Planning

1.2. PURPOSE AND OBJECTIVE

The purpose of the contingency plan is to delineate responsibilities for the operational response to terrestrial and marine emergencies, which could result in oil spills and cause damage to Trinidad and Tobago's economy.

The central objective of all countermeasures operations will be to minimize the threat to human health and terrestrial and marine ecosystems *inter alia* seabirds, marine life, fisheries, ecologically sensitive zones, all beaches, forests, agriculture, inland water courses, water intakes, groundwater reservoirs as well as other economically relevant facilities and amenities at risk. Preservation of human life will be paramount to any decision-making process and response.

Procedures will be established that ensure local, national and regional co-operation involving contingency planning, prevention, control and clean-up. The National Plan will be the basis and guide for the development of all facility and terminal oil spill plans.

1.3. SCOPE

To ensure a timely and effective response to spills, or the threat of an oil spill, this Plan:

a) Establishes reporting, alerting and assessment systems;

b) Identifies the chain of command and related responsibilities, including the competent national authority and the national oil spill response organization;

c) Establishes an "Oil Spill" Records and Information Management System

d) Establishes an incident reporting procedure;
e) Identifies the size of spill which can be dealt with at the national level;

f) Identifies high risk areas and likely sources of oil spills;

g) Identifies ecologically sensitive zones, vulnerable resources at risk and priorities for protection;

h) Identifies oil spill equipment, logistic support facilities and communication capabilities available within Trinidad and Tobago;

i) Identifies external sources of expert advice and equipment and establishes procedures for contacting them and assisting in their entry and departure from Trinidad and Tobago;

j) Establishes and maintains collaboration with experts in the field of oil spill planning and response

k) Identifies Trinidad and Tobago's power of Intervention;

l) Explains the problems to be faced with an oil spill and appropriate response techniques;

m) Identifies storage facilities for recovered oil as well as disposal methods;

n) Establishes a dispersant application policy and a list of approved dispersants.

o) Establishes an in-situ burning policy.

This Plan addresses the geographical area bounded by the Exclusive Economic Zone including the coastal and territorial waters of Trinidad and Tobago. Its response management approach will also be effective for spills of oil or other deleterious petroleum products on land and in any aquatic environment inland.

1.4. STATEMENT OF AUTHORITY

The Ministry of Energy and Energy Affairs (MEEA) is authorized to regulate and manage spills caused by licensees according to the Petroleum Act and Regulations.

The Environmental Management Act, Chapter 35:05, authorizes the EMA or the designated environmental officers to enforce the law with management of the environment.

The Territorial Sea Act and Archipelagic Water and EEZ Act are mechanisms to enforce the law with respect to enforcement by the Trinidad and Tobago Coast Guard, Customs, Fisheries Division, Police or Harbour Master within the EEZ of Trinidad and Tobago.

These and other laws under which participating agencies function in order to ensure that the land and marine areas are protected against oil pollution are as follows:

Laws	Applicable Sections
Oil Pollution of Territorial Waters Act 37:03 1951	3, 4
The Territorial Sea Act 1969	6A
Continental Shelf Act 1969	7
Petroleum Act 1969	Part III, 29 (1) (h), (j)
Petroleum Regulation 1970	42 (2) (c), (d), (i), (j), (k), (l), (m); 43 (r), (s)
Disaster Measures Act 16:50 1978	2, 3, 4
Archipelagic Waters and Exclusive Economic Zone Act 1986	28, 30, 32
Environmental Management Act 35:05 2000 and Applicable Rules – CEC Rules	24, 25, 53, 55, 61 and 70(1) as it relates to
OSH Act (as amended) 2004	As it relates to an industrial establishment

Table 2: Laws Applicable to Oil Spill Planning and Response

There are also applicable policies that provide guidance and direction on emergency management, for instance:

Policies	Applicable Sections
National Environmental Policy	Section 4.8 (d) and Section 4.10
National Tourism Policy	Permits required for access to particular sites
National Biodiversity Strategy and Action Plan 2001	Provide guidance on priorities for protection
National Policy and Programme on Wetland Conservation for Trinidad & Tobago (2002)	To manage the threats to wetlands and requires protection, management and restoration of wetlands in order to sustain and enhance their ecological and socio-economic values and function.

Table 3: Laws Applicable to Oil Spill Planning and Response

2. MITIGATION – MANAGEMENT STRUCTURE FOR NOSCP

2.1. LEAD AGENCY

The Lead Agency is the organization in charge of initiating and receiving information directly from the Lead Agencies of other States and Territories. This organization is in charge of coordination between public institutions, private interests and international authorities for oil spills in Trinidad and Tobago.

In Trinidad and Tobago, the Lead Agency is the Ministry of Energy and Energy Affairs (MEEA).

The Incident Command Team (ICT) will be activated when there is a threat of pollution to Trinidad and Tobago. This group will include representatives from the Ministry of Energy & Energy Affairs (MEEA), the Environmental Management Authority (EMA), Maritime Service Division of the Ministry of Works and Transport (MSD/MOT), agencies of the Ministry of National Security (MNS) e.g. TTCG and TTAG, the Tobago House of Assembly (THA) and Municipal Corporations where applicable and the Responsible Party (RP). The response organizations will utilize the Incident Command System (ICS).

Other persons and organizations may be co-opted as appropriate and as desired by the MEEA. The role of the MEEA is primarily to direct the TTCG otherwise referred to as the Government's Response Agency, but also includes planning, preparedness, monitoring, response operations and ensuring that other agencies play an appropriate part in supporting any action.

The Incident Commander from the Lead Agency (MEEA) will normally be in overall charge of operations and will chair the ICT. This person will be designated as the National Controller (NC) and will draw on the expertise of the relevant agencies that participate in a supporting role during a spill incident and will be advised on maritime matters by the MSD and the MNS. Two Deputy National Controllers and an Assistant Deputy Controller will also be designated to fulfil the functions of the National Controller and Deputy Controllers respectively when unavailable. A Standing Cabinet-Appointed Committee comprising members from the agencies involved in the Command Staff and other relevant agencies will manage the NOSCP under the guidance of the National Controller. Details of all relevant personnel with office and home telephone numbers are included in Appendix A.

Support, at the operational level, will be provided by the Ministry of National Security (MNS). Resources will be co-opted as necessary and all oil spill cleaning tasks will involve resources through the Tier 2 OSRO, the Ministry of National Security, the Regional Corporations, and the Ministry of Works and Infrastructure (MOWI).

The responsibilities of NOSCP Controller and the Committee are as follows:

Category	**Responsibility**
1. Equipment requirements	*Ensure a minimum level of pre-positioned oil spill combating equipment commensurate with the risk involved, and programmes for its use;*
2. Exercises	*Ensure a programme of exercises for oil pollution response organizations and training of relevant personnel;*
3. Oil Spill Plans	*Ensure that there are detailed plans and communication capabilities which are continuously available to an oil pollution incident;*
4. Co-ordination Arrangements	*Ensure that there are arrangements to co-ordinate the response to an oil pollution incident with, if appropriate, the capabilities to mobilize the necessary resources.*

5. Foreign Affairs, Immigration and Customs	*Co-operate and provide advisory services, technical support and equipment for the purpose of responding to a serious oil pollution incident, upon the request of any State Party affected or likely to be affected*
	Request assistance for Tier 3 spills from foreign organisations
	Facilitate the arrival and utilization in, and departure from, its territory of ships, aircraft and other modes of transport engaged in responding to an oil pollution incident or transporting personnel, cargoes, materials and equipment required to deal with such an incident;
	Facilitate the expeditious movement into, through, and out of Trinidad and Tobago of personnel, cargoes, materials and equipment referred to in (7) below.
6. Research and Development, Technology transfer and Training	*Engage directly or through other competent international organizations in the promotion and exchange of results of research and development programmes relating to the enhancement of the state-of-the-art of oil pollution preparedness and response, including technologies and techniques for surveillance, containment, recovery, dispersion, clean-up and otherwise minimizing or mitigating the effects of oil pollution, and for restoration.*
	Establish directly or through other competent international organizations, the necessary links between research institutions of Trinidad and Tobago and those of other State Parties.
	Promote directly or through other competent international organizations, the holding on a regular basis of international symposia on relevant subjects, including technological advances in oil pollution combating techniques and equipment.
	Encourage directly or through other competent international organizations, the development of standards for compatible oil pollution combating techniques and equipment.
	The National Controller shall, where appropriate, directly or through international bodies, as appropriate, in respect of oil pollution preparedness and response, provide support for those State Parties which request technical assistance— • *to train personnel;* • *to ensure the availability of relevant technology, equipment and facilities;* • *to facilitate other measures and arrangements to prepare for and respond to oil pollution incidents; and* • *to initiate joint research and development programmes.*
	Co-operate in the transfer of technology in respect of oil pollution preparedness and response.
Category	**Responsibility**
7. Bilateral and Multi-lateral Plans	*Establish and maintain bilateral or multilateral agreements for oil pollution preparedness and response*

Table 4: Responsibilities of National Controller

The Standing Committee will include but not be limited to the following agencies and organizations represented by a senior decision-maker of these GoRTT organizations: MEEA, EMA, ODPM, MSD, TTCG, TTAG, MOFA, IMA, MFP (Fisheries Division), OSHA, NPMC and PETROTRIN.

2.2. LEAD AGENCY ROLES AND RESPONSIBILITIES

The Lead Agency is responsible for the following main functions under the Incident Command System (ICS). This plan is developed to utilize the Incident Command System (ICS) and hence uses the ICS terminology. It is expected that the ICS Forms would be used during a Tier 2 or Tier3 response.

Figure 3 below shows the basic ICS organizational chart with the Incident Commander, the Command Staff and the four major Sections comprising Operations, Logistics, Planning and Finance all headed by Section Chiefs.

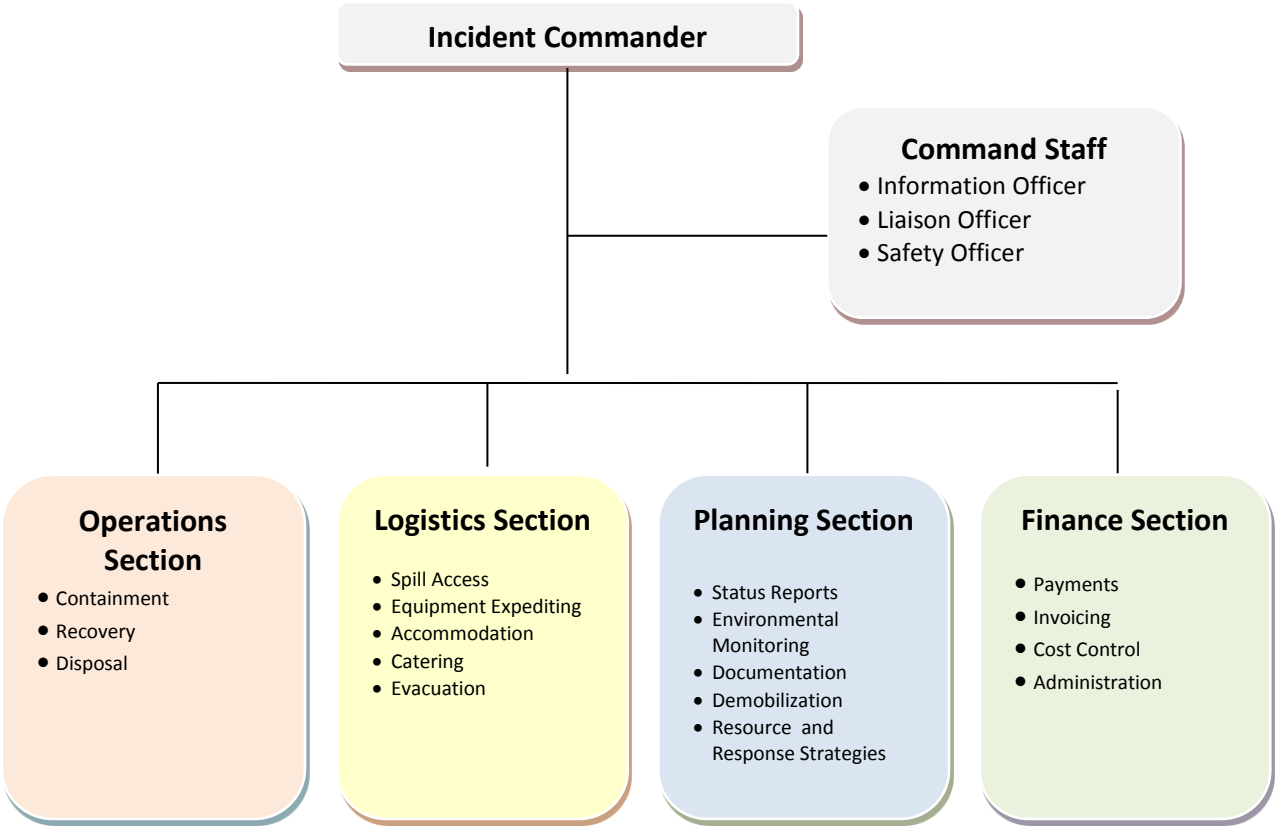


Figure 3: Incident Command System Basic Structure

Incident Commander

The Incident Commander has the overall responsibility for the response operations and must assemble the spill response team (including specialists if required).

a) The Incident Commander for a Tier 1 incident is the **Responsible Party (RP)** or the TTCG for mystery spills.

b) The Incident Commander of a Tier 2 incident will utilize the unified command between the Responsible Party, MEEA, and TTCG/TTAG/TTR.

c) The Incident Commander of a Tier 3 incident will utilize unified command among the Incident Commanders from the **MEEA** (or RP if known) supported by the **MSD**, **TTCG, TTFS, IMA** and **EMA,** as applicable. The Incident Commander from the MEEA will be the National Controller or his deputy.

Information Officer

The Information Officer is responsible for developing and releasing information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations. Only one Information Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdictional incidents. The Information Officer may have assistants, as necessary, and the assistants may also represent assisting agencies or jurisdictions. This function shall be fulfilled by officers from the Communications Specialists in the **MEEA** supported by the **EMA** and **ODPM** for T2 or T3. See Appendix G for essential information on Public Relations.

Safety Officer

The Safety Officer is responsible for monitoring and assessing hazardous and unsafe situations and developing measures to assure personnel safety. The Safety Officer will correct unsafe acts or conditions through the regular line of authority, although the Safety Officer may exercise emergency authority to prevent or stop unsafe acts when immediate action is required. The Safety Officer maintains awareness of active and developing situations, ensures the Site Safety and Health Plan is prepared and implemented, and includes safety messages in each Incident Action Plan. Only one Safety Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents. The Safety Officer may have assistants, as necessary, and the assistants may also represent assisting agencies or jurisdictions. This function is to be provided by the **OSHA** (or RP) supported by TTFS, and MEEA for Tier 2 and Tier 3.

Liaison Officer

Incidents that are multi-jurisdictional, or involve several agencies, may require the establishment of the Liaison Officer position on the Command Staff. The Liaison Officer is the point of contact for the assisting and cooperating Agency Representatives and stakeholder groups. Only one Liaison Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents. The Liaison Officer may have assistants, as necessary, and the assistants may also represent assisting agencies or jurisdictions. The **MEEA** shall fulfil this responsibility.

Operations Section Chief

The **Operations Section Chief** - (OSC), a member of the General Staff within ICS, is responsible for the management of all operations directly applicable to the primary mission.

The OPS activates and supervises organization elements in accordance with the Incident Action Plan (IAP) and directs its execution. The OPS also directs the preparation of Unit

operational plans, requests or releases of resources, makes expedient changes to the IAP, as necessary; and reports such to the Incident Command (IC). The major responsibilities of the Operations Section Chief are:

a) Review Common Responsibilities

b) Develop operations portion of IAP.

c) Brief and assign Operations Section personnel in accordance with the IAP.

d) Supervise Operations Section.

e) Determine need and request additional resources.

f) Review suggested list of resources to be released and initiate recommendation for release of resources.

g) Assemble and disassemble strike teams assigned to the Operations Section.

h) Report information about special activities, events, and occurrences to the IC.

i) Respond to resource requests in support of Natural Resource Damage Assessment (NRDAR) activities.

j) Maintain Unit/Activity Log (ICS Form 214).

The Operations Section Chief role will be fulfilled by the **MEEA** supported by the **TTCG** and **TTAG.** Further details on this function and the participants can be found in Appendix D and the ICS Operational Guide prepared by OSRL.

Planning Section Chief

The **Planning Section Chief** - (PSC), a member of the General Staff within ICS, is responsible for the collection, evaluation, dissemination and use of information about the development of the incident and the status of resources. Information is needed to:

a) Understand the current situation

b) Predict the probable course of incident events; and

c) Prepare alternative strategies for the incident.

The **Planning** Section Chief is responsible for collecting, evaluating, and disseminating the tactical information related to the incident, and for preparing and documenting Incident Action Plans (IAP's). Further details on this function and the participants can be found in Appendix D and the ICS Operational Guide prepared by OSRL.

This function shall be fulfilled by the **MEEA** (or RP) and assisted by **EMA**, **IMA**, **MSD**, and **TTCG**.

Logistics Section Chief

The **Logistics Section Chief** - (LSC), a member of the General Staff within ICS, is responsible for providing facilities, services, and material in support of the incident. The LSC participates in the development and implementation of the Incident Action Plan (IAP) and activates and supervises the Branches and Units within the Logistics Section.

The Logistics Section Chief coordinates communications and equipment, personnel and supply movements in a large spill. The LSC activates a mobile command centre and ensures that its operational needs are met. Duties also include the following:

a) Spill access

b) Equipment expediting

c) Accommodation

d) Catering

e) Evacuation

f) Field Coordination and Communications (summon equipment, maintain field communications equipment, coordinate logistic support)
g) Arrange for technical and repair services

This function shall be fulfilled by the **MEEA** (or RP). Further details on this function and the participants can be found in Appendix D and the ICS Operational Guide prepared by OSRL.

Finance Section Chief

The **Finance and Administrative** Staff is responsible for all financial, administrative, and cost analysis aspects of the incident.

The Finance Section Chief facilitates financial and other resources, arranges payments and controls invoicing. Ensures on-site cost and recovery accounting, and a chronological record is kept of spill control events. Further details on this function and the participants can be found in Appendix D and the ICS Operational Guide prepared by OSRL.

This function shall be fulfilled by the **MEEA** (or RP) and assisted by **EMA** and **MSD**.

2.3. RESPONSE ORGANIZATION

The responsibilities of the Response Organization are defined within ICS and can be found on the fema.gov website.

Appendix D shows the assignments of agencies to all the functions within ICS.

2.4. OPERATIONS CENTRE

The primary and alternate GORTT Emergency Operations Centres in the event of an emergency are provided as follows:

Operation Centre	Location	Type of Centre
ODPM	Tacarigua	NEOC
MEEA	Port-of-Spain	Primary
MEEA	La Romain	Alternate
Petrotrin	Pointe-a-Pierre	Alternate

Table 3: Operations Centres in Trinidad and Tobago

The primary centres will be staffed as necessary and will provide the command and control facility for the entire oil spill operation.

Appendix F provides more information on the Incident or Emergency Command Posts or Centres.

2.5. SUPPORT AGENCIES AND COMPANIES

The support agencies and companies provide technical and advisory assistance to the Lead Agency in the areas of planning, emergency services, infrastructure and social services. (These resources can be drawn from public institutions, private enterprise, oil and gas companies, and NGOs).

International Agencies can also be utilized to provide expert advice, equipment and personnel.

Brief descriptions of the roles of support agencies are included in Appendix A.

2.6. INTERAGENCY AGREEMENTS

Where possible, agreements with the relevant Government Agencies shall be documented in order to obtain the necessary assistance for oil spill preparedness and response.

The agreements that currently exist are the following:

Agreements	Year
Bilateral Oil Spill Contingency Plan between Trinidad and Tobago and Venezuela	1989
MOU between the EMA and various GORTT Ministries and other agencies	1996

Table 4: Intra-agency and Inter-governmental Agreements

Trinidad and Tobago is signatory to the following International Maritime Conventions:

International Conventions	Signatory
Cartagena Convention 1983	1986
Oil Spill Protocol 1983	1986
International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78	2000
Oil Spill Preparedness Response and Co-operation Convention (OPRC) 1990	2000
Civil Liability Convention (CLC) 1992	2000
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND) 1992	2000

Table 5: International Conventions which Trinidad and Tobago is a Signatory

3. PREPAREDNESS

3.1. ASSUMPTIONS

In the event of a major oil spill in the terrestrial and marine environment, the following assumptions are made:

a) The first priority will be safety and preservation of life of persons and personnel.

b) Early detection mechanism shall be utilized to determine source and size of the spill and to mount an early response to the spill in the EEZ of Trinidad and Tobago.

c) In the event of extensive oil impacts, a substantial logistical task would be required to organize and sustain the deployment of clean-up personnel and equipment.

d) The mounting of a labour-intensive and protracted cleaning operation would quickly absorb the available labour force so that external reinforcement of equipment and personnel would almost certainly be required as a contingency.

e) It is likely that Trinidad and Tobago will be able to dispose of all of the oily residue and waste within Trinidad and Tobago.

For major marine spills, it is recognized that at-sea operations and shoreline protection especially sensitive areas will be the priority and precautionary shoreline treatment operations will be undertaken. For major terrestrial spills it is recognized that watercourses, adjacent communities, agricultural and sensitive areas will be the priority for protection. This plan focuses on the provision of equipment and human resources within the country. This plan also recognizes that external aid will be utilized early when it has been established by the National Controller that local capabilities may be exhausted or unable to deal with problem at hand.

Smaller amounts of oil resulting from minor incidents should be manageable by local resources. Oil pollution from illegal discharges that frequently occur in both the onshore and offshore environment is a considerable nuisance and should be handled using a local capability in the first instance. However in the offshore environment it is recognized that major illegal discharges may require international assistance due to the potential impacts.

Due to the proximity of Venezuela and the fact that a threat to one country may pose a danger to another, a good working relationship as well as updating and maintenance of the Bilateral Plan must be fostered between the authorities of the involved countries with each Contingency Plan being held by the other. A similar arrangement shall be established with other neighbouring countries based on dispersion modelling.

3.2. LOCAL AND FACILITY PLANS

All local oil and gas operators, downstream energy-sector based operators, bunkering, storage and pipeline operators that require approvals from the MEEA and MSD must submit oil spill contingency plans to the MEEA and MSD as applicable as a minimum every 2 years. The local plan should be consistent with and be coordinated with other response plans (national and regional). All local plans are required to be in ICS format. The MEEA will ensure that local Plans are compliant. The EMA may also have requirements as per the CEC Rules which are binding on operators as applicable. The minimum standard for Auditing Oil Spill Plans will be the *Audit Guide for the Assessment of Emergency Response Plans and Emergency Management Systems* Document and the *Readiness Evaluation/Excel Tool for Oil Spills (RETOS)* as developed by ARPEL.

MARPOL 73/78 Regulation requires that every oil tanker of 150 tons gross tonnage and above and every other ship other than an oil tanker of 400 tons gross tonnage and above shall carry on-board a Shipboard Oil Pollution Emergency Plan (SOPEP) approved by the Flag State. The SOPEP must be in accordance with guidelines developed by IMO and should also include, as a minimum, the following information in the event of an oil pollution incident:

a) Reporting procedure

b) List of authorities to be contacted

c) Detailed description of the action to be taken immediately by persons onboard to reduce or control the discharge of oil

d) Procedures and point of contact on the ship for coordinating shipboard activities with national and local authorities in combating the pollution.

3.3. RISK ASSESSMENT

Upstream and downstream energy-sector based organizations, marine traffic, especially oil-tankers, large cruise-liners and cargo vessels in transit through coastal waters, present the risk of major oil pollution from collision, fire, explosion and grounding. Lesser, but nevertheless serious, pollution is caused by vessels pumping out their bilges or otherwise illegally discharging oil. Pipelines, refineries, road tank wagons, gas stations, and oil handling facilities also pose a threat to both marine and inland environments.

Risk scenarios resulting from normal oil industry and shipping operations in areas under the jurisdiction of Trinidad and Tobago, as well as those outside our jurisdiction likely to affect us, must be identified. The NOSCP will outline a response capability, in co-operation with industry, to cover these operations. Operators shall perform risk assessments for their operations to determine the type and quantity of equipment required, response measures and limitations. Based on this risk assessment they must also effectively deal with the Tier 1 spill so that the Average Most Probable Discharge

(AMPD) has minimal or no impact on the shoreline or marine life. Resources at risk as a result of operations must be identified and mechanisms for protection must be outlined.

A risk assessment must be conducted every two years by the MEEA in conjunction with EMA and OSHA. These assessments must also consider risks of oil spills to and from neighbouring countries.

Operation facilities that pose a potential medium to high risk of oil spill incidents in Trinidad and Tobago are shown in a map in Appendix P. The tanker routes within the Wider Caribbean Region are also shown in a map in Appendix P.

Trajectory modelling and sensitivity mapping on a GIS platform must be incorporated as part of the risk assessment process. This applies to all oil spill contingency plans. These must be used to develop credible scenarios for all oil spill drills.

The Caribbean Plan Chapter 11 expands on the threat throughout the Caribbean Region. The risk of spills in Trinidad and Tobago is summarized in Appendix P according to the primary activities that could lead to accidental discharges. See also Appendix O for sensitive areas mapping that exists currently.

3.4. TRAINING AND EXERCISES

A training matrix outlining the minimum training requirement for personnel and agencies involved in oil spill preparedness and response in Trinidad and Tobago is presented in Appendix Q. Training will be coordinated and administered through the agency where the National Controller resides.

The National Controller will arrange with the TTCG for periodic exercises to ensure that reporting, alerting and communication systems function effectively and that those personnel assigned specific tasks under this plan are familiar with them.

The mobilization and deployment of equipment, personnel and materials to ensure availability and performance should be exercised. Additionally training programs for shoreline clean-up personnel and the Control and Command Teams will be developed.

Type of Exercise	Minimum Frequency under Area Responder System	Minimum Frequency under Tier 2 OSRO System
Function testing of dispersant spraying equipment	Quarterly	Quarterly
Offshore deployment of dispersant spraying equipment	1 per year	2 per year per OSRO
Offshore limited scale deployment of equipment	1 per year per operator	1 per year per OSRO
Offshore full scale deployment of oil recovery	1 per 2-year cycle per operator	1 every 2 years per OSRO
Table-top exercise	1 per year per operations centre	4 per year per OSRO
New production operations after approval of response plan	Within 12 months	Within 12 months
Table-top Bilateral drills with neighbouring countries where there are Bilateral Plans	1 per 2-year cycle	1 per 2-year cycle

Table 6: Frequencies of Exercises

Table top exercises will be held at least annually that includes multiple agencies in Trinidad and Tobago. Exercises with neighbouring countries should be held every two years to test response plans and the coordination of planning and operations.

Invitations must be sent to the relevant GORTT agencies including the MEEA, EMA, TTCG, ODPM, TTFS and OSHA to observe and/or participate in all of these events as required. See Appendix Q for more information.

3.5. USE OF DISPERSANTS

It is the position of GORTT that use of dispersants using the following parameters will cause no significant environmental harm from such use. It is the policy of GORTT that when combating spilled oil within its territorial seas, the Incident Commander as authorized by the Lead Agency, may use dispersants under the following conditions:

a) The area of application is not less than one nautical mile from any shoreline, nor closer than three nautical miles up-current from important marine fisheries or coral reef ecosystems which are less than 20 feet from the water's surface;

b) The water depth should exceed 10 meters (30 feet) in the area in which the dispersant will be applied;

c) The method of application is one recommended by the manufacturer;

d) The rate of application is as recommended by the manufacturer;

e) The dispersants exhibiting low toxicity; and

f) The MEEA with assistance from the TTCG, MSD and MNS will notify potentially affected downstream Island States and/or Territories whenever dispersant use is intended to be conducted beyond its territorial seas.

The MEEA will be responsible for the approval of the use of dispersants in Trinidad and Tobago waters in accordance with the criteria agreed for the Region unless there are special overriding considerations at the time. It must be noted, however, that for chemical dispersants to be effective, they must be applied on fresh oil in order to maximize the limited window of opportunity for their use – often within 24-48 hours following a spill. This window of opportunity may be expanded in some cases to 72-96 hours depending on the oil type and dispersant to be used. Dispersants must not be used in sensitive areas as determined by the **MEEA**, **EMA** and **Fisheries Division**.

It is further emphasized that only licensed and approved dispersants are permitted. This does not include commercial detergents - which must never be applied. As an added feature, for approved dispersants, the onus is on each operator to demonstrate that their dispersants can function effectively within the environments and oils on which it would likely be utilized. This must be determined by small-scale real-life exercises and verified by the MEEA.

The criteria for the use of chemical dispersants in the Caribbean Region are established in the Caribbean Island OPRC Plan Chapter 10 (see also Appendix M).

The decision-tree flowchart for dispersant use is as follows:

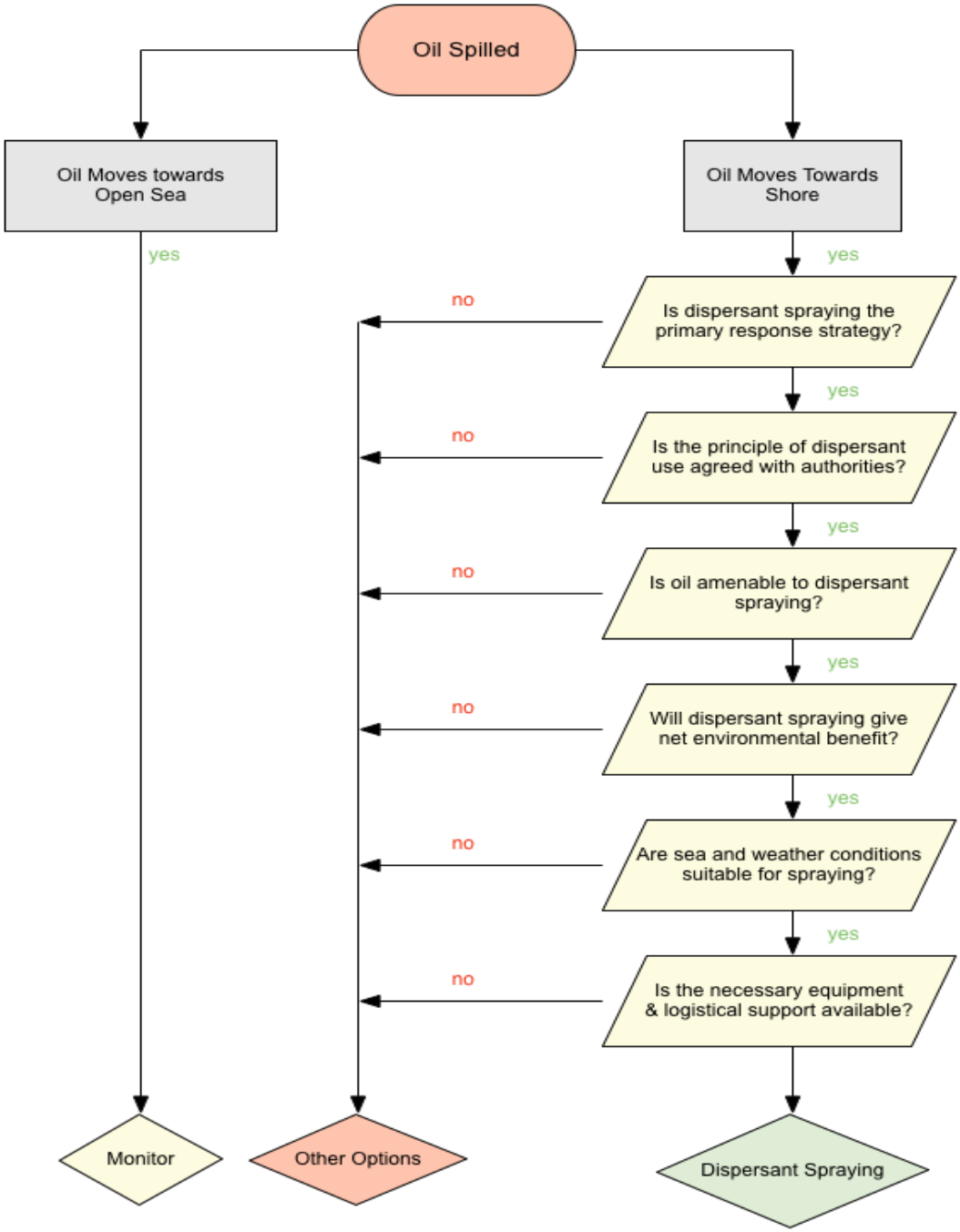


Figure 4: Dispersant Use Decision-tree

3.6. IN-SITU BURNING

Criteria for in-situ burning in the Caribbean Region are established in the Caribbean Island OPRC Plan Chapter 10.

The TTFS, Forestry Division and the EMA will be responsible for the approval of in-situ burning in Trinidad and Tobago in accordance with the criteria agreed for the Region unless there are special overriding considerations at the time. It must be noted, however, that for in-situ burning to be safe and effective, it must occur on fresh oil in order to maximize the limited window of opportunity – often within 24-48 hours following a spill. Safety concerns with regard to the fire and smoke plume must also be considered, and must not occur closer than 12 miles from any adjacent Island State or Territory.

It is further emphasized that only approved equipment comprised of fire-resistant booms and igniters are permitted.

ARPEL's In-situ Burning Guidelines entitled "A Guide to In-situ Burning of Spills" provides additional information with respect to conducting these procedures. See Appendix N for further details.

3.7. ILLEGAL DISCHARGES

If an illegal discharge takes place within a port area of Trinidad and Tobago, the Harbour Master will advise the Director of Maritime Services (DMS) who will consider whether prosecution action is appropriate under the International Convention for Prevention of Pollution from Ships, MARPOL 73/78, and/or local laws and regulations.

If a foreign ship discharges oil while passing through the territorial waters of Trinidad and Tobago, the TTCG will advise the MSD who will report the incident to the Flag State of the vessel concerned along with any photographs or evidence and request that the matter be investigated further.

In event of a terrestrial oil spill, the MEEA and the EMA will take the lead in the determination of the appropriate actions to be taken including the collection of the samples.

A fingerprinting database will be maintained by the IMA for centralized national archiving purposes and for making comparisons of oil for matching purposes and for purposes of identification of the Responsible Party and for possible prosecution. Suitable alternate laboratories for conducting the testing of samples will also be identified as a contingency in the event that the primary laboratory is not available. These alternative laboratories will provide other testing methodologies besides GC-MS technique used by the IMA to increase the robustness of the matching protocols.

All parties responsible for spilling oil of 1 gallon and more or if a visible sheen on water is created must report immediately such incidents to the EMA and to the MEEA (if the party is an oil, gas or petrochemical operator). In addition, these parties must report such

incidents on the Initial Notification Form in Appendix B and present monthly oil spill statistical data to these agencies as proscribed by the EMA and MEEA.

3.8 LEGAL DISCHARGES

The possible need to discharge oil to save a ship and/or personnel is recognized in the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), a convention in force for 78 nations, including the United States. On the other hand, U.S. statutes impose penalties for oil discharges into the sea that the convention would permit. Thus, the Oil Pollution Act of 1990 (OPA 90) dictates a strict liability standard for damage from oil spills and establishes criminal sanctions for spillers. It also reaffirms states' rights to set their own rules concerning ship-source oil pollution.

The Legislation of Trinidad and Tobago, if it does speak to permitting emergency lightering into the environment should address this concern; and issue strict liability and penalties for such oil spill discharges as obtains in the United States on a per volume basis yet providing legal protection for the individual making or directing this discharge if lightering is the option of last resort.

The difficulty and subjective nature of decisions related to purposeful jettisoning of hydrocarbons demands standard, objective decision-making criteria. Such criteria could help expedite a process that inevitably involves multiple decision makers and special interests. The following criteria are provided as fundamental conditions that must exist before any oil is jettisoned:

- Time pressures demand immediate action.
- Deliberate discharge of the proposed amount of oil is likely to save the ship and the remaining cargo.
- All other salvage options, such as internal cargo transfer and lightering (bunkering), have been exhausted or considered and rejected.
- Failure to jettison is likely to lead to loss of the ship and release of the remaining cargo. The principal issue is likely to be whether the ship will break up in bad weather, so information is needed concerning tides, currents, and approaching storms.

The advisement to permit and report emergency lightering or jettisoning of oil rests in the domain of the **MSD** and **EMA**. Currently the legal discharge issue needs to be addressed.

3.9 INTERVENTION

The MSD will monitor all actions by a damaged vessel or rig, will carefully assess any salvage agreement between the master of the Vessel and any Salvage Company, and will be prepared at all times to intervene under the proposed Shipping (Marine Pollution) Act (presently a Bill). The MSD can use this power to give direction when:

a) An accident has occurred either to or in a ship;

b) In the opinion MSD, action is urgently required to prevent or reduce oil pollution or the risk of oil pollution on a large scale to Trinidad and Tobago or in the waters thereof. Directions in this respect will relate to either the ship or its cargo and should preferably be in writing. Once action is taken, the MSD can arrange for other persons or agencies to act on its behalf. Further details on Intervention are in the Caribbean Island OPRC Plan.

4. RESPONSE

4.1 HEALTH AND SAFETY

Personnel health and safety are prime considerations during an incident response when safety issues can be more complex than those during regular industry duties. As an example, an oil spill recovery on a watercourse involves boat operations where personnel can potentially be exposed to toxic and flammable hazards.

The first imperative of an oil spill response must be spill prevention and measures must be instituted to mitigate the potential for a spill. If a spill incident occurs, safety of life is the highest priority and should never be compromised regardless of the environmental imperative.

A Site Safety and Health Plan shall be prepared and implemented for all responder work sites. Appropriate personal protective equipment (PPE) must be worn by all responders in accordance the potential risks as determined from a risk assessment.

All chemicals used shall be approved by the MEEA and handled in accordance with the instructions of their corresponding Material Data Safety Sheet (MSDS).

Night operations shall be avoided unless there is sufficient light to work safely.

Contingency plans shall state the health and safety precautions and any company specific procedures. This includes the need to identify information and procedures on:

a) Toxicology

b) Fire and explosion hazards / risk

c) Operations safety guidelines

d) Personal protective equipment

e) Site security

f) Personnel safety responsibilities

The OSH Agency shall provide direction with respect to the safety measures and use of suitable personal protective equipment for the different component tasks of a response operation.

More detailed information on safety can be sourced from the IPIECA Report Series, Volume 11 “Oil Spill Responder Safety Guide”.

4.2. ALERTING SYSTEMS

Following notification (verbal and/or initial reporting), the Incident Commander from the MEEA will activate the Emergency Operations Centre and the personnel designated to staff the Centre positions should report for duty. Once the significance of the incident has been confirmed, the MEEA will activate the NOSCP. The Incident Commander who has overall responsibility for implementation of the Plan will also contact external agencies such as the CCA and others as appropriate through the appropriate member, or failing this, through the National Oil Company, PETROTRIN. The International Maritime Organization (IMO) Regional Consultants in Curacao will also be informed as necessary in accordance with the Caribbean Island OPRC Plan.

See Appendix B for the initial reporting form and instructions, Appendix C for the International Reporting Form, Appendix D for the Mechanisms in Place for Tiered Response and Roles and Assignments in ICS, Appendix E for the spill notification/alerting sequence, and ICS Form 203 for the filling out of personnel for ICS functions.

4.3. SPILL ASSESSMENT AND SURVEILLANCE

Initial confirmation will be made by the TTCG using information gained by observation by aircraft, surface vessel, remote sensing and satellite and an assessment as to the threat to Trinidad and Tobago will be made by the TTCG who will report directly to the MEEA.

The MEEA and the IMA will arrange for surveillance of the oil slick and, by use of meteorological (provided by the Metrological Office), hydrographic data (from the IMA), or other means, predict its probable movement.

If the assessment shows that another state is likely to be threatened, the MOFA, TTCG and the MSD will inform that state through their counterpart agencies.

For routine surveillance, all pilots of aircraft and masters of ships and vessels must be instructed by the Civil Aviation Authority (CAA) and MSD respectively to report any sightings of oil in the sea for immediate onward transmission to the MEEA, EMA and the TTCG.

Instruction on aerial surveillance is included in the Caribbean Island OPRC Plan. Further information on Surveillance options and capabilities can be found in Appendix H.

4.4 SAMPLING AND FINGERPRINTING

Sampling of oil for fingerprinting analysis (to determine the source of the oil spill) will be done by trained personnel in accordance with the sampling procedures established by the IMA called the ― Oil Spill Sampling Manual published in January 2004 or any revisions that supersede this document. Sampling will also be done to determine the area contaminated which may involve water, sediment and biological sampling. Laboratory analyses for samples collected will be provided by the Institute of Marine Affairs (IMA),

CARIRI, UWI St, Augustine Chemistry Dept. and any other competent laboratory using standard or established procedures.

The IMA and CARIRI shall be the agencies to assist with the establishment a National Fingerprinting Database for Trinidad and Tobago based on liquid hydrocarbons from oil, gas and petrochemical operations and imported and exported crude oil, in the first instance.

The sampling procedure will also include the collection of sufficient samples so that one set can be provided to the responsible party.

The TTCG will assist in the collection of samples in conjunction with the MEEA and the EMA especially with respect to marine spills.

4.5. CLEAN-UP RESPONSE DECISION AND OPERATIONS

The Incident Command Team (ICT) will meet under the Chairmanship of the MEEA when summoned. It will implement the National Plan and will also consider the following matters:

a) Mobilize personnel, equipment and materials from internal and, if necessary, external resources.

b) The desirability of engaging external expertise to advise on oil spill clean-up, and the related measures needed to deploy external resources into and within the territory;

c) The possible prevention or reduction of outflow of oil at source;

d) If marine or coastal resources are threatened, whether it is practicable to mount any at-sea response, with or without external aid, and whether sensitive shoreline areas need to be protected by the deployment of booms;

e) If beaches have been, or are likely to be affected, determine clean-up priorities and direct resources accordingly;

To assist in making these decisions, Appendix O indicates ecologically sensitive zones as the priority areas for clean-up. Appendix I lists locally available resources. Appendix L gives spill response and clean-up strategies. Appendix J gives External Sources of Equipment and Advice.

4.6. CLEAN-UP AND DISPOSAL OF RECOVERED OIL

Clean up and disposal will be dependent on a number of factors, for example, by the characteristics of the environment (e.g. sandy beach, rocky beach, estuary, mangrove, recreational facilities); by species; by accessibility; by type and volume of spilt material; by equipment available and by human resource availability. A Natural Resource Damage Assessment must be carried out by the EMA and supported by the IMA, MEEA, MFP,

WASA and the RP to determine the extent of the impact of the oil spill which will inform the best clean-up strategies and methodologies.

The philosophy that will be adopted for the handling of waste is waste hierarchy where the following obtains:

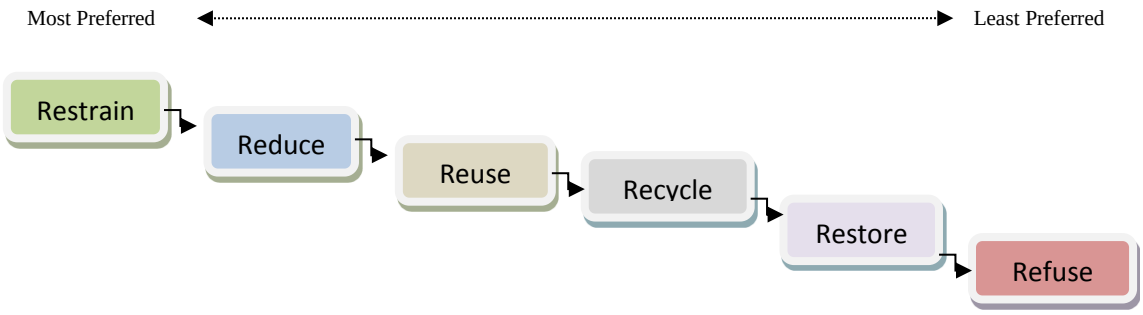


Figure 5: Waste Management Hierarchy

Waste Terminology	Definition
Restrain	Restrain or prevent the use of hazardous chemicals when can, this in turn will prevent harsh environmental effects.
Reduce	Reduce impacts on the Environment
Reuse	Reuse waste generated in the same project
Recycle	Recycle wastes that are unused for another project.
Restore	Restore the biodiversity of the affected area
Refuse	Safe disposal of waste to landfill

Table 7: Waste Hierarchy Terminology Explained

As indicated by Figure 5, restraint from producing waste is the most desirable option while Refuse (disposal) is the least desirable option. Oil and water mixtures have the option of treatment by re-processing, separation and emulsion breaking or a combination of treatment methods. Oil mixed with sediment has the option of treatment by re-processing, stabilization, bioremediation, sediment washing, landfill (for the sediment) and thermal treatment. Oil and organic debris have the option of treatment by stabilization, bioremediation, and thermal treatment. Oil contaminated PPE/equipment have the option of treatment by landfill or thermal treatment. The EMA and the MEEA will be the ultimate authorities in determination of the fate of all waste. See Appendix T for standards for bioremediation, effluent discharge and waste reuse and recovery.

The clean-up will be conducted by workers mobilized by the Tier 2 OSROs/RP/TTCG. Appeals may be made for volunteer groups to assist from qualified and recognized NGO's. Tarred sand will be removed with appropriate equipment coordinated by the Tier 2 Base and safely transported to a designated disposal or remediation site. Non-oil stained debris can be managed by SWMCOL. Oil contaminated soil or sand can be placed in temporary storage cells at on-site locations as designated by the Planning Section Chief and then transported safety to an EMA-approved bioremediation site for in-situ remediation or incineration. The standards for effluent discharge and soil remediation is provided in

Appendix Q. Any liquid oil recovered will have to be placed in containers, treated by a competent contractor and then forwarded to a waste oil collection system for recovery through a refining process or other similar system e.g. Petrotrin's refinery. A separate detailed document called "Waste Management Plan for Oil Spills in Trinidad and Tobago" will be the guidelines used for Waste Management for National Oil Spills.

4.7. HANDLING OF EXTERNAL RESOURCES

The handling of external reinforcements of personnel and equipment may impose considerable strain on Trinidad and Tobago's internal arrangements. The following salient points deserve mention here:

a) Aircraft likely to be deployed are a side-loading Jet Cargo Aircraft which may be an extended DC-8 or a Boeing 767-200F for transport.

b) Aircraft usage of airports at Piarco and Crown Point will certainly be required for landing and unloading of certain aircraft and, for fuelling of all aircraft;

c) Availability and deployment of marine crafts;

d) Seaport docking and cargo handling facilities and, where necessary, water transport;

e) Immigration, Health and Customs arrangements are required to be in place for bringing into the country emergency equipment and personnel rapidly.

4.8. TECHNICAL ADVICE AND RESOURCES FROM OUTSIDE OF THE COUNTRY

In the event of a spill being determined to be beyond the resources of the Region and recognizing the need for speedy deployment of reinforcements, the following reporting procedures have been established:

a) Report details direct to MEEA and TTCG

b) MEEA and/or TTCG will then

(i) Contact the relevant operator to engage the services of their Tier 3 equipment provider (e.g. CCA) to provide the necessary equipment. In the event that the spill cannot be assigned to a responsible party, the national oil company, Petrotrin will be required to contact their Tier 3 provider to assist, under their direction, at the expense of the MEEA, with the necessary equipment and technical advice.

(ii) Depending on that advice, approach with a request for third party access to clean-up facilities, trained personnel and air deployment using dedicated aircraft.

(iii) If the oil spill is from a damaged tanker all ‘reasonable’ costs incurred in the clean-up will be reimbursed by the Civil Liability Convention (CLC) and the International Oil Pollution Compensation Fund.

Appendix A has a list of international service providers who may be useful in the event of a spill or prior to a spill.

4.9. PUBLIC RELATIONS

Effective public relations are an integral part of any oil spill clean-up operation. In the event of spillage, the National Controller in collaboration with the MEEA, EMA, TTCG, ODPM and the RP will make coordinated arrangements for an experienced public relations officer to disseminate pertinent information to the public and the media to ensure that those who need to know have a full and timely appreciation of the incident and of the actions taken and progress made during the response.

Appendix G addresses the mechanism provided for addressing this important issue.

5. RECOVERY

5.1. RESTORATION AND REHABILITATION

Once clean-up operations are completed, it may be necessary to restore affected areas. The degree of restoration will be determined by the MEEA and the EMA using the appropriate local or internationally accepted standards for remediation. In the event the spill is from a vessel, the International Tanker Owners Pollution Federation (ITOPF), the P&I Club of the spilling vessel and the IOPC Fund must be engaged at an early stage to ensure that restoration plans are in keeping with the IOPC Fund Guidelines.

Consideration will be given, as necessary, to replacing contaminated beach sand, replanting mangrove, marsh and sea grass beds, and restocking aqua-cultural projects.

In areas identified as having high environmental sensitivity, consideration will be given to establishing a monitoring program to determine the long-term effects on flora and fauna.

Concerning oiled wildlife rehabilitation, recovery and interment, the following system will be followed:

- Oiled wildlife shall be designated for rehabilitation by the Wildlife Section of the Forestry Division

- All oiled wildlife designated for rehabilitation shall be sent for treatment to a registered rehabilitation centre. The only registered centre in Trinidad and Tobago is the Wildlife Orphanage and Rehabilitation Centre (WORC). See Appendix A for their contact details.

Oiled wildlife rehabilitation will be coordinated by an established and recognized registered NGO, e.g. Wildlife Orphanage and Rehabilitation Centre (WORC), the Zoological Society of Trinidad and Tobago and the Reptile Conservation Centre of Trinidad and Tobago (see Service Contact List in Appendix A).

An operation will be terminated by the NC when it becomes ineffective or when the desired level of clean-up has been achieved based on established clean-up standards.

The Incident Commander will therefore:

- Liaise with all interested parties regarding the conduct of the operation and the level of cleanliness appropriate to each location.

- Stand down equipment and order its removal to an appropriate location for cleaning and maintenance.

- Ensure that temporary storage sites are restored and other work areas are tidied up. On completion of the foregoing, through utilisation of the relevant Section Chief, he will:

- Ensure all relevant documentation is completed.
- Prepare final information bulletin.
- Ensure that consumed materials are reordered and that damaged equipment is repaired or replaced.
- Consolidate costs; regularize accounting procedures; prepare financial report.
- Prepare a formal detailed report (to include time and date of termination).
- Address claims for clean-up costs and pollution damage.

5.2. SALVAGE

Following some serious incidents, part of the decommissioning process may involve the removal of damaged facilities e.g. rigs or vessels which will be under the supervision of the MSD and TTCG. The facility-owner will be required to engage salvors to deal with the casualty.

The initial salvage options may include firefighting, counter-flooding, internal transfers, other actions to stabilise the facility or vessel, and perhaps emergency towing to bring the casualty to calmer waters or a safe haven for marine incidents.

Further detail regarding Salvage is provided in Appendix S.

5.3. SPECIAL DEEPWATER REQUIREMENTS

As a result of past sub-sea spill events from oil and gas wells, and the challenges associated with responding to such spills, a special section, Appendix U, was developed to attempt to address concerns associated with such a response.

It is recognised that when the oil reaches the surface when there is a sub-sea spill, surface response strategies will obtain. Some of the areas of concern that must be addressed in terms of a response for deepwater fall within these categories:

- ROV Requirements
- Sub-sea Dispersant Application and Chemical Management
- Vessel Response Requirements
- Additional Rig Requirement and Response Time Requirements
- Disposal Options

6. REPORTING, COMMUNICATION, LEGAL AND FINANCE

6.1. REPORTING SYSTEMS

Upon notification of a marine oil spill, the TTCG, which is usually the initial contact point, shall immediately notify the Lead Agency (MEEA), who will in turn alert relevant support agencies. The initial notification form is found in Appendix B. The format for the subsequent more detailed follow-up report - CARIBPOLREP- is contained in the Caribbean OPRC Plan (See Appendix C).

For a land oil spill the initial contact points shall be the MEEA and the EMA.

Reporting of all oil spills, whether the responsible party or not, is a mandatory requirement under international conventions (see below) with similar requirements also reflected or to be reflected in national regulations. It is a requirement under this Plan.

6.2. VESSEL REPORTING

Ship Masters

Masters or other persons in charge of vessels shall report, without delay, any sightings of oil on the surface of the water to the nearest coastal Island State or Territory as required by Article 4, Oil Pollution Reporting Procedures, Section (10) (a) of the International Convention on Oil Pollution Preparedness Response and Co-operation, 1990 (OPRC).

Ship Owner

Most ships masters are obliged by an applicable regulation (under the law of an Island State or Territory, derived from international conventions to which the government is Party) to notify the nearest State or Territory of a marine pollution emergency that has arisen. In the case of Trinidad and Tobago, the report shall be made to the Director, MSD. Normally this obligation will fall upon the master of the ship, but if the ship has been abandoned, or if the master's report is incomplete, then the obligation on the ship owner to make a report may arise. The obligation to report, which parties to MARPOL 73/78 undertake to implement in their internal law for ships registered in their territory, is contained in Protocol I of that Convention.

6.3. NOTIFICATION OF THE FLAG STATE

Under article 5(3) of MARPOL 73/78, the flag State is entitled to receive notification if any other State party denies the ship entry to its ports or offshore terminals or takes any action against the ship for the reason that it does not comply with MARPOL 73/78.

Under article 6 of MARPOL 73/78, the flag State must cooperate with other Parties in the detection of violations and the enforcement of the provisions of the Convention; if presented with evidence of a violation, the flag State must investigate the matter and, if

satisfied that there is sufficient available evidence for proceedings to be brought for a violation, it must instigate such proceedings.

6.4. COMMUNICATIONS

In the event of an oil spill, the MEEA will be the primary Co-ordination Centre. All information from the site of the spill and impacted areas will be fed into the communication system by ship-to-shore/shore-to-ship VHF or satellite phone or other available means. If the spill reaches the coastline, a field site would be set up to feed information into the Control Centre. Each Strike Team will be responsible for coordinating information to be fed into the Centre. Appendix H provides more information on the communications arrangements.

6.5. COMPENSATION

The 1992 Protocol of the International Convention and Civil Liability for Oil Pollution damage (the "CLC") once enforced makes the owner of a ship carrying cargo of persistent oil in bulk strictly liable for any pollution damage in the area of Trinidad and Tobago including the territorial waters, seabed, shores, beaches and ecology thereof.

The liability extends to post-spillage prevention and clean-up costs. Trinidad and Tobago does not have to prove that the ship was in any way at fault in causing the pollution.

In cases where the costs of clean-up exceed the limited liability of the owner of the ship, Trinidad and Tobago may make a claim to the International Oil Pollution Compensation Fund in accordance with the 1992 Protocol of the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.

It should be noted that none of these compensation schemes applies to legal discharges. However, applicable local legislation will be required to be in place to address legal discharges.

Further details on cost recovery schemes are presented in Chapter 8 of the Caribbean Plan. See Appendix R for more details on the compensation regimes.

The compensation scheme for terrestrial oil spills and for marine spills outside of the CLC and Fund Conventions will be adopted for Trinidad and Tobago as outlined in a separate document.

6.6. RECORD KEEPING AND PREPARATION OF CLAIMS

In order that financial claims may be processed with minimum delay, it is essential that accurate records are maintained for each clean-up location and include details of all actions taken; the reason for such action; personnel and equipment deployed; and consumable materials used. All meetings must be documented and receipts of purchases preserved for future reference and for preparation of claims. The ICT will have overall

responsibility for ensuring that these very important records are maintained. The ICS Standard Forms will be used for record-keeping.

6.7. POST-INCIDENT REPORTS

Following resolution of the oil spill and termination of the response for a particular incident, the support agencies involved will be responsible for submission of an After Action Report to the Incident Commander not later than three days following closing of the response. The Incident Commander and the Response Agency shall be jointly responsible for submission of a comprehensive After Action Report, incorporating reports from all responsible agencies within 7 days of closing the particular response.

Subsequently, the MEEA will submit the final report to the Permanent Secretary/Minister, for their approval.

Appendices

APPENDIX A – CONTACT LIST

GOVERNMENT MINISTRIES AND AGENCIES CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
Airports Authority	General Manager	Main Office: Airports Administration Centre Caroni North Bank Road Piarco	669-5311 669 – 2288 669-4868 (Piarco) Tobago: 639 - 8547, 639 - 8389			aatt@tntairports.com operations@tntairports.com
Caribbean Industrial Research Institute (CARIRI)	Director	UWI Campus St Augustine	662-7161-3 645-2355		662-7177	cariri@trinidad.net
Chaguaramas Dev't Authority (CDA)	General Manager, HSE Officer	Airways Road, Chaguaramas	634-4364/ 4227/4349/4312			jmark@chagdev.com gmoffice@chagdev.com mforde@chagdev.com
Civil Aviation Authority		Piarco	669-4302			
Customs & Excise Division	Comptroller	Abercromby St. & Independence Square Nicholas Court	625-3311-9			policyunit@customs.gov.tt
Environmental Management Authority (EMA)	Compliance Officer II	#2 Dumfries Road, La Romain	697-7088 Ext. 3262	680 – 9588	697-0309	rramoutar@ema.co.tt
Fire Services Emergency	Emergency		990			
		San Fernando	652-2675/6/7			
		Petrotrin	658-4200 Ext. 2580			
		Wrightson Rd, POS	625-9049/51 625-2671		625-2481	
Immigration Division	Chief Immigration Officer	Piarco Airport, Piarco	669-5895 (24-hr hotline)			
Institute of Marine Affairs (IMA)	Director,	Hilltop Lane, Chaguaramas, P.O. Box 3160, Carenage	634-4291-4		634-4433	director@ima.gov.tt

GOVERNMENT MINISTRIES AND AGENCIES CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
Ministry of Food Production, Fisheries Division	Director, Fisheries	Fisheries Division Cipriani Boulevard Port-of –Spain	623-8525		623-8542	fishdiv@fplma.gov.tt CChanAShing@fplma.gov.tt emohammed@fplma.gov.tt
Ministry of Energy and Energy Affairs (MEEA)	Senior Petroleum Engineer	Maska Building, South Trunk Road La Romain	697-1484 Ext 3309	778-7383	697-7013	mrudder@energy.gov.tt
	Chief Mechanical Engineer	Maska Building, South Trunk Road La Romain	697-7864 Ext. 3301	480-8929	697-7013	iramdahin@energy.gov.tt
	Permanent Secretary	IWC, Tower C, 1 Wrightson Road, POS	623-6708			permsec@energy.gov.tt
Ministry of Foreign Affairs	Permanent Secretary,	IWC, 1 Wrightson Road, Port of Spain Level 10-14 Tower C	623-4116/20 Ext. 2203/2205 623-4116/20 Ext. 2228		627-0571 624-4220	permsec@foreign.gov.tt thompsong@foreign.gov.tt
Ministry of Health	Permanent Secretary	63 Park Street, Port-of-Spain	627-0010/12/32/35 Ext. 605, 607, 610, 612			
Ministry of Environment and Water Resources	Permanent Secretary,	Level 26, Tower D IWC, 1 Wrightson Road Port of Spain	-		-	-
Ministry of Local Government	Permanent Secretary	Ministry of Local Government Kent House, Long Circular Road, Maraval	622-1669 or 628-1323/1324/1325 or 622-1979 or 628-1450 622-7410		628-7283	LocalGovPS@gov.tt
Ministry of National Security	Permanent Secretary	Temple Court, 31-33 Abercromby Street, Port of Spain.	623-2441-5		627-8044	info@mns.gov.tt
Maritime Services Division, Ministry of Transport	Director, Deputy Director	Tower D IWC, 1 Wrightson Road Port of Spain	625-3218 625-7004			msddir@tstt.net.tt
Office of Disaster Preparedness &	CEO	4A Orange Grove Road, Trincity, Tacarigua	640-1285/8905		640-8988	info@odpm.gov.tt

GOVERNMENT MINISTRIES AND AGENCIES CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
Management (ODPM)						
Office of the Attorney General	Attorney General	Cabildo Chambers; 23-27 St. Vincent Street; Port of Spain	623-7010/1576 625-8901		625-0470	
OSH Agency (OSHA)	Chief Inspector	Duncan Street Complex Corner Duncan Street and Independence Square, POS	OSHA hotline 623-OSHA (6742)			ttosha.gr@gmail.com ramoutarr@gmail.com
Point Lisas Industrial Port Development Company Ltd (PLIPDECO)	President	Plipdeco House Orinoco Drive Pt Lisas	**679-7233**; 636-2201 2705-7, 1336/2779 1888/1335		679-2907	ataylor@plipdeco.com
Police	Emergency		999			
Tobago Emergency Mgmt. Agency (TEMA)	CEO	Fairfield Complex www.tema365.com	660-7489/ 639-3421, Ext. 244		660-7657	nematobago@gmail.com
Tobago House of Assembly (THA)	Director, DNRE	Department of National Resources and the Environment Calder Hall Administration Complex	639-3421/ 3876/2113/ 3880/ 4224/ 2146/ 3886			
Tourism Development Company (TDC)	President or Public Affairs Manager	Level 1, Maritime Centre, #29 Tenth Avenue, Barataria	675 7034-7 675 7034-7		675-7722 638-7962	info@tdc.co.tt
Trinidad and Tobago Air Guard	Commanding Officer, Group Captain	Piarco Air Station, North Bank Road, Piarco	669-3877	724-9751	669-0884	ttagops@yahoo.com admin.airguard@gmail.com
Trinidad and Tobago Coast Guard	Commanding Officer, Commander	Staubles Bay Base Chaguaramas	634-4235/ 4434/4440		634-4039	ttcgops@gmail.com cosec_cg@hotmail.com
Trinidad and Tobago Regiment	Operations Officer or J3	Airways Road Chaguaramas	634-3347			

GOVERNMENT MINISTRIES AND AGENCIES CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
Trinidad and Tobago Meteorological Services	Director	Rawinsonde Building South Terminal Piarco International Airport Piarco	669-5465/3964 669-4392		669-4009	dirmet@tstt.net.tt
Trinidad and Tobago Solid Waste Management Co. Ltd (SWMCOL)	Executive Chairman	34 Independence Square, Port of Spain	625-6678 625-6680 625-6678-80		623-6534	info@swmcol.co.tt

ENERGY COMPANY CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
Atlantic LNG Company of Trinidad and Tobago (Pt. Fortin)	HSE Director Snr Environmental Specialist	Lot #1, 1A and 1, Corner Clifton Crescent and Hilltop Avenue, Clifton Hill, Point Fortin	648-2916	681-5795	648-6717	atlanticinfo@atlanticlng.com Henley.Harewood@atlanticlng.com
Bayfield Energy	Country Manager	LP #64 Isthmus Road, Galeota Point, Guayaguayare	630.2002	387-0695	630-2143	admin.general@betrinidad.com
BG T&T (Blk 5a, E, 6b, 6d NCMA1 (Blk 13), Central Block)	Environmental Manager	BG House 5 St. Clair Avenue Port of Spain	628-0888	741-0400	622-6520	Orissa.Forde@bg-group.com
BHP Billiton Blk 2c, 3a Galeota Terminal	HSSE Manager	Invaders Bay Tower, Invaders Bay, off Audrey Jeffers Highway Port of Spain	821-5158	745-6445	625-9255	premraj.dukharan@bhpbilliton.com
bpTT LLC East Coast: FL, Imm, Mah, Cassia, Amh, Can, Mango, Chma, Teak, Poui, Samaan, Blk 5(b), Terminal	VP Safety and Operational Risk,	5-5A Queen's Park Plaza, Queen's Park West, POS	623-2862 Ext. 5607	686-7078 468-2037	627-7878	tyrone.kalpee@bp.com mungr2@bp.com allan.subero@bp.com
Centrica T&T Ltd. Blk 22, 1a, 1b	Country Manager HSSE Advisor	11 Albion, Corner Albion Street and Dere Street, POS	821-7250	471-4694		nicole.simonthompson@centrica.com
EOG Resources Blk Modified U(b), U(a), 4a, Lower Reverse L, SECC: Ibis, Oilbird, Kisskidee/ Banyan/ Pelican	President HSE Advisor	Briar Place, 10-12 Sweet Briar Road, St. Clair, Port of Spain	622-8653		628-4218	
Mora Oil Ventures (East Coast)	CEO	Suite 405, Level Four, Long Circular Mall, Long Circular Road, St. James	622-0427		628-3708	

ENERGY COMPANY CONTACTS						
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**CELL**	**FAX**	**EMAIL**
New Horizon (Parrylands Block E)	Managing Director	P.O. Box 3897 133 Clifton Hill Point Fortin	355-2700 355-2701	761-7374		chan@oilandgas.com
Niko Resources (T&T) Limited	Country Manager	13/17 Keate Street Port of Spain	627-4440 627-4443		625-4442	
Parex Resources	Country Manager	67 Battoo Boulevard Marabella	221.5868	487-0258	221.1486	Brian.Lynam@parexresources.com
Petrotrin	Manager-HSE-Head -HSE-LNE; Head HSE-Petrotrin-Trinmar; Manager Port Operations	Administration Building, Southern Main Road, Pointe-a-Pierre	658-0094; 658-3072; 658-4200		658-0095 658-7306 648-3862	Shyam.Dyal@petrotrin.com Patrick.Julien@petrotrin.com Garret.Manwaring@petrotrin.com Leonard.Chanchow@petrotrin.com
Primera Oil and Gas Limited	CEO	30 Forest Reserve Road Fyzabad	678-4229 620-8554 765-1327	677 7462 677-7462		precon@tstt.net.tt
Repsol E&P T&T	Manager-HSE	4 Queen's Park West Port of Spain	724-6907	927-2757		rramjitr@repsolypf.com
Shell Trinidad Limited	HSSE Advisor	Atlantic Avenue, Point Lisas Industrial Estate, Couva	636-0040		6794714	
Sinopec Offshore Oil and Gas Limited (SOOGL)	HSE Manager	Maple House, Sweet Briar Road, St Clair, POS				
Trinity Exploration and Production Ltd	CEO; HSSE Manager	3rd Floor SSL Bldg. 40-44 Sutton Street San Fernando, Trinidad	Phone: 653-7651,7911,4369 ext 5270	290-2915	652-2807	info@ten.co.tt hsse@ten.co.tt
T&T National Petroleum Marketing Company Limited NP)	HSE Manager	NP House, National Drive, Sea Lots	625-3531-3 / 625-1364-8	688-7559	627-4028	aferrette@npmc.co.tt

SERVICE ORGANIZATIONS CONTACTS					
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE/CELL**	**FAX**	**EMAIL**
Briko Air Service Ltd.	Chairman	Couva Delivery Centre, Couva PO Box 1148	636-0709	636-1168	briko@tstt.net.tt
Bristow Caribbean Ltd. (helicopters)	Managing Director	Hangar #4 Piarco International Airport, Piarco	669-8101-7	669-7758	
Hospitals	Community Hospital of SDAs	Tobago	639-4014 660-7444		
	PORT OF SPAIN General Hospital	POS	623-2327 623-2951/2		
	EWMSC	Mt. Hope	645-4673/2640		
	San Fernando General	San Fernando	652-3580 652-3581-6		
	Couva District Hospital				
IRP Fire and Safety	CEO	119 Boundary Rd, San Juan www.irpltd.com	674-0693/0694/3632	675-3873/ 674-0736	Csr.fse@irpltd.com technical.services@irpltd.com roger.corbie@irpltd.com
Kaizen Environmental (Trinidad) Services Limited	President	Rajkumar Street, Mission Road, Freeport, Trinidad	299-0009/385-4833	673-6420	ddefreitas@kaizen-tt.com mdasilva@kaizen-tt.com tcallender@kaizen-tt.com
National Helicopter Services Limited (NHSL)	General Manager	NHSL Heliport, Camden Field PO Bag 685, Couva	679-2628/ 2629/2630	679-2345	nateli@tstt.net.tt
Oil Mop Environmental Services Limited (waste oil reprocessing)	General Manager	Petrotrin Compound, Dispensary Road, Guaracara, Pointe-a-Pierre, Trinidad	658-3340 / 2363 / 7968 681-0400/680-6115/686-5956	658-3346	info@oilmoptt.com
Radio Emergency Associated Communications Team (REACT)		P.O. Box 3062, Tragarete Road, Port of Spain, Trinidad, W.I.	628-2886	622-2557	reactTnT@yahoo.com Gb7800@gmail.com

SERVICE ORGANIZATIONS CONTACTS					
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE/CELL**	**FAX**	**EMAIL**
Reptile Conservation (animal rehabilitation)	Manager	San Juan		766-8951	
Superior Energy Services Trinidad Ltd (Vessels, diving, ROVs, Temporary Accommodation)	Manager		868) 657-7039 Office (868) 678 8730 Cell	697-7719	Claude.Fleary@iss-snub.com
Tiger Tanks (equipment, storage, response personnel)	Managing Director		651-1544/0130/ 1460 678-9868		denis.latiff@tigertankstrinidad.com anthony.superville@tigertankstrinidad.com
Trinclean (equipment and supplies)	Managing Director,	L.P. 66 Cor. Rapsey and Jackson Streets, Curepe	662-5833 713-4131		trinwipers@yahoo.com
T. N. Ramnauth Co. Ltd. (equipment, personnel)	Managing Director	#224 Clarke Road. Penal	647-4884/7804 Cell: 678-8202	647-4416	tnrcoltd@hotmail.com
T&T Society for the Prevention of Cruelty to Animals (TSPCA)		11 Mucurapo Lands, Mucurapo Road, St. James Trinidad; P.O. Box 373, Scarborough, Tobago	Trinidad: 622-1367 Tobago: 639-2567	628-1615 (Trinidad) 639-9050 (Tobago)	info@ttspca.org
Wildlife Orphanage and Rehabilitation Centre (WORC) (animal rehabilitation)	Director	299 Queen Elizabeth Avenue, Petit Valley	637-3842		
Yacht Services Association of Trinidad and Tobago (YSATT)	President	Crews Inn Hotel & Yachting Centre, P.O. Box 2852, TT Post, Chaguaramas	634-4938	634-2160	info@ysatt.org ysatt@tstt.net.tt thebay@ysatt.org
Zoological Society of Trinidad and Tobago (animal rehabilitation)	Director	Emperor Valley Zoo	622-3530, 391-9056	622-7808	info@zstt.org

INTERNATIONAL ORGANIZATIONS					
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**FAX**	**EMAIL**
ARPEL - Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean		Javier de Viana 2345 P.O. Box 1006 11200 Montevideo - URUGUAY	(598-2) 410 6993	(598-2) 410 9207	arpel@arpel.org.uy
Clean Caribbean and Americas (CCA) (Tier 3 OSRO)	Training Director	2381 Stirling Road, Fort Lauderdale, Florida, 33312, USA	954-983-9880	954-987-3001	staff@cleancaribbean.org
EmergWest Consulting	CEO	2234 Foothills Court, Abbotsford, BC, Canada V3G 1E1	(604) 785-5256	(604) 855-0134	mark@emergwest.com
Regional Marine Pollution Emergency Information and Training Centre –Wider Caribbean (RAC/REMPEITC-Caribe)	Consultant from USCG	Fokkerweg 26, Curacao, Netherlands Antilles	5999-461-4012	5999-461-1996	imoctr@attglobal.net
International Group of P&I Club		Peek House, 20 Eastcheap London EC3M 1EB	+44 (0) 20 7929 3544	+ 44 (0) 20 7621 0675	secretariat@internationalgroup.org.uk
International Maritime Organization (IMO)		4 Albert Embankment London SE1 7SR	+44 (0) 20 7735 7611	+44 (0) 20 7587 3210	info@imo.org
International Oil Pollution Compensation Fund (IOPC)		Portland House Bressenden Place London SWIE 5PN U.K.	+44 (0) 20 7592 7100	+44 (0) 20 7592 7111	info@iopcfund.org
International Petroleum Industry Environmental Conservation Association (IPIECA)		5th Floor, 209-215 Blackfriars Road London SE1 8NL	+44 (0) 20 7633 2388	+44 (0) 20 7633 2389	info@ipieca.org
International Tanker Owners Pollution		1 Oliver's Yard, 55 City Road London EC1YHQ	+44 (0) 20 7566 6999 +44 (0) 762 398 4606	+44 (0) 20 7566 6950	central@itopf.com

INTERNATIONAL ORGANIZATIONS					
ORGANISATION	**POSITION**	**ADDRESS**	**OFFICE**	**FAX**	**EMAIL**
Federation Ltd. (ITOPF)			(24 –hr emergency number)		
Oil Spill Response Limited (OSRL)(Tier 3 OSRO)		Lower William Street Southampton SO14 5QE, UK	+44 (0)23 8033 1551	+44 (0)23 8033 1972	southampton@oilspillresponse.com
US Coast Guard		Sector San Juan, Puerto Rico	(787) 289-2041	(787) 729-6706	
UN World Conservation Monitoring Centre (WCMC)		219 Huntingdon Road, Cambridge, CB3 0DL	+44 (0)1223 277314	+44 (0)1223 277136	

APPENDIX B – INITIAL OIL SPILL NOTIFICATION REPORT

MINISTRY OF ENERGY AND ENERGY AFFAIRS **INITIAL OIL SPILL NOTIFICATION REPORT – STK8**	
COMPANY NAME:	DATE:
Location of Loss -	
Date Discovered:	Time discovered:
Commodity Lost	
Estimated Quantity Lost	Method of Estimation:
Estimated Recovery	
Estimated Net Loss	
Type and Extent of Pollution :	
Loss First Discovered by :	
Address;	
First Reported to Ministry by:	Date:
Cause of Loss :	
Reason for Loss	
Corrective Measures Taken	
Measures Taken to Prevent Recurrence	
Damage to Equipment Due to Loss -	
Person Injured	Address
Injury	
Person Injured	Address
Injury	
Remarks	
Signed Date	
(for Official use only) Comments of Investigation Officer	
Investigation officer Date	

INSTRUCTIONS FOR PREPARATION OF THE INITIAL OIL SPILL NOTIFICATION REPORT – STK 8

Name of Form:	Physical Loss Report
Objective:	To report to the MEEA any loss of petroleum products by companies producing, transporting, storing, refining and marketing petroleum and petroleum products.
Frequency:	As occurs. This report shall be submitted in the case of a significant or material loss of petroleum or petroleum product or any unusual or significant event resulting in the loss of petroleum or a petroleum product.
Date due:	Within four working days following discovery of a physical loss.
Copies:	Original plus two copies.
Distribution:	Deputy National Controllers (MEEA)
Company Name:	Enter name of the reporting company responsible for the loss.
Date:	Enter date of submission of this report.
Location of Loss:	Enter brief description of geographical location of loss.
Date discovered:	Enter date loss was discovered.
Time discovered:	Enter time of day loss was discovered.
Commodity Lost:	Identify what commodity was lost.
Estimated quantity Lost:	Enter quantity lost and unit of measure.
Estimated quantity recovered:	Enter quantity of material recovered and specify unit of measure.
Estimated net loss:	Enter estimated net loss of material. This figure is obtained by subtracting estimated quantity recovered from estimated quantity lost.
Method of Estimation:	Enter brief description of method used in estimating loss and recovery specifying unit of measure used.
Type and extent of pollution:	Enter brief description of any pollution that may have occurred because of loss of material
Loss first discovered by:	Enter name of person who discovered loss.
Address:	Enter home/office address of person who discovered loss.

First reported to MEEA by:	Enter name of person who first reported loss to MEEA
Date:	Enter date loss was reported to MEEA.
Cause of Loss:	Enter brief description of cause of loss.
Reason for Loss:	Enter brief description of reasons for cause of loss.
Corrective Measures taken:	Enter brief description of measures taken to prevent continuation of loss.
Measures taken to prevent Recurrence:	Enter brief description of measures taken to prevent recurrence of loss
Damage to equipment due to loss:	Enter brief description of damage to equipment due to loss of material.
Persons injured:	Enter name of any persons injured due to loss of material, or due to cause of loss of material. For each person injured a notice of personnel injury form must be prepared and submitted to the MEEA.
Address:	Enter address of each person injured.
Injury:	Enter brief description of each injury.
Remarks:	Enter other relevant comments.
Signed:	Persons responsible for investigation of loss will sign this report.
Date:	Enter date report was signed.
Comments of Investigating Officer:	Investigating officer of the MEEA will enter his comments here.
Investigating Officer:	The investigating officer will sign this report after he has investigated loss of material
Date:	Investigating officer will enter the date he signed this report.

APPENDIX C – INTERNATIONAL NOTIFICATION PROCEDURES (INCLUDING CARIBPOLREP FORMAT)

1.0 Dissemination of Information on Oil Spill Incidents

1.1 An Island State or Territory first receiving a report of an oil spill incident should immediately inform neighbouring Island States and Territories that the incident may affect their related interests, giving as much detail as possible about the incident. In the event that a spill has occurred, that information should include date, time, position, type and amount of oil spilled, the prevailing and forecast weather conditions, proposed actions and recommendations. As the situation develops, information to these Island States or Territories must be updated continuously, and a regular synopsis provided to keep them informed. The procedures for such reports and communications are described in this chapter of the Plan. Transmission of such reports should not be delayed if complete information is not immediately available.

1.2 Available meteorological and hydro-graphic data should be analyzed to give rough early predictions of general spill movement. More sophisticated spill movement prediction methods may be subsequently used. However, visual observation of any spill is essential and the responsible authority under the appropriate National Contingency Plan should use those resources already identified, such as charter, military or commercial aircraft for surveillance. It is essential that the results of such observation and prediction be transmitted to other States and Territories that may be affected by the spilled oil until it no longer threatens any Island States and Territories in the area covered by the Plan.

1.3 Participating Island States and Territories should make every effort to transmit information that may aid in establishing liability for pollution removal costs, damages, and related fines and penalties, to requesting national authorities from other participating Island States and Territories that are, or may have been, affected by an oil spill incident.

1.4 The initial report of an oil spill to a Lead Agency may be received from a variety of sources and may require confirmation by the Lead Agency that receives the report. After confirmation, the Lead Agency will draft a POLREP, message to all the Lead Agencies of the other Island States or Territory's Caribbean Plan Regional Organization. If over flights or surface vessel observations determine that one or more States or Territories could be affected by the movement of the oil on the surface of the water, then speed of drift and direction shall be calculated and reported along with all other pertinent information.

2.0 Message Routing Procedure (CARIBPOLREP)

2.1 After receipt of the initial report of an oil spill incident the Lead Agency may require confirmation of the spill sighting. After the spill has been confirmed, the Lead Agency, utilizing the Caribbean Oil and Hazardous Material Spill Alerting Mechanism, will prepare a CARIBPOLREP message to notify neighbouring Island States and Territories that may be affected by the spill.

2.2 The CARIBPOLREP message will be sent directly to neighbouring islands or to the U.S. Coast Guard, Sector San Juan, Puerto Rico [Tel (787) 289-2041 Fax (787) 729-6706] requesting relay of the CARIBPOLREP messages to member Island States or Territories alerting them of the spill and the possibility that assistance may be needed as defined in the Caribbean Island OPRC Plan.

2.3 Once the initial CARIBPOLREP message has been sent subsequent messages will be routed through the established routing network until the spill emergency has been concluded.

3.0 CARIBPOLREP FORMAT

3.1 The following is a summarized list of the composition of the CARIBPOLREP message.

Heading

1. Date time group:
2. From:
3. To:
4. Subject:

Situation

1. Date and Time
2. Position
3. Incident
4. Outflow
5. Characteristics of Pollution
6. Source and Cause of Pollution
7. Wind direction and speed
8. Current or tide
9. Sea state and visibility
10. Drift of pollution
11. Forecast
12. Identity of observer and ships on scene

Action Taken

1. Implementation of National Contingency Plan
2. Incident surveillance

3. Photographs and samples
4. Names of other states informed

Future Plans

Various types of information such as anticipated changes of command; reducing information exchange to encompass only relevant, affected parties, etc.

Assistance Requested

1. Source of assistance.
2. Estimated cost.
3. Prearrangement for delivery.
4. Assistance to where and how.
5. Other states requested.
6. Names and passport numbers of persons.
7. Description of equipment.
8. ETA and arrival information.
9. Place of embarkation.
10. Place of disembarkation.

3.2 If the CARIBPOLREP is used in exercises, the text is to be introduced with the word EXERCISE and finished with this word three times. Each of the subsequent reports, which deal with the exercise, must be introduced and finished with the word EXERCISE as well.

4.0 CARIBPOLREP Explanation

HEADING:	**REMARKS**
1. Date Time Group:	The day of the month as well as the time of day of the message.
2. From:	Lead Agency of the Island State or Territory that is initiating the message.
3. To:	Commander Sector San Juan, Puerto Rico requesting the U.S. Coast Guard pass the message to other Island States or Territories. Lead Agencies may pass information directly to other Island States of Territories that may be affected by the Spill.
4. Subject:	CARIBPOLREP, sequential number of the report and the name of the vessel on facility involved in the spill incident.

SITUATION:	**REMARKS**
1. Date and Time:	Date and time of the incident.
2. Position:	Position of vessel or vessels involved in the incident. If source of spill is unknown location by latitude and longitude in degrees and minutes and

may, in addition, give the bearings of and the distance from a location known by the receiver.

3. Incident: The nature of the incident should be stated here, such as BLOWOUT, TANKER GROUNDING, TANKER COLLISION, OIL SLICK, etc.

4. Outflow: The nature of the pollution, such as CRUDE OIL, CHLORINE, DINITROL, PHENOL, etc., as well as the total quantity in tonnes of the outflow and/or the flow rate, as well as the risk of further outflow. If there is no pollution but a pollution threat, the words NOT YET followed by the substance, for example, NOT YET FUEL OIL, should be stated.

5. Characteristics of Pollution: Gives type of pollution, e.g., type of oil with viscosity and pour point, packaged or bulk chemicals, give proper name or United Nations number, if known. For all, give also appearance, e.g. liquid, floating solid, liquid oil, semi-liquid sludge, tarry lumps, weathered oil, discoloration of sea, visible vapour. Any markings on drums, containers, etc., should be given.

6. Source and Cause of Pollution: e.g., from vessel or other undertaking. If from vessel, say whether as a result of a deliberate discharge or casualty. If the latter, give brief description. Where possible, give name, type, size, call sign, nationality and port of registration of polluting vessel. If vessel is proceeding on its way, give course, speed and destination.

7. Wind Direction and Speed: Indicates wind direction and speed in degrees and MPH. The direction always indicates from where the wind is blowing.

8. Current of Tide: Indicates current direction and speed in degrees and knots and tenths of knots. The direction always indicates the direction in which the current is flowing.

9. Sea State and Visibility: Sea state indicated as wave height in meters. Visibility is in nautical miles

10. Drift of Pollution: Indicates drift course and speed of pollution in degrees and knots and tenths of knots. In case of air pollution, (gas cloud), drift speed is indicated in m/s.

11. Forecast: e.g., arrival on beach with estimated timing. Results of mathematical models, or computer trajectory modelling.

12. Identity of Observer and Ship on Scene: Indicates who has reported the incident. If a ship, name, home port, flag and call sign must be given. Ships on scene can also be indicated under

this item by name, home port, flag and call sign, especially if the polluter cannot be identified and the spill is considered to be of recent origin.

ACTION TAKEN

1. **Implementation of National Contingency Plan**: Indicate if National Contingency Plan has been activated. If appropriate, give name of Response Agency and On-Scene-Commander.

2. **Incident Surveillance**: Indicate type of spill surveillance such as aerial or vessel. Number of over flights per day, etc.

3. **Photographs or Samples**: Indicates if photographs or samples from the pollution have been taken. Fax or Telex number of the sampling authority should be given.

4. **Names of Other States Informed**: Lead agency initiating message concerning the spill incident should name the other Island States that have been notified directly. This is important if the control of communications is being passed to the U.S. Coast Guard Commander, Greater Antilles.

5. **Assistance to Where and How**: Information concerning the delivery of the assistance e.g., rendezvous at sea with information on frequencies to be used, call sign and name of on-scene commander of the requesting Island State or Territory or land-based authorities with telephone number, fax, or telex number and contact person.

6. **Other States Requested**: Only used if not covered by 4.4.5.1 if further assistance is later needed by other Island States or Territories.

7. **Personnel Names, Passport Nationality and Number**: Names of persons responding from an assisting Island State including their passport numbers. This information is necessary to facilitate rapid entry into the requesting Island State or Territory.

8. **Description of Equipment**: A brief description of the equipment including serial and model numbers. Also include a list of any component parts that are being shipped with the equipment.

9. **ETA and Arrival Information**: Time and place of arrival of equipment and of personnel should be given to accommodate clearance with customs and immigration officials in the requesting Island State or Territory.

10**. Place of Embarkation**: The responding Island State should give the airport or seaport where responding personnel will be arriving at in the requesting country.

11. **Spare**: Any relevant information pertaining to the spill should be included such as results of field inspections or surveys, statements of ships personnel, vessel and cargo owners and if the owners are members of a cooperative association, and so on.

APPENDIX D – RESPONSE ORGANISATION

1.0 Operator Subscription to an Oil Spill Response Organization for Tier 2 and/or Medium-sized Spills

- Operators will be required to possess Tier 2 oil spill equipment and personnel or optionally subscribe to a Tier 2 Oil Spill Response Organization (OSRO) in order to singly or collectively cover Tier 2 oil spill incidents as a performance standard. As a minimum, operators will be required to have equipment and personnel in country to handle medium sized spills as defined in Section 1 as a minimum planning standard (see Appendix I).

- Oil and Gas Operators will be responsible monitoring of their licensed areas especially for non-associated operations with the oil spill risks and areas and areas that fall outside their licensed areas which can be impacted by oil. Areas that may be impacted by their operations outside of the licensed areas must be coordinated with other neighbouring operators or GORTT.

- Operators shall have the immediate capacity to handle Tier 1 and Tier 2 oil spills. Tier 1 and Tier 2 shall be defined for each operator based on risk assessment including, but not limited, to the following:

    - Volume of oil and/or condensate produced
    - Volumes of oil and/or condensate stored
    - Locations of operations
    - Resources at risk

- Mystery spills response shall be led by the MEEA and co-ordinated on-scene by the TTCG with assistance from an OSRO and funding by the NOSCP Fund. The TTCG will ensure that the OSRO performs the oil spill response and recovery operations in accordance with best industry practice. This OSRO may be a cooperative or an Oil and Gas Operator with Tier 2 level equipment and personnel. GORTT through the MEEA may request assistance from the Oil and Gas Companies from their Tier 2 equipment stockpiles for spills where a RP has not immediately been identified.

- GORTT through the MEEA will bear the clean-up costs for "mystery" spills and attempt to determine the Responsible Party. The principles of cost allocation are provided below:

    - The costs of clean-up resulting from a spill caused by an identified RP or its affiliates operating in Trinidad and Tobago will be borne by the responsible party.
    - The costs of clean-up resulting from a spill caused by oil seepages caused by natural forces and not man-made sources will be borne by GORTT.

- In the event there is a dispute concerning who is the RP and agreement cannot be achieved, within seven (7) days, a 3-member Fact Finding Commission of Enquiry pursuant of the Provisions of the Commission of Enquiry Ordinance Ch. 7 No. 2 with all the necessary powers will be established to independently investigate the cause of and the party responsible for the spill. In the event that blame cannot be attributed to any party, GORTT will within the lesser of 1 month of submission of the report of commission or 6 weeks from the spill event, refund all clean-up costs incurred by organisations that incurred costs in assisting with the oil spill clean-up.

- The TTCG shall possess their own equipment or optionally be a subscriber to a Tier 1 OSRO.

- The MEEA shall require companies that cannot or do not meet the requirement for handling of Tier 2 spills to form a cooperative with other entities in order to have Tier 2 coverage.

- In the interim, until the Tier 2 and/or Tier 3 is operational to the satisfaction of the MEEA, the MEEA will coordinate the response for Tier 2 and/or Tier 3 incidents by requiring all oil and gas companies to assist and respond to any oil spill as may be necessary in accordance with Fig. D1. It is expected that all operators will have internal mechanisms and arrangements to respond immediately to oil spill response directives of the MEEA, EMA or MSD within the areas identified in Fig D1 as assigned. It is expected that the operators with the greater risk will be required to provide greater assistance in monitoring and responding within their assigned areas. The operators with the greatest risk within the areas are identified as follows based on operation type:

Area	Companies	Operation by Type						
		Prod	Pipe	Store	Transfer	Ship	Refine	Process
I	Bayfield	x	x					
	BHP Billiton	x	x	x	x	x		x
	BPTT	x	x	x	x	x		x
	Repsol	x	x					
	NGC		x					
II	BGTT				x	x		
	NPMC			x	x	x		
III	ALNG				x	x		
	Petrotrin	x	x	x	x	x	x	x
	Shell			x	x	x		
	Trinity	x	x	x	x			x

- All existing oil and gas operators shall be required to attain functional Tier 2 capability within six months from tender award of Tier 2 OSRO.

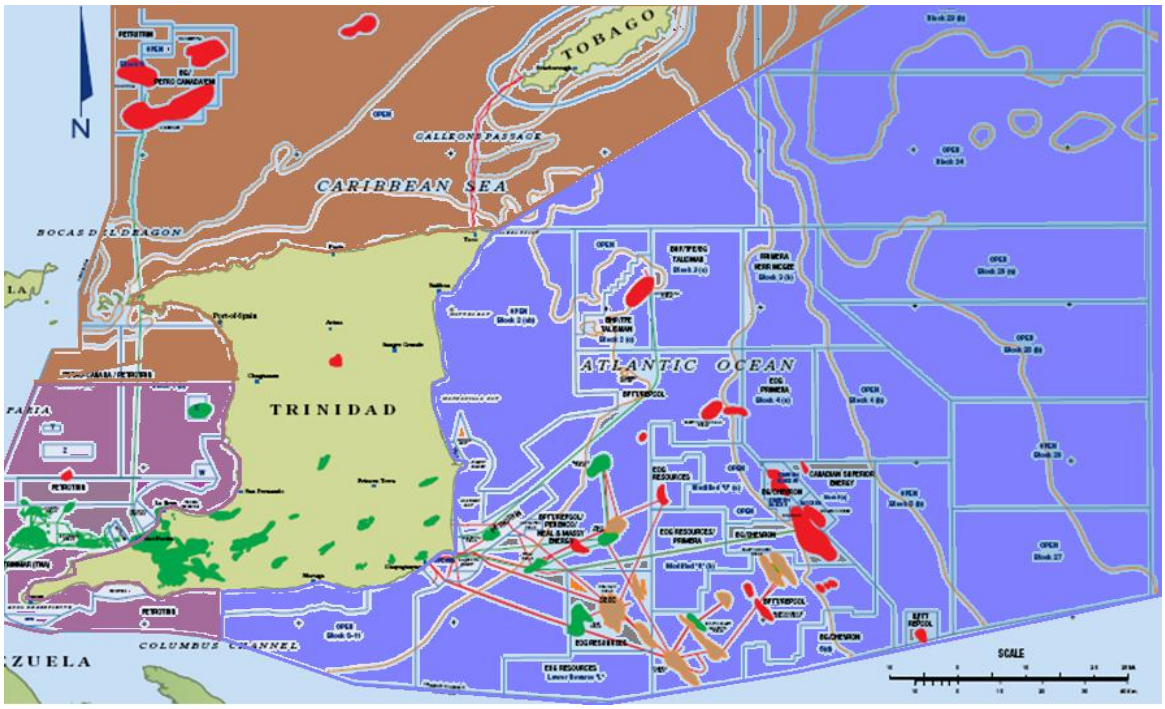


Fig. D1: Defined Area Responders that will assist GORTT in responding to Tier 2 Spills

Key:

Area Responders for Area I: Bayfield, BHPB, BGTT, bpTT, EOG, Repsol, Moraven, Petrotrin, Niko/Voyager, NGC

Area Responders for Area II: BGTT, BHPB, TTCG, Centrica, NPMC, PATT, Bunker Companies, Ship-to-Ship Transfer Companies.

Area Responders for Area III: ALNG, Centrica, Petrotrin, Petrotrin-Trinmar, Primera, SOOGL, Trinity, Shell Trinidad, Plipdeco

2.0 Organizational Chart, Roles and Incident Management Team (IMT)

An organization chart clearly identifies individuals (according to positions) who will be involved in a spill response. It may also include administrative personnel responsible for documentation and financial aspects. An Incident Command System standardizes the process of preparing an organization chart (see below).

A decision is required as to which personnel should be part of an organization chart for any particular operation. Adjustments can still be made to the suggested information if training or an actual spill indicates changes are required. Consider also what external personnel requirements may be required for spills that are:

- large
- require a lengthy time for clean-up
- outside (Trinidad and Tobago) geographical area of jurisdiction

The duties and responsibilities must be detailed for all positions that appear in notification and organization charts. For some types of operations it may be beneficial to identify the duties and responsibilities for each of the three designated levels of spills.

3.0 ICS Organization

The ICS organization is comprised of five functional sections: Command, Operations, Planning, Logistics and Finance. A "basic" and an “expanded” ICS structure are shown in Figures D2 and D3 below. Figure D4 shows the agencies and the functional positions within these agencies that are assigned to the ICS functions.

Figure D2: Basic ICS Structure

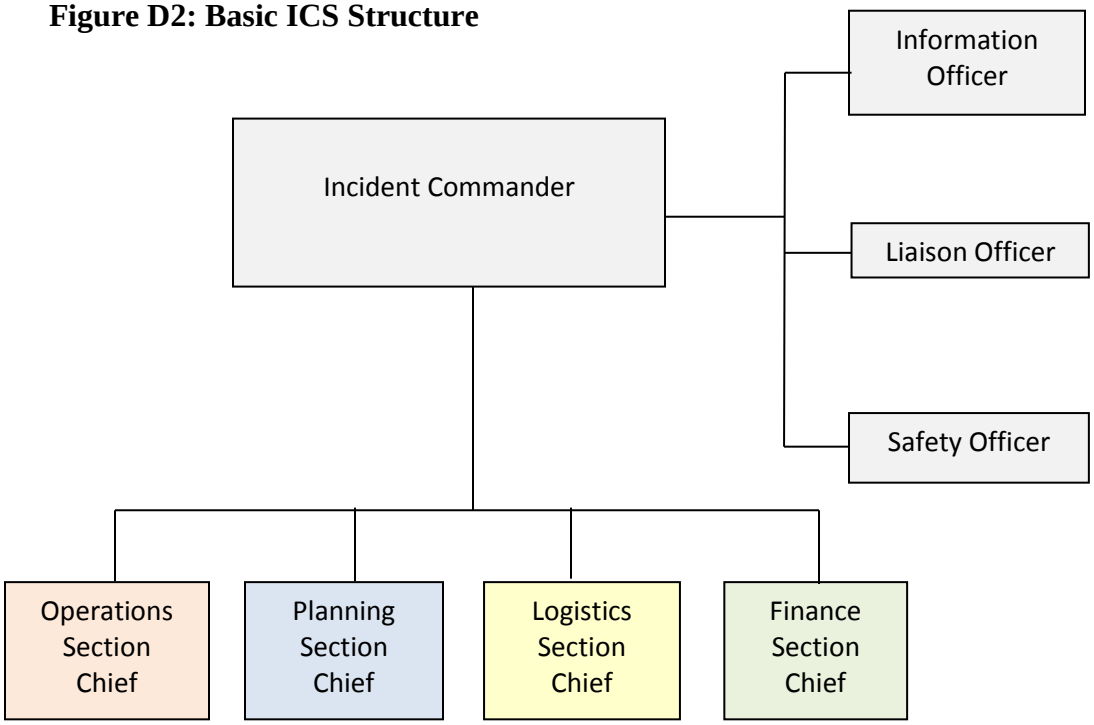


Figure D3 – Expanded ICS Structure

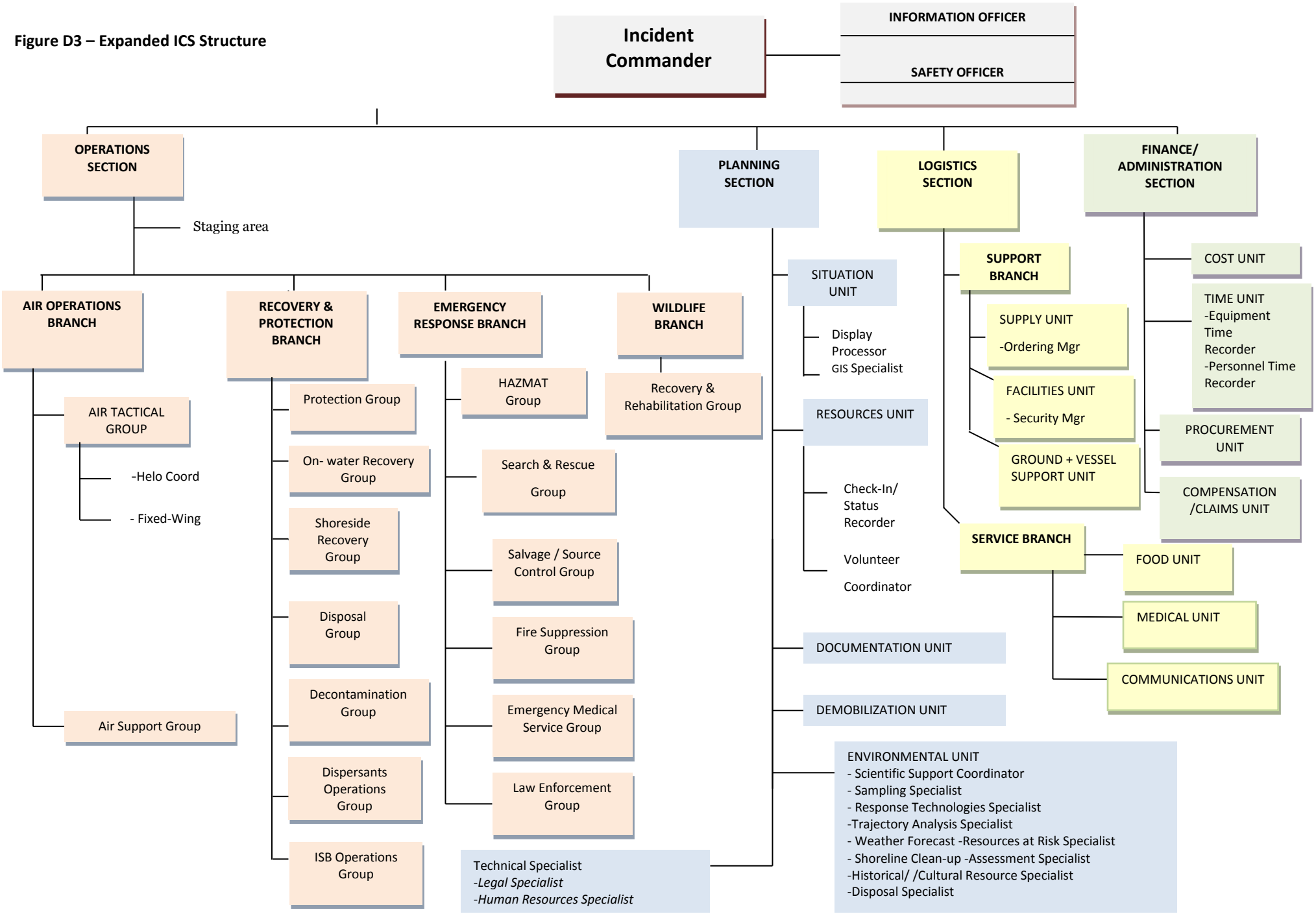
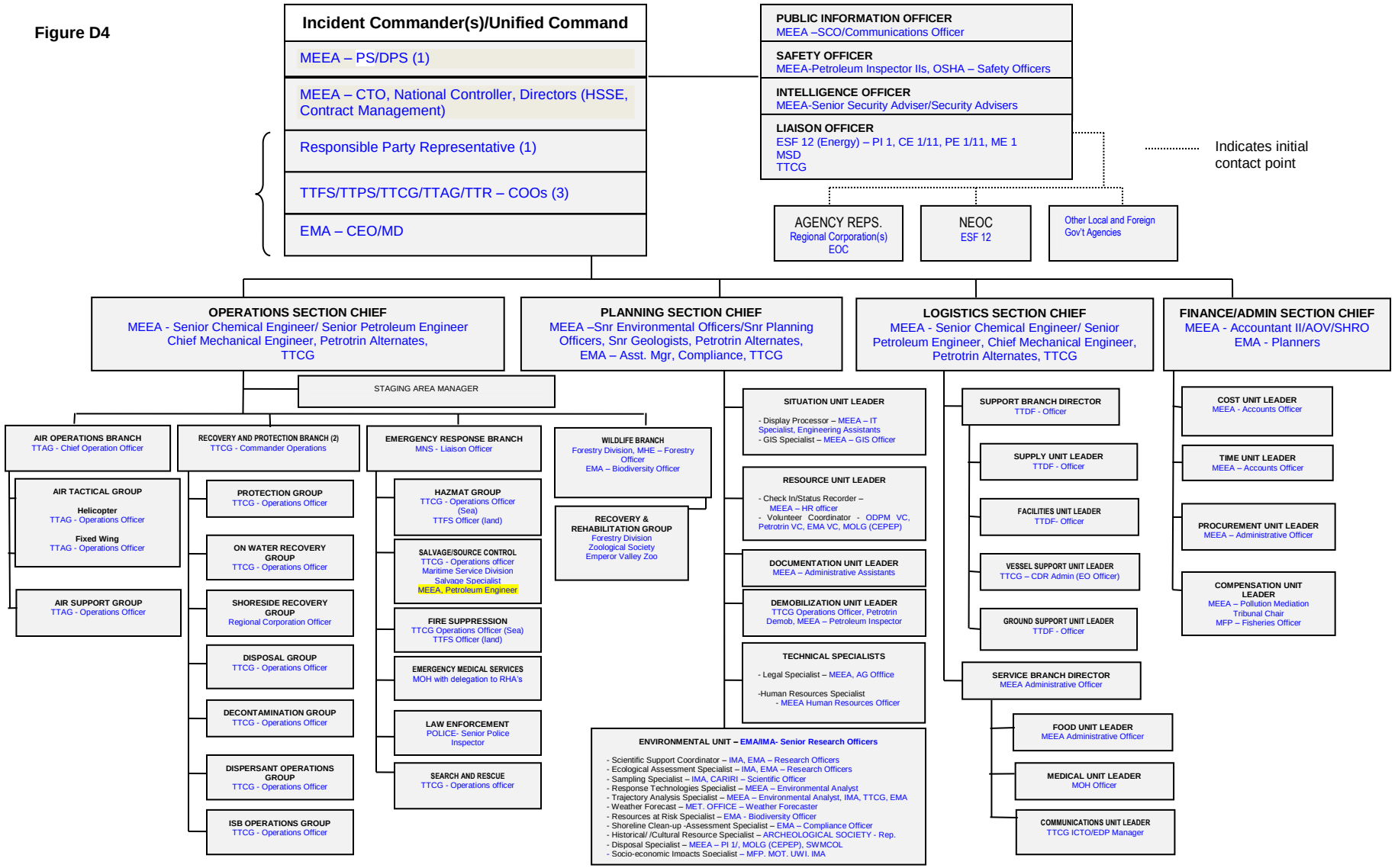


Figure D4


Incident Commander(s)/Unified Command
MEEA – PS/DPS (1)
MEEA – CTO, National Controller, Directors (HSSE, Contract Management)
Responsible Party Representative (1)
TTFS/TTPS/TTCG/TTAG/TTR – COOs (3)
EMA – CEO/MD
PUBLIC INFORMATION OFFICER
MEEA –SCO/Communications Officer
SAFETY OFFICER
MEEA-Petroleum Inspector IIs, OSHA – Safety Officers
INTELLIGENCE OFFICER
MEEA-Senior Security Adviser/Security Advisers
LIAISON OFFICER
ESF 12 (Energy) – PI 1, CE 1/11, PE 1/11, ME 1
MSD
TTCG
Indicates initial contact point
AGENCY REPS.
Regional Corporation(s) EOC
NEOC
ESF 12
Other Local and Foreign Gov't Agencies
OPERATIONS SECTION CHIEF
MEEA - Senior Chemical Engineer/ Senior Petroleum Engineer Chief Mechanical Engineer, Petrotrin Alternates, TTCG
PLANNING SECTION CHIEF
MEEA –Snr Environmental Officers/Snr Planning Officers, Snr Geologists, Petrotrin Alternates, EMA – Asst. Mgr, Compliance, TTCG
LOGISTICS SECTION CHIEF
MEEA - Senior Chemical Engineer/ Senior Petroleum Engineer, Chief Mechanical Engineer, Petrotrin Alternates, TTCG
FINANCE/ADMIN SECTION CHIEF
MEEA - Accountant II/AOV/SHRO
EMA - Planners
STAGING AREA MANAGER
AIR OPERATIONS BRANCH
TTAG - Chief Operation Officer
AIR TACTICAL GROUP
Helicopter
TTAG - Operations Officer
Fixed Wing
TTAG - Operations Officer
AIR SUPPORT GROUP
TTAG - Operations Officer
RECOVERY AND PROTECTION BRANCH (2)
TTCG - Commander Operations
PROTECTION GROUP
TTCG - Operations Officer
ON WATER RECOVERY GROUP
TTCG - Operations Officer
SHORESIDE RECOVERY GROUP
Regional Corporation Officer
DISPOSAL GROUP
TTCG - Operations Officer
DECONTAMINATION GROUP
TTCG - Operations Officer
DISPERSANT OPERATIONS GROUP
TTCG - Operations Officer
ISB OPERATIONS GROUP
TTCG - Operations Officer
EMERGENCY RESPONSE BRANCH
MNS - Liaison Officer
HAZMAT GROUP
TTCG - Operations Officer (Sea)
TTFS Officer (land)
SALVAGE/SOURCE CONTROL
TTCG - Operations officer
Maritime Service Division
Salvage Specialist
MEEA, Petroleum Engineer
FIRE SUPPRESSION
TTCG Operations Officer (Sea)
TTFS Officer (land)
EMERGENCY MEDICAL SERVICES
MOH with delegation to RHA's
LAW ENFORCEMENT
POLICE- Senior Police Inspector
SEARCH AND RESCUE
TTCG - Operations officer
WILDLIFE BRANCH
Forestry Division, MHE – Forestry Officer
EMA – Biodiversity Officer
RECOVERY & REHABILITATION GROUP
Forestry Division
Zoological Society
Emperor Valley Zoo
SITUATION UNIT LEADER
- Display Processor – MEEA – IT Specialist, Engineering Assistants
- GIS Specialist – MEEA – GIS Officer
RESOURCE UNIT LEADER
- Check In/Status Recorder – MEEA – HR officer
- Volunteer Coordinator - ODPM VC, Petrotrin VC, EMA VC, MOLG (CEPEP)
DOCUMENTATION UNIT LEADER
MEEA – Administrative Assistants
DEMOBILIZATION UNIT LEADER
TTCG Operations Officer, Petrotrin
Demob, MEEA – Petroleum Inspector
TECHNICAL SPECIALISTS
- Legal Specialist – MEEA, AG Offfice
-Human Resources Specialist
- MEEA Human Resources Officer
ENVIRONMENTAL UNIT – EMA/IMA- Senior Research Officers
- Scientific Support Coordinator – IMA, EMA – Research Officers
- Ecological Assessment Specialist – IMA, EMA – Research Officers
- Sampling Specialist – IMA, CARIRI – Scientific Officer
- Response Technologies Specialist – MEEA – Environmental Analyst
- Trajectory Analysis Specialist – MEEA – Environmental Analyst, IMA, TTCG, EMA
- Weather Forecast – MET. OFFICE – Weather Forecaster
- Resources at Risk Specialist – EMA - Biodiversity Officer
- Shoreline Clean-up -Assessment Specialist – EMA – Compliance Officer
- Historical/ /Cultural Resource Specialist – ARCHEOLOGICAL SOCIETY - Rep.
- Disposal Specialist – MEEA – PI 1/, MOLG (CEPEP), SWMCOL
- Socio-economic Impacts Specialist – MFP, MOT, UWI, IMA
SUPPORT BRANCH DIRECTOR
TTDF - Officer
SUPPLY UNIT LEADER
TTDF - Officer
FACILITIES UNIT LEADER
TTDF- Officer
VESSEL SUPPORT UNIT LEADER
TTCG – CDR Admin (EO Officer)
GROUND SUPPORT UNIT LEADER
TTDF - Officer
SERVICE BRANCH DIRECTOR
MEEA Administrative Officer
FOOD UNIT LEADER
MEEA Administrative Officer
MEDICAL UNIT LEADER
MOH Officer
COMMUNICATIONS UNIT LEADER
TTCG ICTO/EDP Manager
COST UNIT LEADER
MEEA - Accounts Officer
TIME UNIT LEADER
MEEA – Accounts Officer
PROCUREMENT UNIT LEADER
MEEA – Administrative Officer
COMPENSATION UNIT LEADER
MEEA – Pollution Mediation Tribunal Chair
MFP – Fisheries Officer

KEY PERSONNEL – INCIDENT MANAGEMENT TEAM (IMT)

IMT DUTY TITLE	IMT MEMBER	AGENCY
Incident Commander Unified Command: TTPS, TTFS, Regional Corporation, Responsible Party Representative, EMA, MSD	National Controller, CTO, DPS, PS	MEEA
Information Officer	Communications Specialists	MEEA
Safety Officer	Safety Officers in respective Ministries or agencies	OSHA MEEA
Security Officer	Security Advisors	MEEA
Liaison Officer	Petroleum Inspectors Foreign Service Officers Engineers	MEEA, MOFA, TTCG, MSD
Operations Section Chief	SCE, SPE, CME	MEEA
	Commander Operations nominee	TTCG
	Nominee	TTFS
	Petrotrin nominee	Petrotrin
Air Operations Branch Leader: TTAG Operations Officer		
Air Tactical Group Leader • Helicopter Coordinator • Fixed Wing Coordinator	TTAG Operations Officer TTAG Operations Officer TTAG Operations Officer	TTAG
Air Support Group	TTAG Operations Officer	TTAG
Recovery & Protection Branch Leader: TTCG Operations Officer		
• Protection Group	TTCG Operations Officer	TTCG
• On-water recovery group	TTCG Operations Officer	TTCG
• Disposal Group	TTCG Operations Officer Waste Management Officer	TTCG, SWMCOL
• Decontamination Group	TTCG Operations Officer	TTCG, TTFS
• Dispersants Operations Group	TTCG Operations Officer	TTCG, MEEA
• In-situ Burning operations Group	TTCG Operations Officer	TTCG, EMA, TTFS
Emergency Response Branch Leader: TTAG Operations Officer		
• HAZMAT Group	Fire Officers	TTFS
• Search & Rescue Group	TTCG Operations Officer	TTCG, TTFS
• Salvage/Source Control Group	TTCG Operations Officer MSD Vessel Inspectors MEEA Petroleum Engineers	TTCG, MSD, MEEA
• Fire Suppression Group	Fire Officers, TTCG Operations Officer	TTFS, TTCG
• Emergency Medical Services Group	Emergency Health Responders	MOH
• Law Enforcement	Senior Police Officers	TTPS
Wildlife Branch Leader, Senior Biodiversity Officer, EMA		

IMT DUTY TITLE	IMT MEMBER	AGENCY
Planning Section Chief	Senior Environmental Officers Senior Environmental Managers Senior Planning Officers Senior Petroleum Engineers Petrotrin nominee	MEEA EMA TTCG MSD Petrotrin
Situation Unit • Display processor • GIS Specialist	Environmental Specialists	MEEA
	GIS Specialists	MEEA UWI
Resources Unit • Check-in/Status Recorder • Volunteer Coordinator	Human Resources Officers Volunteer Coordinators	MEEA, TTCG ODPM, MEEA Petrotrin, MFP MOLG, EMA
Documentation Unit	Administrative Assistants	MEEA
Demobilization Unit	TTTCG Operations Officer	TTCG
Environmental Unit Leader: Environmental Compliance Officer, EMA		
• Scientific Support Coordinator	Research Scientist	IMA, EMA
• Ecological Assessment Specialist	Research Specialist	IMA, UWI, EMA
• Sampling Specialist	Chemists	IMA, CARIRI
• Response Technologies Specialist	Environmental Specialist	MEEA, EMA
• Trajectory Analysis Specialist	Environmental Specialist, Research Officer	MEEA, EMA, TTCG, IMA
• Weather Forecast – Specialist	Meteorologist	Met. Office
• Resources at Risk	Biodiversity Specialist	EMA
• Shoreline Clean-up Assessment Specialist	Environmental Specialist	EMA
• Historical/Cultural Resources Specialist	Archaeologist/Cultural Specialist	Arch. Society
• Disposal Specialist	Waste Disposal Specialists	SWMCOL, MOLG
• Socio-economic Impacts Specialist	Economists Social Scientists	MFP, MOT, MSD, UWI (International Relations dept.), IMA

IMT DUTY TITLE	IMT MEMBER	AGENCY
Logistics Section Chief	SCE, SPE, CME Senior Coast Guard Officer Petrotrin nominee	MEEA TTCG Petrotrin
Support Branch Director • Supply Unit • Facilities Unit • Ground and Vessel Support Unit	TTCG Officer TTDF Officers TTDF Officers TTDF Officers/ TTCG Officers	• TTDF • TTDF • TTDF/TTCG
Service Branch • Food Unit • Medical Unit • Communications Unit	• Admin Officers • MOH Officers • TTCG ITCO, EDP Officers	• MEEA • MOH • TTCG, MEEA
Finance/Administration Section Chief	Accountant II, AOV, SHRO, EMA Planners	MEEA EMA
Cost Unit	Accountants	MEEA
Time Unit • Equipment time recorder • Personnel time recorder	Accountants Accountants	MEEA
Procurement Unit	Administration	MEEA
Compensation/Claims Unit	Petroleum Pollution Compensation Tribunal	MEEA, MFP, MSD

APPENDIX E – NOTIFICATION CHARTS/ALERTING SEQUENCE

Alerting Sequence

Figure E1: Spill Notification Chart for Trinidad

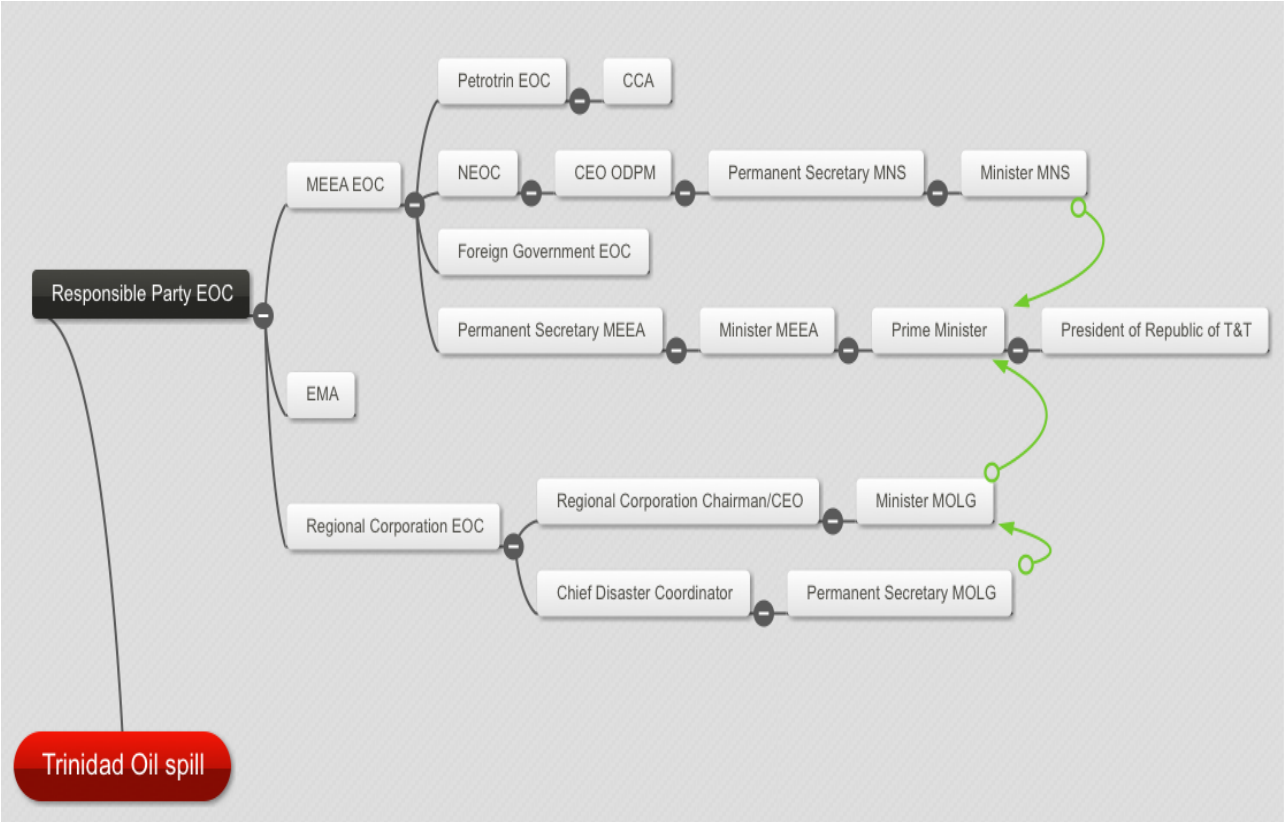
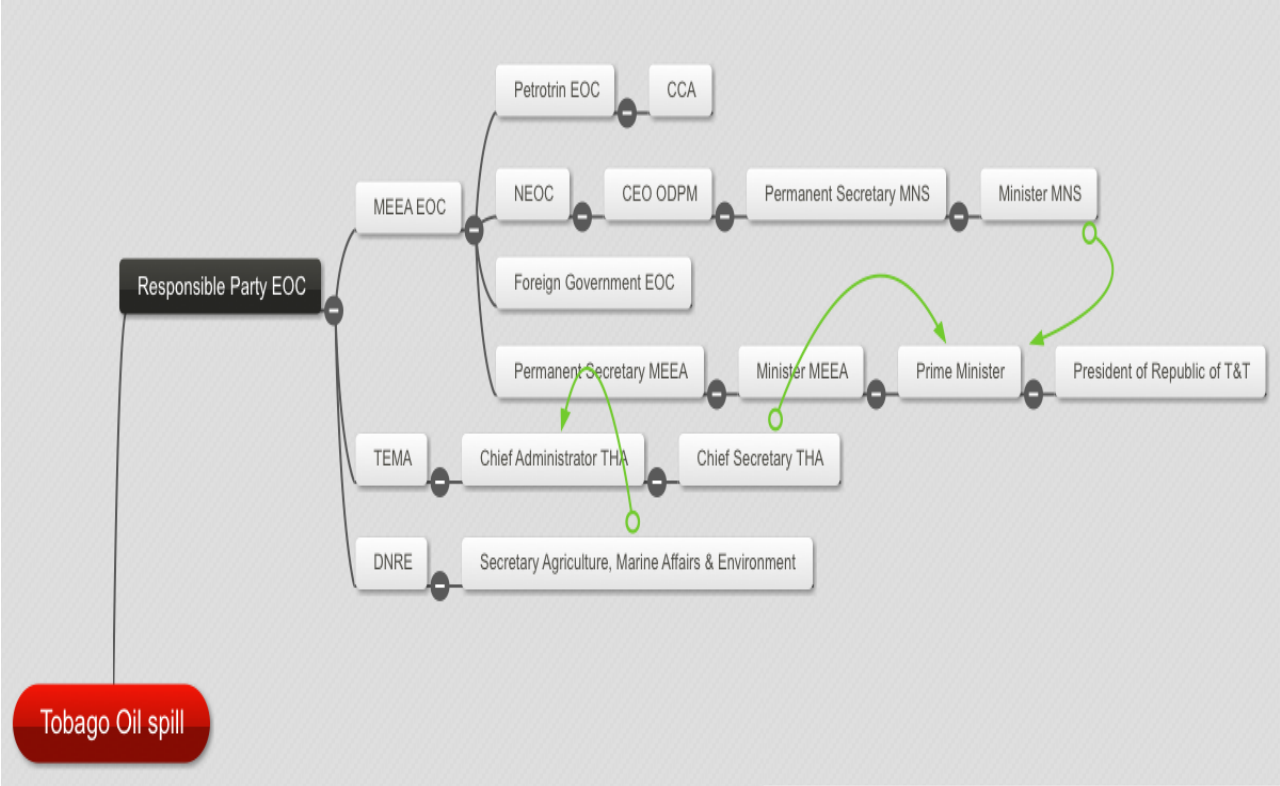


Figure E2: Spill Notification Chart for Tobago Spills



APPENDIX F - INCIDENT COMMAND POST

The Incident Command Post or Emergency Operations Centre (EOC) provides several key elements:

- A known sheltered place where supervisory personnel can meet and discuss management issues relating to the clean-up.
- Communications equipment, both internal and external, including direct links to vessels, helicopters, and vehicles.
- Storage of reference materials such as charts, computerized sensitivity maps, and spill trajectory modelling systems.
- Possible first aid care.
- Dealing with the media

Types of Incident/Onsite Command Posts

Type of Command Post	Location	Furnishings	Equipment Available
Incident Command Post			
Existing Buildings or Operations Rooms	ODPM NEOC, Tacarigua	Tables, chairs, sleeping facilities, white board, flip charts	Telephones, TVs, Video links, Computers, Projectors Mobile Radios, Power Generator, Photocopying
	MEEA, POS (Primary EOC)	Conference Table Chairs, Kitchen, White Board	Screen, Projectors, Power Generator, Photocopying
	MEEA, La Romain (Alternate EOC)	Conference Table Chairs, Kitchen, White Board	Telephone, Screen, Projectors, Fax, Power Generator, Photocopying
	Petrotrin, Pointe-a-Pierre (Alternate EOC)	Conference Table Chairs, Kitchen, white board, flip charts	Meteorological feed, Screen, Whiteboard, Telephone, Internet, Projectors, Mobile Radios, Fax, Photocopying, TV, Scanner, Plotter
	TEMA TEOC, Scarborough	Tables, chairs, sleeping facilities, white board, flip charts	Telephones, TVs, Computers, Projectors Mobile Radios, Power Generator, ACCU weather stations, emergency water supply, VHF repeaters, VHF Handheld Radios, Transceiver Base Station, Desk Dispatch Radio Phone, Satellite video, Photocopying
On-site Command Post			
Self-contained Mobile Facility: Buses, Vans and Trucks	ODPM, Tacarigua TEMA, Scarborough	Tables, chairs, white board, flip charts	Phones, TVs, Video, Computers, Projectors, Mobile Radios, Generator, Copiers

APPENDIX G – PUBLIC RELATIONS

Introduction

A major maritime incident or 'disaster' attracts the attention of the print and electronic media. The response from reporters is likely to be immediate and, depending on the scale and nature of the incident, it may attract the attention of national and international media. The requirements of the media are immediate and sustained. The sheer numbers that arrive at the scene within a very short time exacerbate the problem of satisfying these requirements.

Such emergencies can place enormous demands on all those involved in the response. Media interest, particularly if it is international, can create pressure throughout a 24-hour period.

Recent years have seen a rapid advance in telecommunications and information technology capabilities. Television channels devoted entirely to output are with us to stay. The impact made at the scene of the disaster by those engaged in gathering material for the media can be massive and it is vital to prepare for the influx of media representatives.

Failure to consider the media response at an early stage may have serious implications for the management of the whole incident.

It is essential that the media team:

- Identifies the agencies that are responsible for handling various aspects of the situation;
- Ensures that media activity does not interfere with the operational activity of the emergency services; and
- Ensures that the media do not harass human casualties.

The media team recognizes an incident that has major media potential.

The alerting procedure currently in place at MEEA is as follows:

- On receiving a report of pollution, the receiving party must immediately contact the NC NOSCP and
- The NC NOSCP will alert the Minister and the Information Officer

Media Relations personnel within government agencies should work with their RP counterparts in preparing and releasing news releases. This is critical in order for both the RP and the Government to be conveying a consistent message to the public.

Media management and public information will be disseminated out of (the Incident Command Post). The Information Officer will organize media releases and conferences

as necessary. For emergency situations, such as announcements on danger to the local population, necessity of evacuations etc., the Information Officer will issue announcements on local media. All such releases should be approved by the IC.

The Second Stage

In the first few minutes of the incident, possibly within an hour, NC needs to establish a spokesperson to give the briefest confirmation of the incident.

If it is clear that the situation is a serious one and is likely to continue for some time but NC has not had sufficient time to assess the situation, any statements should be brief and factual. They should deal only within the areas of responsibility of the person making them. It is the responsibility of NC, in any incident, to agree to the release of further information. It should be his responsibility to be aware of media demands from the outset.

In order to minimize the risk of issuing conflicting or misleading information to the media, and bearing in mind the necessity for fast but accurate information and that press officers are likely to be co-located, all agencies should adopt the following approach:

- To inform the agreed initial lead agency public relations officer before giving verbal statements to the media and restrict comments to matters concerning the agency that they represent;

- Before issuing news releases, to consult with the lead agency Communications Officer. If it proves impossible to contact the lead agency in advance (for example, due to communication difficulties) inform the lead agency as soon as possible afterwards;

- To contact those persons within their own organisation who the media may contact, or who may wish to make statements, and to brief them on the requirement for co-ordination with the lead agency public relations officer;

- If and when the incident develops to a different phase (for example, coastline clean-up operations) to consider making the lead agency the relevant local authority or Area Controller; and

- When arriving on scene, to liaise urgently with other press officers and to make contact with the lead officer to ensure that their contact details are quickly available

Sample Initial Press Release

An oil spill has occurred at (location) from (responsible party, if known). It was discovered at (time and date). The following areas have been affected: (fill in)

Cause of the spill is being investigated by (fill in) and clean-up operations are underway by (fill in). The amount of product spilled is (amount) (or is not known, or is being calculated by the (fill in).

Brief statement of operations being undertaken and by whom:

The spilled material is/is not considered to be a health hazard. The following precautions should be taken by members of the public in the (fill in area(s)).

Further updates will be given at (time, date).

APPENDIX H – SURVEILLANCE AND COMMUNICATIONS PLAN

Surveillance

Surveillance will be provided by the following mechanisms and all of mechanisms must be employed in order to detect oil spill on land or on water. Upon sighting of an oil spill the EMA and TTCG 24-hour numbers must be contacted.

The surveillance must be conducted on a weekly frequency over areas identified as high risk and on a monthly basis over areas of medium risk.

Surveillance Systems		
Oil Companies	**Public**	**Government**
• Platform personnel • Vessel support • Helicopter contractors • Divers • ROV operators • Cameras on NUIs • Satellite • Cameras, Video	• Fisher-folk • Farmers • Airline pilots • Divers • Residents	• TTAG pilots • MNS pilots • TTCG vessels • Caribbean Airlines pilots • Government vessels e.g. Water Taxis • Thermal Infrared Surveillance (MNS, IMA) • Satellite Surveillance (IMA) • Remote Sensing (IMA) • Divers (Scuba, Nitrox) (IMA, MFP) • Cameras, Video • ROV (IMA) • Radar-based Coastal Monitoring Systems (IMA/MNS)

Communications

When there is an emergency it is necessary that the relevant agencies and companies have the requisite communications equipment that is compatible so that communication is effective. The table below show the minimum requirement for the various oil and gas companies, the public and Government Agencies.

The preference is that all emergency centres be equipment with both HF and Satellite Phones. An established band frequency must be established and tested at regular intervals to ensure that the system is continuously functional.

Emergency officers also must be provided with post-paid company cell phones in order to make the necessary local and over-seas calls for protracted incidents.

Communication Systems		
Oil and Gas Companies	**Public**	**Government**
• Telephones • Cell Phones • High Frequency Radio • Satellite Phones • Internet	• Telephone • Cell phones	• Telephone • Post-paid Cell phones (with preference on the cell network during Tier 2 and 3 emergencies) • High Frequency (HF) Radio • Satellite Phones • Internet

APPENDIX I - LOCALLY AVAILABLE TIER 1 OIL SPILL RESPONSE RESOURCES AND EQUIPMENT

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	Petrotrin	bpTT LLC	BGTT	BHP Billiton	Repsol	NGC
Booms	Offshore/Ocean Boom	-	1,000 ft. Ro-Boom (PaP) 3,000 ft. Ro-Boom (PaP)	-	-	400ft (C) 600ft (G)	1200 ft.	-
	Shore Sealing Booms	-	1,000 ft. (PaP)	- (G)	-	2400 ft.	540 ft. (G)	-
	Nearshore Boom	500 ft.	1,000 ft. (PaP) 2,400 ft. (PF)	-	-	200 ft.	1200 ft.	-
	Sorbent Boom	-	660 ft.	- (G)	755 ft.	360 ft.	80 ft. (C)	-
	Beach Boom	-	0 ft.	0	-	1300 ft	1000 ft	-
	Other Types	-	1000 ft (river)	15 lengths (2.5 ft. x 35 ft.) (river)	-	-	1,200 ft. (river) (G)	-
	Towing Bridles	-	-	-	-	1 (C)	8	-
Boom Anchor Systems	Anchors	-	7	-	-	13	14	-
	Anchor Chain	-	Included	-	-	Included	Included	-
	Anchor Line	-	Included	-	-	Included	Included	-

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	**Petrotrin**	**bpTT LLC**	**BGTT**	**BHP Billiton**	**Repsol**	**NGC**
	Anchor Buoys	-	Included	-	-	Included	Included	-
Sorbents	Granular	2790 lbs	1.175lbs	-	300lbs	-	-	-
	Sweeps	-	-	-	-	1 Box (C)	2 pallets (20) bags each (C)	-
	Pads	-	6 bales	-	13.5 bales	-	6 bags (C)	1800
	Mops	-	12	-	-	-	-	-
	Other	-	5 rolls	-	450 lbs: spill sorbs 6: socks 2 boxes: wipe 16: pillows	(10) Sorbent blanket rolls (C)	-	-
Skimmers	Vacuum skimmer	-	3	-	-	0	-	-
	Rope Mop skimmer	-	(1) (PaP)	3 (G)	-	0	-	-
	Disc skimmer	-	(1) Vikoma Komara 20K (PaP)	-	-	(1) Vikoma Komara 12K (G)	-	-

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	**Petrotrin**	**bpTT LLC**	**BGTT**	**BHP Billiton**	**Repsol**	**NGC**
	Portable Skimmer	-	(1) Desmi Weir (PaP) (1) Desmi Weir (PF)	-	-	0	-	-
	Desmi minimax	-	(1) (PF)	- (G)	-	0	-	-
	Other skimmers	-	-	- (G)	-	2	1 manta ray	-
Pumps	Engine Driven Pumps	-	(2) (PaP)	- (G)	-	(4) 3" pumps w/hoses (C)	3	1 10gl/min
	Other Pumps	-	9	-	3	-	-	
Washers/Sprayers	Pressure Washers	1	-	0	2	(1) (G)	-	4
	Back Pack Sprayers	-	16	- (G)	-	-	-	
Holding/Temporary Storage Tanks	Tanks	-	(6) 400 gal each (PaP) (1) 2,500 gal (PF)	- (G)	-	(8) Quik tank 3000 gal (C) (1) Fastank 2400 gal (G)	1 plastic tote container (C) (1) CanFlex Frame 3000 gal (G)	2
	Megabags	-	-	-	20	50	-	-

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	**Petrotrin**	**bpTT LLC**	**BGTT**	**BHP Billiton**	**Repsol**	**NGC**
	Others	55 gallon drums (in excess)	10,000 gal marine vessel	-	4	-	-	-
Dispersant & Cleaners	Corexit A9500	-	50 drums (PaP) 30 drums (PF)	5500 gals (G)	165 gals	(6) drums, 55 gals each (C)	4 drums, 55 gals each (C)	
	Corexit Other -	-	-	60 bbls (LB)	-	-	-	
	MH 16	-	-	-	-	0	-	yes
	Beach Cleaner	-	21 5-gal Speklean	- (G) 500	-	-	-	
Dispersant Applicators	Pump Assemblies	-	-	-	330 gals 1980 gals 165 gals	3 (C)	1	-
	Back-pack Systems	-	-	- (G)	-	3	1	-
	Spray Booms	-	3 on tugs (PaP) 2 VOSS spray (PF)	8	4	2	1 Ayles Fernie (C)	-
	Heli-bucket	-	-	-	4	1	-	

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	Petrotrin	bpTT LLC	BGTT	BHP Billiton	Repsol	NGC
Support Equipment	Helicopter Access	-	3	3	-	-	1	Yes-NHSL
	OSR Boats	-	3	2	1 (Camden)	-	1	-
	Work Boats	-	5	4	-	-	2	10
	Fixed Wing Access	-	-	-	4	-	-	
	Portable Lights					3 (C)		
	PPE	-	All (basic)	All (basic) Life rings Life vests Fire Extin - guishers	50: Disposal coveralls 1 pr: NitroPro Oil gloves 10 prs: rubber gloves 6: Aprons 6 prs: goggles 4: Hal face masks Rubber boots	-	24 sets Tivex coveralls Safety goggles Life jackets Rubber gloves Cotton gloves	yes
	Gas Detectors	5	12	-	10	-	-	yes
	Generators	-	2	3	-	1 (C)	-	yes

EQUIPMENT CATEGORY	Equipment Type	COMPANY						
		NP	**Petrotrin**	**bpTT LLC**	**BGTT**	**BHP Billiton**	**Repsol**	**NGC**
	Crane		(1) (PF)					
	Personnel decontamination kit	-	-	-	-	-	1	-
	Response Trailer	-	-	-	-	-	1	-
	Mobile Command Centre	-	0	1	1	-	-	yes
Services	OSRO Services Contractor	-	-	Eastern Divers	-	Kaizen	Seacor	-
	Trajectory Modelling	-	1	1	1	1	-	
Warehousing		NPMC, Sea Lots	Pointe-a-Pierre (PaP) Santa Flora (SF) Point Fortin (PF)	Pt. Galeota (PG) La Brea (LB)	Chaguaramas	Tobago (T) Chaguaramas (C) Guayaguayare (G)	Pt. Galeota (PG) Chaguaramas (C)	Pt Lisas

CRITERIA FOR ESTABLISHING THE DIMENSIONS OF MINIMUM RESPONSE CAPACITY

1.0 Establishing the Dimensions of Response Capacity as a Minimum Planning Standard

To establish the dimensions of response capacity for the installation the response strategies set down for incidents identified in the accident scenarios must be observed.

2.0 Response Capacity (Minimum Planning Standard)

The response capacity of the installation must be guaranteed by means of the resources in hand and those of third parties according to prior arrangements, in obedience with the criteria for small spills (up to 50 bbls or 1% WCD whichever is less) and medium spills (700 bbls or 10% WCD, whichever is greater) and the worst possible cases as defined below. Based on such criteria the individual Emergency Plan can assume specific structures and strategies for each spill situation, in accordance with the accident scenarios established and their requirements.

2.1 Booms

The floating barriers must be dimensionally designed as a function of the accident scenarios foreseen in the response strategies established, taking into account work fronts at the pollution source, at the edges of the slick and protection of the high priority vulnerable areas, obeying the following criteria.

Strategy	Minimum Quantity
Completely encircle the vessel or the source of the spillage	3 x overall length of the vessel or the source of spillage
Oil slick containment	In accordance with the Effective Daily Capacity for Retrieval of Oil (EDCRO)
Protection of rivers, canals and other bodies of water	The largest of: 3.5 x breadth of the water body in metres or 1.5 ÷ maximum speed of the current in knits x breadth of the water body in metres, whichever is the greatest up to a maximum of 350 metres of effective barrier

2.2 Skimmers

The calculation of skimmer capacity should obey the following criteria for small and medium spills:

Small (dp) and medium (dm) spills		
Volume	**Length of time the resource will be available at the spill location**	**Effective Daily Capacity for Retrieval of Oil (EDCRO)**
V_{dp} is equal to or less than the discharge volumes: V_{dp} = 8 m^3 or V_{dp} = volume of the average most probable discharge, Where V_{dp}= volume of small spill	T_{dp} is the resource time available for the response to a small discharge: T_{dp} is less than 2 hours	$EDCRO_{dp} = V_{dp}$
V_{dm} is equal to or less than the discharge volumes: V_{dp} = 200 m^3 or V_{dp} = 10% of the worst case of spillage, Where V_{dp}= volume of medium spill	T_{dm} is the resource time available for the response to a medium size discharge. This can be increased by acceptable technical justification, as long as this is accepted by the MEEA. T_{dm} is less than 6 hours	$EDCRO_{dm} = 0.5 \times V_{dm}$

(a) In the case of an offshore platform, chemical and mechanical dispersion could be an answer to a response structure for the installation with due technical justification and acceptance by the MEEA.

(b) In the case of ports and terminal installations the scenario for oil spills from ships and vessels must be included within the following limits

a. Oil Terminals: the EDCRO must be sized for small and medium discharges. In the case of greater spills the installation must put forward the response foreseen to guarantee continued action after the emergency response.

b. Organized Ports and other port and terminal installations: The EDCRO must be sized for small and medium-sized discharges. In the case of a spill greater than 8 m3, the installation must put forward foreseen to guarantee continued action after the emergency response.

Worst Case Discharge case (d_{wc})	
TN1 = maximum resource availability time	**12 hours**
EDCRO	Coastal zone, lakes, reservoirs and other drift current environments: EDCRO d_{wc1} = 2,400 m^3/day Rivers and other drift current environments: EDCRO d_{wc1} = 320 m^3/day Maritime Waters outside the Coastal Zone EDCRO d_{wc1} = 1,600 m^3/day
TN2 = maximum resource availability time	**36 hours**
EDCRO	Coastal zone, lakes, reservoirs and other drift current environments: EDCRO d_{wc2} = 4,800 m^3/day Rivers and other drift current environments: EDCRO d_{wc2} = 640 m^3/day Maritime Waters outside the Coastal Zone: EDCRO d_{wc2} = 3,200 m^3/day
TN3 = maximum resource availability time	**60 hours**
EDCRO	Coastal zone, lakes, reservoirs and other drift current environments: EDCRO d_{wc3} = 8,000 m^3/day Rivers and other drift current environments: EDCRO d_{wc3} = 1,140 m^3/day Maritime Waters outside the Coastal Zone: EDCRO d_{wc3} = 6,400 m^3/day

N.B. Resource availability time = Time for resource to arrive at the scene of the spill

Determination of EDCRO for Oil Recovery Devices

- Oil recovery devices identified by a facility owner or operator must be identified by the manufacturer, model, and effective daily recovery capacity. These capacities must be used to determine whether there is sufficient capacity to meet the applicable planning criteria for small, medium or large spills.
- To determine the EDCRO the following formula shall be used"

EDCRO = T x 24 hours x E

Where,

T = Throughput rate in barrels per hour (nameplate or nominal capacity)
E= 20 per cent efficiency factor (maximum value)

2.3 Chemical Dispersants

- The volume of chemical dispersants available must be equivalent to 5% of the volume of the oil to be dispersed, and its application must meet the requirements of the MEEA.

2.4 Mechanical Dispersion

- In the case of the option of mechanical dispersion, a justification must be presented to the governing environmental authority for the calculations of the amount of equipment and/or vessels to be used and the time that such resources are to be available.

2.5 Temporary Storage

- The temporary storage capacity for the oil retrieved must be equivalent to 3 hours skimmer operation.

2.6 Absorbents

- The absorbents used for final cleaning up of the spill area, for the locations inaccessible to the skimmer and, in some cases, for protection of the vulnerable littoral areas, or other special areas, must be quantified in accordance with the following criteria:
    - Absorbent barriers: the same length as the barriers used for containment
    - Absorbent blankets: in a quantity equivalent to the same length as the barriers used for containment
    - Bulk volumes of absorbent materials of amounts compatible with the response strategy put forward

2.7 Material Resources for the platforms

- The platforms shall be equipped with the equipment and materials established as part of the SOPEP as determined by the Convention for the Prevention of Pollution Caused by Shipping, concluded in London on 2/11/73, and its Protocol.

APPENDIX J - EXTERNAL SOURCES OF SPECIALIST EQUIPMENT, PERSONNEL AND ADVICE

Contact information is contained in Appendix A.

Marine Spill Response Corporation (MSRC)

MSRC is a private, independent, tax-exempt, not-for-profit Corporation dedicated to the clean-up and mitigation of large oil spills in United States coastal, tidal and certain other waters. MSRC is establishing a program to use its best efforts to contain and clean up large oil spills that are beyond local response capabilities and where the U.S. Coast Guard is directing the response. MSRC operates five Regional Response Centres.

The closest Centre to the Caribbean region is located in Miami, Florida and is primarily responsible for U.S. waters in the southeast and U.S. waters surrounding the U.S. Virgin Islands and Puerto Rico. The Regional Response Centre serves to:

- warehouse, receive, store, deliver and expedite supplies, equipment and materials related to MSRC's spill response activities
- act as a training centre for spill response personnel
- provide a site for testing supplies, equipment and material
- operate as spill response communications and command post

The centre employs approximately 70 persons full-time in spill response; supplemented as needed during a spill by personnel from MSRC's other regions and headquarters, and other needed contractors. Current plans call for 5 pre-staging areas in the Southeast region where equipment and sometimes vessels and personnel will be located. St. Croix in the Virgin Islands is such a site with a 210' response vessel.

The primary purpose of MSRC is to provide a best effort response to major spills of oil in U.S. offshore and tidal waters, including bays and harbours. MSRC's operational posture under the Cartagena Convention and its Protocols concerning cooperation between Island States and Territories in the Wider Caribbean Region remains the subject of study.

Clean Caribbean and Americas (CCA)

Clean Caribbean and Americas (CCA) is an oil spill equipment cooperative funded by member companies that operate petroleum facilities or transport persistent oils in and through the Caribbean basin. CCA acquires, maintains, and trains member personnel on a stockpile of oil spill response equipment, materials and chemicals. The CCA stockpile is warehoused in Fort Lauderdale, Florida, USA and is principally intended to be air shipped to the airport nearest the spill site. CCA's purpose is to provide stockpiles of readily available equipment, materials and chemicals unique to and required in oil spill clean-up operations. Equipment, materials, and

chemicals that are readily available on the commercial market are for the most part not included in the stockpile.

Oil Spill Response Limited (OSRL)

Oil Spill Response Limited (OSRL) provides an oil spill response capability to its members through its contractor OSSC. OSSC resources include:

- equipment and expert personnel designed to respond credibly to two simultaneous spills of 30,000 tons anywhere in the world
- 450 tons of equipment, split 75% for a near shore capability and 25% offshore
- 38 expert staff located in Southampton, UK.
- One 50 ton capacity transport jet and one 20 ton C-130 transport which can be used for both freight and dispersant spraying (available on a 6 hour standby basis). The jet could arrive within the Caribbean area within 18-24 hours and the C-130 in about 36 hours.

OSRL is available to non-members subject to certain conditions (it is recommended that copies of conditions are obtained in advance to facilitate a rapid exchange of faxes). OSRL also has a significant training capability both in its Southampton base where some 800 places are available annually and at on-site training at customer locations.

Global Response Network

Global Response Network has been formed that represents a world-wide network of spill response centres including CCA, OSRL, EARL and MSRC.

For further info please contact Trish Johns, GRN Co-ordinator (GRN Coordinator, Telephone number: +44 (0)20 7724 0102 or trishjohns@oilspillresponse.com) or www.globalresponsenetwork.org.

External Sources of Expert Advice

Contact information is contained in Appendix A.

The Focal Point Agency for the Caribbean Island OPRC Plan to provide administrative assistance is: International Maritime Organization, Regional Marine Pollution Emergency Information and Training Centre (Wider Caribbean) - REMPEITC-Caribe.

APPENDIX K – EQUIPMENT STAGING AREAS

Staging areas have been selected to accommodate various modes of transportation including overland, air and water. Each location has the means to move equipment and materials quickly and efficiently. These locations have been selected so that they are strategic to coastal terminals and main shipping routes where there is the highest risk of spills.

Main receiving areas of equipment are:

Main Receiving Areas	Locations
Ports	Port of Spain, Chaguaramas, Point Lisas, Galeota Point
Airports	Piarco, Crown Point

The primary staging areas are:

Primary Staging Areas	Locations
Petrotrin	Pointe-a-Pierre, Point Fortin
TTCG	Chaguaramas
NPMC	Port-of-Spain
PATT	Port-of-Spain
bpTT	Galeota Point
TEMA	Scarborough

In addition, facilities will be able to accommodate the preparation, fuelling (as appropriate), deployment, retrieval, and decontamination (where and if appropriate) of the following countermeasures:

- Containment (booms, ropes, chains, anchors, sorbent booms)
- Removal (skimmers, power packs, hoses, connectors, sorbents)
- Transfer (pumps, hoses, connectors, power units)
- Storage (containers, membranes, tanks)
- Dispersion (dispersants, spray arms and buckets, connectors, other fittings)
- In situ burning (as appropriate - aircraft, Helitorch, gel, fire-resistant boom, igniters)

APPENDIX L - SPILL RESPONSE AND CLEAN-UP STRATEGIES

This Appendix describes applicable oil spill response strategies. Details on how to perform the operations will be made available in a reference manual or training program.

Considerations for Developing Spill Response Strategies

Planning & Logistics	Response (including monitoring) as soon as practicable (4-6 hours) for Tier 1 spills. Response time (including monitoring) to be as soon as practicable for Tier 2 spills. Response time to be within 24- 48 hours for Tier 3 spills.
Spills on Land	Contain spills on land as close to the source as possible, if safety allows. Every effort should be made to ensure that the spill does not reach water, where its containment and recovery are much more difficult and the potential environmental impacts are much greater. Containment can be achieved by using: • a berm or dyke around the spill source (berms can be constructed from earth or sand bags); or • a trench or ditch down slope of the source.
Spills on Water (Open Sea)	Options may include booming, skimming, removal, storage, dispersants and in-situ burning. Booms are commonly placed: • across a narrow entrance to the ocean, such as a stream/river outlet to close off that entrance so that oil can't pass through into marshland or other sensitive habitats. • in places where the boom can deflect oil away from sensitive locations, such as mangroves, shellfish beds, beaches used by piping plovers as nesting habitats etc.. • around a sensitive site, to prevent oil from reaching it. **Small and medium size spills** It is recommended to use a skimmer(s) in conjunction with a Side Fitted Single vessel sweep (single or double sided) with the skimmer(s) placed in the apex of the sweep boom(s). “V” shaped sweeps are strongly recommended because of its excellent manoeuvrability. **Large oil spills** For larger oil spills, the Side Fitted Single Vessel "V" Sweep configuration may be combined with a large "U" configuration with an open apex. The oil - which is concentrated by the large "U" - will be guided into a narrow stripe behind the U-sweep, and may immediately be contained and recovered by the Side Fitted Single Vessel

	Sweep following right after the "U". **Oil Recovery** The recovery vessel's forward movement will force the floating oil - trapped inside the sweep – to concentrate at the apex of the boom formation. Allow the oil layer to build up before starting the skimmer. An oil layer of at least 2.5 to 5 cm (1-2") is recommended. No type of skimmer will work efficiently in a real life situation without the presence of sufficient amounts of oil. But on the other hand the oil should continuously be pumped away as it enters the skimming zone. Otherwise it may escape under the boom. It is a question of obtaining a balance, and only the actual situation can indicate where this balance is. It is always better to start skimming too early than too late. In the first case, you may recover more water than necessary (dependent on type of skimmer), but in the second case you may lose the oil under the boom. If you recover too much water, it is not necessarily a big problem, as long as the type of skimmer pump used does not emulsify oil and water. Recovered water can easily be decanted from the storage tank, to be discharged in front of the sweep. In this way, any oil in the decanted water will be recovered again. Dispersant application involves the spraying of chemicals by aircraft or boat to accelerate the natural dispersion of the oil. *For the North and East Coast Trinidad: Booming in Open Sea is not normally possible. Application of dispersant may be warranted based on the size of spill. If the spill appears as a sheen, dispersant will not be necessary. For containment, booming of sensitive coastal areas is the priority.* *For the West Coast Trinidad: Booming, Skimming, Removal, Storage and Dispersants may be necessary.* *For Tobago: Booming, Skimming, Removal, Storage and Dispersants may be necessary on all sides of the island to protect beaches and sensitive areas.*
Spills on Water (Rivers)	The aim is to keep the recovery equipment fixed to the river bank or structures in the river, while the water with the spilled oil is doing the work. Always try to deflect the oil to the slow side (the inner bank at a curve) of the river, if possible. The speed of the river current may require that the booms are positioned in a very small angle relative to the direction of the current. This is due to the fact that the speed of the water perpendicular to any section of boom must be less than 0.7 knots. The skimmer must be placed in a way which ensures the maximum flow of oil to it. In some situations it is possible to form a small circulation area close to the river bank, where the deflected and concentrated oil will rotate in a direction driven by the incoming oil, flowing along the boom. In this way the oil moves away from the critical entrainment zone at the apex, thus better avoiding loss of oil under the boom. Another very efficient way to ensure this takes place is to dig a small pond right next to the river. The river and the pond must be connected with one or two ditches. Use the boom

	to guide the oil into the pond. Both solutions work very well with the skimmer placed in the middle of the circulating oil. It may not always be possible to drive a truck all the way to the river bank, as the ground is too soft or muddy. It may be necessary to man-carry the recovery equipment to the river. So low weight is of essence here. Large debris must be deflected before it enters the boomed area. Rakes used from small boats will be quite useful. In some situations it is even possible to deflect large debris by means of a steel wire stretched across the river in or below the water surface, and placed in a small angle relative to the direction of the current.
Spills on the Shoreline	Spills on shorelines are threatening to the wild life environment and may result in the most costly recovery method. It should therefore be avoided by recovering as much oil as possible in the open water. The different shoreline types falling within the affected area should be identified and quantified and the most appropriate clean-up strategy for each considered. Factors to be taken into account include amenity value, whether beaches are easily accessible for heavy equipment and the ability of the beach to support such vehicles. **Manual clean-up followed by natural weathering of the remaining oil is preferred for ecological reasons.** Chemicals used on shoreline clean-up must be approved by the Relevant Authorities for the intended use. This approval must be obtained in writing, prior to application during an incident**.** Associated safety and environmental risks must be carefully evaluated and legal issues addressed, as is the case for all response options There are several ways of acting in the event of an oil spill on the shoreline, but they all depend on the actual situation: **Sandy Beaches** ***Small to medium size spill:*** Use beach cleaning machines or bulldozers on the beach if it will carry the weight of such vehicles. If there is no significant surf, you can wash and push the oil back into the sea, to be recovered by a small shallow water skimmer, operating in an area surrounded by a beach boom. Dig a hole under the skimmer if the water is too shallow. Use a Fastank or a rigid open container for temporary storage. ***Larger spills/light to medium viscosity:*** Fence in the oil by means of a shoreline boom, and operate a shallow water skimmer from the beach. If possible, try to push or wash the oil on the beach back into the water in order to let the skimmer recover it. Severe surf will make this operation difficult, if not impossible. A skimmer head or pump with a self-adjusting weir lip - mounted on a "Hiab" type hydraulic crane - a so called "Sweeper", is a very useful tool for this type of spill response. The skimmer- or pump head can always be placed in the best recovery position, remotely controlled from the beach, a vessel, or a barge. Fast to operate and safe for personnel. Pump the oil to a land-based storage or to a sea-based facility such as a barge or a towable storage bladder (TSB). ***Larger spills/high viscosity:*** As just above, but due to the viscosity it may be necessary to dismantle the skimmer pump from the floats and use it for transfer of the spilled oil. Sometimes the oil emulsion in the water next to the beach will be so highly viscous

	that a skimmer cannot sink into the oil. It will stay on top of it. Therefore a skimmer pump, mounted on a "Hiab" type hydraulic crane, is also a useful tool. **Stony or Rocky Beaches** ***Small to medium spill/light to high viscosity:*** Use absorbents for small amounts of oil and when gentle treatment is required. For larger amounts the best way to recover the oil from a rocky coast is to wash the oil back into the sea, using fire hoses or high pressure- or hot water cleaners, and let a small shallow water skimmer recover it there. Work in an area fenced-in by a shoreline boom. Use a Fastank or a rigid open container for temporary storage. It must always be considered whether it is environmentally feasible to pressure wash a coast line. If there are important living organisms at risk, and the spill is too big for using absorbents, a more gentle treatment with bio-degradable detergents or surface washing agents could be the option. No action at all may in some cases be the best solution. ***Large spill/light to medium viscosity:*** As above for small spills. However, larger skimmers and pumps can be used. Operate the skimmer from the shore, from a vessel, or from a barge, and store the oil in a land or sea-based temporary storage facility. A skimmer head or pump with a self-adjusting weir lip - mounted on a "Hiab" type hydraulic crane - a so called "Sweeper", is a very useful tool for this type of spill response. The skimmer- or pump head can always be placed in the best recovery position, remotely controlled from the beach, a vessel, or a barge. Fast to operate and safe for personnel. Let nature finalize the cleaning process, or use a bio-degradable detergent or surface washing agent. Use absorbents whenever feasible. ***Large spill/high viscosity:*** As just above, but dismantle the skimmer pump from the floats for transfer of the oil. A skimmer can be used by means of a feeder which can force heavy oil into the transfer pump. Sometimes the oil emulsion in the water next to the beach will be so highly viscous that a skimmer cannot sink into the oil. Therefore a skimmer pump, mounted on a "Hiab" type hydraulic crane, is also a useful tool here. Let nature finalize the cleaning process, or do the final cleaning using a bio-degradable detergent or surface washing agent. **Gravel Beaches Subject to Tidewater** Gravel beaches and tidewater cause special problems for oil spill responders. When the tide goes down, the oil sinks with the water level deep into the gravel and at every high tide the oil will be back at the surface. If you try to wash the top layer of gravel at low tide, it may appear clean until after the next high tide. Then new oil "from the deep" will cover the beach. A careful assessment of the pros & cons of cleaning must be performed prior to doing anything to these beaches. Natural degradation may be the fastest and safest way for the environment.

Wetlands, Mangrove Swamps and Marshes	These areas are priority for protection. The main protection options are booming and mechanical recovery. If oil enters these areas the main clean-up options are: • Natural Recovery – no action • booming and skimming of oil on the water surface in creeks; • pumping of bulk oil from sediment surface, depressions and channels; • low pressure water flushing of free oil from sediment surface and vegetation into areas where it may be collected; and • Use of absorbent materials with subsequent collection and disposal. **No Action/Natural Recovery** There are several circumstances under which it is appropriate to do nothing. The foremost of these situations is when clean-up would cause more harm than benefit to mangroves or other associated habitats, or when shorelines are inaccessible. When no clean-up is conducted, oil will slowly degrade and be removed naturally, assisted by natural and storm-generated flushing. Spills of light oils, which will naturally evaporate and break down very rapidly, do not require clean-up. Such light oils are usually gone within days. Furthermore, light fuel oils such as gasoline and jet fuels typically impart their toxic impacts immediately, and clean-up can do little to reduce the damage. It is important to recognize, though, that even where no clean-up is advisable, light oils can cause significant injury and contaminated mangrove habitats may require many years to recover. Clean-up also is not recommended for small accumulations of oil, regardless of product type. Impacts caused by light accumulations generally do not warrant the trade-offs associated with clean-up activity. Even for major spills, there may be cases for which it is best to take no action, depending on the nature of the oiling and the characteristics of the mangrove forest affected. Generally, clean-up should not be conducted in interior areas of mangrove forests because of the risk of damaging mangrove roots and seedlings, trampling oil into the sediment where it will degrade much more slowly, and spreading oil into previously unoiled areas. Exceptions may be made if access is possible from upland areas or if vegetation is sparse enough to permit access without injury to pneumatophores and prop roots. If clean-up is attempted in interior mangroves, experienced personnel must constantly oversee clean-up crews to prevent further injury. In any case, attempts should be made to control the movement and spread of any mobile oil within the mangroves to prevent contamination of adjacent areas.

Several response techniques described below, including barriers, passive collection, and flushing can be used to help control and contain oil.

Barrier Methods – Booms

Several forms of barriers can deflect or contain oil, including booms, sediment berms, dams, and filter fences. Barriers can be used along mangrove shorelines and inlets to prevent oil entry. Proper strategic boom deployment in sheltered lagoon areas may be highly effective in trapping large quantities of oil and reducing oil impact to interior mangroves. To be effective, barriers must be deployed immediately after a spill before oil moves into mangrove areas. This means that appropriate types and sufficient amounts of barrier materials must be stockpiled and available at the time of the spill, and that strategies for boom placement and deployment have already been established and tested. Because of the soft substrate and sensitivity of prop roots and pneumatophores, barrier methods should be deployed carefully and maintained vigilantly to prevent physical damage during installation and removal. Untended boom that breaks loose can become entangled in the mangrove fringe, breaking off pneumatophores, prop roots, and juvenile plants. Where barrier methods are not an option, mangrove forests will remain vulnerable to contamination. For example, booms generally cannot be deployed successfully along mangrove shorelines with strong currents or along sections of mangrove shorelines behind shallow flats. Booms are usually not effective with light oils because they can readily mix into the water column and pass under floating boom. Heavier oils are more likely to remain at the water surface and so are more easily controlled with booms, although very heavy oils can sometimes become negatively buoyant and pass under boom.

Pumping/Vacuuming

Vacuuming can remove pooled oil or thick oil accumulations from the sediment surface, depressions, and channels. Vacuum equipment ranges from small units to large suction devices mounted on dredges, usually used outside vegetated areas.

Generally, vacuuming should be conducted only at the outer fringe of mangrove forests; it is most feasible and least damaging where vegetation is not very dense, enabling easy access.

Vacuuming can be used effectively on heavier and medium oils, providing they are still reasonably fluid. Lighter, more flammable petroleum products such as jet fuel and diesel generally should not be vacuumed.

Use of Sorbents

Sorbent boom or other sorbent materials can be placed at the fringe of oiled mangrove forests to passively recover any mobile oil, including sheens. Sorbents are oleophilic and either absorb or adsorb oil. They can be composed of either synthetic or natural materials, and they come in a variety of forms, including sausage boom, "pompom" or snare boom, sheets, rolls, pellets, and loose particulates. Sorbents vary in their effectiveness depending upon oil type, degree of oil weathering, and sorbent absorption or adsorption capacity. Sorbent materials must be placed and removed carefully to

	minimize disturbance of sediments and injury to mangrove roots. Sorbent materials must be closely monitored to ensure they do not move and damage mangrove roots, and must be removed when they become saturated or are no longer needed. Sorbents have been used to wipe heavy oil coating from mangrove surfaces. Before using sorbents in this way, consideration should be given to associated physical damage. This activity is best conducted only in areas where substrate is firm enough to prevent oil mixing into it. **Low-Pressure Ambient Water Flushing** Low-pressure flushing with ambient seawater can wash fluid, loosely adhered oil from the sediment surface and mangrove vegetation into areas where it can be collected, as long as it can be done without resulting in significant physical disturbance of the sediment. Generally, flushing is most feasible at the outer fringe, but can sometimes be used to remove oil trapped within the mangrove forest. Flushing at water levels high enough to submerge sediments may help minimize impact to the substrate. If substrate mixing is likely or unavoidable, responders should allow the oil to weather naturally. Flushing is not effective with heavy oils, such as Bunker C, or highly weathered oils. Oil should be flushed only during ebbing tides to move it out where it can be collected. Flushing can be a useful technique to help control the movement and spread of mobile oil in mangrove areas to prevent contamination of adjacent areas. When flushing free-floating oil, care should be taken to minimize emulsification.
Coral Reefs	There are many factors that influence the effect of an oil spill on an ecosystem and these must be taken into consideration when dealing with coral reefs. Some of the most obvious factors are: • The amount and type of oil spilled; • The degree of weathering of the oil prior to contact with corals; • The extent of the contamination; • The presence of other stress factors, such as high sedimentation; • Physical factors such as storms, rainfall and currents – the state of the tide during the initial contamination is very important; • The nature of the clean-up operation; • The type of coral; and • Seasonal factors, e.g. coral spawning. The goal of spill response in coral areas is the same as in any other habitat—to minimize damages caused by the accident and any associated spillage. Choosing response methods carefully, with an understanding of the sensitivities of the reef environment, will minimize any additional impacts incurred from the clean-up. Skimmers and booms are the main options that can be used however the following should be noted:

	• Booms should be tended regularly so they do not harm shallow reefs • When anchoring booms care should be given not to damage corals **NOTE:** a) Chemicals should never be used in these sensitive areas. b) It is recognized that these areas are not generally easily accessible and heavy clean-up operations may cause physical damage. Care must be taken in any associated clean-up activity to minimize damage.
VOCs and SVOCs	VOCs and SVOCs require specialized equipment for detection and monitoring. Every report that indicates the possibility of the presence of VOCs and SVOCs must be investigated promptly and immediate steps taken to detect and identify the offending substance and source. Isolation of the source then becomes the top priority followed immediately by addressing human concerns of both health and safety.
Spill Monitoring	Spill monitoring includes safety and occupational health conditions, existing and possible environmental threats and for river and offshore spills, trajectory modelling.
Removal	Techniques for skimming and collection of oil released onto land or into water. Transfer Equipment needed to move collected liquids and solids to interim storage and disposal facilities.
Oil Recovery	When large volumes of oil have been contained either through natural or mechanical containment it will be necessary to remove or recover the oil. In rivers, this will generally occur in excavated trenches, adjacent to berms or natural barriers, or back water areas. Vacuum trucks are ideal at clean-up sites accessible by road and where a large volume of oil has pooled in an area that is generally free of water. The truck must be positioned at a safe distance so that there is no possibility of fire or explosion**.**
Control Points	Specific geographical locations, primarily on rivers, which provide for the pre-planning of staging and deployment locations for oil spill response equipment. Pre-identification required of access, work area size, boat launches, equipment storage, natural boom anchors, water depth, water speed, flow patterns and water hazards.
In-situ Burn	As presented in the Caribbean Oil Spill Plan and in Appendix N.
Post-Spill Activities	Personnel decontamination, equipment cleaning, spill debris disposal, and maintenance, debriefing and review of strategies following an incident.

APPENDIX M – USE OF DISPERSANTS

As presented in the Caribbean Island OPRC Plan.

1.0 General Dispersant Policy for Island States and Territories

1.1 The Caribbean Plan envisions that each Island State or Territory will develop its own policy pertaining to the use of dispersants in its Exclusive Economic Zone (EEZ). The dispersant policy adopted by the State or Territory will be part of its National Contingency Plan.

1.2 Scientific studies over the past several years have shown that the new generations of dispersants, in themselves, exhibit low toxicity even at application concentrations ten times those prescribed. Studies have also shown that the concentration of dispersed oil in the water column drops off significantly at depths below three meters and, given reasonable flushing, dispersed oil does not remain in the area of application for any significant length of time as it is distributed and diluted by the currents. More or less, aggressive use of dispersants may be warranted. Each Island State and Territory is encouraged to establish guidelines based on its own environmental considerations and circumstances within its own territorial seas.

1.3 It is the position of the Island States and Territories that use of dispersants using the following parameters will cause no significant environmental harm from such use. It is the policy of the Island States and Territories that when combating spilled oil within its territorial seas, the OSC as authorized by the Lead Agency, may use dispersants without prior notifications to other Island States and Territories under the following parameters:

a) The area of application is not less than one nautical mile from any shoreline, nor closer than three nautical miles up-current from important marine fisheries or coral reef ecosystems which are less than 20 feet from the water's surface;

b) The water depth should exceed 10 meters (30 feet) in the area in which the dispersant will be applied;

c) The method of application is one recommended by the manufacturer

d) The rate of application is as recommended by the manufacturer;

e) The dispersants, exhibiting low toxicity; and

f) The Lead Agency will notify potentially affected downstream Island States and/or Territories whenever dispersant use is intended to be conducted beyond its territorial seas.

1.4 In the event the OSC determined that the use of dispersants is necessary and if it is apparent that downstream Island States and/or Territories may be affected, then

concurrence for such use must be obtained from the potentially affected Island States and Territories outside the parameters of section 10.3.3.

1.5 Response operations, including the application of dispersants, will not be conducted in the EEZ of another Island State or Territory without prior concurrence of the Lead Agency of that Island State and/or Territory.

1.6 During a dispersant operation, the OSC should determine the effectiveness of the dispersant application by on-scene observation and/or by laboratory testing. Application of dispersants should be discontinued if proven to be ineffective.

1.7 To establish an updated list of dispersants stockpiled in the region, each Island State or Territory will submit to the Focal Point Agency (IMO Regional Consultant) the quantity, size of storage containers, brand name, type, and location of storage. (Example: 12-55 gallon plastic lined drums of Corexit 9527). The updated information will be submitted on an EQUIPMENT/DISPERSANT LOCATION page for insertion in Chapter 5 of the Caribbean Plan.

2.0 Application of Dispersants

2.1 The best combination of dispersants and application method must be selected for the specific situation. On the open sea they can be applied from surface vessels and from aircraft. It is very important to use proven equipment which has been properly calibrated and to follow the instructions of the suppliers of equipment and dispersants.

2.2 Spraying operations should be started as soon as possible after it has been decided that dispersant use will form part of the response. Many oils will form stable water-in-oil emulsions (chocolate mousse) of which the viscosity will be higher than that of the original oil. The extent of emulsification and the stability of the emulsion will depend upon the type of oil, sea state and temperature. The viscosity also increases because of the evaporation of lower molecular weight hydrocarbons. Both processes may have taken place to a considerable extent within a couple of hours after the spill and thus dispersant effectiveness may be reduced if application is delayed. After oil has emulsified into mousse, it is very difficult to disperse. Treatment with dispersants should, therefore, start before the mousse formation or extensive weathering has taken place.

2.3 Supplying an adequate quantity of dispersant to deal with a large spill can often be a problem. Spill response managers should include in their contingency plans an inventory of suitable dispersants and should be aware of how this supply can be augmented from additional resources. In the event that the supply is inadequate, spill response managers should prepare to use a combination of response techniques.

3.0 Operational Use and Application of Dispersants

3.1 In general, dispersants are applied either by surface vessels equipped with dispersant spray booms and support equipment (pumps, hoses, dispersant drum/tank) or by aircraft (fixed-wing or helicopter) using specially designed spray equipment and systems. In

general, dispersants are only minimally effective when applied by means of fire monitors. Proper use of dispersants requires the appropriate dosage in terms of amount of chemical per unit area, such as gallons per acre, litres per hectare, etc. The dosage is extremely variable and depends on the type of dispersant, type of oil, slick thickness, temperature, viscosity, and other characteristics of the spilled oil. The actual flow rates are a function of the vessel/aircraft speed, the pump capacity, the dilution rate, and the effective swath width covered.

3.2 Surface Application. Most surface dispersant spray systems existing in response inventories utilize a reduction pump system that dilutes a dispersant concentrate with seawater before being sprayed on the surface through multiple-nozzle spray booms. Mounting spray booms ahead of the vessel's bow wave and wake assist in proper application of the dispersant to the oil. Vessel sprays and pump system flow rates must be periodically calibrated to assure the desired dosage. Despite improvements in vessel spraying equipment, the technique will always have some limitations, due to the low treatment rates and inherent difficulties of location oil slicks from a vessel.

3.3 Aerial Application
In contrast, aerial spraying offers the advantages of rapid response, good surveillance, high treatment rates, optimal use of dispersant and better evaluation of dispersant treatment.

List of MEEA Approved Chemicals for Oil Spill Response*

CHEMICAL NAME	COMPANY	DATE APPROVED	APPROVAL PERIOD	EXPIRY DATE	USES
Aqua -Sol	CanChem Solutions Ltd.	29/06/2011	3 years	29/06/2014	Water Based Degreaser
COREXIT EC 9500	Nalco	31/01/2011	3 years	31/01/2014	Dispersant
COREXIT EC 9527	Nalco	06/12/2010	3 years	06/12/2013	Dispersant
Oil Gator	Enviro-Care Ltd.	14/11/2011	3 years	14/11/2014	Absorbent/Bioremediation Product
Sea Brat #4	Target Solutions	23/05/2011	3 years	23/05/2014	Dispersant
ZI-400	Interchem Ltd.	04/06/2011	3 years	04/06/2014	Dispersant

*The list of approved Degreasers, Dispersants, Bioremediation Products and other chemicals and materials are updated from time-to-time by the Ministry of Energy and Energy Affairs and will be contained in the MEEA List of Approved Chemicals for use in the Energy Sector. Operators should consult this List for updated information and the complete list with respect to these chemicals/materials.

APPENDIX N – INSITU BURNING

As presented in the Caribbean Island OPRC Plan.

1.0 In-Situ Burning

1.1 In-situ burning is another tool for oil spill response. There are limitations on its effectiveness as presented below. There are also health concerns from the resultant smoke; however, recent studies indicate these health concerns may be negligible except immediately downwind of burning oil.

1.2 It is the policy of the Island States and Territories that there is no objection to the use of in-situ burning as a response tool when the burn will not be closer than 12 miles from any adjacent Island State or Territory. Should the OSC desire to use in-situ burning at lesser distances from adjacent Island States or Territories, prior concurrence must be obtained from the Lead Agency of said Island States and/or Territories. In-situ burning shall not be undertaken without due consideration for the safety of all personnel.

2.0 Technical Information on In-Situ Burning

2.1 Recent research indicates that controlled in-situ burning of spilled oil may be a practical means of removing substantial amounts of oil from the water surface under some circumstances.

Considerations in use of in-situ burning include:

a) Containment of oil
b) Weathering prior to ignition
c) Ignition
d) Maintenance of burning
e) Smoke which is produced
f) The environmental consequences of burning
g) Collection and disposal of the residue and
h) Wind and sea conditions.

2.2 If in-situ burning is successful, it may be possible to remove over 90% of the oil from the water surface.

2.3 Containment of the oil by means of a boom to a minimum of 3mm thickness is necessary for ignition. Fire-resistant booms for containment while burning are commercially available but are expensive.

2.4 Weathering of the oil can make it difficult to ignite. If the oil contains more than 20% water, special techniques of ignition will be needed. Most oils appear to be ignitable even though weathered unless they contain emulsified water; an exception can be highly refined heavy products such as asphalt.

2.5 Igniters that are available include:

a) The Heli-torch (helicopter-transported device for ejecting burning gelled gasoline (napalm) onto the oil surface
b) Incendiary devices developed by Environment Canada
c) Such simple means of ignition as use of burning rags or burning oil-soaked sorbent masses.

2.6 Maintenance of burning. Oil will continue to burn after ignition until it is about 1mm in thickness, after which it will self-extinguish.

2.7 Smoke that is produced will likely be on the order of 10% by weight of the oil which is burned. The smoke particles appear all to be less than 10 microns in size. Observation and mathematical modelling indicate that the smoke will rise rapidly owing to heat and rapidly become diluted. Smoke from a 3,500 gallon burn becomes non-visible about 10km from the fire.

2.8 The environmental effects of burning appear to be minor or negligible within a few hundred meters down-drift from the burn pool. Concentrations of particulates are less than the US National Ambient Air-Quality Standards. There are no dioxins or benzo-furans produced, and the concentrations of poly nuclear aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) are low.
Heating of the water surface appears to be limited to the first few centimetres at most. The residue from burning is highly viscous but, in most cases, floats on the water surface. However, in a few cases the residue from burning has sunk.

2.9 Collection of the burn residue can be relatively simply effected by use of nets or other mechanical devices, and it may be disposed of by burning.

2.10 The limits of wind and sea conditions for burning have not yet been established, except that it will be difficult to ignite the oil if the wind speed is too high. The limit of wind speed will likely depend on the degree of weathering. For a freshly spilled light crude oil or light product, the limiting wind speed is likely to be on the order of 20 knots. If the oil is heavier or highly weathered, the limiting wind speed will be less.

APPENDIX O – SENSITIVE AREAS

Areas for Critical Protection

Area	Location	Critical Period of Year
Ports/Wharves	Cronstadt Island, Point Gourde, Pier 1 and 2, Port Templadora, Port of Spain, Sea Lots, Pt. Lisas, Claxton Bay, Pointe-a-Pierre, San Fernando, Brighton, Point Fortin, Cedros, Galeota Point, Sandy Point, Scarborough, Charlotteville	Year-round
Beaches	Beaches on East Coast, North Coast	Year-round
Fish Areas	See map from Fisheries Division	Year-round
Reefs	Reefs around Tobago esp. Buccoo, Speyside, Drew Shallows	Year-round
Birds	See below	
Mangroves	Gulf of Paria Coastal areas	Year-round
Industrial	Pt. Lisas, Pointe-a-Pierre, Pt. Fortin	Year-round
Cultural	Maracas Beach	
Tourism	Maracas Bay, Las Cuevas Bay, Manzanilla Beach, Matura Beach	Year-round
ESAs	Buccoo Reef, Nariva Swamp, Aripo Savannahs, Matura National Park	Year-round

Fig. O1: Fishing Areas for Consideration with respect to Oil Spill Response (Source: Fisheries Division, MFP)

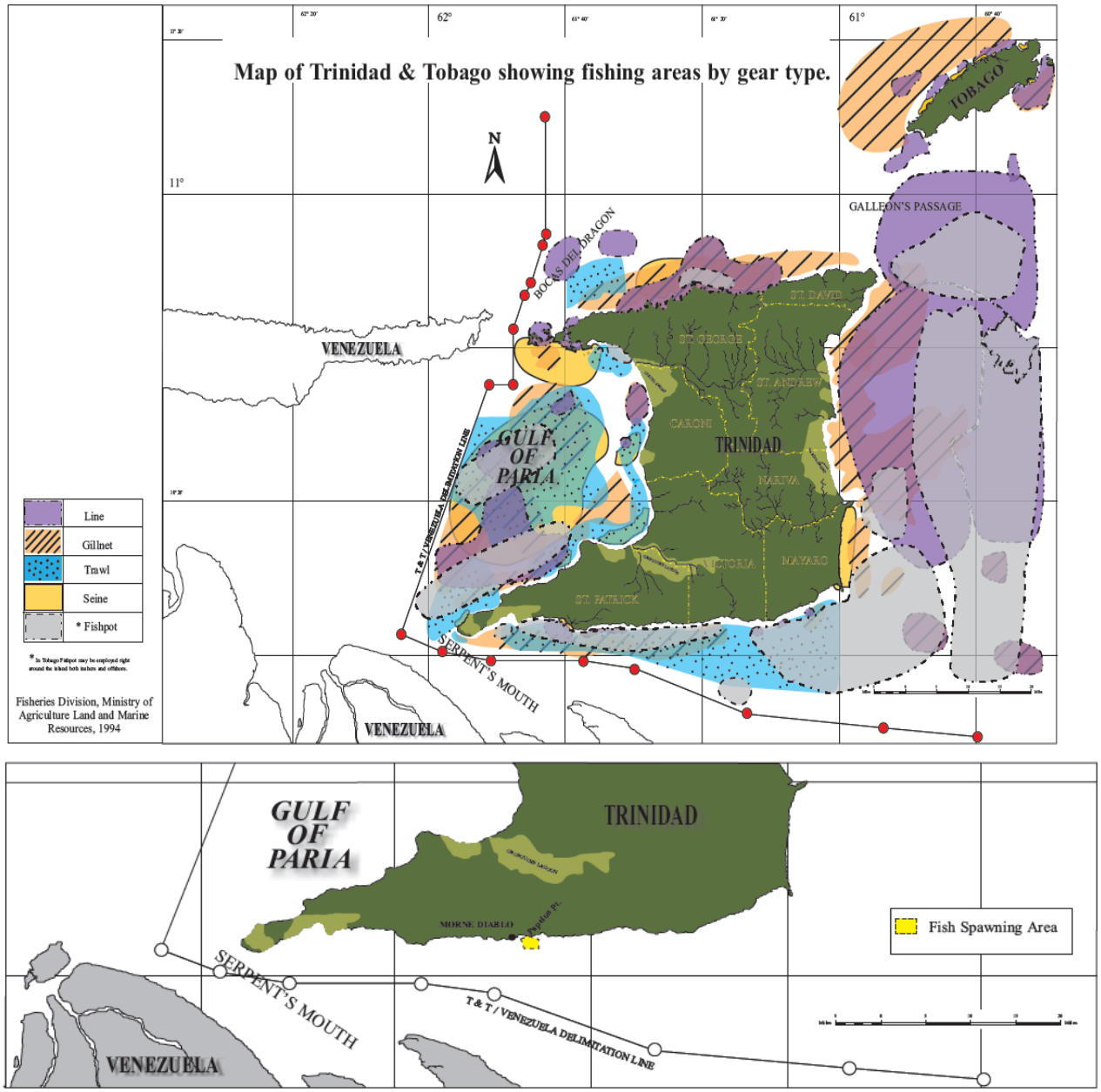


Fig O2: Fish Spawning Area (Source: Fisheries Division, MFP)

Species for Critical Protection

Sensitive & Protected Species	Location	Critical Period of Year
Manatee	Nariva Swamp	Year-round
Pawi	Forested areas	Year-round
White-tailed Sabre Wing Humming Bird	Forested areas	Year-round
Turtles: Leatherbacks, Hawksbills, Green Turtles, Olive Ridleys, Loggerheads	Matura, Fishing Pond and Grande Rivière	March to September

Shoreline Sensitivity for North East, East and South Trinidad and Tobago

It is expected that local and area contingency plans will utilize the Environmental Sensitivity Index as developed by the National Oceanic and Atmospheric Administration (NOAA) for classification of environmental sensitivity for the Coastal regions of Trinidad and Tobago that may be impacted by each potential responsible party based on an approved risk assessment.

The following table is a complete list of shoreline classifications for Environmental Sensitivity Index (ESI) maps for three types of environmental settings:

- **Estuarine.** River-mouth; salt- or brackish-water.
- **Lacustrine.** Related to lakes.
- **Riverine.** Related to rivers, particularly large rivers.

Lower rankings represent shorelines that are less susceptible to damage by oiling; higher rankings become more likely to experience damage by oiling.

Environmental Sensitivity Index (ESI) Key

ESI Rank	Estuarine	Lacustrine	Riverine
1A	Exposed rocky shores	Exposed rocky shores	Exposed rocky banks
1B	Exposed, solid man-made structures	Exposed, solid man-made structures	Exposed, solid man-made structures
1C	Exposed rocky cliffs with boulder talus base	Exposed rocky cliffs with boulder talus base	Exposed rocky cliffs with boulder talus base
2A	Exposed wave-cut platforms in bedrock, mud, or clay	Shelving bedrock shores	Rocky shoals, bedrock ledges
2B	Exposed scarps and steep slopes in clay		
3A	Fine to medium-grained sand beaches		
3B	Scarps and steep slopes in sand	Eroding scarps in unconsolidated sediment	Exposed, eroding banks in unconsolidated sediments
3C	Tundra cliffs		
4	Coarse-grained sand beaches	Sand beaches	Sandy bars and gently sloping banks
5	Mixed sand and gravel beaches	Mixed sand and gravel beaches	Mixed sand and gravel bars and gently sloping banks
6A	Gravel beaches Gravel beaches (granules and pebbles)*	Gravel beaches	Gravel bars and gently sloping banks
6B	Riprap Gravel beaches (cobbles and boulders)*	Riprap	Riprap
6C*	Riprap		
7	Exposed tidal flats	Exposed tidal flats	

ESI Rank	Estuarine	Lacustrine	Riverine
8A	Sheltered scarps in bedrock, mud, or clay Sheltered rocky shores (impermeable)*	Sheltered scarps in bedrock, mud, or clay	
8B	Sheltered, solid man-made structures Sheltered rocky shores (permeable)*	Sheltered, solid man-made structures	Sheltered, solid man-made structures
8C	Sheltered riprap	Sheltered riprap	Sheltered riprap
8D	Sheltered rocky rubble shores		
8E	Peat shorelines		
8F			Vegetated, steeply-sloping bluffs
9A	Sheltered tidal flats	Sheltered sand/mud flats	
9B	Vegetated low banks	Vegetated low banks	Vegetated low banks
9	Hypersaline tidal flats		
10A	Salt- and brackish-water marshes		
10B	Freshwater marshes	Freshwater marshes	Freshwater marshes
10C	Swamps	Swamps	Swamps
10D	Scrub-shrub wetlands; Mangroves**	Scrub-shrub wetlands	Scrub-shrub wetlands
10E	Inundated low-lying tundra		

* A category or definition that applies only in Southeast Alaska.
** In tropical climates, 10D indicates areas of dominant mangrove vegetation.

The overall coordination of development and maintenance of sensitivity maps (using GIS) resides with the Institute of Marine Affairs (IMA). Operators must develop sensitivity maps in accordance with the ESI methodology for areas that can be impacted by their operations based on a risk assessment. Where there is an overlap in the areas that can be impacted the cost of development should be shared equally. In areas where there are no operators to impact this cost is to be borne by the state through the TTCG.

Sensitivity Maps for Trinidad and Tobago are contained in a separate Annex entitled “Coastal Environmental Sensitivity Index Mapping for Trinidad and Tobago”.

APPENDIX P - RISK ASSESSMENT

Trinidad and Tobago lies just off the South American mainland, the most Southerly Caribbean Island State in the Caribbean Sea. There are no dedicated shipping lanes within Trinidad and Tobago waters except for the entry point into the major ports. These special conditions results in Trinidad and Tobago waters, including the Gulf of Paria, to become places of risk for marine transport and prone to spills or discharges of all types of oily residues from ships.

The marine areas that are most threatened in Trinidad and Tobago are as follows:

Operations Presenting Risk	Locations
Offshore oil and gas exploration and production	Atlantic Ocean (BHPB, bpTT, Repsol, BGTT, EOG); Caribbean Sea (BGTT, Centrica), Gulf of Paria (Petrotrin, Centrica, SOOGL, Venture, Trinity E&P)
Coastal oil refineries, oil terminals and non-oil terminals	Pointe-a-Pierre (Petrotrin), Point Galeota (bpTT), Sea Lots (NPMC), Pointe Fortin (Petrotrin), Piarco (AATT), Crown Point (AATT), Point Lisas (Shell)
Near shore land-based exploration and production	South-West Trinidad (Petrotrin, Venture)
Bunkering	Gulf of Paria, Atlantic Ocean
Disposal of waste oil, bilge liquids, cargo tank residues	Undetermined
Disposal of waste oil, bilge liquids, cargo tank residues	Undetermined
Oil tanker traffic	Atlantic Ocean, Caribbean Sea, Gulf of Paria
Non-oil shipping traffic	All areas
Pipelines	Gulf of Paria (Petrotrin, Trinity E&P) Atlantic Ocean (BHPB, bpTT, Repsol, BGTT, EOG, NGC) Columbus Channel (BPTT, BHPB)

On the Atlantic side of Trinidad, the main polluting risks by petroleum hydrocarbons exists from marine traffic (including tanker traffic), oil and gas platforms, oil and condensate pipelines and the harbour activities of the Port at Galeota Point and at the Single Point Moorings of bpTT and BHP Billiton.

In the Gulf of Paria, the main polluting risks by petroleum hydrocarbons exists from marine traffic (including tanker traffic importing crude to the Petrotrin Refinery from various sources including South America and West Africa), and from petroleum installation in the Soldado Fields.

The areas on land that are most threatened in Trinidad and Tobago are as follows:

- Southern Trinidad - all areas where there are oil and gas installations inter alia wells, gathering stations, and refineries

It is expected that the Licensees and PSC Operators will provide details on the risks within their licensed or contract areas in their Oil Spill Contingency Plans and the areas that can possible impacted by oil spills from their operations and other activities occurring with their licensed area.

Figure K1 shows some of the known high and medium risk areas of particular interest and a limited-scale conception of the probable crude and LNG tanker routes in and around Trinidad and Tobago.

The designation of high risk areas is due to a combination of any of the following factors of concern:

1. The existence of a source of a pollution incident
2. The higher likelihood of an accident
3. The distance from the point where an effective response can be mounted.
4. The type of resources at risk.

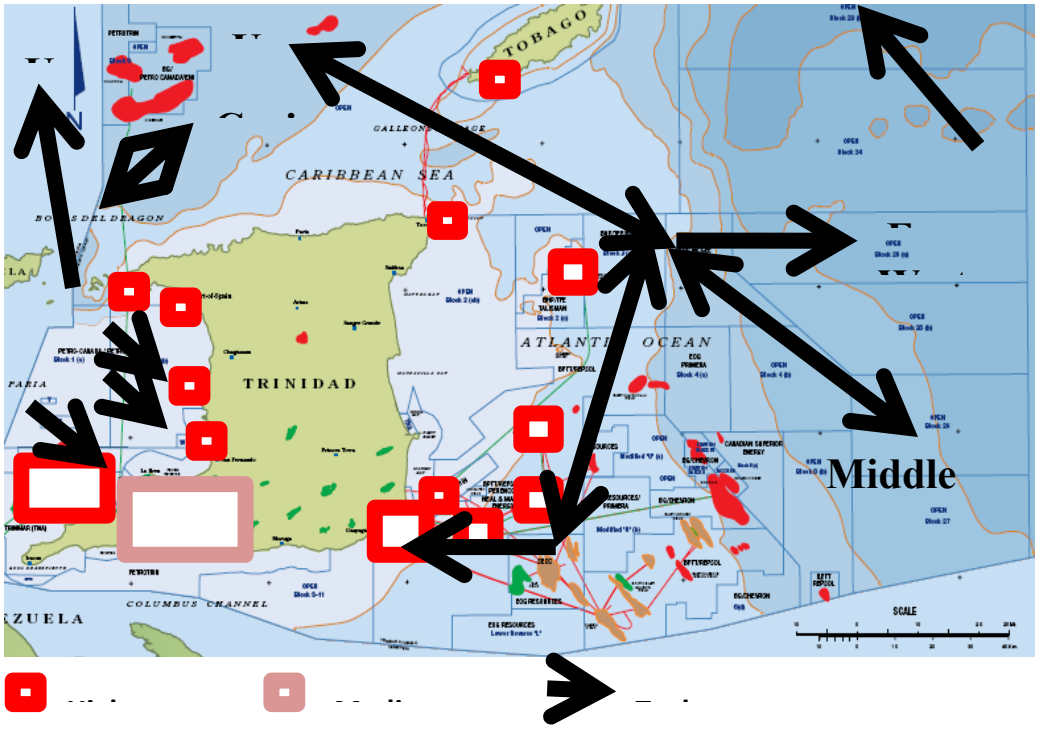


Fig K1: Map showing Areas of Source-risk for Oil Spills and General Probable (Crude/LNG) Tanker Routes

Oil Spill Trajectories

Forecasting Slick Movement

It is equally important to be able to forecast the probable movement of a slick as well as likely changes in properties of the oil after it has been spilled. This allows sensitive resources in the path of the slick to be identified and, if appropriate, response measures to be put into effect. The task of forecasting the position of an oil slick can only be accomplished if data on winds and currents are available since both contribute to the movement of floating oil. Other factors to be considered are waves and tides.

The Effect of Wind

It has been found empirically that floating oil will move downwind at about 3% of the wind speed. In the presence of surface water current, an additional movement of the oil equivalent to the current strength will be imposed in any wind-driven motion. If the wind is negligible, which is rarely the case, the oil will move only under the influence of currents and tides.

> **Extract from South American Pilot Vol. IV**
>
> The islands of Trinidad and Tobago lie at the southwest end of the northeast Trade Winds of the North Atlantic Ocean. Over open sea, east to northeast winds predominate throughout the year. Winds from between north and east account for approximately 80% of all winds in most months: however, slight variations of frequency occur in October (70 %) and in September and November (75%). From May through November, east winds have a higher frequency than all other winds.
>
> Winds force 3 (12-19 kph) and 4 (20-30 kph) occur on 60-70% of occasions, with up to 30% force 5 (31-40 kph) during the months December to February, but less than 3% July – September. Wind force 6 (41-50 kph) occur on about 10% between December-February, but less than 3% between July-September. Gales force 7 (51-62 kph) and 8 (63-74 kph) or more occur only rarely and then in association with brief squalls or during the passage of a hurricane when such winds can blow from any direction. Generalized data on wind speed and direction is given for guidance only. Real time data will be required during an actual spill incident.

The Influence of Currents and Tides

Surface currents dominate the movement of the slick unless the winds are extremely strong. Close to land, tidal currents must be taken into account, but farther out to sea their contribution is minimal since they are cyclic and tend to cancel out over time, although rarely ever completely. This gives rise to a residual current, which will determine the long-term movement of the slick.

The following is given as a guide to the predominant flows in the seas around Trinidad and Tobago.

Extract from Admiralty Chart #493

- The South Equatorial Current enters the Caribbean Sea in a general west-north-westerly direction with rates of up to about 3 knots. Part of it divides off the southeast coast of Trinidad and flows north-westward along the east coast of the island; the other flows westwards south of Trinidad to enter the Gulf of Paria and then sets northwest ward at from 1-1 ½ knots emerging through the Bocas del Dragon to join the main west-going South Equatorial Current in the Caribbean Sea.

Extract from US defence Mapping Agency Chart #24400

- The current between Trinidad and Tobago islands sets to the northwest, usually with sufficient strength to prevent a sailing vessel from working against it. The flow is somewhat checked by the ebb tidal stream. The current runs westward along the north shore of Trinidad.

- The south Equatorial Current flows in a predominantly north-westerly direction. Its rate is generally up to about 3 knots but on striking Tobago it divides locally and passes the north-eastern extremity of the island at a rate of 3 to 4 knots.

NOTE: the South Equatorial Current is sometimes referred to as the Guiana Current

Computer Modelling

Of interest for oil spill contingency planning are the predicted time of history of surface oil spread and drift, the predicted weathering state of the oil versus time, and the predicted shoreline impacts for drifting oil. In addition, stochastic modelling, also known as hind casting, can be used to determine the origin of spills.

Various organizations and companies have developed oil spill computer models which can provide valuable support to both contingency planners and pollution response teams. It should be stressed that, though the use of models may be desirable, such models are not essential for effective planning and response. The models are able to make predictions about the trajectory and fate of spilled oil and cannot readily replace the need to monitor a spill physically in the event of an actual incident. This can be done effectively only from aircraft, by personnel fully trained in the interpretation of visual observations of oil on water.

APPENDIX Q - TRAINING AND EXERCISES

1.0 Introduction

The ultimate test of any contingency plan is measured by performance in a real emergency. It is vital therefore, that the NOSCP includes an ongoing programme to test the plan through realistic exercises.

2.0 Purpose

This exercise programme progressively prepares response teams to perform effectively in realistic representations of all the risks that the NOSCP has been designed to meet.

In addition, response strategies will be tested and recommendations made for modification or improvement to the NOSCP.

3.0 Legal Basis

Article 6 Clause 2 (b) of the OPRC convention requires, inter alia, that "In addition, each Party, within its capabilities either individually or through bilateral or multilateral co-operation and, as appropriate, in co-operation with the oil and shipping Affairs, port authorities and other relevant entities, shall establish:

> a programme of exercises for oil pollution response organizations and training of relevant personnel.

The members of the Plan, at each level, will have periodic and regular exercises that involve the TTCG and the MEEA to familiarize themselves with the operative procedures of the emergency response. The TTCG and the MEEA should also coordinate its training exercises with any local industry exercises.

4.0 Exercise Categories

Four exercise categories are identified which allow different aspects of the plan to be exercised separately and promote understanding of the purpose and scope of the whole plan. They are:

- notification;
- tabletop;
- equipment deployment; and
- incident management (limited and full-scale deployment)

- **Notification Exercises**

To test the procedures to alert and call out the response teams and are conducted through telephone and other means of communication, as stipulated in the response plan.

They are used to test communications systems, check availability of personnel, evaluate travel options and the speed at which travel arrangements can be made, and assess the ability to transmit information quickly and accurately.

This type of exercise will typically last one to two hours and may be held at any time, day or night, announced or unannounced.

- **Tabletop Exercises**

These consist of interactive discussions of a simulated scenario among members of a response team but do not involve the mobilization of personnel or equipment.

They focus on the roles and actions of the individuals, the interactions between the various parties and the development of information and response strategies.

A tabletop exercise might typically last four to eight hours and should be announced well ahead of time to ensure availability of personnel.

- **Equipment Deployment Exercises**

These involve the deployment of oil spill response equipment at particular locations in response to an oil spill scenario and in accordance with strategies laid down in the plan for a particular spill scenario. They test the capability of the response teams to respond to the three levels of oil spill incidents namely, Tier 1, Tier 2 and Tier 3 and provide experience of actual conditions and of oil spill scenarios while enhancing individual skills and teamwork. In some instances, an Equipment Deployment Exercise might be run in conjunction with a Tabletop or an Incident Management Exercise.

An equipment deployment exercise would typically last six to eight hours and should be repeated frequently until teams are acquainted with the equipment.

- **Incident Management Exercises**

These are often more complex in that they simulate several different aspects of an oil spill incident and involve third parties. Such an exercise may be of limited scope, for example, using own personnel to role-play the main external parties, or of full scope, when outside agencies and organizations are invited to provide personnel to play their own roles within the exercise.

These exercises require significant planning in terms of availability of personnel, development of an adequate scenario and the physical arrangements for staging such events.

An incident management exercise often lasts one to two days and incurs a high financial cost. Appropriate budget allocations should, therefore, be included in forward planning.

5.0 Training

A continuous training programme must be in place to train new personnel and to maintain the skills of persons already trained and experienced in oil spill management.

Since persons are continuously coming into and leaving the employ of the Government Service, this warrants that the training programme be ongoing and sustained.

The training matrix in the table below provides a framework to ensure that the competencies of personnel in the GORTT agencies and the oil and gas companies are always present and available.

Personnel	IMO Training				Advanced Training		Specialist Training																			Conferences				
	IMO level 1	IMO level 2	IMO level 3	IMO level 4	Advanced Spill Mgt	IMO Conventions	ICS for managers	ICS general	Aerial Surveys	HAZCOM	ESI	ISB	HAZWOPER/ HAZMAT (Basic & Advanced)	HNS	Waste Management	Deployment & ops of acoustic doppler systems	ROV Training	Forensic Investigation	Advanced Terascan scripting	Trajectory Modelling	Hydrodynamic modelling	Remote (land-based Radar & Satellite) Sensing	CCA /OSRL Responder	Ecological Risk Assessment	IOSC (USA)	Interspill (EUROPE)	Spillcon (AUSTRALIA)	Clean Gulf (USA)	MOBEX
Beginners	■							■																					
Incident Commanders	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■		■			■	■	■	■	■	■	■
Planning Section Chiefs			■					■	■	■										■	■	■			■	■	■	■	■
Operations Sections Chiefs			■					■		■		■	■	■	■										■	■	■	■	■
Logistics Section Chiefs			■					■		■		■			■										■	■	■	■	■
Finance Section Chiefs			■					■		■																			
Minister/ PS/ Senior Management			■				■	■		■																			
Trainers				■				■																					
Petroleum/Chemical Engineers	■							■																					
Mechanical Engineers	■							■																					
Petroleum Inspectors	■							■																					
Environmental Officers	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Coast Guard/Fire Services	■							■			■	■	■	■	■	■	■	■	■	■					■				■
Air Guard/ SAUTT	■							■	■									■							■				■
Regiment	■							■																					
EMA	■							■				■				■	■	■	■	■									
SWMCOL	■							■							■														
ODPM	■							■																					
IMA	■							■			■					■	■	■	■	■	■	■	■	■					
MSD	■							■																					
Legal	■					■		■										■											
Communications	■							■		■																			
TTFS	■							■				■	■	■															
Health & Safety Professionals	■							■		■			■			■	■	■	■	■	■	■	■	■	■			■	■
OSROs		■			■			■				■	■	■	■										■				■

APPENDIX R LIABILITY AND COMPENSATION FOR POLLUTION DAMAGE

1.0 Introduction

Dealing with marine pollution, whether at sea or on the shore, can be a protracted and expensive business. Initially the costs of clean-up operations fall on the bodies incurring them.

This Appendix gives a brief description of the ways that those involved in clean-up operations can later recover their costs. However, its purpose is not to provide definitive legal advice.

2.0 Pollution caused by persistent oil carried in tankers

Two international conventions establish the international compensation regime for oil pollution damage from tankers:

- the International Convention on Civil Liability for Oil Pollution Damage (the "Civil Liability Convention");

- the International Convention on the Establishment of an International Fund For Compensation for Oil Pollution Damage (the "Fund Convention").

The former convention deals with the liability of tanker owners. The latter establishes the IOPC Fund.

Under these conventions, the tanker owner and the IOPC Fund are strictly liable for the costs of reasonable clean-up operations. Strict liability means that the claimant need not prove fault to obtain compensation. The tanker owner and the IOPC Fund may escape liability only if they can prove that one of a limited number of exceptional circumstances (e.g., an act of war) caused the damage.

3.0 Pollution caused by persistent oil carried in ships other than tankers

At present, there are no comparable international arrangements on liability and compensation for damage caused by persistent fuel oil carried in ships other than tankers. Trinidad and Tobago has introduced national legislation to make owners of ships other than those to which the Civil Liability Convention applies strictly liable for pollution damage caused by persistent oil. This legislation makes it simpler for claimants to recover the costs of damage caused by the fuel oil carried by non-tankers. They do not have to prove that the ship-owner was at fault.

Unlike tanker owners, other ship-owners may limit their liability to amounts determined in accordance with the Convention on Limitation of Liability for Maritime Claims 1976. They are not required to maintain liability insurance.

4.0 Pollution caused by pollutants other than persistent oil

There is currently no statute dealing with liability and compensation for pollution damage caused by substances other than persistent oil. In May 1996, however, a diplomatic conference convened by the International Maritime Organization adopted the Convention on Liability and Compensation for Damage in Connection with the Carriage by Sea of Hazardous and Noxious Substances.

Trinidad and Tobago has not yet signed this convention. In the meantime, the ordinary rules of civil common law continue to apply to liability and compensation for pollution damage caused by substances other than persistent oil carried on ships.

5.0 Pollution caused by offshore installations

The MEEA and the EMA impose requirements on operators of offshore oil and gas installations as part of the development approval process. Operators must have appropriate liability coverage.

6.0 Pollution from unidentified source

Generally, claimants can only obtain compensation if they know its precise source. However, there is one exception to this. The IOPC Fund pays compensation for reasonable clean-up costs if the claimant can prove (for example, by sophisticated chemical analysis) that the pollution resulted from a spill of persistent oil from a tanker.

One mechanism set up to assist in the determination of the RP will be the establishment of a National Fingerprinting Database using GC-MS technology for all crude and condensates produced and imported into Trinidad and Tobago with the operator bearing the cost for collection and analysis of all samples collected by an independent entity, namely, the IMA. Other laboratories that have similar technology will be utilized in assisting in the matching process, for example, UWI or CARIRI, if for some reason the equipment at the IMA is unavailable.

APPENDIX S - SALVAGE: Details of operations

1.0 Introduction

Following almost all serious incidents, the ship-owner engages commercial salvors to deal with the casualty and secure the cargo and bunkers. The initial salvage options may include firefighting, counter-flooding, internal transfers, other actions to stabilise the ship, and perhaps emergency towing to bring the casualty to calmer waters or a safe haven.

Subsequent salvage actions may involve cargo and bunker transfer operations, diving operations, beaching the casualty or grounding it in shallow water and patching or filling holes. If a ship has grounded salvors may attempt to refloat it using tugs and perhaps by pressuring flooded tanks or compartments with air to increase buoyancy. In exceptional cases when the salvage of the ship is not practicable, the only way of minimizing pollution may be to tow it a long way offshore and sink it.

2.0 Emergency towing arrangements

Where there is a serious risk of harm to persons or property, or a significant risk of pollution, it may be necessary to initiate emergency towing arrangements. Such arrangements should be unambiguous, agreed by all parties where possible, and activated as swiftly as practicable. Standard operational procedures should apply irrespective of whether an Emergency Towing Vessel (ETV) is under charter to MSD, tasked from appropriate local harbour, industry or GORTT resources, or is a salvage tug of opportunity.

3.0 Emergency towing requirement – considerations

It is difficult to establish strict or prescriptive criteria for when to use an ETV. Individual circumstances must dictate the appropriate response.

4.0 Present emergency towing arrangements

Incident Commander holds comprehensive databases of tugs available locally and contact details. TTCG has operational instructions for TTCG Commander Operation to activate a response from such vessels.

5.0 Agreements for Salvage and Towage (AST)

The Incident Commander has arrangements in place for emergency chartering of local tugs. For salvage “Lloyds Standard Form of Salvage Agreement” (LOF 1995) will be used, while for towing the “Standard Towage Conditions” as attached hereto will be used in the absence of any acceptable alternative provided by the tug owner. These agreements cover activation, contractual arrangements, liabilities and operational procedures, should Incident Commander request assistance from any local tug as part of the response to an incident. Some tugs may not be altogether suitable for emergency offshore towing. Weather conditions may restrict their use. Their role may therefore be to provide “first-aid” prior to the arrival of a more suitable vessel.

Any local tug tasked initially by TTCG or Incident Commander is de facto under contract. The MEEA must therefore fund it. Where necessary and appropriate, the MEEA will seek to recoup its costs.
The AST provide for any subsequent commercial agreements made between a ship-owner and a tug operator to offset any potential cost to MEEA for the initial charter of the tug.

6.0 Shelter for damaged ships

Except in the most severe incident, a ship is likely to retain some of its cargo and bunkers. It may be desirable to carry out a cargo and bunker transfer operation from the stricken ship to prevent or minimize further spills. It may help to move the ship to a more sheltered area such as a port or oil terminal.

It is safer to carry out cargo and bunker transfer operations in sheltered areas. However, the decision to use an area moves the risk of pollution to an area that the incident might otherwise not have affected. DMS considers carefully whether to use a sheltered area and, if so, which to select. DMS has in mind that time may be short and the damaged ship may not be in a condition to travel very far.

7.0 Emergency cargo and bunker transfer operations

The Incident Commander has access to emergency transfer equipment for use in off-loading oil or hazardous substances from a damaged or disabled ship. This ensures that there is suitable equipment available in Trinidad and Tobago for cargo and bunker transfer operations.

The equipment provides a total transfer capability, including pumps, power packs, hoses, fenders, communications equipment, protective clothing, breathing apparatus, and inert gas generators.

Incident Commander needs to lift equipment by air to the deck of a damaged ship; using GORTT helicopters (operational commitments permitting). When the Incident Commander uses GORTT units he consults the TTDF through the TTAG about the most suitable airfield from which to lift equipment by air.

The Incident Commander provides details of the equipment to lift:

- Weights and dimensions of the equipment, especially of the heaviest item;
- The position of the casualty; and
- The estimated time of arrival of the equipment by road.

APPENDIX T - ACCEPTABLE MIMIMUM STANDARDS FOR WASTE WATER, REMEDIATED SOIL AND RECOVERED OIL

WASTEWATER OR RUNOFF WATER

For ON-SITE and OFF-SITE treatment, wastewater generated through the treatment of contaminated material, run off from work site, decontamination of response equipment or leaching of residues of treatment process must meet the Water Pollution Rules (2001) as amended in 2006 standards before final disposal to a receiving water body.

RESIDUAL MATTER/REMEDIATED SOIL

All residues and soil being remediated at an ex-situ bioremediation site must comply with the following minimum standards. These standards also delineate the maximum permissible levels of contamination (action level) above which treatment will be required for an industrial area or zone:

Parameter	**Standard**
TPH	<1%
pH	6-8
Conductivity	< 4 mhos/cm
Sodium Adsorption Ratio (SAR)	<12
Chlorides	<1000 ppm

RECOVERED OIL

Any oil recovered from treatment process must meet the following specifications:

Parameter	**Standard**
Water content	<2%
Sulphur content	<5%
Solids content	<1%
Lead content	<170 ppm
Other trace metals	<1000 ppm

APPENDIX U – DEEPWATER RESPONSE REQUIREMENTS

INTRODUCTION

With the advent of operators moving into deeper waters offshore there exist a greater challenge in terms of accessibility, visibility, disperse-ability and containment of an oil spill at these depths. It has become necessary to place specific emphasis on deep water operations and its specific needs (such as ROVs and additional response vessels) in order to satisfy the MEEA that the likelihood of such an event taking place is minimised as much as possible and the extent of damage to the environment is also minimised.

This section is subject to review pending outcomes and findings from the GOM-Deep Water Horizon incident.

For the purpose of this document deep water has been defined as greater than 1000 ft because of issues related to accessibility and the water depths of future blocks to be allocated.

PURPOSE AND OBJECTIVE

The purpose of this section is to establish the requirements for safely conducting deep-water oil spill response in anticipation of deep-water exploration and production activities in the offshore environment of Trinidad and Tobago in the near future. The requirements established in this appendix are specific to deep-water and will support the NOSCP.

PREVENTION/MITIGATION

Disaster Management has to start with knowing the risks that threaten a project, vulnerability or exposure to the risks and the equipping oneself with requisite layers of protection or barriers for arresting and mitigating the possible failure events.

RESPONSE READINESS REQUIREMENTS

The following categories have been identified as critical in order to respond to a deep water incident.

- *ROV Operating Capabilities*

    - *Secure the availability of ROV(s) in Trinidad and Tobago to be able to respond to deep-water incidents.*
    - *Remotely Operated Vehicles (ROV's) should have the capability to perform all anticipated underwater tasks will need to be available on the drilling rig.*

- *The ROV must be accompanied with an adequate stock of spares and tooling available on site to ensure ROV operability and availability as when required.*

- *Use of ROV's for application of subsea dispersants.*

- *Subsea Dispersant Application*

  - Operators and selected response contractors should have available the capabilities to apply dispersants at the source (subsea) of the oil spill.

- *Accessibility of Response Vessels*

The capability to make a rapid response in deep water requires access to a diverse fleet of vessels as given below:

  - Dynamically Positioned (DP) Vessels

    - Secure the availability of DP vessels in Trinidad and Tobago and the region to be able to respond to deep-water incidents.

  - Fire fighting capability

    - Secure the availability of fire-fighting vessels in Trinidad and Tobago to be able to respond to deep-water incidents.

  - *Containment Vessels*

    - Secure the availability of containment vessels in Trinidad and Tobago to be able to respond to deep-water incidents.

    - The physical size, class, location, and capacity of Floating, Storage Production and Offloading Vessels and tankers must be adequate.

    - Port, refinery and processing facilities should be adequate to accommodate these vessels.

- *Accessibility of Additional Rigs*

    - Demonstrate the capability to source additional rigs within a reasonable time frame.
    - Duty of care to assist.

- *Disposal or Processing of Recovered Oil*

    - Response agencies should be able to have access to suitable options to safely treat, store and dispose the recovered oil in Trinidad and Tobago and internationally.

- *Response times*

    - Response times to mobilize vessels, rigs, air craft and other equipment need to be determined and incorporated in all agreements/contracts and spill plans.

- *Chemical Management*

    - Chemical management programme e.g. dispersants, biocide and other chemicals released to environment and their fate and behaviour in the environment.

APPENDIX V – UNIT CONVERSIONS AND SLICK CALCULATIONS

UNIT CONVERSIONS

Volume		
1 barrel (US)	42 gallons US	159 litres
1 barrel Imp	45.1 barrels Imp	205 litres
1 gallon Imp	1.2 gallons US	4.546 litres
1 cubic metre^3	1, 000 litres	6.29 barrels US
1 litre	0.22 gallons	0.03531 ft^3
1 cubic yard^3	0.765 m^3	
1 ft^3	0.0283 gallons Imp	
1 decimeter^3	0.001 meters^3	1 litre
1 metric tonne	7.5 barrels	

Area		
1 Acre	0.405 hectares	4, 050 m^2
1 Hectare	10, 000 m^2	2.471 acres
1 km^2	100 hectares	247 acres
1 m^3	1.196 yard^2	
1 yard^2	0.836 m^2	9 ft^2
1 ft^2	0.0929 m^2	
1 mile^2	2.59 km^2	640 acres

Length/Distance		
1 km	0.54 nautical miles	0.622 mile
1 nautical mile	1.852 km	1.151 mile
1 mile	1.609 km	1, 760 yard
1 m	1.094 yard	3.262 ft
1 yd	0.914 m	

Length/Distance		
1 foot	0.305 m	
1 inch	25.4 mm	

Speed		
1 knot	1.85 km/hour	0.51 metres/second
1 metre/second	3.6 km/hour	1.94 knots

Mass		
1 tonne (metric)	1000 kilograms	0.984 tons
1 ton (imperial)	20 hundredweight	1016.05 tonnes (metric)
1 hundredweight	50.8 kilogrammes	112 pounds
1 kilogram	2.205 pounds	1 litre of water
1 gram	0.035 ounces	

Flow		
1 cubic metre/hour	16.7 litres/minute	3.671 gallons/minute
1 litre/second	2.119 cubic feet/minute	13.21 gallons/minute
1 cubic foot/minute	0.1039 gallons/second	0.472 litres/second
1 gallon/minute	0.0631 litres/second	
1 barrel/hour	2.65 litres/minute	0.5825 gallons/minute
1 gallon (US)/acre	11.224 litres/hectare	

Pressure		
1psi	0.069 bar	6.901 Pascal
1 bar	100 Pascal	14.49 psi
1 bar	30 feet of water	

Temperature											
Celsius	0	10	20	30	40	50	60	70	80	90	100
Fahrenheit	32	50	68	86	104	122	140	158	176	194	212

^{0}F to ^{0}C deduct 32, multiply by 5, and divide by 9
^{0}C to ^{0}F multiply by 9, divide by 5, and add 32

CALCULATION OF SPILLED OIL ON WATER AND LAND

An accurate assessment of the quantity of spilled oil is virtually impossible due to the difficulty in gauging its thickness. At best, the correct order of magnitude can be estimated by considering certain factors. Oil pollution is seldom uniform in either thickness or coverage, unless the contamination is very heavy.

A very useful source of guidance is the document entitled "Open Water Oil Identification Job Aid for Aerial Observation – New Standardized Oil Slick Appearance and Structure Nomenclature and Code" updated in November 2007 and developed by the National Oceanic and Atmospheric Administration can be sourced at http://response.restoration.noaa.gov/sites/default/files/OWJA_2012.pdf

Floating Oil

Oil spreads rapidly and most liquid oils will soon reach an average thickness of about 0.1 mm, characterized by a black or dark brown appearance. Similarly, the colour of sheen roughly indicates its thickness.

The following table is a guide to the relation between appearance, thickness and volume of floating oil:

Oil Type	Appearance	Approximate thickness (mm)	Approximate Volume (m^3/km^2)
Oil sheen	silvery	0.0001	0.1
Oil sheen	iridescent (rainbow)	0.0003	0.3
Crude and fuel oil	black/dark brown	0.1	100
Water-in-oil emulsions ('mousse')	brown/orange	> 1	> 1000

Note: 1 mm ~ 1/32 in.
1 m^3 ~ 6.3 US barrels.
1 km^2~ 247 acres ~ 0.4 ml^2

A reliable estimate of water content in a "mousse" is not possible without laboratory analysis but, accepting that figures of 50% to 80% are typical, approximate calculations of oil quantities can be made given that most typical floating "mousse" are 1 mm or more thick. However it should be emphasized that the thickness of "mousse" and other viscous oils is particularly difficult to gauge because of their limited spreading.

In order to estimate the amount of floating oil it is necessary not only to gauge thickness but also to determine the percentage area of the surface covered by oil, water-in-oil emulsion and sheen. Again, accurate estimates are complicated by the patching incidence of floating oil. To avoid distorted views, it is best to look vertically down on the oil when assessing its distribution. By estimating the percentage coverage of each form of oil, the area covered relative to the total surface area affected can be calculated.

Always bear in mind that although sheen may cover a relatively large area of water surface, it makes a negligible contribution to the volume of oil present. Hence, it is crucial to distinguish between sheen, thicker oil and emulsion.

Oil Spilled on Land

The appearance of oil spilled on land depends to a large extent on the type of soil, which can vary from rocky shores, through pebble and sand beaches, to clay or muddy land areas and wetlands.

Winds, waves and currents cause oil to be deposited on the coastline in streaks or patches rather than as a continuous cover.

The assessment of oil spilled anywhere on land is largely a visual one and will be impossible if the oil is effectively hidden from view for example, by penetration into the soil or by vegetation such as mangroves.

Quantifying oil spilled on land involves selected representative areas of contaminated soil for a calculation of the amount of oil present. The area chosen should be small enough to allow an accurate estimate of oil volume in a reasonable time, yet large enough to be representative of the whole section similarly affected. The exercise has to be repeated on other sections where the degree of oil coverage may be different. Quantifying spilled oil in this way only yields an approximate figure due to several inescapable sources of error.

Depending on the soil type, oil may soak into the substrate; or saturation/penetration may not be uniform. The presence of debris or stones and crevices can be an added complication, and when calculating oil volumes the occurrence of water-in-oil emulsions can be misleading. In some situations it may prove impracticable to use the relatively time consuming methods outlined above in which case it should always be possible to describe the degree of pollution as either light (< 10 ml oil/m^2), moderate (10 ml-1litre oil/m^2) or heavy (1-100 litres oil/m^2).