

## **INTRODUCTION TO THE BONN AGREEMENT COUNTER-POLLUTION MANUAL**

### **1.1 General**

1.1.1 The Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances (the Bonn Agreement) was adopted on 13 September 1983 in English, French and German versions, all of which are authentic. It entered into force on 1 September 1989. It has been modified by amendments agreed on 22 September 1989, which entered into force on 1 April 1994, and by amendments adopted on 22 September 2001, which will enter into force on the accession of Ireland to the Bonn Agreement. A consolidated text of the English version is in Chapter 29.

1.1.2 This Manual has been adopted by the Contracting Parties to the Bonn Agreement as guidance on cooperation:

- a. when two or more Bonn Agreement countries (and the European Community (EC)) participate in a joint action to combat spillages of oil and/or other harmful substances on the sea of the North Sea Area;
- b. in the surveillance of shipping in the North Sea Area to promote compliance with the international rules and standards against marine pollution.

### **1.2 The Aims of the Manual**

1.2.1 The aims of the Manual are to enable the Contracting Parties:

- a. to establish quickly, and to run effectively, the operational aspects of a multinational combating operation;
- b. to assist the Contracting Parties in their choice of proper combating strategies, including various ways of responding to an incident (or the threat of an incident) involving oil and/or other chemicals spilled at sea;
- c. to execute the agreed surveillance operations.

1.2.2 The Manual should also assist the on-scene Commanders in their execution of combating operations involving other countries.

1.2.3 Thus the Manual should be considered as a practical tool for use at various command levels in the combating organisations.

### **1.3 The Contents of the Manual**

The Manual consists of three Volumes: Volumes I, II and III. The three volumes are subdivided into chapters as follows:

#### ***Volume 1 – Operations***

- |                |  |
|----------------|--|
| Chapter 1:     | consists of the preface, the aim of the manual, the content of the manual and the updating of the manual |
| Chapters 2-8:  | Agreed Operations procedures for reporting, command structures etc.                                      |
| Chapters 9-18: | Description of national organisations  |
| Chapter 19:    | Zones of joint responsibility and other bilateral/multilateral plans                                     |
| Chapter 20:    | Inventory of Assessment Tools  |
| Chapter 21:    | Directory of National Contact Points   |

***Volume 2 - Strategy/Policy***

Chapter 22: Policy strategy of pollution combating

Chapters 23: Response to oil pollution, various strategies and techniques

Chapter 24: Equipment

Chapters 25-26: Response to chemical pollution

Chapter 27-28: General policy/strategy: places of refuge and emergency towing guidelines

***Volume 3 - Administration***

Chapters 29-30: Bonn Agreement text and checklist for administrative/organisational aspects

Chapters 31-33: Guidelines for major spills sampling and analysis, reimbursement

**1.4 Updating the Manual**

The updating of the Manual according to information received from the Contracting Parties is the responsibility of the Bonn Agreement Secretariat. The Manual needs to be readily capable of being updated as the most recent information becomes available. It also needs to be evident to the recipient that he/she is in possession of the latest text. The principles for updating the manual are therefore as follows:

- (a) The Bonn Agreement Counter Pollution Manual is preceded by a Table of Contents. This is marked with the date of issue. Each Chapter in the Manual is shown with its Current Reference. Whenever any Chapter in one of the Volumes of the Manual is revised, the revised text will be circulated by e-mail to all Contracting Parties accompanied by a revised Table of Contents showing the Current Reference of each Chapter.
- (b) Each Chapter has a specific Current Reference indicated at the bottom left-hand corner of each page. For Chapters in the various Volumes, the Current Reference is made up of the volume number in question, followed by the Chapter number, followed by the year in which the Recommendation or Decision was approved by the Contracting Parties, followed by an indication of the official language (E = English, F = French).
- (c) For Chapters referring to a single Contracting Party, the Current Reference is made up of the Volume number followed by the Chapter number, followed by an abbreviation for the Contracting Party concerned, followed by the year and month when the information was made available. When information for a Contracting Party is missing, there is no Current Reference.
- (d) The pages of each Chapter are numbered at the bottom right-hand corner of each page with an indication of the total number of pages in that Chapter (e.g. 3/6 indicates that it is the third page out of a total 6 pages for that Chapter).
- (e) Each Contracting Party will be responsible for ensuring that the members of its services that need access to the Manual either down-load amendments from the BONN website, or are provided with the new material as it becomes available.

**1.5 Date of Establishment**

The Manual was established by the Contracting Parties during 1989-1991 and updated when and where necessary.

**1.6 Website Version of the Manual**

A website version of the Manual is available on the Bonn Agreement website at the following url: [http://www.bonnagreement.org/eng/html/counter-pollution\\_manual/welcome.html](http://www.bonnagreement.org/eng/html/counter-pollution_manual/welcome.html).

## **RECOMMENDATION CONCERNING THE COMMAND STRUCTURE AND OPERATIONAL CO-OPERATION FOR JOINT COMBATING OPERATIONS**

### **2.1 The Contracting Parties**

RECALLING the provision of Article 7 of the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, 1983 (Bonn Agreement) concerning assistance to a Contracting Party by other Contracting Parties called upon,

TAKING into consideration that assistance could be rendered in the form of strike teams consisting of personnel, ships, reconnaissance aircraft, equipment for confinement, recovery and on-scene storage of Harmful Substances under national command,

BEING AWARE of the difficult practical and organisational problems that arise from joint combating operations involving strike teams from several countries,

NOTING that joint operations necessitate a clear and simplified command structure agreed upon beforehand,  
RECOMMEND that:

- a. The organisational structure in joint operations should contain two main co-ordination and command levels, namely Operational Control ashore and Tactical Command on the scene of operations.
- b. The Operational control should be exercised by the country that has asked for assistance (lead country) which normally is the country within whose zone the operation takes place. Each country exercises control in its territory or territorial sea.
- c. Change of Operational Control and tactical Command might, when practical and agreed between the parties concerned, take place when the main body of a combating operation moves from one zone to another.
- d. Liaison officers from participating countries should be integrated in the staff of the Operational Control to secure the necessary knowledge of rendered national resources.
- e. The overall Tactical Command is laid upon a designated Supreme On-Scene Commander/Co-ordinator (SOSC) from the lead country.
- f. Strike teams provided by assisting countries should normally operate under the command of a National On-Scene Commander/Co-ordinator (NOSC).
- g. The NOSC operates under the command/co-ordination of the SOSC.
- h. For practical and organisational reasons, not more than three countries should be engaged in one and the same limited area within a combating operation, except in exceptional cases.

### **2.2 Supplementary Operational Guidelines**

With the aim of further facilitating the operational co-operation in joint combating operations, the following guidelines have been agreed upon:

### **2.3 General Principles**

The general principles for the command structure for combating operations are given in the annexed diagram, figure 1.

## 2.4 Lead Country

2.4.1 The Contracting Party who has asked for assistance should, unless otherwise agreed, be in charge of the joint operations (lead country).

To that effect the lead country should *inter alia*:

- give administrative, operational and logistic support to assisting foreign units
- give clearly defined tasks to all units
- organise the practical co-operation between units from different countries
- keep all units well-informed of the overall situation, and
- keep a firm contact with the command organisations of the assisting countries in order to ensure that assisting foreign units can be transferred to national command if so necessitated.

2.4.2 Operationally self-contained foreign units should, to the largest extent, be given separate tasks within defined geographical areas. The execution of the task will normally be carried out under the command of the appropriate NOSC who will be in close radio contact with the SOSC from the lead country.

2.4.3 If the assistance is rendered in the form of equipment or units not operationally self-contained, it is the responsibility of the lead country's operational control or tactical command to integrate the equipment or units in the combating operation.

## 2.5 Transfer of Operational Control and Tactical Command

2.5.1 If the main body of the pollution in question passes the borderline of a neighbouring country's zone the operational control and tactical command (lead country) will normally be transferred to the country whose zone is affected by the main body of the pollution.

2.5.2 The timing of the shift of operational control and tactical command should be negotiated between the two countries in question, giving due regard to the overall picture and any possible trends in its development.

2.5.3 The countries in question will further have to settle the number of units and the amount of equipment that could be placed at the disposal of the new lead country and how the combating operation should be continued.

## 2.6 Liaison Officers

2.6.1 In combating situations where two or more Contracting Parties are, or could be, involved, the Contracting Parties in question should be entitled to send two liaison officers as a maximum to the respective national centres responsible for combating operations.

2.6.2 The exchange of the liaison officers is independent of whether the combating operation is carried out on a purely national basis, by means of rendered equipment or by strike teams from other Contracting Parties.

2.6.3 The liaison officers should be given the opportunity to give advice and statements during meetings in matters concerning the actual combating and the disposal of resources, etc, when the matter in question concerns their own country's territory.

2.6.4 The liaison officers are placed under the same obligations of discretion as imposed on the centre's own national staff but are not limited as to the substance to be reported to their own national authorities.

2.6.5 The liaison officers are under no administrative obligations from the host country except those established by the host country for the functioning of the centre itself. The liaison officers will thus have to arrange for their own accommodation, meals, etc.

2.6.6 The liaison officers should be given access to all necessary communication means such as telephone, telefax, telex and email to a reasonable extent if available.

2.6.7 The functions of the liaison officers should be two-way so that their home country should be able to channel its opinions and wishes through the liaison officers. In cases involving joint operations or rendered equipment, this two-way function will be of great importance.

2.6.8 In relation to the undertaking of surveillance activities with fixed wing aircraft, helicopters and satellite surveillance, the liaison officers should co-ordinate the surveillance activities with their national authorities in order to avoid costly duplication (see Chapter 4).

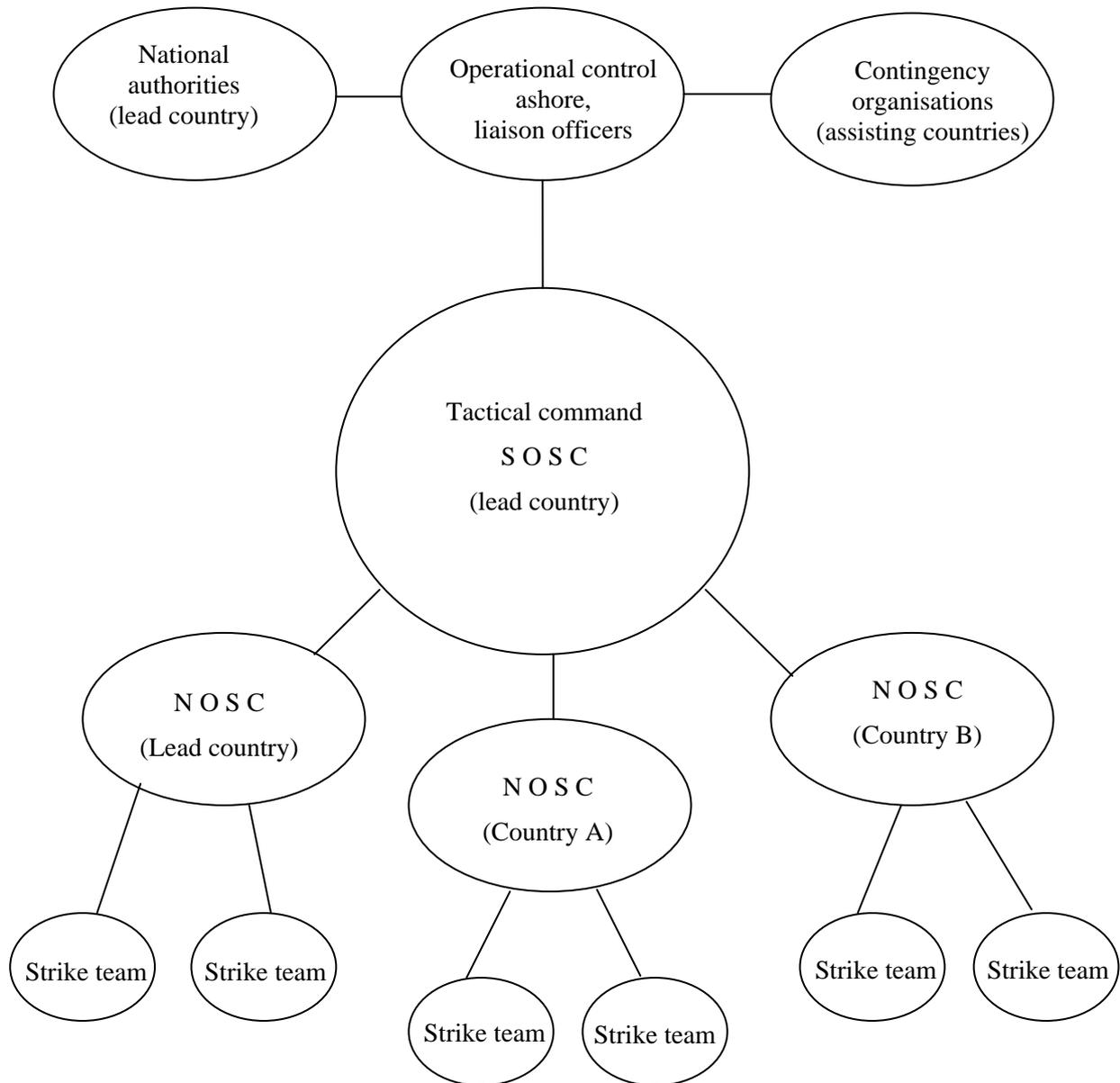
2.6.9 If two countries affected by the same pollution choose not to exchange liaison officers, they should as a rule exchange daily situation reports.

2.6.10 If more than one Contracting Party is involved in a response operation assisting an affected Contracting Party, those Contracting Parties could decide to coordinate the liaison function. One liaison officer could then act on behalf of more than one Contracting Party.

## **2.7 Command of Different Strike Teams**

When needed, units from different strike teams can temporarily be put at the disposal and command of another NOSC.

**Figure 1: Command structure for combating operations**



When needed, units from different strike teams can temporarily be put at the disposal and command of another NOSC.

## **RECOMMENDATION CONCERNING RADIO COMMUNICATIONS IN JOINT COMBATING OPERATIONS**

### **3.1 The Contracting Parties**

RECALLING the provision of Article 7 of the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, 1983 (Bonn Agreement) concerning assistance to a Contracting Party by other Contracting Parties called upon,

TAKING into consideration that assistance could be rendered in the form of strike teams consisting of one or more ships or of aircraft,

BEING AWARE of the need for radio communications in joint combating operations at sea,

NOTING that in order to avoid disturbance and jamming in a joint operation, there is a strong need for different radio communication frequencies on the one hand between the Operational Control ashore and the Supreme On-Scene Commander/Co-ordinator (SOSC) and, on the other hand, between the SOSC and participating National On-Scene Commanders/Co-ordinators (NOSC) as well as between the different NOSCs and their respective team units,

RECOMMEND that:

in accordance with the scheme of radio communications for joint combating operations presented in the annex to this recommendation,

- a. Concerning the communications between the Operational Control ashore and the SOSC (which is the concern of the lead country of the operation), consideration should be given to the possibility of using wireless email, telefax, teleprinter or telex.
- b. Communication between the SOSC and the NOSCs should be performed on one or, if needed, more of the international VHF-channels 10, 67 and 73.
- c. The vessels from which the SOSC operates should have at least two VHF-stations on board with a standby function on channel 16.
- d. Communications between a NOSC and the strike team units should be performed on special domestic (internal) frequencies.
- e. Communication between SOSC/NOSC and between aircraft should be performed on special frequencies, see the Aerial Surveillance Handbook.
- f. The working language between OSCs from different countries should be English.
- g. The broad aspects of the radio communication problems in joint oil combating operations at sea should be presented to the telecommunications authority in each country for information and internal consideration.

### **3.2 Notes and Supplementary Guidelines**

With the aim of further facilitating Radio Communications in joint combating operations, the following guidelines have been agreed upon. (See Annex 1).

### **3.3 Communication Between the Operational Control and the SOSC (1st Level)**

3.3.1 The operational control is exercised normally by the country within whose zone the operation takes place (lead country) and its physical location will normally be ashore.

3.3.2 It is the responsibility of the lead country to establish and maintain the communication between the operational control and the SOSC.

3.3.3 Depending on the facilities and internal organisation within the lead country, the communication could be established either directly from the operational control to the SOSC via teleprinter, radio telephone or radio telegraphy between the coast radio station and the SOSC.

3.3.4 To facilitate the communication between the operational control and the SOSC the possibility of using email or wireless teleprinter e.g. telefax via mobile radiotelephone or telex as the best means of communication between these two command levels should be considered.

#### **3.4 Communication Between the SOSC and the NOSC (2nd Level)**

3.4.1 In accordance with 3.1.a, the communication between the SOSC and the NOSC should be performed on one or if needed more of the international maritime VHF channels 10, 67 and 73.

3.4.2 To this end, the vessel from which the SOSC operates should, as a rule, have at least two maritime VHF stations on board with a stand-by function on channel 16.

3.4.3 It is the responsibility of the lead country to obtain the permission from the national telecommunication authorities to use the maritime VHF channels 10, 67 and 73 for combating operations at sea which could be given either as a general authorisation to use the frequencies during combating operations and combating exercises or as a separate authorisation for each combating operation and combating exercise. As channels 10, 67 and 73 are not established for exclusive use in combating operations but could also be used for inter-ship communications, port operations service and ship movement service there exists a risk that the communication on these frequencies between authorities engaged in a combating operation could be seriously hampered by other traffic not relevant to the ongoing operation.

3.4.4 Under such circumstances the national telecommunications authorities should be consulted to advise on how non-combating traffic could be minimised or completely eliminated.

3.4.5 It should further be noted that the first radio contact between the SOSC and NOSC should be made on channel 16 unless otherwise agreed.

#### **3.5 Communication Between NOSCS**

3.5.1 Under circumstances where one NOSC and his strike teams operate geographically close to another NOSC and his strike teams, a need may arise for direct communication between the NOSCs in respect of navigation, manoeuvring and other operational matters.

3.5.2 In order to restrict the number of VHF channels in use, the communication between NOSCs should be performed on the same VHF channel as used for communication between the NOSCs and the SOSC.

3.5.3 If more VHF channels are used for communication between the SOSC and the NOSCs, the communication plan should be established in such a way that NOSCs and their strike teams operating geographically close to other NOSCs and their strike teams should be allocated to the same VHF channel for communication with the SOSC.

#### **3.6 Communication Between the NOSCS and their Strike Teams (3rd Level)**

3.6.1 In accordance with 3.1.d, the communication between a NOSC and his strike team units should be performed on special domestic (internal) frequencies.

3.6.2 For communication between NOSC and aircraft reference is made to the Aerial Surveillance Handbook.

3.6.3 Before deciding on the domestic frequencies, a NOSC from a country other than the lead country should check with the SOSC that the frequencies in question do not interfere with other frequencies used on the scene of action.

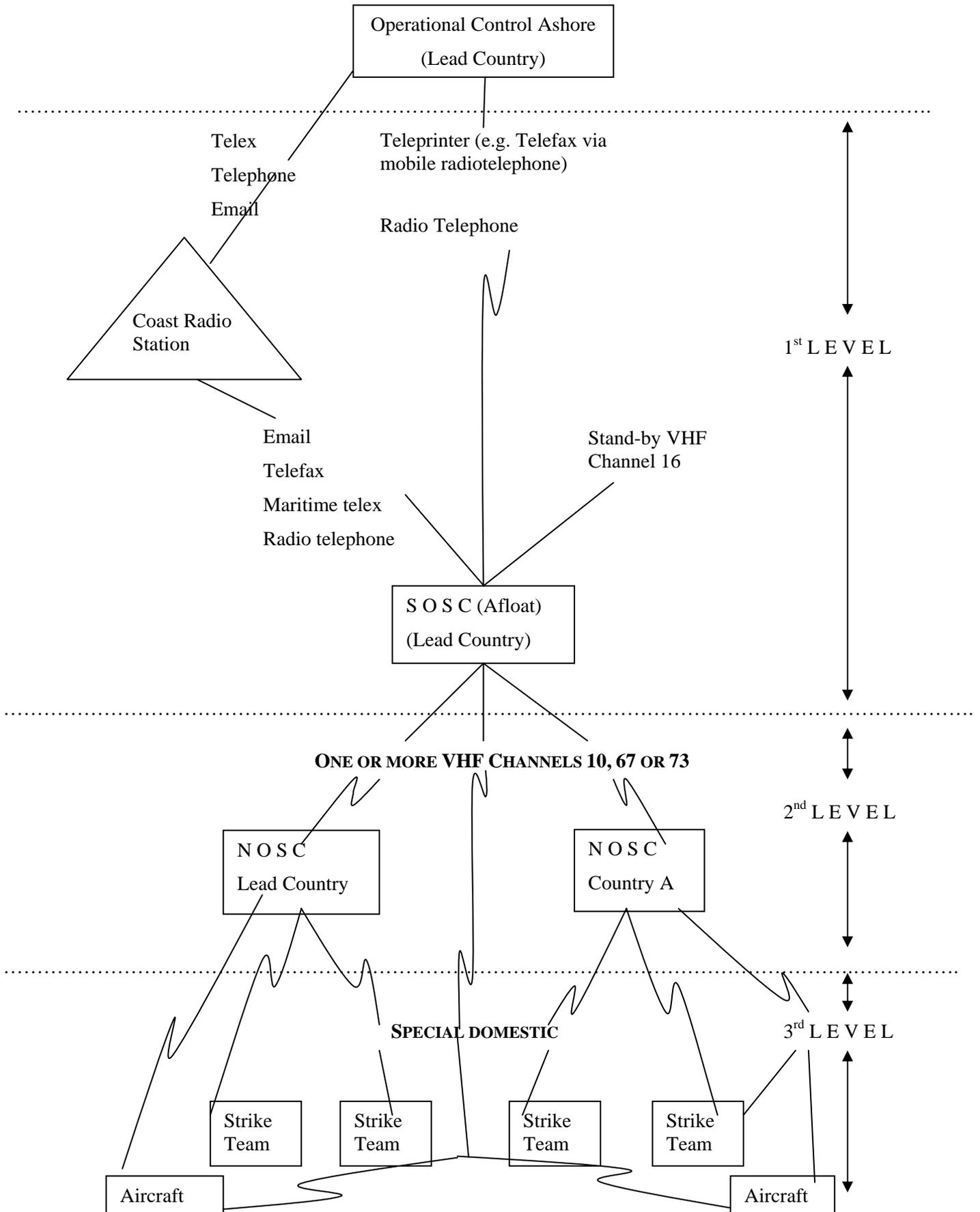
**3.7 Communication between Strike Teams**

3.7.1 It is anticipated that if need arises for communication between strike teams under the same NOSC, this communication will be carried out on the same domestic frequencies as used for communication with the NOSC or on a special domestic frequency selected for internal communication between strike teams.

3.7.2 Due to the use of domestic frequencies between the NOSC's and their strike teams, direct communication between strike teams from NOSC's of different nationality cannot normally be expected.

3.7.3 For communication between aircraft, reference is made to the Aerial Surveillance Handbook.

**BONN AGREEMENT COMMUNICATION PLAN FOR JOINT COMBATING OPERATIONS**



## AERIAL SURVEILLANCE

### CO-OPERATION ON AERIAL SURVEILLANCE OVER THE NORTH SEA AREA<sup>1</sup>

#### 4.1 Introduction

4.1.1 The purpose of airborne surveillance is to detect spillages of oil and other harmful substances that can threaten the marine environment of the North Sea Area. The spillages caused by accident, or made in contravention of international conventions will be recorded, taking due account of visual observation, aerial photographs and remote sensing data. Where possible, samples will be taken both from the sea surface and on board the suspected offender.

4.1.2 Within the framework of the Bonn Agreement it has been decided to establish close co-operation on airborne surveillance. This will be achieved by:

- a. co-ordination of the national flight plans carried out by the Contracting Parties themselves;
- b. co-operation in areas of mutual interest, e.g. by means of Coordinated Extended Pollution Control Operations (CEPCO);
- c. setting up special flights, such as Tour d'Horizon, Joint Flights and Aerial Surveillance Exercises;
- d. standardisation of reporting formats and exchange of information to Contracting Parties;
- e. working together in improving existing systems and develop new techniques to enhance the information obtained;
- f. the provisions of the Bonn Agreement Oil Appearance Code (BAOAC) and connected guidelines for its use.

4.1.3 The Contracting Parties to the Bonn Agreement have agreed to participate in the collaboration to the best of their ability.

4.1.4 The surveillance is co-ordinated in accordance with the decisions of the North Sea Conferences and provisions of sub-regional plans in order to make it more efficient and to make better use of the resources.

4.1.5 It is agreed that this cooperation scheme applies only to the international waters of the North Sea.

#### 4.2 Co-ordination

4.2.1 In their regular meetings the Contracting Parties appoint one Contracting Party to be lead country for an agreed period. The lead country prepares the annual programme and updates the Aerial Surveillance Handbook (ASH) accordingly. The ASH contains general information, national waypoints, Tour d'Horizon scheme, special flights, reporting formats and surveillance results assessment. It also contains, as Annexes, the maps showing navigation points and routings, both regional and international.

4.2.2 The ASH will be issued to Contracting Parties by the lead country. It should be read in conjunction with this chapter. The ASH is designed to be used for the day-to-day management of airborne surveillance and as a ready reference for air crew. A lead country collects the data of the various flights executed in a particular year and makes an annual report.

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<sup>1</sup> The North Sea Area covers the North Sea, the English Channel, the waters around Ireland and parts of the Western Approaches and the Norwegian Sea.

### **4.3 Operational Flights**

#### **4.3.1 National flights**

National flights are carried out by Contracting Parties over their own territorial waters and over other waters under their jurisdiction.

#### **4.3.2 Regional flights**

Parties involved in a bi- or multilateral agreement (e.g. Memorandum of Understanding) carry out flights on a regular basis over an area of mutual interest.

#### **4.3.3 Tour d'Horizon**

All Contracting Parties agreed on performing a flight mainly along the offshore installations, of at least 600 nautical miles. The aircraft crew will concentrate on all detectable pollutions from various sources. Roughly the area between 52° north and 63° north is to be surveilled. These flights are carried out according to an agreed yearly scheme. The responsible party is entitled to inform the others on times and routing the day before departure and on changes in the prepared schedule.

A Tour d'Horizon flight will be performed under suitable weather conditions.

#### **4.3.4 Coordinated Extended Pollution Control Operations (CEPCOs)**

A CEPCO operation can be defined as a continuous sequence of aerial surveillance flights supported by sea-borne assistance - and where possible also with data from satellite observations - to ensure a permanent presence (e.g. over a period of 24 hours) in a sea area with high shipping intensity. This high level of deployment of means is only possible when several (neighbouring) Contracting Parties cooperate intensively to ensure continuity and optimal coordination of the surveillance activities. The aims of the operation are, *inter alia*:

- (i) to enhance the enforcement of discharge provisions at sea;
- (ii) to increase the deterrent effect of aerial surveillance efforts;
- (iii) to improve the cooperation between the participating authorities.

### **4.4 Aerial Surveillance Exercises**

4.4.1 Each year exercises are organised by authorities of several countries within the Bonn Agreement or the European Community (EC). Participation in these field trials has a bearing on the national and Bonn Agreement flight schedules. Contracting Parties agree to participate in an Aerial Surveillance Exercise organised by one of the countries (not necessarily the lead country) once a year. A participant in exercises will prepare a report to make information gathered available to the organising authority. The organising authority will report to the OTSOPA meeting.

4.4.2 The Aerial Surveillance Exercise normally consists of:

- a. field trials, using limited quantities of oil;
- b. special substances to study the detectability by means of remote sensing;
- c. evaluation of the data recorded during the exercise;
- d. a workshop for the exchange of information and discussions of new improvements or developments on remote sensing equipment;
- e. evaluation of the exercise by an Exercise Evaluation Team.

4.4.3 All participants forward conclusive reports with data analysis to the lead country.

#### 4.5 Reporting and Reporting Formats

Detected/observed pollution which warrants combating action are to be reported immediately by radio to the appropriate focal point. These reports are to be followed up by documented reports using the recognised Bonn Agreement formats and any supporting documentation and data considered relevant. Such follow-up reports are to be made direct to the appropriate administrative authority and could include any of the following:

- Standard Pollution Observation / Detection Log and Completion Guide (Annex 1)
- Pollution Observation / Detection Report on Polluters and Combatable Spills (Annex 2)
- Standard Algae Observation / Detection Log (Annex 3)

Data from all surveillance flights should be reported to the lead country in accordance with the agreed procedure.

#### 4.6 Flight Operation

The flights will be carried out under normal civil aviation regulations of the State concerned. The territories of other countries will not be infringed, unless necessary permissions have been obtained. Special attention will be given to the restrictions on radio and high frequency transmissions in the vicinity of offshore activities.

#### 4.7 Flight Planning

Flight planning will be drafted under the responsibility of administrative authorities in the respective countries, which are to be identified as follows:

|                             |   |
|-----------------------------|---|
| Belgium                     | Management Unit of the North Sea (MUMM)         |
| Denmark                     | Admiral Danish Fleet                            |
| Federal Republic of Germany | Central Command for Maritime Emergencies (CCME) |
| France                      | French Customs                                  |
| Ireland                     | Irish Coast Guard                               |
| Netherlands                 | Netherlands Coast Guard Centre (KUWA)           |
| Norway                      | Norwegian Coastal Administration                |
| Sweden                      | Coast Guard Headquarters (CGHQ)                 |
| United Kingdom              | Maritime and Coastguard Agency (MCA)            |

#### 4.8 Regional Plans

Plans for bi- or multilateral agreements for collaboration on aerial surveillance will be elaborated by the Contracting Parties. The agreement will cover areas where co-operation is practical and suitable and based on mutual interest.

#### 4.9 Communication

Operational communications between aircraft, ships and centres will increase the mutual exchange of information on observed pollutions and identified suspected polluters. Aircraft and/or ships deployed by responsible authorities are expected to establish contact with a suspected offender and to forward the obtained information to the focal point of a country.

**Annex 1**

HELCOM  BONN AGREEMENT STANDARD POLLUTION OBSERVATION / DETECTION LOG  NO POLLUTION DETECTED

| REPORTING AUTHORITY | AIRCRAFT REG | MISSION No | CAPTAIN | CO PILOT | OPERATOR | OBSERVER | DAY | DATE | MONTH | YEAR |
|---------------------|--------------|------------|---------|----------|----------|----------|-----|------|-------|------|
|                     |              |            |         |          |          |          |     |      |       |      |

| FLIGHT TYPE | ROUTE / AREA | TIME OVER THE SEA DAY |      | TIME OVER THE SEA NIGHT |      | TOTAL TIME OVER THE SEA |      |
|-------------|--------------|-----------------------|------|-------------------------|------|-------------------------|------|
|             |              | hrs                   | mins | hrs                     | mins | hrs                     | mins |
|             |              |                       |      |                         |      |                         |      |

| No | AREA CODE | TIME UTC | POSITION         |                       | DIMENSIONS |          | AREA COVER % | OILED AREA Km <sup>2</sup> | OIL APPEARANCE COVERAGE (PERCENTAGE - %) |   |   |   |   |     | MINIMUM VOLUME m <sup>3</sup> | MAXIMUM VOLUME m <sup>3</sup> | COMBAT Y / N |
|----|-----------|----------|------------------|-----------------------|------------|----------|--------------|----------------------------|--|---|---|---|---|-----|-------------------------------|-------------------------------|--------------|
|    |           |          | LATITUDE 'NORTH' | LONGITUDE 'EAST/WEST' | LENGTH Km  | WIDTH Km |              |                            | 1  | 2 | 3 | 4 | 5 | Oth |                               |                               |              |
|    |           |          |                  |                       |            |          |              |                            |  |   |   |   |   |     |                               |                               |              |
|    |           |          |                  |                       |            |          |              |                            |  |   |   |   |   |     |                               |                               |              |
|    |           |          |                  |                       |            |          |              |                            |  |   |   |   |   |     |                               |                               |              |
|    |           |          |                  |                       |            |          |              |                            |  |   |   |   |   |     |                               |                               |              |
|    |           |          |                  |                       |            |          |              |                            |  |   |   |   |   |     |                               |                               |              |

| No | POLL TYPE | DETECTION |    |    |     |    |    | PHOTO Y / N | VIDEO Y / N | FLIR Y / N | WEATHER |       |     |     |    | REMARKS |  |
|----|-----------|-----------|----|----|-----|----|----|-------------|-------------|------------|---------|-------|-----|-----|----|---------|--|
|    |           | SLAR      | IR | UV | VIS | MW | LF |             |             |            | WIND    | CLOUD | VIS | SEA | Wx |         |  |
|    |           |           |    |    |     |    |    |             |             |            |         |       |     |     |    |         |  |
|    |           |           |    |    |     |    |    |             |             |            |         |       |     |     |    |         |  |
|    |           |           |    |    |     |    |    |             |             |            |         |       |     |     |    |         |  |
|    |           |           |    |    |     |    |    |             |             |            |         |       |     |     |    |         |  |
|    |           |           |    |    |     |    |    |             |             |            |         |       |     |     |    |         |  |

| No | REMARKS | OIL APPEARANCE TABLE |                            |   |   |
|----|---------|----------------------|----------------------------|---|---|
|    |         | No                   | OIL APPEARANCE DESCRIPTION | MINIMUM VOLUME m <sup>3</sup> / km <sup>2</sup> | MAXIMUM VOLUME m <sup>3</sup> / km <sup>2</sup> |
|    |         | 1                    | SHEEN                      | 0.04  | 0.30  |
|    |         | 2                    | RAINBOW                    | 0.30  | 5.00  |
|    |         | 3                    | METALLIC                   | 5.00  | 50.0  |
|    |         | 4                    | DISCONTINUOUS TRUE COLOUR  | 50.0  | 200   |
|    |         | 5                    | TRUE COLOUR                | 200   | >200  |

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## STANDARD POLLUTION OBSERVATION LOG COMPLETION GUIDE

|                                   |  |
|-----------------------------------|--|
| <b>HELCOM:</b>                    | Tick HELCOM Box if the flight is in HELCOM Area  |
| <b>BONN AGREEMENT:</b>            | Tick BONN AGREEMENT Box if flight is in Bonn Agreement Area  |
| <b>NO POLLUTION DETECTED:</b>     | Tick NO POLLUTION DETECTED if no pollution is detected   |
| <b>REPORTING AUTHORITY:</b>       | National Authority Responsible for Pollution Control.  |
| <b>AIRCRAFT REG:</b>              | Aircraft Registration Letters / Numbers.   |
| <b>MISSION No:</b>                | Nationally Assigned Mission Number.  |
| <b>FLIGHT TYPE:</b>               | National Designation for Flight Type as follows:<br>NAT - National<br>REG - Regional<br>EXER - Exercises<br>OPS - Operational Flight.<br>RIG - Oil Rig Patrol<br>SHIP - Shipping Patrol<br>TDH - Tour de Horizon Flight<br>CEPCO - Co-ordinated Extended Pollution Control Operation |
| <b>CAPTAIN OF AIRCRAFT:</b>       | Name of Captain  |
| <b>CO PILOT:</b>                  | Name of Co Pilot   |
| <b>OPERATOR:</b>                  | Name of Operator   |
| <b>OBSERVER:</b>                  | Name of Observer   |
| <b>DAY:</b>                       | Number Assigned to the Day of the Week as follows:<br>Monday - 01<br>Tuesday - 02<br>Wednesday - 03<br>Thursday - 04<br>Friday - 05<br>Saturday - 06<br>Sunday - 07  |
| <b>DATE/MONTH/YEAR:</b>           | Two number designation for each of date/month/year of Flight   |
| <b>ROUTE / AREA:</b>              | Flight Route or Area   |
| <b>TIME OVER THE SEA – DAY:</b>   | Time over the Sea during Daylight  |
| <b>TIME OVER THE SEA – NIGHT:</b> | Time over the Sea at Night   |

|                                   |  |
|-----------------------------------|--|
| <b>TOTAL TIME OVER SEA:</b>       | Total time between Coasting Out and Coasting In.   |
| <b>No:</b>                        | Number allocated to pollution detection.   |
| <b>AREA CODE:</b>                 | The international telephone code for the country (Area) in which the pollution is located:   |
|                                   | <b>Bonn Agreement</b>  |
|                                   | Belgium 32 Denmark (+ Helcom) 45   |
|                                   | France 33 Germany (+ Helcom) 49  |
|                                   | Netherlands 31 Norway 47   |
|                                   | Sweden (+ Helcom) 46 United Kingdom 44   |
|                                   | <b>Helcom</b>  |
|                                   | Estonia 372 Finland 358  |
|                                   | Latvia 371 Lithuania 370   |
|                                   | Poland 48 Russia 7   |
| <b>TIME UTC:</b>                  | Time of pollution detection.   |
| <b>POSITION:</b>                  | Latitude and longitude of pollution (degrees, minutes and seconds // WGS / 84 Datum).  |
| <b>DIMENSIONS:</b>                | Length and width of pollution in kilometres.   |
| <b>AREA COVER %:</b>              | Observer's assessment of the percentage of the boxed dimensioned area (length x width), covered with pollution.  |
| <b>OILED AREA:</b>                | Oiled Area covered with pollution; calculated by multiplying length, width and cover %<br>Example:<br><u>Length x Width x Cover %</u><br>2 Km x 1 Km x 50%, gives<br>[2.0] x [1.0] x [0.5]<br>= Oiled Area = 1 Km <sup>2</sup> |
| <b>OIL APPEARANCE COVERAGE %:</b> | Allocation of Percentage of the `Oiled Area' to the Appearance of the pollution.<br>Example:<br>1/2 cover – Rainbow - Column 2 = 50%<br>1/4 cover - Metallic - Column 3 = 25%<br>1/4 cover - True Colour - Column 5 = 25%      |
| <b>MINIMUM VOLUME:</b>            | Minimum Quantity of Oil Pollution in cubic metres.<br>Calculated as follows:   |

[Oiled Area] x [Appearance Code Minimum Thickness Value] X [Decimal Percentage of Appearance].

$$[1 \text{ Km}^2] \times [0.3 \text{ m}^3/\text{km}^2] \times [0.50] = 0.15 \text{ m}^3$$

$$[1 \text{ Km}^2] \times [5.0 \text{ m}^3/\text{km}^2] \times [0.25] = 1.25 \text{ m}^3$$

$$[1 \text{ Km}^2] \times [200 \text{ m}^3/\text{km}^2] \times [0.25] = 50 \text{ m}^3$$

$$\text{Minimum Total Quantity} = [0.15] + [1.25] + [50] = 51.4 \text{ m}^3$$

**MAXIMUM VOLUME:**

Maximum Quantity of Oil Pollution in cubic metres.

Calculated as follows:

[Oiled Area] x [Appearance Code Maximum Thickness Value]

X [Decimal Percentage of Appearance].

$$[1 \text{ Km}^2] \times [5.0 \text{ m}^3/\text{km}^2] \times [0.50] = 2.5 \text{ m}^3$$

$$[1 \text{ Km}^2] \times [50 \text{ m}^3/\text{km}^2] \times [0.25] = 12.5 \text{ m}^3$$

$$[1 \text{ Km}^2] \times [>200 \text{ m}^3/\text{km}^2] \times [0.25] = > 50 \text{ m}^3$$

$$\text{Maximum Total Quantity} = [2.5] + [12.5] + [>50] = > 65 \text{ m}^3$$

**No:**

The same number as previously allocated to the pollution detection.

**POLLUTION TYPE:**

Pollution Type as follows:

OIL - Oil

CHEM - Chemical

FISH - Fish Oil or Waste

VEG - Vegetable Oil or Waste

OTH - Other (Amplify in Remarks)

UNK - Unknown

**Note: For Algae Detection, use the Algae Observation Log.**

**DETECTION:**

Detection Sensor.

SLAR - Radar

UV - Ultra Violet

IR - Infrared

VIS - Visual

MW - Microwave

LF - Laser Fluorosensor

|                 |  |
|-----------------|--|
| <b>PHOTO:</b>   | Photographs of pollution   |
| <b>VIDEO</b>    | Video of the pollution   |
| <b>FLIR</b>     | Forward Looking Infrared of the pollution  |
| <b>WEATHER:</b> | Weather at the time of pollution observation / detection                                   |
|                 | Surface Wind: Direction and Speed (knots or beaufort as required by national authorities), |
|                 | Cloud: Coverage in Octas or aviation description (scattered / overcast) and Base in feet,  |
|                 | Visibility: Nautical Miles or Kilometres   |
|                 | Sea State: Using the description code given in the Abbreviations                           |
|                 | Weather: Rain, Snow, Haze, Mist etc  |
| <b>REMARKS:</b> | Any Amplifying Remarks.  |

**Note: For all Detections / Observations Boxes write:**

**'Y' Sensor used and pollution detected**

**'N' Sensor used but pollution not detected**

**'-' Sensor was not used or not available**

## POLLUTION OBSERVATION / DETECTION REPORT ON POLLUTERS AND COMBATABLE SPILLS (IMO)

1. REPORTER:
  - a. Reporting State: : .....
  - b. Observer (Organization/Aircraft/Platform) : ..... Call Sign.....
  - c. Observer(s)(Family Name(s)) : 1.....2.....
  
2. DATE AND TIME:
  - a. Date (yymmdd) b. Time of Observation (UTC) : Date..... Time.....UTC
  
3. LOCATION OF THE POLLUTION:
  - a. Position of the Pollution (Lat/Long) : Begin.....N, .....W/E  
: End.....N, .....W/E
  - b. Inside/Outside Territorial Waters :  Inside  Outside
  
4. DESCRIPTION OF THE POLLUTION:
  - a. Type of Substance Discharged : .....
  - b. Estimated Quantity : .....m<sup>3</sup>
  - c. Length (km) d. Width (km) e. Coverage (%) : Length.....km Width.....km Coverage....%
  - f. Oiled Area (km<sup>2</sup>) : Oiled Area.....(km<sup>2</sup>)
  - g. Percentage of Oiled Area by Appearance (%)
 

|   |              |
|---|--------------|
| 1:.....%                                  | 4:.....%     |
| 1=Sheen 2=Rainbow 3=Metallic              | 5:.....%     |
| 4=Discontinuous True Colour 5=True Colour | 3:.....%     |
|   | Other:.....% |
  
5. METHOD OF DETECTION AND INVESTIGATION:
  - a. Detection (Visual, SLAR, IR, UV, Video, MW LFS, Identification Camera, Other) :  Visual  SLAR  IR  UV  Video  MW,  
 LFS  Video  Ident.Cam  Other
  - b. Discharge Observed c. Photographs Taken : Observed: Yes / No Photos Yes / No
  - d. Samples Taken e. Need of Combating : Samples: Yes / No Combat: Yes / No
  - f. Other Ships/Platforms in Vicinity (Names) : .....
  
6. WEATHER AND SEA CONDITIONS:
  - a. Wind Direction b. Wind Force c. Visibility : Direction.....Degrees Force.....Bft/Kts Vis.....kms
  - d. Cloud Coverage e. Wave Height : Cloud.....Octa Wave Ht.....m
  - f. Current Direction : Current Direction.....Degrees

### OBSERVATION OF A DISCHARGE OF HARMFUL SUBSTANCES BY A SHIP UNDER ARTICLE 6(3) OF MARPOL 73/78

7. SHIP INVOLVED:
  - a. Name : .....
  - b. Callsign c. Flag State : Callsign:..... Flag State:.....
  - d. Home Port : .....
  - e. Type of Ship : .....
  - f. Position (Lat/Long) : .....N, .....W/E .....UTC  
: .....N, .....W/E .....UTC
  - g. Heading h. Speed : Heading.....Degrees Speed.....kts
  - i. Colour of the Hull : .....
  - j. Colour of the Funnel and Funnel Mark : .....
  - k. Colour / Description of Superstructure : .....
  - l. Vessels IMO Number : .....
  
8. INFORMATION BY RADIO CONTACT:
  - a. Radio Contact b. Means of Communication : Contact: Yes / No Means VHF / Teleph, .....Ch / Freq
  - c. Last Port of Call : .....
  - d. Cargo e. Last Cargo : .....
  - f. Next Port of Call, ETA (yymmdd) : .....ETA.....
  - e. Statements of Captain/Officer on Duty : .....





**BONN AGREEMENT RECOMMENDATION 15/01 CONCERNING  
THE MEANS OF TRANSMISSION FOR THE POLLUTION REPORTING SYSTEM  
(POLREP) FOR NOTIFICATION OF INCIDENTS OF MARINE POLLUTION TO  
CONTRACTING PARTIES**

THE CONTRACTING PARTIES

RECALLING the provision of articles 5(1) and 6(2) in the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, 1983 (see Chapter 29 of the Bonn Agreement Counter Pollution Manual) concerning the warning and informing of other Contracting Parties in case of casualty or pollution causing great concern.

HAVING REGARD to the Recommendation of Bonn Agreement Contracting Parties concerning the introduction of a pollution reporting system (POLREP) for notification of incidents of marine pollution to Contracting Parties and the Bonn Agreement Recommendation 96/1 concerning the means for transmission of POLREP.

HAVING REGARD to the EU reporting obligation of marine pollution incidents and imminent threats thereof to SafeSeaNet and the development of the dedicated internet-based Common Emergency Communication and Information System (CECIS Marine Pollution) for requesting international assistance and for other emergency communication in real time.

TAKING INTO CONSIDERATION that SafeSeaNet covers Parts I and II of the POLREP and CECIS deals with POLREP Part III, and that the two systems are used by all Contracting Parties.

RECOMMEND that:

- a. the Contracting Parties to the Bonn Agreement should transmit all POLREP using SafeSeaNet and CECIS Marine Pollution ;
- b. exceptionally and in case of serious technical issues, the Contracting Parties to the Bonn Agreement may sent POLREP and plain text messages by means of email and telefax as per Bonn Agreement Recommendation 96/1;
- c. consequently the Pollution Reporting System - annexed to the recommendation of Bonn Agreement Contracting Parties concerning the introduction of a pollution reporting system (POLREP) for notification of incidents of marine pollution to Contracting Parties, included in Chapter 5, version 1/5/90 of the Bonn Agreement Counter Pollution Manual, - should be amended.

## 5.1 POLLUTION REPORTING SYSTEM (POLREP)

5.1.1. The SafeSeaNet (SSN) Pollution Reporting System is for use between authorities to exchange information when pollution of the sea has occurred or when a threat of such is present. SSN has also been linked to the Common Emergency Communication and Information System (CECIS) Marine, to allow all relevant data entered in SSN to be automatically fed into the relevant fields in CECIS Marine while creating a request for assistance.

5.1.2 The POLREP is divided into 3 parts:

SafeSeaNet:

|                   |                                       |  |
|-------------------|---------------------------------------|--|
| Part I or POLWARN | <u>POL</u> lution <u>WAR</u> Ning     | gives information or warning of pollution or threat of pollution |
| Part II or POLINF | <u>POL</u> lution <u>IN</u> Formation | gives detailed supplementary information                         |

CECIS Marine Pollution:

|                    |                                      |  |
|--------------------|--------------------------------------|--|
| Part III or POLFAC | <u>POL</u> lution <u>FAC</u> ilities | deals with matters related to assistance |
|--------------------|--------------------------------------|--|

5.1.3. The Central SSN will automatically “push” all the POLWARN/POLINF to CECIS when notified to SSN for both distributed and non-distributed incidents. Any update or feedback to the original message will also be automatically “pushed” to CECIS. The data from SSN will be processed by CECIS and made available to its users when requesting assistance. As a consequence, Member States notifying Incident Reports via XML shall endeavour to send only POLWARN/POLINF to Central SSN.

5.1.4 SSN and CECIS information:

5.1.4.1 SSN:

Information on the use of incident reports can be found in the document: “SSN incident reports guidelines” on the EMSA website using the following link: <http://www.emsa.europa.eu/ssn-main/documents.html>. SSN can only be accessed through the EMSA web portal by users accredited with a login and password. To be able to edit and send POLREPs users must have the right privileges within the EMSA SSN environment. The username must be created by the authorized National Competent Authority administrators.

5.1.4.2 CECIS marine:

Information on how to create or respond to a request for assistance can be found on the website of the European Commission, Humanitarian Aid and Civil Protection using the URL: <https://webgate.ec.europa.eu/CECIS/login.jsp>. The “user manual for CECIS Marine Pollution” can be found in the tab “user utilities”. A login and password can be created by the national competent authority holding administrator rights.

5.1.5 Detailed explanations of the different numbers in Parts I, II and III of the POLREP as well as examples of POLREP are given in chapters 5.3 and 5.4.

5.1.6. In the exceptional case where SSN and / or CECIS Marine Pollution cannot be used for editing / transmitting POLREPs MS may send POLREP and plain text messages by means of e-mail and telefax as per Bonn Agreement Recommendation 96/1 as explained hereafter.

### **Recommendation 96/1 for the use of a POLREP system.**

5.1.7 The Pollution Reporting System is for use between combating authorities to exchange information when pollution of the sea has occurred or when a threat of such is present.

5.1.8 The POLREP is divided into 3 parts:

|   |                                       |  |
|---|---------------------------------------|--|
| Part I or POLWARN<br>(numbers 1 - 5)    | <u>POL</u> lution <u>WAR</u> Ning     | gives information or warning of pollution or threat of pollution |
| Part II or POLINF<br>(numbers 40 - 60)  | <u>POL</u> lution <u>IN</u> Formation | gives detailed supplementary information                         |
| Part III or POLFAC<br>(numbers 80 - 99) | <u>POL</u> lution <u>FAC</u> ilities  | deals with matters related to assistance                         |

The division into three parts is for identification purposes only. For this reason, consecutive numbers are not used. This enables the addressee or addressees to know merely by looking at the numbers whether they are dealing with Part I (1 - 5), Part II (40 - 60) or Part III (80 - 99). This method or division should in no way exclude the use of all numbers in a full report or the separate use of single numbers from each part or the use of single numbers from different parts mixed in one report.

5.1.9 When Part I is used as a warning, the use of the priority transmission code "URGENT" is optional. Such a message should always be followed up by a supplementary POLREP or be cancelled.

5.1.10 Part II is used to give detailed information about the incident.

5.1.11 Part III is used for matters related to assistance and operational matters exclusively.

5.1.12 Each single report should be identifiable. The receiving combating authority should be in a position to check if all reports of the incident in question have been received. This is done by using a serial number preceded by a national identification, e.g. "DK 1/1".

5.1.13 The national identifiers are the following:

|                             |    |
|-----------------------------|----|
| Belgium                     | BE |
| Denmark                     | DK |
| The European Community      | EC |
| Federal Republic of Germany | DE |
| France                      | FR |
| Ireland                     | IE |
| The Netherlands             | NL |
| Norway                      | NO |
| Sweden                      | SE |
| United Kingdom              | UK |

The number before the stroke indicates the pollution to which the report refers and is used because a Contracting Party may have to deal with several slicks or pollution incidents simultaneously. The number following the stroke indicates the actual number of reports which have been originated on the pollution in question.

"DK 1/1" thus indicates the first report of the pollution in question. "DK 1/2" will in accordance with the described system then indicate the second report of the same pollution.

5.1.14 The last and final POLREP will show as follows: "DK 1/5 FINAL", which means that this is the fifth and final report concerning the first pollution.

5.1.15 If the pollution caused by the incident splits up in clearly separate patches - in this example two spills - the wording, "DK 1/2 now splitting in DK 2 and 3" should be indicated in the last report from the incident identified by the number 1 preceding the stroke.

5.1.16 The first reports from the two patches originating from the incident first reported will then be numbered DK 2/1 and DK 3/1, and consecutive numbering could then be used after the stroke.

5.1.17 In order to keep the receivers of POLREP informed of all the transmitted reports, the combating authority sending the POLREP must after the serial number include information on the recipients of the earlier transmitted POLREPs, e.g.:

DK 2/5 - DK2/1 for DE and SE

DK 2/2 for DE

DK 2/3 for SE

DK 2/4 for DE and SE

5.1.18 Concerning the numbers 5, 60 and 99, it is emphasized that "ACKNOWLEDGE" made by the combating authority addressed should be with reference to the serial number in question, e.g. "your DK 2/1".

5.1.19 By answering a POLREP, the serial number used by the transmitting combating authority is to be used as reference in the answer (see above). However, it is not necessary for countries to adhere to the POLREP system in responding to POLREPs.

5.1.20 If the POLREP is used in exercises, the text is to be introduced with the word "EXERCISE" and finished with the same word repeated three times. The same procedure should also be used for the following reports which deal with the exercise.

5.1.21 A summarized list of POLREP numbers is given in chapter 5.2.

5.1.22 Detailed explanations of the different numbers in Parts I, II and III of the POLREP as well as examples of POLREP are given in chapters 5.3 and 5.4.

## APPENDIX 1

## 5.2 CONTENTS

DTG (day time group)

POLREP

BONN AGREEMENT/

NORDIC/BALTIC/

DENGER/NETHGER/

DENERNETH

## REMARKS

Day and time of drafting the message (DTG). Always 6 figures. Can be followed by month indication. The DTG can be used as a reference.

This is the identification of the report. "POL..." indicates that the report might deal with all aspects of pollution (oil as well as other harmful substances). "...REP" indicates that this is a report on a pollution incident. It can contain up to 3 main parts:

Part I (POLWARN) is an initial notice (a first information or a warning of a casualty or the presence of oil slicks or harmful substances. This part of the report is numbered from 1 to 5.

Part II (POLINF) is a detailed supplementary report to Part I. This part of the report is numbered from 40 to 60.

Part III (POLFAC) is for requests for assistance from other Contracting Parties, as well as for operational matters in the assistance situation. This part of the report is numbered from 80 to 99.

"BONN AGREEMENT" is for identifying the Agreement in question (other code words "NORDIC" for the Copenhagen Agreement 1971, "BALTIC" for the Helsinki Convention 1974, "DENGER" for the Danish German Joint Maritime Contingency Plan 1982 and "NETHGER" for the Netherlands-German Joint Maritime Contingency Plan 1990).

Parts I, II and III can be transmitted in one single report or separately. Furthermore, single figures from each part can be transmitted separately or combined with figures from the two other parts.

Figures without additional text should not appear in the POLREP.

When Part I is used as a warning of a serious threat, the message should be headed with the transmission priority word "URGENT".

All POLREPs containing ACKNOWLEDGE numbers (5, 60 or 99) should be acknowledged as soon as possible by the competent national authority.

POLREPs should always be terminated by a message from the reporting State indicating that no more operational communication on that particular incident can be expected.

DK 1/1

It should be possible to identify every single report and the receiving agency should be in a position to check whether all reports of the incident in question have been received. This is done by using a nation-identifier (DK, FRG, UK, etc) followed by a stroke system, where the number before the stroke indicates the pollution to which the report refers and the number following the stroke indicates the actual number of reports which have been originated on the pollution in question.

## 5.2 CONTENTS

## REMARKS

POLREP BONN AGREEMENT DK 1/1 thus indicates the first report from Denmark of the pollution in question in the Bonn Agreement region.

POLREP BONN AGREEMENT DK 1/2 will, in accordance with the described system, then indicate the second report from the same pollution.

If the pollution caused by the incident splits up into clearly defined patches - in this example two - the wording POLREP BONN AGREEMENT 1 now splitting into POLREP BONN AGREEMENT 2 and POLREP BONN AGREEMENT 3, should be indicated in the last report in the incident identified by number 1 preceding the stroke.

The first reports on the two patches originating from the incident first reported will then be numbered POLREP BONN AGREEMENT DK 2/1 and POLREP BONN AGREEMENT DK 3/1, and consecutive numbers after the stroke could then be used.

- |    |  |  |
|----|--|--|
| 1  | DATE AND TIME  | The day of the month as well as the time of the day when <u>the incident</u> took place or, if the cause of the pollution is not known, the time of the observation should be stated using 6 digits. Time should be stated as <u>GMT</u> , for example 091900z (i.e. the 9th of the relevant month at 1900 GMT).   |
| 2  | POSITION   | Indicates the main position of the incident and longitude in degrees and minutes, and may in addition give the bearing of and the distance from a location known by the receiver.  |
| 4  | OUTFLOW  | The polluting substance, such as CRUDE OIL, CHLORINE, DINITROL, PHENOL as well as the total quantity in tonnes of the outflow and/or the flow rate, and the risk of further outflow should be mentioned. If there is no pollution, but a threat of pollution, the words NOT YET followed by the substance (for example NOT YET FUEL OIL) should be stated.   |
| 5  | ACKNOWLEDGE  | When this number is used, the message (email or telefax) should be acknowledged as soon as possible by the competent national authority.   |
| 40 | DATE AND TIME  | No. 40 relates to the situation described in numbers 41 to 60 if it varies from number 1.  |
| 41 | POSITION AND/OR EXTENT OF POLLUTION ON/ABOVE/ IN THE SEA | Indicates the main position of the pollution in degrees and minutes of latitude and longitude, and may in addition give the distance and bearing of some prominent landmark known to the receiver if other than indicated in number 2. Estimated amount of pollution (e.g. size of polluted areas, number of tonnes of oil spilled if other than indicated in number 4, or number of containers, drums lost).<br><br>Indicates length and width of slick given in nautical miles if not indicated in number 2. |
| 42 | CHARACTERISTICS OF POLLUTION                             | Gives type of pollution, e.g. type of oil with viscosity and pour point, packaged or bulk chemical, sewage. For chemicals, the proper name or United Nations number, if known, should be given. Appearance, e.g. liquid, floating solid, liquid oil, semi-liquid sludge, tarry lumps, weathered oil, discolouration of sea, visible vapour should also be given as well as any markings on drums,  |

| 5.2     | CONTENTS  | REMARKS  |
|---------|---|--|
|         |   | containers.  |
| 43      | SOURCE AND CAUSE OF POLLUTION                             | Indicates the source of pollution e.g. from vessel or other undertaking. If from vessel, it should be notified whether the pollution is a result of a deliberate discharge or casualty. If the latter, a brief description should be given. Where possible the name, type, size, call sign, nationality and port of registration of polluting vessel should be mentioned. If the vessel is proceeding on its way, course, speed and destination should be indicated. |
| 44      | WIND DIRECTION AND SPEED                                  | Indicates wind direction and speed in degrees and in m/sec. The direction always indicates from where the wind is blowing.   |
| 45      | CURRENT DIRECTION AND SPEED AND/OR 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.  |
| 46      | SEA STATE AND VISIBILITY                                  | Sea state indicates the wave height in metres. Visibility should be indicated in nautical miles.   |
| 47      | DRIFT OF POLLUTION  | Indicates drift course and speed of pollution in degrees and knots or tenths of knots. In cases of air pollution (gas cloud), drift speed should be indicated in m/sec.  |
| 48      | FORECAST OF LIKELY EFFECT OF POLLUTION AND ZONES AFFECTED | Results of mathematical models could indicate e.g. arrival on beach with estimated timing.   |
| 49      | IDENTITY OF OBSERVER/<br>REPORTER                         | Identifies who has reported the incident. If it is a ship, the name, home port, flag and call sign must be given.  |
|         | IDENTITY OF SHIPS ON SCENE                                | Ships on-scene could 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.   |
| 50      | ACTION TAKEN  | Mentions action taken for the disposal of the pollution.   |
| 51      | PHOTOGRAPHS OR SAMPLES                                    | Indicates if photographs or samples from the pollution have been taken. Contact numbers (including telephone, email address, telefax and telex numbers as appropriate) of the sampling authority should be given.  |
| 52      | NAMES OF OTHER STATES AND ORGANISATIONS INFORMED          |  |
| 53 - 59 |   | SPARE FOR ANY OTHER RELEVANT INFORMATION:<br>e.g. results of sample or photographic analysis, results of inspections or surveyors, statements of ship's personnel.   |
| 60      | ACKNOWLEDGE   | When this number is used, the telex/telefax/email should be acknowledged as soon as possible by the competent national authority.  |
| 80      | DATE AND TIME   | No. 80 is related to the situation described below, if it varies from numbers 1 and/or 40.   |
| 81      | REQUEST FOR ASSISTANCE                                    | Type and amount of assistance required in form of: <ul style="list-style-type: none"> <li>- specified equipment</li> <li>- specified equipment with trained personnel</li> </ul>   |

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| <b>5.2 CONTENTS</b>                                | <b>REMARKS</b>  |
|--|---|
|  | - complete strike teams<br>- personnel with special expertise<br>with indication of country requested   |
| 82 COST  | Information on cost of delivered assistance to be notified to requesting country.   |
| 83 PRE-ARRANGEMENTS FOR THE DELIVERY OF ASSISTANCE | Information concerning customs clearance, access to territorial waters in the requesting country.   |
| 84 TO WHERE ASSISTANCE SHOULD BE RENDERED 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 Supreme On-Scene Commander of the requesting country or land-based authorities with contact numbers (including telephone, email address, telefax and telex numbers as appropriate) and contact persons. |
| 85 NAMES OF OTHER STATES AND ORGANISATIONS         | Only to be filled in if not covered by number 81, e.g. if further assistance is later needed by other States.   |
| 86 CHANGE OF COMMAND                               | When a substantial part of an oil pollution or serious threat of oil pollution moves or has moved into the zone of another Contracting Party, the country which has exercised the supreme command or the operation may request the other party to take over the supreme command.  |
| 87 EXCHANGE OF INFORMATION                         | When a mutual agreement has been reached between two parties on a change of supreme command, the country transferring the supreme command should give a report on all relevant information pertaining to the operation to the country taking over the command.  |
| 88 - 98  | <b>SPARE FOR ANY OTHER RELEVANT REQUIREMENTS OR INSTRUCTIONS</b>  |
| 99 ACKNOWLEDGE                                     | When this number is used, the message (email or telefax) should be acknowledged as soon as possible by the competent national authority.  |

## APPENDIX 2

## Summarized list of POLREP numbers

| Address              | From .....                     | To .....                                |
|----------------------|--------------------------------|---|
| Date Time            | Group                          |   |
| Identification       |                                |   |
| Serial Number        |                                |   |
| .....                |                                |   |
| Part I<br>(POLWARN)  | 1                              | Date and Time                           |
|                      | 2                              | Position                                |
|                      | 3                              | Incident                                |
|                      | 4                              | Outflow                                 |
|                      | 5                              | Acknowledge                             |
| .....                |                                |   |
| Part II<br>(POLINF)  | 40                             | Date and Time                           |
|                      | 41                             | Position                                |
|                      | 42                             | Characteristics of pollution            |
|                      | 43                             | Source and cause of pollution           |
|                      | 44                             | Wind direction and speed                |
|                      | 45                             | Current or tide                         |
|                      | 46                             | Sea state and visibility                |
|                      | 47                             | Drift of pollution                      |
|                      | 48                             | Forecast                                |
|                      | 49                             | Identity of observer and ships on scene |
|                      | 50                             | Action taken                            |
| 51                   | Photographs or samples         |   |
| 52                   | Names of other states informed |   |
| 53 - 59              | Spare                          |   |
| 60                   | Acknowledge                    |   |
| .....                |                                |   |
| Part III<br>(POLFAC) | 80                             | Date and Time                           |
|                      | 81                             | Request for assistance                  |
|                      | 82                             | Cost                                    |
|                      | 83                             | Pre-arrangements for the delivery       |
|                      | 84                             | Assistance to where and how             |
|                      | 85                             | Other states requested                  |
|                      | 86                             | Change of command                       |
|                      | 87                             | Exchange of information                 |
|                      | 88 - 98                        | Spare                                   |
| 99                   | Acknowledge                    |   |

## APPENDIX 3

## 5.3 EXAMPLES OF POLREP REPORTS

## 5.3.1 POLREP EXAMPLE NO. 1

|                 |   |                        |   |
|-----------------|---|------------------------|---|
| Address         |   | From DK                |   |
|                 |   | To DE and NL           |   |
| Date time group |   | 181100z June           |   |
| Identification  |   | POLREP BONN AGREEMENT  |   |
| Serial number   |   | DK 1/2 (DK 1/1 for DE) |   |
| =               |   | =                      |   |
| 1               | Date and time   | 1                      | 181000z   |
| 2               | Position  | 2                      | 55°33' N - 07°00' E   |
| 3               | Incident  | 3                      | Tanker collision  |
| 4               | Outflow   | 4                      | Crude oil, estimated 3,000 tonnes   |
| 41              | Position and/or extent of pollution on/above/in the sea   | 41                     | The oil is forming a slick 0.5 nautical miles to the South East. Width up to 0.3 nautical miles   |
| 42              | Characteristics of pollution                              | 42                     | Venezuela crude. Viscosity 3.780 Cs at 37.8°C. Rather viscous   |
| 43              | Source and cause of pollution                             | 43                     | Danish tanker ESSO BALTICA of Copenhagen 22,000 GRT call sign xxxx, in collision with Norwegian bulk carrier AGNEDAL of Stavanger, 30,000 GRT, call sign yyy<br><br>Two tanks damaged in ESSO BALTICA. No damage to the AGNEDAL |
| 44              | Wind direction and speed                                  | 44                     | 270 - 10m/sec   |
| 45              | Current direction and speed and/or tide                   | 45                     | 180 - 0.3 knots   |
| 46              | Sea state and visibility                                  | 46                     | Wave height 2m. 10 nautical miles   |
| 47              | Drift of pollution  | 47                     | 135 - 0.4 knots   |
| 48              | Forecast of likely effect of pollution and zones affected | 48                     | Could reach the island of Sylt, DE or further south, NL on the 23rd of this month   |
| 49              | Identity of observer/reporter. Identity of ships on scene | 49                     | Agnedal, number 43 refers   |

---

|    |  |     |    |   |
|----|--|-----|----|---|
| 50 | Action taken                                     |     | 50 | 2 Danish strike-teams with high mechanical capacity on route to the area  |
| 51 | Photographs samples                              | or  | 51 | Oil samples have been taken. Telex 64471 SOK DK   |
| 52 | Names of other states and organisations informed |     | 52 | DE  |
| 53 | Spare  |     | 53 | DENGER PLAN is activated  |
| 81 | Request assistance                               | for | 81 | DE is requested for 2 strike teams with high mechanical pick-up capacity  |
| 82 | Cost   |     | 82 | DE is requested for an approximate cost rate per day of assistance rendered   |
| 83 | Pre-arrangements for the delivery of assistance  |     | 83 | DE units will be allowed to enter Danish territorial waters for combating purposes or Danish harbours for logistics informing SOSC beforehand |
| 84 | To where assistance should be rendered and how   |     | 84 | Rendezvous 57°30' N - 07°00' E. Report on VHF channels 16 and 67. SOSC, Lieutenant Commander Hansen in GUNNAR SEIDENFADEN, call sign OWAJ     |
| 99 | ACKNOWLEDGE                                      |     | 99 | ACKNOWLEDGE   |
|    | =  |     |    | =   |

**APPENDIX 4**

## 5.3.2 POLREP EXAMPLE No. 2

|                 |  |                       |  |
|-----------------|--|-----------------------|--|
| Address         |  | From DE               |  |
|                 |  | To DK                 |  |
| Date time group |  | 182230z June          |  |
| Identification  |  | POLREP BONN AGREEMENT |  |
| Serial number   |  | Your DK 1/2 refers    |  |
| =               |  | =                     |  |
| 80              | Date and time                                  | 80                    | 182020z  |
| 82              | Cost   | 82                    | Total cost per day will be approx .....                      |
| 84              | To where assistance should be rendered and how | 84                    | ETA DE units at POLREP Bonn Agreement DK 1/2 will be 182100z |
| =               |  | =                     |  |

**APPENDIX 5**

## 5.3.3 POLREP EXAMPLE No. 3

|                 |                            |
|-----------------|----------------------------|
| Address         | From DK                    |
|                 | To NO                      |
| Date time group | 21 0940z June              |
| Identification  | URGENT                     |
|                 | EXERCISE                   |
|                 | POLREP BONN AGREEMENT      |
| Serial number   | DK 1/1                     |
| =               | =                          |
| 1 Date and time | 1 210830                   |
| 2 Position      | 2 57°50' N - 10°00' E      |
| 3 Incident      | 3 Tanker collision         |
| 4 Outflow       | 4 Not yet                  |
| 5 Acknowledge   | 5 Acknowledge              |
|                 | EXERCISE EXERCISE EXERCISE |
| =               | =                          |



- 50 Action taken
- 51 Photographs and/or samples taken
- 52 Detection: remote sensing (IR, SLAR, UV) and/or visual
- 53 Names of other states informed
- 54 Algal concentration
- 55 Salinity
- 56 Temperature
- 57 Species
- 58 Toxicity
- 59 Foaming/colouring
- 60-69 Details of monitoring
- 70 Acknowledge

PART III: ALGPOLFAC (80-99)

- 80 Date and time
- 81 Request for assistance (equipment, experts)
- 82 Cost
- 83 Pre-arrangements for the delivery
- 84 Assistance to where and how
- 85 Other states requested
- 86 Change of command (when bloom has moved)
- 87 Exchange of information
- 88-98 Spare (any other requirements or instructions)
- 99 Acknowledge

## EXERCISES

### 7.1 PRINCIPLES OF EXERCISES

7.1.1 The Contracting Parties have agreed:

- (i) to inform one another about bilateral or multilateral exercises concerning combating of pollution at sea in which one or more of the Contracting Parties have participated. This information should contain a short note on the exercise as such, in particular if special problems have been analysed, as well as lessons learned from the exercises with particular emphasis on matters of interest for the other Contracting Parties to the Bonn Agreement;
- (ii) to endeavour to carry out regular exercises in order to strengthen the operational co-operation in pollution combating operations within the framework of the Bonn Agreement;
- (iii) that exercise programmes for intersessional periods shall be agreed by the Contracting Parties at plenary meetings.

### 7.2 PROCEDURES FOR ALARM EXERCISES

7.2.1 To avoid conflict with exercises undertaken in the Helsinki Convention and the Copenhagen Agreement, the Contracting Parties have agreed that alarm exercises in the Bonn Agreement should only be carried out in the months of March, June, September and December.

7.2.2 To identify exercise traffic, the text of *all* messages (both to and from the lead country) shall begin with the words

EXERCISE BONN AGREEMENT

*All* messages shall end with the words

EXERCISE EXERCISE EXERCISE

7.2.3 At the end of each exercise, the lead country shall send a final “END OF EXERCISE” signal to all Contracting Parties.

### 7.3 IMPLICATIONS OF ALARM EXERCISES FOR DEALING WITH REAL INCIDENTS

7.3.1 In the light of experience gained from the alarm exercises in the framework of the Bonn Agreement, the Contracting Parties have agreed that, in the event of a real pollution incident:

- (i) Contracting Parties requesting and providing assistance should themselves notify their appropriate national authorities (Foreign Office and Customs) of expected times of arrival and departure of strike teams and equipment so as to avoid border problems;
- (ii) Contracting Parties providing assistance will normally make arrangements for transportation of equipment to the place specified by the assisted Party, but that assisted Party should bear the total costs if so requested by the assisting State;
- (iii) arrangements for the disposal of recovered substances should be part of every Contracting Party’s contingency plan;
- (iv) it is the responsibility of the assisted Contracting Party to ensure that the recovered substances are disposed of satisfactorily and that the equipment which has been provided on request is returned to its owner in a clean state;

- (v) a Contracting Party requesting assistance in the form of spraying aircraft will normally specify whether it wishes the assisting Contracting Party to provide the initial dispersant to be sprayed. The subsequent provision of dispersant will normally be the responsibility of the assisted Contracting Party.

7.3.2 It has been agreed that the efficiency of the arrangements under 7.3.1 (i) and (ii) above should be included when the Contracting Parties report back to OTSOPA on the outcome of alarm exercises.

7.3.3 It has been agreed that it would be useful if Contracting Parties which have dealt with real incidents would report on these issues in a manner similar to that used for exercises.

## **7.4 EXERCISE REPORT**

On finalisation of an exercise within the Bonn Agreement, the lead country shall prepare a brief report on lessons learned for the following OTSOPA meeting.

The report should as a minimum cover the following items:

### **7.4.1 Preparation of exercise**

A short description of how the exercise was prepared - relevant references

### **7.4.2 Implementation of exercise**

- a. Date and period of exercise
- b. A brief description of how the exercise was initiated

### **7.4.3 Participating Contracting Parties**

Names of participating Contracting Parties with a description of participating units from each Contracting Party.

### **7.4.4 Running and finalisation of exercise**

Under this heading a brief description of the following items should be given:

- scenario
- command
- communications
- finalisation of exercise
- exercise reports from participating Contracting Parties.

### **7.4.5 Comments of participating Contracting Parties**

A brief summary of comments received from each participating Contracting Party. Only comments on important matters should be mentioned.

### **7.4.6 Conclusion**

A general conclusion from the lead country's point of view on lessons learned. Suggestions and recommendations on how to improve exercises in the future.

Tables, statistics or figures can be added as necessary under each item as annexes at the end of the heading.

The exercise report should be presented to the next meeting of OTSOPA and subsequently to the Meeting of the Contracting Parties.

## **7.5 GUIDELINES FOR JOINT EXERCISES IN CO-OPERATION IN COMBATING SPILLAGES ON THE SEA WITHIN THE NORTH SEA AREA<sup>1</sup>**

Within the BONN Agreement context, the following types of joint exercises in co-operation in combating spillages into the sea (BONNEX) have been agreed upon:

- Alarm exercise (BONNEX BRAVO)
- Equipment exercise (BONNEX CHARLIE)
- Operational exercise (BONNEX DELTA)

### **7.5.1 Alarm exercise - BONNEX BRAVO**

- (i) The aim of this exercise type is to test the agreed procedures and lines of communication for reporting, requesting and providing assistance, and to get a picture of the current response readiness of the Contracting Parties to calls for assistance.
- (ii) The exercise further aims at familiarising the personnel with the use and national handling of the adopted POLREP reporting form.
- (iii) It is not the intention with this exercise that combating equipment and its handling personnel should be activated.
- (iv) When receiving an Exercise POLREP (POLWARN), the participating Contracting Parties should record time of receipt, time of transmission to the responsible national authority and time for the receipt of the POLREP (POLWARN) by the person responsible for initiating further national action.
- (v) When receiving an Exercise POLREP (POLINF/POLFAC), in addition to the time recorded as for POLREP (POLWARN), the participating Contracting Parties should e.g. make a realistic evaluation of types and amount of equipment as well as personnel at their disposal for rendering assistance called for as well as the estimated time of arrival at the scene of the accident.
- (vi) After termination of each exercise, the Contracting Parties shall submit a report containing the aforementioned times and evaluations, as well as a description of the management structure during the event, to the lead country for the drafting of the Exercise Report with the aim of having this report presented and discussed at the first following meeting of OTSOPA and subsequently to the meeting of the Contracting Parties.
- (vii) When sending the telefax to end the exercise, the lead country shall notify the deadline for submission of the report from each Contracting Party and the address to which the report should be sent.
- (viii) The BONNEX BRAVO takes place without notice within a specified period of time, and the participants in the exercise are not notified of the incident before the exercise takes place.
- (ix) The BONNEX BRAVO can be carried out between all the Contracting Parties and the arrangement and initiation of the exercise are undertaken by a designated lead country.

### **7.5.2 Equipment exercise - BONNEX CHARLIE**

- (i) The purpose of this exercise is to test the co-operation between combating units of the Contracting Parties with respect to both communication and equipment. It is intended to involve staff authorities only to a very limited extent.
- (ii) The BONNEX CHARLIE is carried out between two (or more) Contracting Parties with bordering response regions.

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<sup>1</sup> The North Sea Area covers the North Sea, the English Channel, the waters around Ireland and parts of the Western Approaches and the Norwegian Sea.

- (iii) Notice as to time and event is to be given well in advance of the exercise and Contracting Parties not taking part in the exercise and the Secretariat shall be invited to send observers to the exercise.
- (iv) Reports on the exercise should be sent to the lead country for the drafting of the Exercise Report (see 7.4) with the aim of having this report presented and discussed at the following meeting of OTSOPA and subsequently to the Meeting of the Contracting Parties.
- (v) The BONNEX CHARLIE is arranged and carried out after direct consultation between the Contracting Parties involved and following the lead country principle.

### **7.5.3 Operational exercise - BONNEX DELTA**

- (i) The aim of this exercise type is partly to test the alarm procedure, the response capability and the response time of the Contracting Parties, partly to test and to train the staff functions and the co-operation between combating units of the Contracting Parties.
- (ii) Guidelines for this exercise type will have to be worked out at a later stage when experience from undertaking the three foregoing exercise types has been gained.

### **7.5.4 Costs**

Unless otherwise decided, each participating Contracting Party pays its own expenses for planning and implementing the various exercises.

## **7.6 COORDINATED EXTENDED POLLUTION CONTROL OPERATIONS (CEPCO)**

A CEPCO operation can be defined as a continuous sequence of aerial surveillance flights supported by sea-borne assistance and, where possible, by data from satellite observations, to ensure a permanent presence (e.g. over a period of 24 hours) in a sea area with high shipping intensity. This high level of deployment of means is only possible when several neighbouring Contracting Parties cooperate intensively to ensure continuity and optimal coordination of the surveillance activities. The aims of the operation are, among others, to enhance the enforcement of discharge provisions at sea, to increase the deterrent effect of aerial surveillance efforts and to improve cooperation between participating authorities. An expanded CEPCO is an extension of the CEPCO programme.

## **7.7 RESEARCH, TRIALS AND TRAINING GROUP (RTTG)**

The RTTG has a watching brief to monitor research and trials around the world, to promote the organisation of trials of developments that appear promising for the work of the Bonn Agreement, to review the outcome of all surveillance work in the Bonn Agreement area and to coordinate the exercise programme between the Bonn Agreement and HELCOM Contracting Parties. The group works mainly by correspondence.

## OFFSHORE WINDFARMS

### Introduction

1. The world's energy is mainly provided by the combustion of fossil fuel. As the world's energy consumption increases, the supply of energy from fossil fuels is decreasing. The burning of fossil fuels contributes to pollution of the air and possible climate change. A global movement towards the generation of renewable energy is therefore underway to help meet the increased energy needs. One form of renewable energy is wind energy. Single windmills or windmill parks are now found throughout the world.

2. In Europe and in the Bonn Agreement area, authorities working in close cooperation with commercial entities, are building or planning to build these parks. Electrical power from offshore windfarms will make an important contribution to future energy and climate policies in the EU. Average wind forces at sea are high enough to promise an enormous potential in energy. Therefore many coastal states intend to build large wind energy parks, so-called windfarms, in their waters – after having considered the environmental impact of the planned windfarms infrastructure and having evaluated the risk for shipping prior to granting permission.

3. These windfarm constructions could however leak hydraulic oil, although according to the latest technical information the risk is limited. The constructions could also be threatened by a floating oil slick drifting into the park. Response authorities need to be prepared for incidents resulting in oil slicks drifting into sea areas where windfarms are located.

### Legal framework

4. With regard to the legal situation, windfarms are dealt with in similar way as offshore installations (oil and gas production installations)<sup>1</sup>. The owner is responsible for taking appropriate measures to avoid leakage of hazardous and noxious substances, including oil, from his property. In the event of a leakage from a construction, the owner is held liable and will be asked to recover the spilt oil and clean up the pollution. If as a result of another incident e.g. a collision between two ships, oil is discharged that drifts into the sea area where the windfarm is located, the owner of the windfarm may hold the ship-owner liable and require him to clean up or claim reimbursement for costs should the ship-owner (the polluter) not follow-up. This is in accordance with the “polluter pays” principle.

### Risk analysis

5. Before permission to build a windfarm is granted, the relevant authorities working closely with the owners of shipfarms should ideally first study the possible effects of the proposed windfarm on shipping. Under the Safety@sea project these studies have been conducted for North Sea areas. Where windfarms are proposed in the vicinity of existing shipping lanes, the impact of drifting ships (loss of propulsion) and the risk of collision should be anticipated. Although there will be safety zones around each single pole and around the park, a collision when a “dead” ship drifts into the park is a possibility.

### Construction of the windmills

6. In general, a windmill consists of one pole with one turbine in which case a large steel tube is drilled into the soil (monopole). It may be stabilised by means of gravity foundation (e.g. a large, partly buried box filled with sand). Another method is to lay rock or concrete blocks around the pole. This arrangement would allow oil particles to enter and stick to the construction and the oil could then wash out some time after an incident.

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<sup>1</sup> The legal framework is quite extensive depending on the topics to be included. UNCLOS articles 56 and 60 refer to the sovereign rights of coastal states. The International Environmental Policy and Energy Policy deals with sustainable energy resources. Nature Conservation Policy, under which OSPAR deals with *inter alia* bird protection (habitat). SOLAS plays a role as does the Bonn Agreement (in relation to response to pollution). Finally, national legislation and regulations can be referred to.

**Tiered preparedness and response to drifting pollution**

7. In some countries the windfarm owner has the responsibility to have a limited, 'Tier 1' level of preparedness and response (in Belgium, this has even led to the participation of the owner in response means in order to raise the level of preparedness of the Belgian authorities for marine pollution). In this case he is obliged to have a 'Tier 1' Contingency Plan, which contains specific information concerning rescue and pollution combating operations.

**Mechanical recovery**

8. Assuming a 'mystery' slick of considerable dimensions is drifting towards a windfarm and response authorities decide to initiate a combat operation, the question can be raised about what special measures need to be considered, e.g. would it be feasible to contain the oil by deploying booms or could the park be protected by deploying booms around the park to deflect the floating oil? If the oil drifts into the park and floats between the poles, recovery vessels should be allowed to enter for mechanical recovery operations. However, the turbines must then be switched off even if there is sufficient space between a rotor-blade and the ship.

**Dispersants**

9. Another response option is the application of dispersants, depending on the type of oil and the sea conditions. It is likely that dispersant spraying could be done from a vessel, whereas a spraying aircraft would not be allowed to apply dispersants to an oil slick in a windfarm.

**Mariculture**

10. In the discussions about the development and building of wind energy parks at sea, be it in coastal zones (shallow water) or at more remote places in the EEZ, a recurring subject is the possibility of introducing mariculture (mussels etc.) to the windfarm area. This may require special measures in order to protect the area against a drifting pollution. With regard to claims for the loss of production in cases where spilt oil reaches the mariculture area, it is stressed that this is a private matter between the polluter and the owner of the park or the fishfarm.

**Preventive measures**

11. Several preventive measures can usefully be taken, mainly based on navigational requirements. These are for example: the definition of a safety zone around the area, use of mist horns, signalisation of all structures at all time for nautical and aerial purposes, installation of oil retention tanks, list-keeping of all ships operating on behalf of the owner of the windfarm, numbering of structures, early warning of the authorities for all park-related activities in the shipping routes, the organisation by the owner of (multi-) annual simulation exercises on various subjects such as nautical emergencies, towing or pollution response, and the obligation on the owner (to be determined case-by-case) to follow the requirements of the competent authorities with regard to navigational requirements and safety.

**Communication**

12. It is recommended that a communications system be established between the Focal Point (24 hrs centre) of a coastal state and the operational centre of the owner of the windfarm so that the turbines can be switched off in case of emergency. The procedures for response to pollution should be included in the Emergency Handbook (contingency plan) of the windfarm.

## National organisation - Belgium

### 9. INFORMATION ON NATIONAL STRATEGIES, LEGISLATION, ORGANISATION, SHIPS, AIRCRAFT AND EQUIPMENT

#### 9.1. INTRODUCTION

The Belgian coast is adjacent to the Strait of Dover, which is one of the busiest shipping routes in the world. Two major shipping lanes cross the shallow Belgian maritime area (Noordhinder TSS and Westhinder TSS). Moreover, there is a considerable traffic in the Belgian territorial sea to and from the ports of Antwerp, Zeebrugge and Ostend. This intense traffic in the narrow shipping lanes creates a serious risk for pollution mainly resulting from possible collisions.

##### 9.1.1. Basic requirements for combating spills of oil and harmful substances

The preparedness for responding to marine pollution incidents is based on the following aspects:

- Incident assessment capability (aerial reconnaissance, sea surveillance/monitoring, modelling)
- Response control capability (control/command unit, contingency planning)
- Availability of a minimum stockpile of public response resources allowing initial quick action
- Recourse to external resources (private and other) for specialised response.

##### 9.1.2. General description of national organisation and legislation

The responsibility for formulating marine environmental policies at national level rests with the federal Minister who is in charge for the marine environment matters. Through the Directorate-General Environment (Federal Public Service Health, Food Chain Safety and Environment) assisted by the Management Unit of the North Sea Mathematical Models (MUMM, Royal Belgian Institute of Natural Sciences), the Minister coordinates the implementation of the various international agreements.

The national responsibility for dealing with marine pollution incidents in the Belgian zone of responsibility in the North Sea is a federal competency which primarily rests with the federal Minister who is in charge for the marine environment matters. In case of a catastrophic event, including grave pollution incidents, the national contingency plan for the North Sea ("*General Emergency and Intervention (GEI) Plan North Sea*") is activated. The management of the response to such an event is then placed under the coordination of a Command Post Operations (operational level) and the Province Governor of West-Flanders (management level) (see [9.2.](#)).

At operational level the Directorate-General Environment owns the Belgian stockpile of pollution combating equipment and is responsible for its deployment. It is assisted by the Management Unit of the North Sea Mathematical Models (MUMM - scientific assessment), the Civil Protection (trained response personnel and logistics), the Navy (communications, trained response personnel and sea-going support) and the Flemish Region (communications and sea-going support). When the GEI Plan North Sea is activated the Navy is in charge of the overall coordination of the response operations at sea (see [9.2.1.1.](#)).

In case of major pollution threatening or affecting the Belgian coastline, the Civil Protection intervenes for deploying the equipment for the protection and clean-up of the shoreline. In case of minor pollution, the municipal authorities holding concessions for the beaches are responsible for

the protection and the cleaning up of the shores. Combating minor pollution in the ports is the responsibility of the port authorities.

According to Belgian federal law on the protection of the marine environment (20 January 1999) counter-pollution activities in the open sea should be based as a first option on oil containment and mechanical recovery. Chemical dispersion is a second response option.

The use of dispersants at sea is subject to the authorisation of the federal authority (MUMM) appointed by the Minister in charge of the protection of the marine environment. Belgium has not developed a specific dispersant testing and approval procedure. Only those dispersants having received wide acceptance in Bonn Agreement countries may come into consideration for use at sea.

### 9.1.3. National Contact Point for the Bonn Agreement

The Maritime Security Centre (MIK) of the Navy operational command (COMOPSNV, Ministry of Defence) at Zeebrugge is the Belgian National Contact Point for the Bonn Agreement. International messages from Bonn Agreement Contracting Parties (POLREPs) received by the MIK are passed on to the Maritime Rescue and Coordination Centre at Ostend (MRCC - Ministry of the Flemish Region) and other concerned Belgian Coastguard partners. In case of a serious pollution incident in the Belgian part of the North Sea, the MRCC activates the national alarm procedures as foreseen in the GEI Plan North Sea (see 9.2.1.).

The MIK is also the National Focal Point for in-flight aerial surveillance reports.

## 9.2. RESPONSIBILITIES, ORGANISATION AND RESOURCES

### 9.2.1. National contingency plan and tasks: “GEI Plan North Sea”

In case of major pollution incident at sea, the general structure of intervention and pollution combating operations is stipulated in the national contingency plan for the Belgian part of the North Sea (“General Emergency and Intervention (GEI) Plan North Sea”) and is independent of the type of incident or threat. The GEI Plan North Sea defines the organisation of an overall, multidisciplinary response structure to the various emergency situations and incidents that may happen at sea and which require a coordination or management from Belgian authorities, such as: maritime emergencies, SAR and medical evacuations, marine pollution (oil or other harmful substances), incidents in windmill farms, etc. The **Governor of West-Flanders** acts as coordinator of the GEI Plan North Sea.

As stipulated in the GEI Plan North Sea, emergency situations at sea are managed by means of a structure consisting of two coordinating bodies (see [Figure 1](#)):

- The Command Post Operations or **CP-OPS** which ensures the **operational** coordination, and is under the operational lead of a Director of the CP-OPS, the Dir-CP-OPS (see 3.2.);
- The **Coordination Committee** which ensures the **management** coordination, and is under the coordination of the Governor of West-Flanders.

Most emergency situations at sea will lead to the activation of management coordination at provincial level, under the coordination of the Governor of West-Flanders. In some cases however, a management coordination will be activated at federal level, e.g. in case of a specific request from the Governor, or in case of a security emergency.

The start-up of the operational coordination (CP-OPS) does not automatically lead to the start-up of management coordination (Coordination Committee). It is possible however that there is

operational and management coordination at the same time, during which the CP-OPS remains active and executes the tasks that the (provincial or federal) Coordination Committee has imposed.

Besides the aspect of two coordinating bodies, the GEI Plan North Sea is also a **multidisciplinary** plan for the sea, in line with the general structure of emergency plans in Belgium. Each of the 5 disciplines (see [Fig.1](#)) consists of a functional unit of intervention tasks that are executed by different intervening services, under the operational lead of a discipline 'director'. Therefore a specific 'mono-disciplinary Intervention Plan' has also been drafted for each of these disciplines.

The 5 disciplines are:

- Discipline 1 (D1) covers **Assistance Operations at sea**. The tasks and duties with regard to these assistance operations cover more specifically SAR-, safety- and environment- (pollution response)-related interventions. The 'Director Assistance Operations' takes the operational lead of this discipline. Depending on the kind of intervention (Safety/SAR operations or pollution response), this function will be taken up by somebody of the Shipping Assistance Division or somebody of Defence. In most cases however, given the overarching character of maritime safety aspects, the coordination of the assistance operations will be ensured by the Shipping Assistance Division, whereas Defence will only take the lead of D1 in case the operations primarily consist of pollution response. In case of a major accidental marine pollution incident, it can be decided to create a specific **Evaluation and Planning cell** within this D1.
- Discipline 2 (D2) covers the urgent **medical interventions**, the necessary measures for public health and psychosocial assistance for the victims.
- Discipline 3 (D3) covers the **police interventions** at sea.
- Discipline 4 (D4) comprises the organisation of **logistic support** and activation of logistic means.
- Discipline 5 (D5) deals with the **communication** of information and directives to the population and to the media in an emergency situation. This task is fulfilled at the management level by the Governor's services.

#### 9.2.1.1. CP-OPS – Operational coordination

The operational coordination of the GEI Plan North Sea can be proclaimed for an incident that requires a multidisciplinary co-ordinated approach without important management decisions. The Director of the Command Post or **Dir-CP-OPS** will proclaim the operational co-ordination and will inform the Governor thereof. In case of a *safety*-incident the function of Dir-CP-OPS will normally be fulfilled by the **Nautical Director of MDK**, unless the Governor - depending on the situation - appoints another discipline director as Dir-CP-OPS. In case of a *security* incident, the Dir-CP-OPS will be delivered by the 'Police' discipline (D3). As soon as the Dir-CP-OPS has proclaimed the operational phase, a CP-OPS will be established **at MRCC Ostend**. The CP-OPS will be composed of the Dir-CP-OPS and the directors of the activated disciplines, and, depending on the incident (e.g. SAR, maritime safety or pollution response), the Dir-CP-OPS can call upon experts of various services. The tasks of the **CP-OPS** are, amongst others:

- The multidisciplinary co-ordination of the interventions;
- Initial evaluation of the situation;
- In case of marine pollution: first priority setting and defining of response strategy;
- Taking of protective measures for intervening personnel and the public;
- Obligation to inform the Governor of an incident and to report on the situation;
- In anticipation of the establishment of a Coordination Committee: management coordination and ensuring that the MRCC performs the necessary alerting.

At sea, the **On Scene Commander** from the Ministry of Defence (Navy) ensures the multidisciplinary coordination of the operations (see [Fig.1](#)). He thereby acts under the operational control and orders of the Dir-CP-OPS. The On Scene Commander is *inter alia* responsible for the execution of the operations, hereby assisted by technical experts, organises the coordination and communication at sea and supervises the execution of instructions given by the Dir-CP-OPS (for these tasks the On Scene Commander can be assisted by an 'On Scene Coordinator SAR' and an 'On Scene Coordinator ENV', for the specific coordination of SAR and pollution response operations respectively), and fulfils the function of Supreme On-Scene Commander (SOSC) in case of marine pollution with a multinational response in the Belgian marine areas.

#### 9.2.1.2. Coordination Committee - Management coordination at provincial level

The **Governor of West-Flanders** or his authorized representative activates the management coordination at provincial level. The management coordination level can be activated e.g. in case the required means exceed the available resources, in case of a sudden occurrence of or imminent threat for major impact, or in case the incident has a transboundary character. As soon as the decision has been taken to start up the management coordination at provincial level, the provincial **Coordination Committee** (see [Fig.1](#)) is convoked. In this phase with two coordinating bodies, the CP-OPS will remain active and will execute the orders imposed by the Coordination Committee.

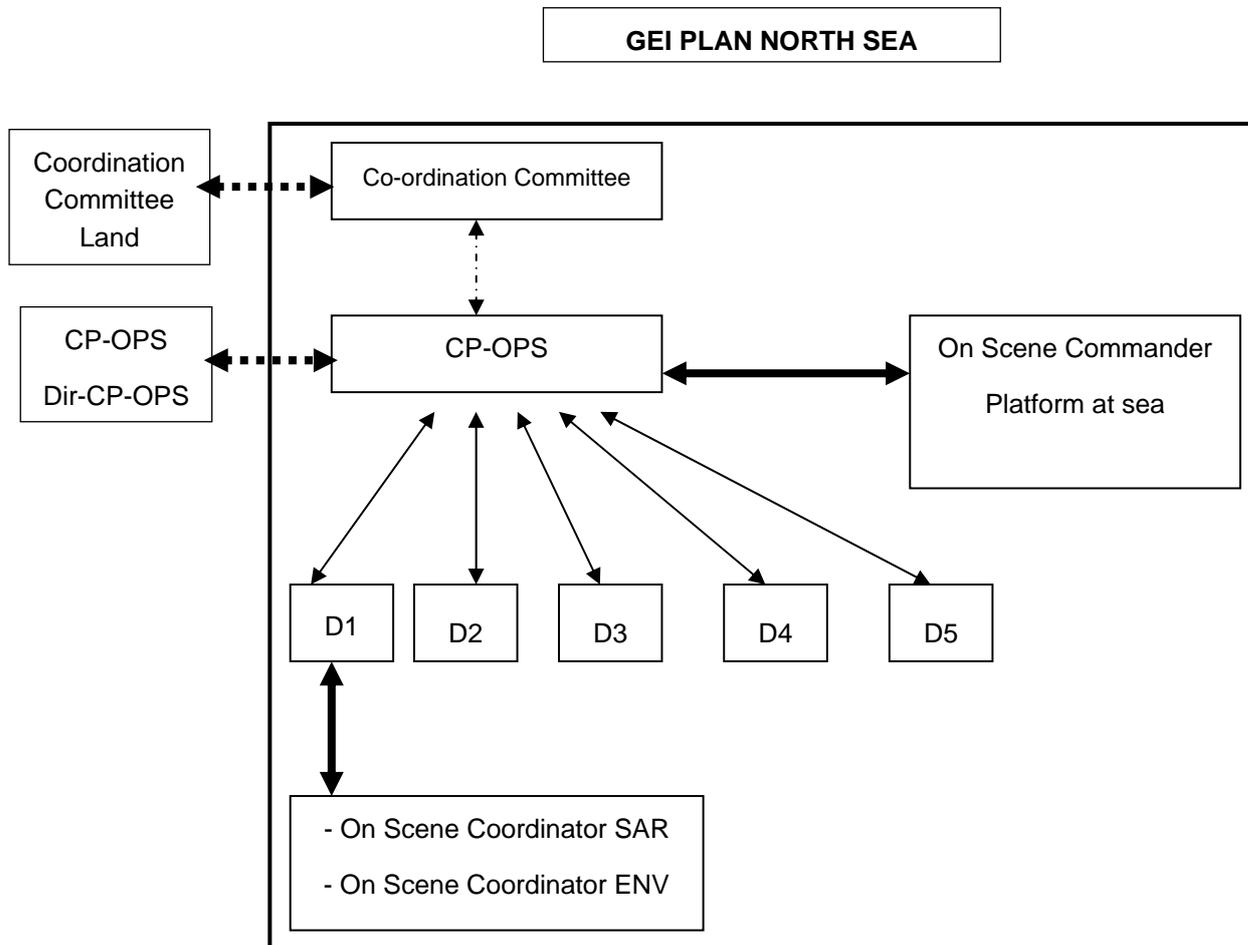
The Coordination Committee consists of representatives of the activated disciplines of the GEI Plan North Sea and can be complemented with national experts, in particular representatives of competent governmental services. Salvage companies can be convoked to the Coordination Committee as external experts. If needed the Dir-CP-OPS or his substitute shall be present at the Coordination Committee to support the Governor in his decision-making.

The provincial Coordination Committee has the overall responsibility for the coordination and management of a crisis and interventions. The committee will *inter alia* determine a general plan of action and strategy as well as the level of crisis management. It will take financial decisions and take socio-economic aspects into account. It will also provide information and will function as contact point. Beside the provincial Coordination Committee, a **financial and a legal Cell** can be established. When activated the financial Cell will be engaged in the financial settlement of the incident; for this purpose the Coordination Committee can also decide to establish an operational financial cell within the CP-OPS.

#### 9.2.1.3. Management coordination at federal level

Generally speaking, the GEI Plan North Sea will mostly be managed at the level of the Governor whereby the federal authorities offer assistance to the Governor. Only in very exceptional cases such as incidents in the Security field (e.g. cases of terrorism, or a nuclear incident) a federal level will be activated by the Interior Minister. In such cases the Governor will still play his role of coordinator, but the decisions will be taken at federal level (federal Coordination Committee chaired by the Minister of Interior and supported by various federal crisis cells).

**Figure 1:** Overall organizational structure as defined in GEI Plan North Sea.



#### 9.2.1.4. Organisation in case of emergency situations with international character

In case of an environmental emergency at sea with international character, with transboundary pollution and/or multinational response operations, the Plan stipulates that the operational agreements as determined in the framework of the Bonn Agreement shall apply – such as with respect to the rendering of assistance, the operational control and tactical command in case of joint operations, or the exchange and function of liaison officers.

#### 9.2.1.5. Aspects of Communication

The GEI Plan North Sea furthermore describes the various communication aspects in case of activation. **MRCC Ostend** plays a central role herein, ensuring the alerting and activation of all concerned services and authorities, as well as the phasing out of the operations; furthermore, as Belgian 'Coastal Station' the MRCC always has to be informed in first instance of an incident, e.g. by a vessel, a witness, or the MIK (e.g. in case of POLREPs from abroad)

**Different phases** have been defined in the GEI Plan North Sea (see [Figure 2](#)). In function of the type and gravity of the incident, the emergency situations at sea can be proclaimed in a mono- or multidisciplinary way. The multidisciplinary action can be proclaimed at the level of operational

coordination, at the level of the provincial management coordination (pre-alarm phase and alarm phase<sup>1</sup>) or at the level of the federal management coordination. The Coordination Committee that is active when the emergency situation is ending ensures the deactivation of the GEI Plan North Sea and guarantees the transition to the aftercare phase.

**Figure 2:** Upscaling Scheme of GEI Plan North Sea.

| MONODISCIPLINARY<br>INCIDENTS   | MULTIDISCIPLINARY<br>INCIDENTS  | P<br>R<br>E<br> <br>A<br>L<br>M | MULTIDISCIPLINARY<br>DISASTERS  |
|---|---|---------------------------------|---|
| <i>Coordination level:</i><br><br>MRCC  | CP-OPS<br><br>(operational coordination<br>without management<br>coordination)              |                                 | CP-OPS<br><br>+<br><br>COORDINATION<br>COMMITTEE  |
| <i>Notification via MRCC:</i><br><br>NOTIFICATION MATRIX<br>COASTGUARD<br><br>or<br><br>request oral or written advice<br>via MiniMAS <sup>2</sup> procedures | NOTIFICATION<br><br>in line with tables and<br>formats in Annexes<br><br>GEI Plan North Sea |                                 | NOTIFICATION<br><br>in line with tables and<br>formats in Annexes<br><br>GEI Plan North Sea |

With regard to **notification of and communication with foreign countries**, and also with regard to **requests for international assistance**, reference is made to a series of international agreements and channels such as – in the case of marine pollution – the Bonn Agreement (incl. the Zone of joint responsibility and the POLREP-procedures), SafeSeaNet, European aid requests via the European Monitoring and Information Centre MIC and CECIS (e.g. also for activation of EMSA pollution response vessels), and various other bilateral agreements.

<sup>1</sup> The pre-alarm phase corresponding to a stand-by phase of the management coordination in the initial stage of an incident; the alarm phase directly leading to the start-up of the provincial management coordination with establishment of the Coordination Committee

<sup>2</sup> MiniMAS stands for national maritime assistance service procedures in case of a minor incident.

#### 9.2.1.6. National system on 'Places of Refuge'

Belgium recently extended its national contingency plan for the North Sea with a dedicated Part on places of refuge, containing plans for the accommodation of ships in need of assistance. These plans have been drafted in implementation of Art.20 of European Monitoring Directive 2009/17/EC, and also taking into account the international guidelines on places of refuge (mainly IMO Res.A.949(23)).

For situations of ships in need of assistance as referred to in the Monitoring Directive 2009/17/EC, the **Governor of West-Flanders** acts as **competent authority** for the accommodation of ships in need of assistance. For the situations as foreseen in the Directive, the Belgian Coastguard partners will temporarily delegate their competences to the Governor whereby he can take (urgent) decisions and measures with respect to ships in need of assistance. This 'competent authority' function of the Governor as well as the key role of MRCC Ostend (which functions as 'competent authority' prior to the activation of the GEI Plan North Sea) and the support given by other Coastguard partners in that respect, are defined in detail in the specific operational plans for the accommodation of ships in need of assistance.

#### 9.2.2. Execution of response actions

In case of an accidental marine pollution incident, national authorities that will be activated and represented within the two-level emergency management structure of the GEI Plan North Sea (see 9.2.1.) are, amongst others, the Directorate-General Environment, the Navy, MUMM, the Civil Protection, and Flemish Region services.

The Directorate-General Environment carries out the pollution response intervention in the open sea when necessary. The Navy and the Flemish Region provide the sea-going support for deploying the pollution combating equipment at sea. Further assistance is provided by the federal Maritime Police, the Maritime Inspection (Port State Control) and the MRCC. MUMM is assisting with dedicated airborne reconnaissance for assessment and guidance.

#### 9.2.3. Strategy for combating marine pollution at sea

For oil spills, the first response option according to national law (law of 20 January 1999 on the protection of the marine environment in the marine areas under Belgian jurisdiction) is containment and mechanical recovery. The use of dispersants or other chemical products is a second response option under this law. Their use can only be permitted by MUMM (as competent authority appointed by the federal Minister for the Environment), when an evaluation of the circumstances indicates that the chemical treatment will result in a global reduction of the anticipated negative effects of the pollution on the marine environment as compared with natural processes or other combating methods (cf. Net Environmental Benefit Analysis - NEBA).

For small spills, without activation of the GEI Plan North Sea (monodisciplinary action), the Directorate-General Environment carries out the counter-pollution operation in the open sea in collaboration with the Navy and the Flemish Region.

For major spills, with activation of the GEI Plan North Sea (multidisciplinary action):

- Counter-pollution activities are conducted under the provisions of the GEI Plan North Sea and placed under the leading of the Dir-CP-OPS (operational level) and the Province Governor (management level).
- The pollution response strategy is decided by the Coordination Committee and/or Dir-CP-OPS on the basis of an assessment of the characteristics and behaviour of oil, the possible environmental impact of the response technique and, with respect to the use of dispersants, after the necessary authorisation.

- The Navy coordinates the pollution response operations on scene, via the On Scene Commander and On Scene Coordinator ENV.
- Combating operations at sea are carried out by means of the pollution combating equipment of the Directorate-General Environment (containment booms, skimmers, floating storage tanks, dispersant spraying systems, pumps, ...).

#### 9.2.4. Strategy for combating shoreline pollution

For minor coastal pollution, without activation of the GEI Plan North Sea:

- The coastal municipalities deal with minor pollutions on their shorelines. (The Civil Protection also intervenes on request of the municipalities when the type and the extent of the pollution require the use of specialised shore protection or shore clean-up equipment.)
- Port authorities are responsible for clean-up operations in their waterways and harbour basins. (They may also ask for the assistance of the Civil Protection and the deployment of pollution combating equipment of the Directorate-General Environment.)
- The Flemish Region has an interest in keeping access to harbours open.

In case of major pollution, with activation of the GEI Plan North Sea and the emergency and intervention plan of the Province of West-Flanders:

- The co-ordination of the response operations is provided within the framework of the GEI Plan North Sea and, if activated, the emergency and intervention plans of the Province of West-Flanders, with *inter alia* activation of Civil Protection units for coastal clean-up and a fluent 'sea-land' interaction in the management of the incident (see [Fig.1](#)).

#### 9.2.5. Resources for dealing with oil and chemical pollution

Pollution combating operations are carried out by means of the pollution combating equipment of the Directorate-General Environment. A wide range of equipment is available (containment booms, skimmers, storage tanks, dispersant spraying units, pumps, protective clothing, ...) allowing response to spills up to 1,000 m<sup>3</sup> of oil. Above that limit the assistance of additional resources from neighbouring countries and/or EMSA (standby oil spill response vessels) is required.

Different kinds of complementary oil recovery systems are available that handle oils with viscosities ranging from low up to very high in different typical operational situations: the *open sea*, the *shallow coastal waters* and the *shoreline*.

This equipment is intended for a rapid initial response. Because of its short shoreline, Belgium has indeed few specialised response personnel and limited stocks of equipment. When the polluter is known, the authorities may therefore prefer - whenever practicable - that he mobilises private counter-pollution resources at his own expense. In such event, he deploys them in agreement with the authorities and under their control.

The Belgian stockpile of equipment is based in a central location near the Belgian coast and is permanently kept ready for rapid intervention. The deployment at sea relies on the use of "vessels of opportunity" and is provided by Navy vessels (tugs and minesweepers) and vessels of the Flemish Region under contract with Directorate-General Environment (tug, hydrographic vessel). Air Force helicopters (Seaking and Alouettes III) are also available. A remote-sensing aircraft operated by MUMM is available for the reconnaissance of marine pollution.

Stocks of oil dispersants are maintained by the Directorate-General Environment and the Civil Protection. The Civil Protection has also special equipment and trained personnel for intervention on accidental spills involving hazardous and noxious substances.

The MUMM has developed 3D mathematical models for predicting the drift and fate of an oil spill, both surface and subsurface, in the North Sea and Channel area. OSERIT, the 3D oil drift and fate model, can also be used as a support tool in a NEBA<sup>3</sup> evaluation and decision-making process.

### **9.2.6. Permits and monitoring**

#### 9.2.6.1. Permits

Counter-measures liable to have a complex or adverse effect on the marine environment, such as the use of dispersants, oil burning, or the release of harmful substances, require prior approval of MUMM.

#### 9.2.6.2. Monitoring and impact assessment of marine pollution

MUMM coordinates environmental surveillance and risk evaluation activities (aerial surveys, vessel-based monitoring, assessment of the fate of the oil using mathematical models, environmental risk assessment, and environmental damage assessment).

When the national GEI Plan North Sea is activated, MUMM representatives participate in the Command Post as scientific advisors on environmental matters.

### **9.2.7. Personnel training policy**

The personnel of the Civil Protection, the Navy, the Flemish regional authorities and the Directorate-General Environment involved in the deployment of pollution combating equipment receives a specific training (both theoretical and practical). Deployment exercises are carried out at regular time intervals. In addition, the Navy trains the officers acting in quality of On Scene Commander when the GEI Plan North Sea is activated.

### **9.2.8. Research and development policy**

MUMM carries out most research activities in the field of marine pollution in Belgium (ecological sensitivity and impact studies, modelling, scientific evaluation and monitoring). MUMM is assisted by the Belgian Navy in running the State oceanographic research vessel BELGICA.

There is currently no specific plan for research and development in the field of oil pollution-combating techniques and systems in Belgium. However the Directorate-General Environment, in close cooperation with the manufacturers of the purchased oil combating equipment, is continuously working on the improvement of the design and the optimisation of the performances of its pollution response equipment.

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<sup>3</sup> Net Environmental Benefit Analysis

## Chapter 10: Denmark – National Organisation

### 10.1 INTRODUCTION

#### 10.1.1 Background

The majority of the maritime traffic entering and leaving the Baltic Sea passes through Danish waters. The two major routes are the Great Belt and the Sound. Some 65,000 vessels pass through these two lanes each year. Because of the intensity of the traffic and the rather narrow lanes, there is a serious risk of pollution resulting from collisions. Furthermore, in recent years there has been an increase in the number of tankers carrying oil out from the Baltic Sea. This may add further to the risk of pollution in Danish waters.

Each year the Admiral Danish Fleet receives reports of 350-400 suspected oil spills in Danish waters. These may originate from natural causes (algae bloom), operational spills from ships or platforms and/or accidents.

#### 10.1.2 General description of national organisation

As of 1 January 2000, responsibility for the state maritime environmental surveillance and enforcement, and the state maritime pollution control at sea was transferred from the Ministry of Environment and Energy to the Danish Armed Forces. With the amendment of the Marine Environment Protection Act of 1 July 2000 the Armed Forces were given the possibility of issuing administrative fines for illegal oil discharges from ships. The Armed Forces' execution of the task is thus based on national legislation and international conventions and agreements.

The aim of the Armed Forces' effort against pollution of the sea is to prevent or minimise the impact of marine pollution on flora and fauna.

The total environmental task consists of the following operational sub-tasks:

- Establishment and maintenance of preparedness;
- Environmental surveillance;
- Enforcement; and
- Pollution control.

The general aim of the task is to guarantee a deterrent effect as part of prevention proper through surveillance, enforcement and securing evidence, primarily in the territorial waters and secondarily in Denmark's Exclusive Economic Zone (EEZ). In order to obtain a maximum deterrent effect, the handling of task is concentrated on surveillance and gathering of evidence. By taking and gathering oil samples and implementing comparable oil sample analyses, the aim is to procure positive evidence in order to commence legal proceedings.

If oil pollution has taken place, the aim is to minimise the impact of the damage, primarily on coasts and beaches, through timely notification of state authorities and effective coordination in the employment of all resources.

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## 10.2 National organisation and responsibilities

### 10.2.1 National/regional/municipal organisation and tasks

Admiral Danish Fleet (ADF) receives all reports on matters concerning the marine environment and is responsible for the direction and coordination of the total employment of the state resources at sea, including assistance from involved external authorities. ADF decides on the extent of the effort in connection with established pollution, and organises the allocated national resources.

If necessary, the accomplishment of the task is coordinated with the municipal/county preparedness units. These units are continuously briefed on the current situation, in order to allow local authorities and county authorities to arrange the necessary resources, or alternatively to request further support through national emergency preparedness and ultimately to request emergency assistance.

To direct and control the accomplishment of the marine environmental task, the 24-hour service set up at the ADF operational centre is used. To handle the national marine environmental task, a Marine Environment Branch has been set up at ADF to provide expert assistance to the ADF operational centre within normal working hours in the evaluation of the preparedness effort in connection with pollution incidents. Outside normal working hours, the expert assistance is handled by an on-call officer in the Marine Environment Branch.

Other principal tasks of the ADF Marine Environment Branch are: Counselling in all matters concerning marine environmental operations; ADF staff work concerning participation in the maritime surveillance of the marine environment; enforcement and maritime pollution control at sea; staff work concerning gathering of evidence in connection with possible criminal cases on oil pollution from ships; staff work concerning general matters on marine environment and sea law; staff work concerning international agreements: participation in national and international exercise activity in relation to the performance of the marine environmental duty; participation in meeting activity, participation in international and national working groups concerning the execution of the marine environmental duty; compiling reports, statistics, etc; updating of ADF internal/external decision code, including preparation of contingency plans in relation to the performance of the marine environmental duty; updating of, in connection with Naval Materiel Command and Tactical Air Command Denmark, the Danish Internet homepage established pursuant to Council of the European Union decision on EU framework regulations for marine pollution cooperation.

### 10.2.2 Strategy for combating at sea

The general counter pollution policy is mechanical recovery at sea. No stock of dispersants is kept, and if it should be decided to buy and use dispersants, a specific permission will have to be granted by the Danish EPA.

### 10.2.3 Strategy for combating on-shore and restoration

If the oil cannot be prevented from reaching the shore, efforts should be made to protect sensitive areas. The responsibility for this task lies within the municipal organisation. If oil reaches the shore – or is originating from a harbour – efforts should be made to contain the oil, thus preventing it from reaching other areas.

### 10.2.4 Resources for dealing with oil and chemical pollution

The state maritime pollution control capability comprises two environmental divisions on stand-by, based in Naval Base Frederikshavn and Naval Base Korsøer respectively. The respective divisions have continuously one unit on 1-hour stand-by, and one unit on 16 hours' notice. The Armed Forces' maritime supplementary environmental preparedness comprises the maritime operational units and 5 pollution control modules on ships of the DIANA class.

Naval Materiel Command is responsible for the proper technical condition of the pollution control equipment and handles in addition supply and logistic support.

#### **10.2.4.1 Exercises**

The planning and accomplishment of annual national marine environmental exercises at sea rest with ADF. Exercises in the coastal area, including exercises involving employment on coasts and in harbours, are planned and accomplished in coordination with the Emergency Management Agency. The exercises are accomplished with participation from relevant external authorities using several special equipment resources, including the Armed Forces' aircraft. The exercises are accomplished in several geographical areas.

ADF is also in charge of planning, accomplishment and control of international exercises held within the Danish area of responsibility.

#### **10.2.4.2 Vessels**

The above (under 10.2.5) mentioned two environmental divisions each consists of 1 vessel of SUPPLY-type (capacity of 300 M<sup>3</sup>), 1 vessel of SEA-TRUCK- type (capacity of 60 M<sup>3</sup> and a minor assisting vessel. In addition to these vessels – and the 5 DIANA class vessels - a number of the Naval Home Guard vessels may be equipped with pollution control modules.

#### **10.2.4.3 Surveillance**

The marine environment surveillance comprises the following sub-areas:

- The maritime surveillance, which comprises surveillance from the sea,
- the airborne surveillance, which comprises surveillance from the air, and
- the satellite based surveillance.

There is no national maritime environmental surveillance proper from ships. The maritime environmental surveillance is merely accomplished in connection with the general navigation and surveillance of Danish waters by the ships of the Armed Forces and other state ships, and in connection with the general enforcement of sovereignty.

As part of the establishing of the detailed maritime situation picture and supplementary to the general surveillance of waters, data from EU reporting centre, Vessel Traffic Service Centre (VTS) Great Belt and SHIPPOS are employed to the extent they are applicable in an environment connection.

The airborne surveillance comprises 500 hours' annual flying performed by specially equipped aircraft from the Air Force's inspection flying structure. The airborne surveillance is carried out over Danish territorial waters, including Danish international straits, and over the Danish EEZ.

ADF has the operational responsibility for arranging the airborne surveillance. ADF plans in direct coordination with Tactical Air Command Denmark (TACDEN) the enjoined inspection flight hours. ADF may contact TACDEN about the employment of F-16 (fighter readiness and recce readiness) and S-61 (rescue helicopters), and further appoint the Navy's LYNX helicopters for employment. As a supplement to the airborne surveillance of the marine environment, the Armed Forces have entered into a contract with Kongsberg Satellite Service about the receipt of approximately 100 images annually.

The Danish Defence Acquisition and Logistics Organization is responsible for the materiel, supply and maintenance support for the performance of the airborne surveillance, including oil sample equipment for use from helicopters.

## EUROPEAN UNION

### Response to accidental or deliberate marine pollution

#### 11.1 General Information

11.1.1 EU can support BONN Agreement countries in preparedness and response to marine pollution mainly through the Union Civil Protection Mechanism (the Union Mechanism) and the European Maritime Safety Agency (EMSA).

11.1.2 The Union Mechanism aims to strengthen the cooperation between the Union and the Participating States<sup>1</sup> and to facilitate coordination in order to improve the effectiveness of systems for preventing, preparing for and responding to disasters. It covers both civil protection and marine pollution emergencies inside and outside the EU. Emergency Response Coordination Centre (ERCC) is the operational hub of the Union Mechanism. The centre is operated by DG ECHO of the European Commission and accessible 24 hours a day.

#### 11.2 EU support in marine pollution emergencies

11.2.1 Upon request for assistance from a country affected by a marine pollution incident, the ERCC can quickly coordinate the mobilisation of pollution response capacity and expertise from the Participating States and EMSA and facilitate their deployment to the affected area. More information on the Union Mechanism and its tools can be found at:

[http://ec.europa.eu/echo/policies/disaster\\_response/mechanism\\_en.htm](http://ec.europa.eu/echo/policies/disaster_response/mechanism_en.htm)

11.2.2 The European Maritime Safety Agency offers four main marine pollution response services, available upon request, to EU Member States, coastal European Free Trade Association (EFTA) Contracting Parties, EU Candidate Countries, and the European Commission, namely:

- With respect to accidental oil spills, the Agency has established a Network of Stand-by Oil Spill Response Vessels around Europe, with state of the art equipment and large storage capacity, providing a European tier of operational resources to support the pollution response mechanisms of the affected coastal State in case of pollution caused by ships as well as by oil and gas installations.
- In order to detect ship borne oil pollutions at sea, EMSA developed the CleanSeaNet (CSN) near real time satellite-based oil spill monitoring and vessel detection service.
- The “MAR-ICE Network” (Marine Intervention in Chemical Emergencies Network) of chemical experts to support EU coastal States in responding to chemical/HNS spills at sea by providing information on chemical substances.
- EMSA can also make available pollution response experts to provide (on-site / office-based) operational and technical assistance for oil and HNS incidents.

More information on the EMSA Pollution Detection and Response Services can be found at:

<http://emsa.europa.eu/operations.html>

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<sup>1</sup> EU 28, Norway and Iceland.

### 11.3 Procedure to request assistance

11.3.1 All requests for EMSA's marine pollution response services or for the assistance through the Union Civil Protection Mechanism (reaching all its Participating States) should be sent to the ERCC at the European Commission preferably through the Common Emergency Communication and Information System (CECIS)<sup>2</sup>. Alternatively the request can be sent to the ERCC by email or fax.

#### ***Request for EMSA Stand-by Oil Spill Response Vessels***

11.3.2 Detailed procedures to request assistance of EMSA contracted vessels is provided in “EMSA Network of Stand-by Oil Spill Response Vessels - User Guide” distributed to coastal States through the members of the Consultative Technical Group for Marine Pollution Response Preparedness and Response (CTG MPPR) and available in the password protected Vessel User Group (VUG) section of the EMSA website.

11.3.3 Description of available vessels, their equipment and performance can be found in CECIS resources database and on EMSA website:

<http://www.emsa.europa.eu/operations/network-of-stand-by-oil-spill-response-vessels.html>

#### ***Request for CleanSeaNet (CSN) satellite images***

11.3.4 Detailed information on the EMSA CSN satellite-based services can be found at:

<http://emsa.europa.eu/operations/cleanseanet.html>

#### ***Request for MAR-ICE (HNS emergencies)***

11.3.5 Information regarding the “MAR-ICE Network” service can be found at:

<http://emsa.europa.eu/operations/hns-pollution.html>

### 11.4 Contact Points

#### **Emergencies (24/7)**

|  |  |
|--|--|
| <p><b>European Commission</b><br/>Directorate General for Humanitarian Aid and Civil Protection (DG ECHO)<br/><b>Emergency Response Coordination Centre (ERCC)</b><br/>Rue de la Loi 86<br/>B-1049 Brussels<br/>Belgium<br/><b>Duty Officer GSM:</b> +32-2-29 21112<br/><b>Duty Officer Fax:</b> +32-2-29 86651<br/><b>Duty Officer E-mail:</b> <a href="mailto:ECHO-ERCC@ec.europa.eu">ECHO-ERCC@ec.europa.eu</a></p> | <p><b>European Maritime Safety Agency (EMSA)</b><br/>Praça Europa Nº4<br/>Cais do Sodré<br/>1249-206 Lisbon<br/>PORTUGAL<br/><b>Maritime Support Services (MSS)</b><br/><b>Duty Officer Tel:</b> +351 21 1209 415<br/><b>Duty Officer Fax:</b> +351 21 1209 480<br/><b>Duty Officer E-mail:</b><br/><a href="mailto:MaritimeSupportServices@emsa.europa.eu">MaritimeSupportServices@emsa.europa.eu</a></p> |
|--|--|

#### **Enquiries (office hrs)**

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B-1040 Brussels  
BELGIUM  
**Tel:** +32-2-29 84396  
**E-mail:** [ECHO-A5@ec.europa.eu](mailto:ECHO-A5@ec.europa.eu)

<sup>2</sup> CECIS is a secure web-based application to facilitate emergency communication among its users. It also contains a database of Member States and EMSA operational response capabilities.

## **FEDERAL REPUBLIC OF GERMANY – NATIONAL ORGANISATION**

### **12. INFORMATION ON NATIONAL STRATEGIES, LEGISLATION, ORGANISATION, SHIPS, AIRCRAFT AND EQUIPMENT**

#### **12.1 INTRODUCTION**

The Federal Republic of Germany (FRG) has established a governmental system to deal with accidental marine disasters and pollution control. In accordance with the German constitution marine emergencies and grave marine pollution have to be managed by both the Federal Government and the five Federal Coastal States.

Thus, close co-operation was agreed between these parties to build up and improve the needed national capacity for marine pollution preparedness and response. Since 2003 the Central Command for Maritime Emergencies (CCME) staffed by federal and coastal states officers and headed by a federal chief of staff centralises the management of maritime accidents by planning, initiating and commanding all response activities.

#### **12.1.1 BASIC REQUIREMENTS FOR COMBATING OF SPILLS OF OIL AND HARMFUL SUBSTANCES**

The large Wadden Sea area off the German coastline with highly sensitive regions in the North Sea and the shallow waters regions (called “Bodden Sea”) in the Baltic are key factors for a wide-ranging contingency planning dealing with marine pollution. Therefore German authorities have launched a comprehensive procurement programme to complete and improve the national ability to respond effectively against marine pollution at sea and along the shoreline. It started in 1977 with *oil* spill response equipment and included:

- prevention measures;
- recovery and clean-up techniques;
- remediation of contaminated sensitive coastal areas.

Taking into account the results of a comprehensive research and development programme of the Federal Minister for Research and Technology, more than 200 million Euro have been spent for specialised recovery vessels and equipment, surveillance airplane, studies, etc. to improve the national capabilities to respond to pollution at sea and within the coastline.

#### **12.1.2 GENERAL DESCRIPTION OF NATIONAL ORGANISATION AND LEGISLATION**

According to the provisions of an administrative agreement 2003, counter pollution measures are a matter of joint responsibility of the Federal Government and of the five Federal Coastal States bordering the North Sea and the Baltic Sea. Counter pollution measures are conducted within above described responsibilities of the CCME representing the Federal Government and the Federal Coastal States concerned or threatened by the pollution.

The Federal Ministry of Transport has established a Maritime Emergency Reporting and Assessment Centre (MLZ) at Cuxhaven for information, verification, assessment and notification of especially severe marine accidents and spillages. The MLZ is empowered to initiate investigations on the nature and extent of notified pollution, e.g. by aerial reconnaissance.

The reporting centre informs the on-duty-officers of the CCME and the information centers of the threatened Federal Coastal States concerned, in case further preparatory activities as response to the incident are deemed necessary. If there is a risk of a considerable spillage or, if one of the representatives of the coastal states requests CCME to take over the command in a response operation, the CCME must convene and take over the overall management and control of sea *and* land based clean-up activities.

## 12.2 RESPONSIBILITIES

The aforementioned administrative agreement between the Federal Government represented by the Federal Ministry of Transport and the five Federal Coastal States forms the basis for the Marine Spill and Casualty Response Organisation in Germany and for the responsibilities of the individual parties.

The Central Command for Maritime Emergencies has to update the German response strategy and to maintain the best possible preparedness for pollution response within and outside of the territorial waters. The section of the Federal Government is especially competent for oil spill control on the high sea; the section of the five Coastal States is responsible within the coastal area, the Wadden Sea and also for beach cleaning.

### 12.2.1 DECISION MAKING LEVELS AND INFORMATION FLOW

The staff organisation of the Central Command for Maritime Emergencies must be immediately established in case of major accidents to initiate counter pollution measures. This team has to:

- set priorities for the general strategy;
- select vessels and equipment;
- advise the respective local authorities to minimise the pollution; and
- co-ordinate all measures taken.

The staff of the CCME should co-operate with the polluter, the insurance companies and/or P&I-Clubs about the measures taken in order to avoid refusal of claims for unreasonable clean-up costs.

### 12.2.2 EXECUTION OF RESPONSE ACTIONS

The individual recovery operations on site will be performed either by the locally responsible Federal Waterway and Shipping Board and/or by those local boards of the five Coastal States, which are responsible for water quality, beach cleaning, etc. in the respective area.

Other organisations (navy, salvage companies, tank ship owners etc.) will be asked for assistance, if necessary. Agreements on details of technical support between the Federal waterway and shipping administration and the aforementioned institutions have been made as part of the wide-ranging national contingency planning.

### 12.2.3 STRATEGY FOR COMBATING MARINE POLLUTIONS AT SEA

At sea priority is given to *mechanical* recovery. The use of chemical dispersants could be considered if this method is to be applied outside of the shallow coastal regions and this response should be regarded as the last resort, if no other counter-actions succeed. The attitude to dispersants remains very restrictive. Their use, therefore, is limited to exceptional situations. In the Baltic Sea dispersant spraying is almost prohibited. As a general rule the use of dispersants is not recommended within isobath - 20 m. Recommendations for the use of these products comprise the following general principles:

- no dispersants in shallow waters (Wadden Sea) or in locations with limited water exchange (Baltic Sea);
- elsewhere, in order to minimise damage risk, the use of dispersants may be justified when the consequences of chemical treatment are considered less serious than the consequences of leaving the oil untreated.

An annual exercise and education programme includes all response vessels and their crews. Ten exercise days are scheduled for all response vessels, in order to keep the national preparedness on a high level. Bilateral marine pollution plans have been agreed with the neighbouring countries Denmark and The Netherlands. Similar arrangements exist in the Baltic Sea with Sweden.

### 12.2.4 STRATEGY FOR COMBATING SHORELINE POLLUTION AND RESTORATION

The national contingency plan contains provisions for all parties involved in a major spill disaster. It includes the procedures and measures of co-ordination and co-operation between the Federal Government/Federal Coastal States, their authorities and the private sector involved in counter pollution activities. Special plans -

including sensitivity maps for protection and response in sensitive zones (mainly the Wadden Sea) - facilitate response decisions to be taken by the CCME.

Computerised models of pollutant movements/spreading cover the North Sea, the German Bight (operational numerical model), the Wadden Sea and the Baltic. They are used for preparation of defence lines at the shoreline but also for the identification of potential polluters (track back mode).

### **12.2.5 RESOURCES FOR DEALING WITH OIL AND CHEMICAL POLLUTION**

Thirty response vessels (21 recovery vessels and 9 support units) can be mobilised within two hours after alert. The national clean-up capacity should be sufficient to cope with a spontaneous outflow of 15.000 m<sup>3</sup> crude oil within 24-48 hours off the German coastline, provided that the meteorological and local conditions do not prevent mechanical recovery. Four major response vessels - 1 hopper dredger and 4 buoy-tender vessels - are permanently on patrol at sea, in order to minimise spreading in the initial spill phase. In addition, two aircraft equipped with advanced electronic sensor devices are used for regular aerial surveillance and the positioning of response units to achieve a higher efficiency of oil recovery.

### **12.2.6 OTHER INFORMATION**

**Notification** in case of marine pollution should be sent to:

Maritimes Lagezentrum Cuxhaven (MLZ)  
Am Alten Hafen 2  
D-27472 Cuxhaven  
GERMANY

Tel: +49 4721 567 485 / 567 392

Fax: +49 4721 554 744 / 745

Email: mlz@havariekommando.de

which is on duty 24 hours per day.

#### **National contact point – Inquiries**

Name: Havariekommando – Gemeinsame Einrichtung des Bundes und der Küstenländer  
Central Command for Maritime Emergencies (CCME)  
Section 2 Maritime and Marine Pollution Emergencies

Telephone: +49 4721 567 480/481/482/483

Fax: +49 4721 567 490

Email: FB2@havariekommando.de

Name: Havariekommando – Gemeinsame Einrichtung des Bundes und der Küstenländer  
Central Command for Maritime Emergencies  
Section 3 Marine Pollution Response Coastal

Telephone: +49 4721 567 498

Fax: +49 4721 567 365

Email: FB3@havariekommando.de

Section 2 is responsible for response operations at sea and Section 3 is responsible for clean up activities close to the shoreline and on beaches, in salt marshes etc.

## FRANCE – NATIONAL ORGANISATION

### 13.1. INTRODUCTION

France has decided not to form a single multi-purpose force to combat accidental pollution in the marine environment. Co-ordination of the existing services is considered the most suitable means to conduct operations.

#### 13.1.1. Context

Metropolitan France has three seabords, Channel/North Sea, Atlantic, Mediterranean. The maritime traffic along these coasts is heavy, about 45,000 ships every year in the Channel and 8,000 in the French zone of the Mediterranean Sea. The risk of pollution is high, as is shown by the fact that, during the last two decades, 35 significant cases of accidents at sea have resulted in actual pollution or risk of pollution. Since 1967, eleven major accidents have caused oil pollution on French coasts. Among the most serious accidents at world level, seven affected the French coastline, either because of an accident at sea occurring near the French coast (Amoco Cadiz, Gino, Erika, Ievoli Sun) or an accident occurring in a neighbouring country causing an oil slick to drift towards the French seaboard (Torrey Canyon in England, Haven in Italy, Prestige in Spain). These examples show the vulnerability of the French coast to the risks from maritime traffic.

#### 13.1.2. General description of the French national system

The French response to accidental marine pollution is organised by the POLMAR Instruction dated 4 March 2002, applicable not only to oil pollution but also to discharges of any substance likely to damage the marine environment. The instruction is an update of two earlier ones, dated respectively 17 December 1997 and 12 October 1978.

The instruction relates to response to pollution of the marine environment resulting from an accident or damage which involves or may involve an oil spill or a spill of some other product. Three types of measure are taken:

- Prevention measures to avoid such pollution occurring in the first place;
- Preparatory response measures to allow the responsible authorities to be given the resources to respond rapidly in the case of accidents;
- response measures intended to limit the consequences.

The national system makes a distinction between response to pollution at sea and response to pollution on land. The application of the POLMAR Plan (Sea) is entrusted to the Maritime Prefects (Commanders-in-Chief of the Navy) under the authority of the Prime Minister. The application of the POLMAR Plan (Land) is the responsibility of the Prefects of the “Départements” concerned, under the supervision of the Minister for the Interior. Action undertaken at sea is the responsibility of the Maritime Prefects. Action undertaken in the coastal strip from land is the responsibility of the Prefects of the “Départements”. The structure in charge of operations comprises representatives of all the Government Departments concerned and appropriate technical bodies, in particular CEDRE, the “Centre de Documentation, de Recherche et d’Expérimentations sur les Pollutions Accidentelles des Eaux (Centre for Documentation, Research and Experimentation on accidental water pollution). In view of the number of ministries involved in the response operations, the general guidelines adopted are proposed to the Secrétariat Général de la Mer (Secretariat General for the Sea) which is responsible to the Prime Minister.

### 13.2. NATIONAL ORGANISATION AND RESPONSIBILITIES

The Maritime Prefect is responsible for organising and directing operations at sea within the boundaries of his own region. When a disaster or a threat of disaster is of such gravity or complexity

that response by ordinary means is not possible, the Maritime Prefect sets in motion the POLMAR Plan (Sea). This Plan gives access to the POLMAR fund which is managed by the Ministry of the Environment. This enables state resources to be supplemented with private resources, either contracted or requisitioned.

The Maritime Prefect reports to the Prime Minister (Secretariat General of the Sea), the Minister for Defence, the Minister for the Environment and the Minister for Transport. The Minister of the Interior and the Prefects of the “Départements” and the civil protection zones which may be concerned are also informed. The Maritime Prefect simultaneously informs Cedre, whose technical advisors and resources are immediately placed at his disposal. The initiation and the termination of the POLMAR Plan (Sea) are the subject of decrees issued by the Maritime Prefect.

The Departmental Prefect is responsible to the Minister for the Interior both for the initiation and the execution of the pollution response operations.

Every coastal department draws up and updates, under the Prefect’s authority, a special POLMAR Plan (Land), in close consultation with the local official representatives and users of the marine environment. Each plan defines the general organisation of pollution response, permitting the mobilisation and coordination of all the available resources. It includes an inventory of the anti-pollution equipment and products available, a list of the zones to be protected as a matter of priority, and plans for the deployment and maintenance of anti-pollution booms. The Plan also provides for the establishment of an inventory of storage sites and centres for treatment of the waste to be recovered.

The special POLMAR Plan (Land) is launched by the Prefect, under the authority of the Minister for the Interior, only for exceptionally widespread pollution. Small-scale and medium-scale pollution is dealt with by the local communities within the context of their general powers as provided in the Local Authorities Code.

### **13.2.1. Operational organisation**

The Maritime Prefect directs all control operations at sea. Action is supervised from a command post located at the Maritime Prefecture (permanent headquarters). In order to facilitate the supervision of operations on the spot, an advance command post (operational headquarters) may be installed at the most favourable location. The Maritime Prefect keeps the Prefects of the “Départements” informed of developments regarding any threat of pollution to the coast, so as to allow an early meeting of the team in charge of land response operations.

On land, the Prefect of the “Département” or his appointed representative directs pollution response operations. He is assisted by a team appointed by himself together with representatives of external departmental and regional services. He also has access to the resources of the local authorities and private resources obtained by agreement or requisitioned. Operations are directed from a permanent headquarters (Préfecture) and, if appropriate, from an advance post located in the most favourable situation.

### **13.2.2. Operational response**

The Maritime Prefect conducts response operations at sea with Navy and Government Resources, whose action he coordinates at sea. He may call upon resources available from the oil co-operatives possessing anti-pollution equipment (e.g. FOST, OSRL). He may request resources available within the context of bilateral agreements (Manche Plan Agreement with Great Britain, Biscay Plan with Spain) or regional agreements (Bonn Agreement Contracting Parties).

Pollution response operations on the coast are directed by decentralised State services. The Prefect of the “Département” may request the assistance of the national resources of the Sécurité Civile (Civil Emergency Services) and the Armed Forces. Moreover, he has access to the resources of the local authorities and all those available from government, in addition to private resources, whether by agreement or requisitioned.

### 13.2.3. Pollution response strategies at sea

The range of operational choices is both wide and restricted, each option being limited by many factors, the response time and the condition of the sea being the most important. These choices may be grouped by type of response:

- action at source or near source in order to stop the spill, lighten the vessel or barge, contain the spill at source and recover and disperse it at source;
- action on the high seas in order to contain the oil by booms and recover it with pumps and skimmers, trawl by booms/skimbers or surface trawls, and disperse it chemically;
- action near the coastline in order to protect sensitive areas of the coast, contain and skim and treat with dispersant in moderation under ecological supervision.

The use of dispersants is the subject of recommendations fixing the limits of the zones of use, in terms of the depth of water and the scale of the pollution (10, 100, 1,000 tonnes). The dispersants used are subject to prior approval from Cedre, which publishes a list of products approved in accordance with a procedure which takes account of both the effectiveness and the toxicity of the products.

### 13.2.4. Pollution response strategies on land

The priority of shoreline pollution response is to protect sensitive sites identified in the POLMAR-Land response plans. Shoreline clean-up is another priority in the NEBA (Net Environmental Benefit Analysis) concept which addresses environmental and economic issues. The recovery at sea of floating pollutants as well as the selective collection of pollutants washed up on the shore are other priorities.

### 13.2.5. Resources

- **Pollution response at sea**

In response to accidental pollution, the French Navy is guided by the Commission d'Etudes Pratiques de lutte antipollution (CEPPOL) (Commission for Practical Studies in Anti-Pollution Response) based in Brest, which advises the Chief of Staff of the French Navy.

Anti-pollution equipment for use at sea is stored in various storage and response centres along the three seaboard in Metropolitan France and those overseas. The main centres are Cherbourg, Le Havre (Channel/North Sea), Brest, Lorient (Atlantic) and Toulon (Mediterranean). In all, the equipment comprises over 11 km of booms, 54 skimmers, 64 pumps and 1,400 cubic metres of dispersants which can be made available for pollution response at sea.

- **Pollution response on land**

Apart from the ordinary resources held by all the authorities, 13 POLMAR (Land) storage and response centres are distributed over the whole of the French coastline (8 in Metropolitan France: Dunkirk, Le Havre, Brest, Saint Nazaire, Le Verdon, Sète, Marseilles, Ajaccio; 5 Overseas: Saint Pierre, Pointe à Pitre, Fort de France, Cayenne, Le Port). These centres store and maintain equipment necessary for the response to marine pollution. The centres are all managed by the Ministry for Equipment, Transport and Housing – Directorate for Sea Transport, Ports and the Coast (DTMPL).

- The Centre for Maritime and River Technical Studies (CETMEF) defines and acquires this equipment after trials in cooperation with the Centre de Documentation, de Recherche et d'Expérimentations sur les pollutions accidentelles des eaux (Cedre).
- Specialised maritime services or the maritime services of the Directorates for Equipment for the “Départements” (DDE) store and maintain this equipment on a local basis.

A few figures give an idea of the scale of the available resources: 33 km of booms, 140 pumps, 80 skimmers, 370 storage tanks.

These resources are placed at the disposal of the Prefects immediately the POLMAR Plan (Land) comes into operation. They may also be made available to the local authorities, under their responsibility and at their expense, by means of agreements and after approval by the Préfet of the “Département” concerned.

- **Other resources**

The authorities may also call upon other stocks of anti-pollution equipment available in the autonomous ports (Dunkirk, Le Havre, Rouen, Nantes/Saint Nazaire, Bordeaux, Marseilles), in certain emergency and firefighting centres and in private stores, especially those held by the private oil co-operative “Fast Oil Spill Team” (FOST) based in Marseilles.

Adding together the stocks available within the context of the POLMAR Plans (Sea) and (Land) and from other partners (ports, fire stations, the private co-operative), a total of about 55 km of booms, 172 skimmers, 241 pumps, 574 storage tanks (large and small), 426 items of beach cleaning equipment and about 1,500 cubic metres of dispersants are available to the authorities in the event of accidental pollution of the marine environment.

- **Preparation and exercises**

The success of the anti-pollution response plan of action depends on the quality of its preparation and implementation. It is therefore essential that the provisions made by the POLMAR Instruction should be tested and the personnel in charge of its implementation should be trained. The Land and Maritime Prefects accordingly organise simulation exercises at sea and on land in order to train both the senior members of the team and the persons responsible for the use of the equipment on land. Plans may be updated and improved through these exercises.

### 13.2.6 Specialised national resources

#### **Specialised response resources: Training units of the Civil Emergency Services**

Five response sections, with 30 men in each, have been formed within two Civil Emergency Services training units. These sections are independent, and are capable of very rapid response times. They are able to work without reinforcements for 48 hours in an anti-pollution response operation. Each section has its own pumping, collection and storage equipment, and its own means of transport and liaison.

- **French Customs Coastguard Service**

The customs authorities are responsible for deploying aircraft using remote sensing techniques to detect marine pollution. For this purpose, the French Customs Coastguard Service has at its disposal two aircraft with several types of remote sensing equipment which can be rapidly brought into service in the event of accidental marine pollution.

The role of these aircraft is to detect oil slicks, to contribute to the scientific assessment of the risk, to control the spread of the pollution, and to guide response equipment to the zone.

- **CEDRE**

Cedre (Centre for Documentation, Research and Experimentation on accidental water pollution) was formed by the French Government in order to improve pollution response technology and to inform the authorities responsible for pollution response regarding this technology.

Cedre may be consulted in cases of accidental pollution at sea, but has no powers to carry out the response operations. If the POLMAR Plan is put into action, Cedre places its resources and personnel at the disposal of the land and Maritime Prefects responsible for pollution response, in order to supply all the advice and assistance these authorities may require.

**13.2.7. Further information**

- National Level

Secrétariat Général de la Mer  
16 Boulevard Raspail  
75007 PARIS  
tel: (33)(0)1 53 63 41 53/41 50  
fax: (33)(0)1 53 63 41 78  
E-mail: sgmer@sgmer.pm.gouv.fr

- Préfectures Maritimes

Préfet Maritime de l'Atlantique  
BP 46  
29240 BREST NAVAL  
tel: (33)(0)2 98 22 10 80  
fax: (33)(0)2 98 22 13 19

Préfet Maritime de la Manche et de la mer du Nord  
BP 1  
50115 CHERBOURG NAVAL  
tel: (33)(0)2 33 92 20 20  
fax: (33)(0)2 33 92 59 26

- Other points of contact (on a 24-hour basis)

Cedre

Rue Alain Colas - BP 20413  
29604 BREST CEDEX  
tel: (33)(0)2 98 33 10 10  
fax: (33)(0)2 98 44 91 38  
E-mail: cedre@ifremer.fr

Direction générale des douanes et des droits indirects  
23 bis rue de l'université  
75007 Paris 07 SP  
France  
Tel : (33) (0)6 64 58 71 23 (H 24)  
(33) (0)1 44 74 44 52  
Fax : (33) (0)1 55 04 65 94  
Email : [dg-b2@douane.finances.gouv.fr](mailto:dg-b2@douane.finances.gouv.fr)  
[Christian.cosse@douane.finances.gouv.fr](mailto:Christian.cosse@douane.finances.gouv.fr)

## Chapter 14: Ireland – National Organisation

### 14.1 INTRODUCTION

Ireland's Exclusive Economic Zone covers an area stretching to 200 miles off the west coast and to the median line between Ireland and the UK in the Irish Sea and Celtic Sea. The area covers approximately 200,000 sq. km. The Zone is a resource of high value in terms of ecological and socio-economic use. It is a very ecologically sensitive area with a wide variety of fauna and flora. It supports an active leisure industry with a large number of blue flag beaches and also commerce including fisheries, marine transport and natural resources.

### 14.2 RESPONSIBILITY FOR COUNTER-POLLUTION MEASURES AT SEA AND ON LAND

The Department of Transport, Tourism and Sport, through the Irish Coast Guard has the main responsibility for exercising Central Government's responsibility for counter pollution response at sea arising from spillage or loss of oil, chemical or dangerous substances which threatens pollution of the Irish coastline or related interests. The Irish Coast Guard is responsible for preparedness and response to marine pollution incidents within the Irish Exclusive Economic Zone, initiating, controlling and directing counter pollution operations. In addition, the Irish Coast Guard is responsible for supervising the planning and implementation by Local and Harbour authorities of arrangements for the protection of coastal amenity, fishery and wildlife areas, the removal of oil from the coastline, and in the event of major pollution incidents, the direction and co-ordination of the on-shore response.

### 14.3 GENERAL COUNTER-POLLUTION POLICY

At Sea: The primary response is by mechanical oil recovery and cargo transfer capabilities. The stated Irish Coast Guard policy on dispersants is that no dispersants will be used without the approval from the Minister through the Irish Coast Guard except in life threatening situations. The decision to use dispersants will be made on a case-by-case basis. It will be based on the real-time evaluation of the likely fate of the oil and on the possible impact of the dispersed oil.

Ashore: Physical recovery is based on mechanical and manual recovery undertaken with the aid of public works equipment.

### 14.4 PREPAREDNESS

The Coast Guard manages and operates three co-ordination/communication centres at MRCC Dublin, MRSC Malin Head and MRSC Valentia for marine emergency management. MRCC Dublin as well as providing marine search and rescue response services is co-located with the National Maritime Operations Centre and is the centre which co-ordinates the response to marine casualty incidents within the Irish Exclusive Economic Zone. SARMAP, OILMAP and CHEMAP computer modelling programs are available at the three centres as decision support tools. The Irish Coast Guard has contracted five civilian Sikorski S92A Search and Rescue helicopters deployed at four bases around the coast. These aircraft can be used for pollution aerial surveillance during daylight hours. Specialised aerial surveillance aircraft can be contracted at short notice internationally.

#### 14.4.1 Contingency Planning

The Sea Pollution (Amendment) Act 1999 provides the Minister for Communications, Marine and Natural Resources with the legislative power to require harbours and ports, oil handling facilities, and maritime local authorities to submit oil spill contingency plans, based on realistic risk assessment, for approval by the

Irish Coast Guard. These contingency plans require risk assessment and a comprehensive breakdown of their risk management facilities - command and control, communications, manpower, equipment, training, and exercises. These contingency plans are part of the overall national plan, also required by the above Act, which is being prepared by the Irish Coast Guard.

#### **14.4.2 Intervention**

The Minister for Transport, Tourism and Sport has nominated senior officers within the IRCG with warranted authority under national legislation to monitor/intervene in actual or threatened marine pollution incidents for the purpose of preventing, mitigating or eliminating danger from pollution or threat of pollution by oil, or by any substance other than oil. These warranted officers may issue directions to the owner, master, salvor or person in charge of a ship following a maritime casualty to take such actions and do such things as he considers necessary and reasonable for the purpose of preventing, mitigating or eliminating danger from pollution or threat of pollution.

#### **14.4.3 Equipment**

The Irish Coast Guard maintains national stockpiles of pollution response equipment at Killybegs, Castletownbere and Dublin. Regular exercises are carried out using these equipment stockpiles. The equipment as far as possible compliments the equipment held at the harbours and ports. This equipment is being added to each year. The equipment is divided into 30% offshore response and 70% on-shore response.

No country has sufficient State equipment to respond to every pollution emergency. However, there are commercial companies who will provide equipment on request and guarantee it will be on-site within 12/24 hours. The Irish Coast Guard has authority to contract such equipment as required.

### **14.5 ORGANISATION OF RESPONSE IN CASES OF POLLUTION**

Overall command and responsibility for the direction of Counter Pollution operations will normally be exercised by the Director, Irish Coast Guard or in his absence by the A/Director Operations. Any oil spills in the marine environment must be reported to the Irish Coast Guard and are forwarded to NMOC/MRCC Dublin, which generates pollution reports and co-ordinates, the initial response. Coast Guard staff will be deployed on-scene as required to assess the severity of the incident and action required.

#### **14.5.1 Strategy for combating at sea**

Based on reports received from aerial surveillance, a plan for the combat operation is drafted and executed. The main strategy is to recover floating oil from the sea surface applying mechanical recovery systems.

#### **14.5.2 Strategy for combating on-shore**

Local Authorities will remove the oil from the shoreline under the direction of the Irish Coast Guard. Depending on the type of oil, the recovery will be executed by mechanical means, a combination of booming/ recovery systems and manpower.

### **14.6 DEPLOYMENT OF PERSONNEL AND EQUIPMENT**

During a major oil or chemical/dangerous substance spill, the Director may deploy the Irish Coast Guard's Marine Pollution Response team (MPRT) as part of the Irish Coast Guard Incident Command System to assume local command of Counter Pollution operations. This team is made up of Irish Coast Guard and local and harbour/port authority personnel.

The Irish Coast Guard incident command system involves setting up a response centre near to the incident. This response centre consists of three units: at sea pollution response, shoreline pollution response and marine casualty/salvage response. The response centre and each of the units are under the direction and co-ordination of the Irish Coast Guard.

#### **14.7 PERSONNEL TRAINING POLICY**

The Irish Coast Guard has provided national pollution management courses for approximately 60 harbour/port and local authority personnel per year for the past number of years. These courses are based on the International Maritime Organization model courses.

#### **14.8 RESEARCH AND TRAINING POLICY**

Current research is concentrated on developing oil spill contingency plans and the development of the national equipment stockpile.

## **KINGDOM OF THE NETHERLANDS – NATIONAL ORGANISATION**

### **INFORMATION ON NATIONAL STRATEGIES, LEGISLATION, ORGANISATION, SHIPS, AIRCRAFT AND EQUIPMENT**

#### **15.1 INTRODUCTION**

The Netherlands is a Coastal State and has Rotterdam, the largest port in the world, within its boundaries. Other ports in the Netherlands are Flushing in the south and Amsterdam and Delfzijl in the far north. The Netherlands has an Exclusive Economic Zone of about 65,000 km<sup>2</sup> in which gas and oil production platforms can be found. It also has three main ship traffic separation zones. Annually, 245,000 route bound ship movements are registered. In summertime recreation is important in a densely populated coastal zone. The Waddenzee in the north is a sensitive area, known as the “delivery room” for fauna.

#### **15.2 RISK ANALYSIS**

Taking into consideration the dense traffic in the three ship traffic separation schemes, and also considering the other activities in the Netherlands EEZ, the level of preparedness has been decided on the basis of a risk analysis conducted in 2005. Although the area is relatively small, three main areas have been defined: the North Sea (roads to Rotterdam); the Waddenzee and the Scheldt estuary. These areas take account of specific sensitive areas. The level of preparedness is set for the North Sea on a recovery capacity of 15,000 tons because that is the volume of an outflow resulting from a collision between a tanker and another ship.

#### **15.3 NATIONAL LEGISLATION**

The Netherlands is signatory to many international conventions such as UNCLOS, the HNS-protocol and MARPOL. International regulations have been implemented in national law. With regard to maritime incidents the most important regulation is the BON Act, which stands for Response to Accidents North Sea. The powers given to authorities in this act are quite stringent and include the power to take over command of a vessel. As well as this Act, the Netherlands uses the Wrecks Act in cases where ships sink or lose cargo inside the 12 miles zone.

#### **15.4 GENERAL DESCRIPTION OF NATIONAL ORGANISATION**

The Minister for Transport, Public Works and Water Management is the coordinating Minister for North Sea activities. This Minister is also responsible for policy in maritime accidents. However, the Director of the Netherlands Coastguard is in charge of coordinating the response operations. Therefore the Coastguard Centre is the National Focal Point, including for all international contacts. The North Sea Agency will take actual response measures, which is part of the DG for Water Management. In an incident an Operational Team can be called together at the Centre. Management matters are dealt with by a Regional Management Team, which meets in The Hague. Relevant departments are represented on this Team. This up-scaling may finally lead to a ministerial team chaired by the Prime Minister.

#### **15.5 STRATEGY IN RESPONSE**

Under the BON Act, the North Sea Calamity Plan (Rampenplan voor de Noordzee) which is reviewed regularly describes the organisation, (inter)national legislation and communication. With regard to the Response Organisation the North Sea Agency has its Incident Response Plan. Three plans together could be regarded as the Netherlands Contingency Plan: the North Sea Calamity Plan, the National Capacity Plan and the Incident Response Plan.

The main strategy in response is to secure the safety of human populations (SAR) on vessels in distress, on offshore installations and on the mainland. With regard to the preservation of the marine environment, the first measures aim at containing the oil or other substance in the damaged vessel. This is undertaken by the owners or contracted Salvage Company. Discharged oil will be contained and recovered mechanically by means of booms and skimmers. The Netherlands has developed and improved the so-called sweeping arm. The application of dispersants is permitted though under strict conditions. These conditions are related to sea-conditions, type and quantity of oil, season and water depth. Coastal pollution is treated by means of recovering and combustion of sand/oil mixtures.

## **15.6 MEANS FOR COMBATING SPILLS OF OIL AND HARMFUL SUBSTANCES**

The Netherlands Coast Guard currently operates one aircraft equipped with Remote Sensing for the routine patrol of the EEZ. In late 2007 this will increase to two aircraft. Annually about 1700 hours are scheduled and this number will increase to approximately 2000 in the third quarter of 2007. The main objectives of the flights are to detect and observe combatable pollution at an early stage, and to identify the source of pollution. The operators are specially qualified policemen who can make official statements on their findings for forwarding to the public prosecutor.

For the mechanical recovery of oil the Netherlands owns a tanker class, first line, response vessel, the ARCA. She is permanently equipped with two 15 meters sweeping arms and also has booms and other skimmers available. Besides the ARCA a number of trailing suction hopper dredges are available on stand-by contracts. Most of these vessels have one or two sweeping arms permanently installed. Annually operational trainings are executed. Booms and skimmers are stored and maintained in the main stockpile in Rotterdam. In the Waddensee in the North and in the Scheldt estuary, equipment and vessels are on stand-by to clean up oil slicks.

When an incident involving hazardous and noxious substances (HNS) occurs on board a vessel, the essential first step in the response is to obtain information on the chemical properties of the substance and, consequently, the behaviour of the substance after release. As long as the HNS remain on board the vessel, it is the obligation of the ship-owner and crew to deal with the incident, assisted in most cases by the specialised crew of a salvage company. The authorities require that they are kept informed. If HNS are discharged into the sea, models are used to predict consequences of the behaviour such as gas plumes or dissolved substances in the water column. Packaged goods *e.g.* lost containers have to be detected by means of side scan sonar and identified and possibly removed.

Response to coastal pollution is also the responsibility of DG Water Management. Oil or other substances that are washed ashore will be collected and treated. Contractors will supply equipment and manpower to deal with the pollution.

## **15.7 INTERNATIONAL COOPERATION**

Being a Contracting Party to the Bonn Agreement and a Member State of the European Union, the Netherlands maintains close cooperation with neighbouring states and has entered into bi- or multilateral operational plans. Recovery vessels, aircraft, equipment and personnel are all available to assist Bonn Agreement and EU member states. All equipment and ships can be placed at the disposal of another Contracting Party through a standard contract.

## Chapter 16: National Organisation/Norway

### 16.1 INTRODUCTION

#### 16.1.1 Background

Each year between 450 and 600 notifications concerning acute oil and chemical discharges are reported to the Norwegian authorities. Main sources for discharges are the offshore petroleum industry, ships and industry on land. The total length of the Norwegian coastline (including islands) is 83 000 km. High concentrations of environmentally sensitive areas such as bird nesting islands and fjords, different climatic zones and poor infrastructure pose great challenges for the national acute pollution contingency. The population of Norway is approximately 5 million, main land area is 323 758 square kilometers and 2 million km<sup>2</sup> of ocean is located within the national economic zone.

#### 16.1.2 General description of national organisation and legislation

The national responsibility for dealing with acute pollution on Norwegian territory, in the territorial sea and at Svalbard rests legally with the Ministry of Fisheries and Coastal Affairs. The Pollution Control Act of 1981, Chapter 6, regulates private and municipal contingency. This Act is based on the following main principles: obligation to notify, obligation to respond and obligation to provide assistance. The Act is also based on the polluter pays principle.

The enforcement of the Act and regulations is the responsibility of the Norwegian Coastal Administration, **Kystverket**.

### 16.2 NATIONAL ORGANISATION AND RESPONSIBILITIES

#### 16.2.1 Decision making levels and information flow

The command system is represented by the following levels:

- The Minister of Fisheries.
- The Director General of Kystverket.
- The Director of The Department for Emergency Response.
- Duty Officer system (24h).

When the national contingency system is in operation, the Director of the Department for Emergency Response will act as the response commander.

#### 16.2.2 National organisation and tasks

The Norwegian Coastal Administration has the following responsibilities:

- National response authority against major acute pollution.
- Co-ordinate private, municipal and governmental contingency into a national system.
- Maintaining the governmental response organisation, Kystverket.
- Conduct surveillance by satellite and aircraft.
- Act as national and international focal point for acute pollution notification.

All private industry is required to establish and maintain its own acute pollution contingency. In addition, about 70 private enterprises have received dedicated contingency requirements. In Norway, contingency requirements are always based on environmental risk assessments.

There are 32 inter-municipal contingency regions (IUA) covering both coastal and inland areas. Acute pollution caused by "normal activity" within a municipality is the responsibility of the IUA.

The governmental at sea contingency (Kystverket and Coast Guard resources) is responsible for responding to spills not covered by private and municipal contingency. Private and municipal contingency organizations are obliged to provide assistance to the governmental contingency.

### **16.2.3 Strategy for combating at sea**

In general, mechanical recovery of oil pollution has first priority. Chemical response (dispersants) is considered an important supplement. If net environmental benefit analysis (NEBA) identifies dispersants as the preferred method, chemical response may take position as the first priority response method for dedicated areas and spill scenarios.

### **16.2.4 Strategy for combating on-shore**

The main criteria for selection of on-shore response methods are the environmental impact, i.e. *restitution period* for critical habitats or populations. The possible negative effect of the response method itself is part of the strategy. Hence, monitoring and attenuation (natural degradation) may be selected if this represents an acceptable restitution period.

### **16.2.5 National resources**

In Norway, response equipment for oil recovery at sea is based on a combination of governmental operated vessels operated by NCA or Coast Guard, offshore industry oil recovery vessels operated by NOFO, and private owned vessels. This strategy is due to the large number of tugs, supply-ships, ferries and fishing vessels available. National private, municipal and governmental resources in Norway are as follows:

- 80 000 metres of harbour booms.
- 22 000 metres of coastal booms.
- 30 000 metres of ocean booms.
- 430 oil recovery devices.
- 11 Coast Guard vessels with on-board recovery equipment
- 6 Oil Recovery vessels belonging to Kystverket.
- 35 privately owned vessels from 12 to 28m on stand-by contracts with Kystverket.
- NOFO resources; see [www.NOFO.no/beredskap](http://www.NOFO.no/beredskap)

## Chapter 17: Sweden – National Organisation

### 17.1 Legislation and areas of responsibility

17.1.1 The Civil Protection Act (2003) defines the different branches of society's rescue services and the responsibilities of each branch.

17.1.2 The Swedish Coast Guard has the responsibility for the maritime environmental protection, which includes the response to oil and other harmful substances in the territorial waters, the EEZ and in the larger lakes Vänern, Vättern and Mälaren.

17.1.3 The fire brigade of the respective municipality is responsible for response to oil and other harmful substances on beaches, in harbours and in inland waters. The municipalities are supervised and supported by the Swedish Civil Contingencies Agency.

17.1.4 The Civil Protection Act also states that for every response operation there shall be a Response Commander. This person is given extraordinary rights to take whatever measures may be necessary in order to save lives, property or the environment.

### 17.2 Response at sea - Swedish Coast Guard

#### *Requirements and strategy*

17.2.1 The requirements from the Government to the Coast Guard are that:

- measures to prevent the spreading of oil in an accident should be started within four hours of receiving notification of the accident;
- recovery operations should be started within eight hours;
- the Coast Guard should be capable of dealing with oil spills of up to 10 000 tons using national resources;
- response to chemical accident should be started within four hours;
- the Coast Guard should have sufficient capacity for international cooperation.

17.2.2 The response strategy and priorities are:

- as a first step, to stop the outflow of oil from the vessel;
- as a second step, to stop the spreading of oil on the water surface;
- as a third step, to recover the oil at sea before it has reached the coastal zone, the archipelago and the beaches.

#### *Organisation*

17.2.3 The Swedish Coast Guard is organised into a headquarters and two regional commands: North-East and South-West. There is also a separate flight command.

17.2.4 The headquarters is responsible for long-term planning, overall capacity and international co-operation (IMO, EU, HELCOM, the Bonn Agreement, the Copenhagen Agreement and EPPR/Arctic Council). The headquarters always has an officer on duty, for strategic decisions and for international co-operation.

17.2.5 The Swedish Coast Guard has a 24-hour command centre with officers on duty and a Response Commander on duty. The command centre is located in Stockholm and Gothenburg. The Coast Guard has sea-going vessels permanently at sea, of which two in each region should be specialised response vessels.

17.2.6 In an operation, the Response Commander has overall responsibility for commanding the entire response operation. The command at sea will be taken by an On-Scene Commander (OSC) and if chemicals other than oil are involved there will be an On Scene Commander/Emergency Responders (OSC/ER) appointed.

#### *Resources*

17.2.7 The Coast Guard has about 70 emergency responders specially trained and equipped for scuba diving, response to chemicals and fire-fighting on board.

17.2.8 The Coast Guard also has a special agreement with municipal fire brigades along the coast according to which each of the fire brigades has agreed to assist the Coast Guard in an accident at sea with a MIRG (Maritime Incident Response Group) team of six firemen. These firemen are specially trained for actions on board ships and for deployment from helicopter together with light equipment. The Coast Guard should provide immediate assistance to the helicopter in the form of heavy equipment such as hoses, foam, cooling capability and everything needed for a protracted operation.

17.2.9 The Coast Guard operates three surveillance aircraft. For environmental surveillance and support in an oil spill situation, the aircraft are equipped with SLAR, IR/UV, FLIR and camera equipment. They are also equipped with sampling buoys, which can be dropped onto an oil spill in order to obtain a sample of the oil. The three aircraft have a total flying time of approximately 3000 hours per year.

17.2.10 The main body of the resources for environmental response consists of twelve environmental response vessels, all equipped with built-in or cassette advancing systems (LORI/LAMOR). These vessels are also equipped with ordinary skimmers, pumps and containment booms, and have a storage capacity of 100-1050 m<sup>3</sup>. The storage capacity can be extended with the help of rubber containers and barges.

17.2.11 The Swedish Coast Guard operates three multipurpose vessels with high capacity emergency towing, fire fighting and recovery capabilities. At least one, and more usually two, of these vessels are always at sea.

17.2.12 For shallow water operations in the archipelago, there are twelve units equipped with brush-skimmers. These are designed for transportation by lorry or by aircraft/helicopter.

17.2.13 For rapid containment of oil, the Coast Guard has seventeen sea-trailers, each carrying 500 metres of booms strategically allocated along the coastline. These sea-trailers are designed for lorry transportation to an appropriate port near the accident. The trailer can be launched into the water directly from the lorry and can be towed to the site at a speed of up to 30 knots.

17.2.14 The Coast Guard has approximately 16 000 metres of "RoBoom high sea booms", "Expandi 4300 coastal booms" and NOFI 600S. The Coast Guard also has a number of skimmers, containers and transfer pumps. For backup and assistance in an operation the Coast Guard has over thirty cutters and around sixty smaller workboats.

17.2.15 For oil recovery operations, most of the response vessels have special air filters and an overpressure system which is used when operating in hazardous atmospheres, thus allowing the crew to

work inside the ship without carrying gas masks etc. One vessel is equipped with filters to protect the interior of the ship against different hazardous gases in case of an incident involving chemicals.

### **17.3 Response on shore – Municipalities and Swedish Civil Contingencies Agency**

The local fire brigades of the municipalities are required to have a certain capacity for beach cleaning and harbour spills. In the case of larger spills, the Swedish Civil Contingencies Agency has allocated two larger equipment stores at strategic locations. These stores support the local fire brigades with different types of beach protection and cleaning devices, such as light booms, tarpaulins, pumps, protective clothing, brushes and buckets.

## Spain – National Organisation

### 17.1 INTRODUCTION

#### 17.1.1 Background

- Around 400 notifications are reported to the Spanish Authorities every year concerning acute oil and chemical discharges.
- Main sources for discharges are the petroleum industry ports, operations on ships and industry on land.
- The total length of the Spanish coastline (including islands) is about 8.000 km.
- Environmentally sensitive areas have been declared such as bird-nesting areas, marine reserves and natural parks in the coastline.
- High traffic density areas such as Finisterre and Tarifa Strait, and areas close to navigation lanes, pose great challenges for the national pollution contingency.
- The population of Spain is approximately 47 million.
- The area of mainland Spain is about 505.000 square kilometres.
- Spain provides pollution detection surveillance over an area of about 1.5 million km<sup>2</sup>.

#### 17.1.2 General description of national organisation and legislation

The national responsibility for dealing with acute pollution originating at sea rests at the Ministry of Development (Fomento) through the General Directorate of the Merchant Marine. The Spanish Maritime Safety Agency SASEMAR deals with the response actions operationally in the framework of the national contingency plans under the direction of the Maritime Authority. The national responsibility for dealing with pollution originated on land is the Ministry of Environment. The National Contingency Plan for Oil Pollution Response is presently under revision.

### 17.2 NATIONAL ORGANISATION AND RESPONSIBILITIES

#### 17.2.1 Decision making levels and information flow

When response is at sea the command system is represented by the following levels:

- The Director General of the Merchant Marine (Head of the Spanish Maritime Authority)
- The Local Head of the Maritime Authority in the area of operations (Capitán Marítimo)
- The Head of the SASEMAR Centre involved
- The officer on duty (24h).

#### 17.2.2 National organisation and tasks

The National Response System is currently under revision.

National organisation is based on levels of response. These levels are defined according to the lines given in the OPRC Convention.

Each level of response is organised under a Contingency Plan and the conditions for activation of each plan are defined in the National Response System.

The National Response System comprises two scenarios: maritime and coastline. Each of them has the contingency plans organised in levels. The levels are: National, Territorial and Local. In the National Response System there are provisions for the coordination between the different level contingency plans in each scenario.

### **17.2.3 Strategy for combating at sea**

In general, mechanical recovery of oil pollution is the preferred option for oil pollution response at sea in Spanish waters. Chemical response (dispersants) can be considered on a case-by-case basis provided an environmental benefit analysis (NEBA) has identified dispersants as the best response option. However the decision to apply dispersants has to be issued specifically in response to the emergency by the high level authority in accordance with the contingency plan.

### **17.2.4 Strategy for combating on-shore**

The strategy for selecting on-shore response methods are the environmental analysis and the impact of the response actions. Removal of the pollution should be exercised taking into account the possible negative effect of the cleaning method. Due to the great variety of environment types along the Spanish coastline and interests to be protected there is no general strategy for response. Each case should be treated on an individual basis and specific analyses and balances should be made in order to ascertain that the response actions are the best possible options on a case-by-case basis.

### **17.2.5 National resources**

The main response capability is under the Spanish Maritime Safety Agency:

- 14 000 metres of harbour booms.
- 23 000 metres of coastal booms.
- 21 000 metres of ocean booms.
- 45 oil recovery devices.
- 7 multipurpose vessels with high bollard pull, on-board oil recovery equipment and storage.
- 6 strategic store bases, two of them with underwater operations response capability.
- 3 Remote Operating Vehicles for underwater operations. The maximum operating depth is 1000 metres.

In order to comply with the OPRC Convention, Ports and Terminals are being equipped with limited primary resources for first response level.

## UNITED KINGDOM

### 18. UK NATIONAL ORGANISATION

#### 18.1 INFORMATION ON NATIONAL STRATEGIES, LEGISLATION, ORGANISATION, SHIPS, AIRCRAFT AND EQUIPMENT FOR COMBATING OIL POLLUTION INCIDENTS

##### 18.1.1 RESPONSIBILITIES

(i) Major pollution incidents affect many interests both within and outside Government. The main organisations likely to become involved in the direction of counter pollution operations and their responsibilities are as follows:

(ii) Maritime and Coastguard Agency (MCA)

The MCA has the main responsibility for exercising central Government's response to an oil or chemical pollution incident inside the UK Pollution Control Zone. The lead role is taken by the Maritime and Coastguard Agency, an executive agency of the UK Department for Transport which is responsible for taking action to deal with marine pollution from shipping and offshore installations, and for providing advice and assistance to, and co-ordination of, local authorities for clean-up on shore.

(iii) Local Authorities

Generally, coastal local authorities take the lead in dealing with pollution which comes ashore. They currently have no statutory responsibility to do so. However they do have a duty to assess the risk of an emergency occurring, and to prepare and maintain plans where they consider it necessary or desirable to act to prevent, reduce, control or mitigate the emergency's effect. In a major incident local authorities would be provided with assistance from the MCA.

(iv) Ministry of Defence

The Ministry of Defence is responsible for dealing with oil spills from its own ships wherever they may be, and for all spills which occur within the limits of naval bases.

(v) Department of Energy & Climate Change (DECC) works to make sure the UK has secure, clean, affordable energy supplies and promotes international action to mitigate climate change.

DECC, with advice from the MCA, is responsible for policy on the control of pollution from offshore installations whose operators are required to provide resources and deal with spills. If an operator's resources proved inadequate to cope with a spill and coastal pollution was threatened, the MCA might take over control of the clean-up operations.

(vi) Port and Harbour Authorities

Port and Harbour authorities have statutory responsibility, under the Oil Pollution Preparedness and Response Co-operation Convention (OPRC), for clean-up operations within their port areas. If any pollution spreads outwards into the open sea or threatens the adjacent coastline, the MCA and local authorities would be involved.

##### 18.1.2 BROAD APPROACH

The central objective of all counter pollution activities is to minimise damage to human health, wildlife, fisheries, ecologically sensitive areas and amenity beaches. The MCA maintains the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (NCP) and resources to cover its at-sea

clean up responsibility. It also maintains specialised beach cleaning equipment for deployment as agreed with local authorities; advises local authorities on their contingency plans; approves plans for ports and harbours in accordance with OPRC and advises DECC on approval of contingency plans for offshore operators. The MCA also provides training to local authority staff in beach cleaning management and techniques. Note: the NCP is in the process of being refreshed and the updated version is expected to be finalised by the end of 2014. The current NCP was effective as of August 2006.

### **18.1.3 ORGANISATION**

Standing arrangements exist to channel reports to the MCA of incidents that cause, or threaten to cause pollution. MCA informs the relevant environmental regulator, fisheries, statutory nature conservation body, local authorities and other bodies of such reports.

**18.1.4** During a major counter pollution incident involving a ship casualty, the MCA Head of Counter Pollution and Salvage Branch exercises overall control of counter pollution operations. MCA staff are deployed to a convenient location close to the incident where local command of at-sea operations would be established. In a major coastal pollution incident, a Shoreline Response Centre in line with the UK Civil Contingencies mechanism, may be established at the request of the affected local authorities, to co-ordinate and lead the on-shore response.

### **18.1.5 COMBATING POLLUTION AT SEA**

The primary response for combating oil at sea in the conditions prevalent around the UK coastline is spraying with dispersant. The UK has a small fleet of contracted aircraft, ready for fitting with spray gear, and available to apply dispersants at 6 hours' notice at all times. They can be deployed quickly to any part of the UK Pollution Control Zone (out to 200 nautical miles). MCA also maintains stockpiles of oil recovery equipment. Two additional dedicated surveillance aircraft, suitably fitted for oil detection provide direction and control of at sea clean-up operations.

### **18.1.6 PREVENTING OR MINIMISING POLLUTION AT SEA**

Primary responsibility for dealing with the situation on board a shipping casualty which causes or threatens to cause oil pollution rests with the owners and the commercial salvors. The MCA, however, keeps closely in touch with what is proposed to ensure that the wider public interest in preventing or minimising pollution is taken fully into account. If necessary the Secretary of State's Representative for Salvage and Intervention (SOSREP) invokes the powers of the Secretary of State to intervene and give directions to the master/salvor/harbour master, or even take direct action.

**18.1.7** Transferring the oil from the damaged vessel, either where she happens to be or at some more favourable location, may be an attractive way to tackle the problem and the MCA has cargo transfer equipment available for this purpose.

**18.1.8** The MCA also maintains an Emergency Towing Vessel (ETV) at the Orkney Islands, Scotland.

### **18.1.9 COMBATING POLLUTION ON-SHORE**

The MCA maintains stockpiles of more specialised equipment which can be made available to local authorities.

### **18.1.10 INTERNATIONAL ASSISTANCE**

Contact telephone, fax and telex numbers can be found at:

<http://www.bonnagreement.org/eng/html/contractingparties/contactpoints.htm>.

## **BONN AGREEMENT COUNTER POLLUTION MANUAL**

### **CHAPTER 19 – ZONES OF JOINT RESPONSIBILITY**

Three areas in the North Sea Area have been made the joint responsibility of two or more Contracting Parties. This chapter (when available) will explain how these joint responsibilities will be handled.

The three joint plans are:

- **MANCHEPLAN** – Anglo-French Joint Maritime Contingency Plan. This plan is in place and a summary of the plan is below.
- **DenGerNeth plan** – A joint plan between Denmark, Germany and the Netherlands. The plan will not come into force until an exchange of notes verbales has been completed.
- **Quadripartite Zone Plan** – A joint plan between Belgium, France, Netherlands and the UK. Arrangements are in place for the preparation of this plan.

#### **MANCHEPLAN – Anglo-French Joint Maritime Contingency Plan**

##### **1 Background**

1.1 A large number of shipping accidents which might occur in the English Channel are liable to affect both British and French interests at the same time. In such circumstances, the authorities of these two States may be called upon to step in simultaneously to deal with these incidents. In order to avoid confusion, and to increase the effectiveness of the measures taken, the French and British authorities have agreed the way forward in such circumstances, in advance, by production of a joint agreement named the Anglo–French Joint Maritime Contingency Plan (MANCHEPLAN).

1.2 MANCHEPLAN determines in advance of any incident :

- the authority and State which will be charged with coordinating the joint action; and
- the principles and procedures of co-operation in maritime search and rescue (SAR) operations and action to deal with pollution and salvage of any kind.

1.3 In the event of joint operations, the participating forces will continue to act in accordance with their standing instructions and national procedures. The success of the joint action depends largely on:

- a good knowledge and understanding by each State of the instructions and procedures of the other, and MANCHEPLAN sets out these procedures; and
- the effective use made of international procedures applicable to the situation.

1.4 MANCHEPLAN only applies in peacetime. In times of tension or war, co-operation may be effected within the ambit of the Atlantic Alliance.

##### **2 Purpose**

2.1 The main purpose of the MANCHEPLAN document is to provide guidance on joint operations for major SAR and pollution control incidents. However MANCHEPLAN is not restricted to such operations and may be activated whenever the French or UK authorities consider co-ordination would benefit by using the Plan.

### **3 Contents**

- 3.1 MANCHEPLAN details the procedures and principles of co-ordination. Initiating action in joint operations rests with the State in whose jurisdiction the incident occurs.
- 3.2 MANCHEPLAN sets out the demarcation lines for each State including those for the Channel Islands as a sub region. The area covered is given in detail with the north eastern extremity between France and Belgium territorial waters and between the French and Belgian continental shelves. The western boundary coincides with the Bonn Agreement limits.
- 3.3 Outside the limits of the Bonn Agreement, UK and French SAR resources are available for use under MANCHEPLAN, and the provision of a joint plan may be applied whenever circumstances suggest that it is expedient to do so.
- 3.4 The MANCHEPLAN sets out the circumstances under which each nation can enter the others territorial waters for the purpose of SAR or pollution control operations.
- 3.5 The MANCHEPLAN allows for exchange of information relating to national laws and regulations, national organisations, clearance resources and facilities, communications and the use of common formats for messages and command procedures.
- 3.6 Further details of SAR and pollution control assets available from each State are contained within the Plan.
- 3.7 The use of a MANCHEGRID can be provided at the discretion of the On Scene Commander to report the position and extent of oil slicks during large scale pollution clearance operations.
- 3.8 SAR operations required for MOD forces in distress are transferred to the Navy or Air Force. In these circumstances the MANCHEPLAN includes details of the co-ordination centres for each State.
- 3.9 Details of when, and how, high level or government intervention may be considered are provided in MANCHEPLAN for guidance purposes.
- 3.10 All major incidents attract media interest and a section of the Plan is devoted to guidance on relationships with the news media.
- 3.11 In addition, the MANCHEPLAN allows for one joint exercise per year to be undertaken.

### **4. Amendments**

- 4.1 All amendments to the Plan are agreed by both States before implementation.

**DenGerNeth Plan Executive summary****Joint Danish-German-Dutch Response Plan to maritime incidents involving Oil and other Harmful Substances and Co-operation in Aerial Surveillance, in short: DENGERNETH Plan (North Sea Area).**

1. Being aware of the continuous threat of pollution to their coasts bilateral Agreements have been concluded between the Netherlands and Germany (NETHGER, 1991) on the one hand and between Denmark and Germany (DENGER, 1993) on the other hand to establish close co-operation in response to pollution of the sea by such substances.

2. The competent Parties i.e. the Defence Command Denmark, the Ministry of Transport, Public Works and Water Management of the Netherlands and the Federal Ministry of Transport, Building and Urban Affairs of Germany, (referred to as the Parties), agree to extend their existing co-operation to include information exchange on the threat of marine pollution and aerial surveillance for the prevention and detection of pollution.

3. Bearing in mind the respective provisions of:

- The Agreement for co-operation in dealing with pollution of the North Sea by oil and other harmful substances, 1983 (Bonn-Agreement); and
- All endeavours of the three countries to control and minimize pollution and its effects;

the Parties to this DENGERNETH Plan recognise the obligation to exchange information on casualties, the threat of pollution and to respond to pollution within the DENGERNETH Region, also in those cases where their own territory is not threatened by the pollution in question.

4. The Plan includes all joint operations involving co-operation, of whatever nature, between Denmark, Germany and The Netherlands pursuant to the objective of this Plan and it applies as necessary and appropriate to any marine pollution or threat of pollution within the DENGERNETH Response Region, which is or could become of sufficient severity to initiate joint action. Even when an incident provides for no imminent threat (as defined under point 2 below) of pollution this Plan will initiate an information exchange. The exchange of information must not necessarily mean an activation of the DENGERNETH Plan.

5. Authorities recognize national response areas, but also around their national border (EEZ boundaries) a specific zone of common interest, the "Quick Response Zone". The meaning of that zone is that immediate actions must take place in maritime accidents and each Party has the right to start response actions immediately regardless in whose NRZ the pollution has occurred.

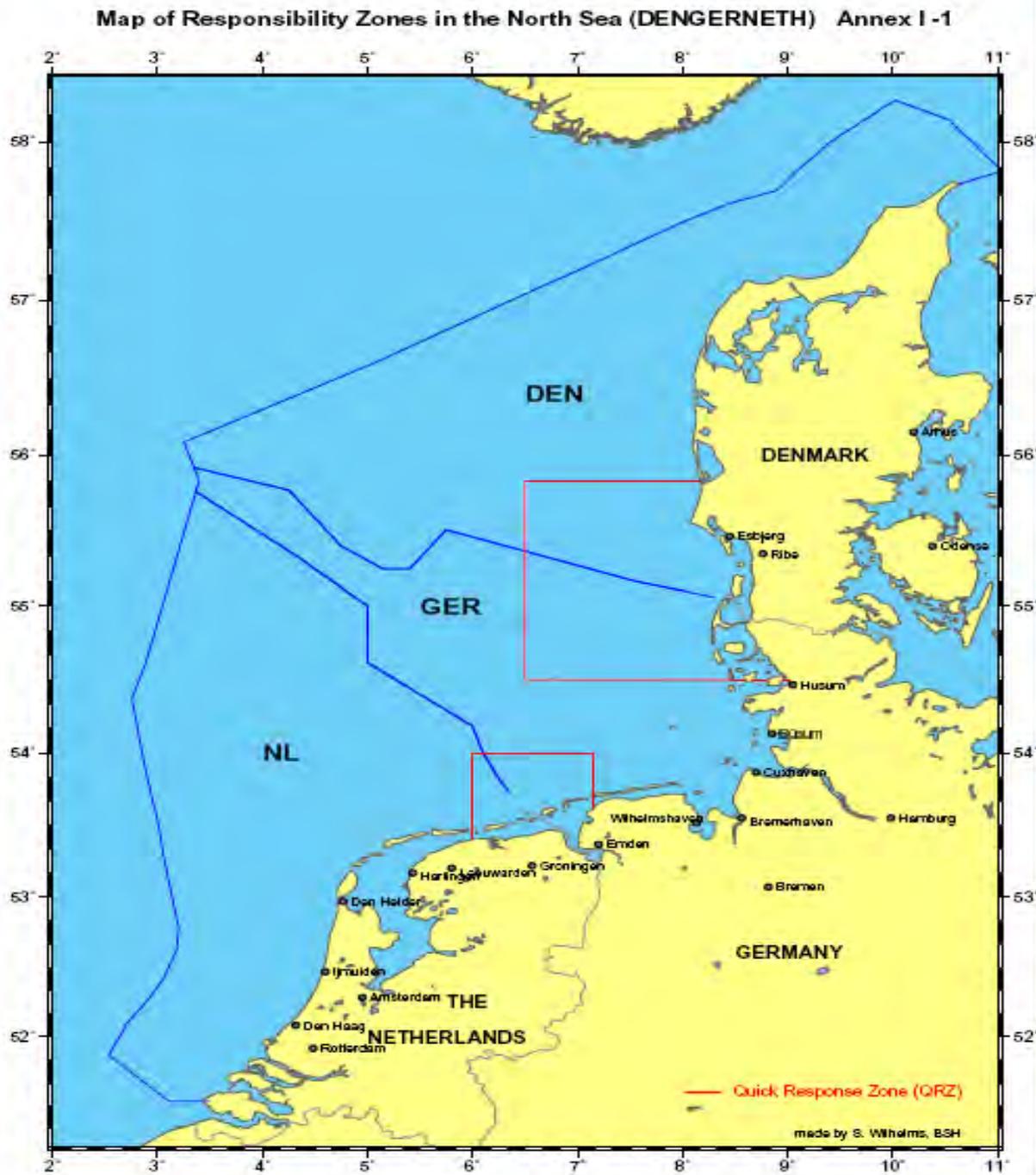
6. The DENGERNETH Plan also applies to the Wadden Sea and the Eems-Dollard region. Regional sub-plans for Wadden Sea areas may be concluded within the framework of this DENGERNETH Plan. The agreement between the Federal Republic of Germany and the Kingdom of the Netherlands concerning the arrangement of cooperation in the Eems Estuary of 8 April 1960 is not affected by this plan.

7. The DENGERNETH Plan is activated:

- ❖ if one country asks the other Parties for assistance (call for assistance) in response to pollution of the sea by oil or other harmful substances. The other Parties are to acknowledge the activation of the Plan
- ❖ if one Party takes response measures in another Party's NRZ
- ❖ in case of pollution or serious threat of pollution outside the Response Region, if the situation calls for an urgent activation of the Plan in a case where the pollution or the threat of pollution could affect the Response Region. In this case the NRAs of the Parties should in due course decide whether or not joint response actions are required.

8. With regard to operational procedures such as surveillance flights, response measures and reporting parties agreed to maintain the general Bonn Agreement procedures.

9. Any of the three parties can initiate amendments of the Plan however, the German authority has the function of keeping the plan up to date.



## INVENTORY OF ASSESSMENT TOOLS (COMPUTER MODELS)

### OIL

| Contracting Party | Name of tool   | Applicable area                  | Specific type of software | GIS related      | Calculation parameter(s)  | Time horizon                    | Input   | Output   | Availability                          |
|-------------------|--|----------------------------------|---------------------------|------------------|---|---------------------------------|---|--|---------------------------------------|
| Belgium           | MU-slick<br><br>Oil spill behaviour models:<br><a href="http://www.mum.m.ac.be">http://www.mum.m.ac.be</a> | Bonn Area                        | Fortran 77<br>Unix        | No               | Transport is calculated by vectorial addition of current and wind. Effects of gravity, surface tension, viscosity and inertia on a circular slick predict spreading. Weathering due to evaporation, dispersion, dissolution, aerosol formation and mechanical recovery. | One week in one-hour steps.     | Spill location, date and time, type of oil. Current. Wind.                                      | Maps, text, curves.                                    | 24 hours, request in office hours.    |
| Denmark           | SEA TRACK WEB<br><a href="http://www.cis.svn.dk/">http://www.cis.svn.dk/</a>                               | Danish waters and the Baltic Sea | Windows                   | Yes              | Vector addition of contribution from water current and wind   | 1 to 40 hours                   | Date, time, position, oil type, volume, wind, current and temperature                           | Numerical tables and maps                              | 24 hours                              |
| France            | TRANSSPILL   | The Channel                      | Special Programme         | No               | Vectorial addition of current and wind.   | 1 to 72 hours                   | Current, wind, pollutant type and volume. Duration of discharge. Location. Emulsification rate. | Maps, weathering curves, tables, spill reports.        | 24 hours<br>Cedre                     |
|                   | G.E.A.   | Channel & Atlantic, North of 43° | Special programme         | No               | Vectorial addition of current and wind.   | 1 to 72 hours                   | Influence of current and wind.  | Maps   | 24 hours<br>French Navy<br>Premar/Com |
|                   | OSIS   | Channel & North Sea              | Windows                   | Inter-changeable | Particle based (lagrangian model).  | 1 to 72 hours                   | Current, wind, location, pollutant type and volume. Duration of discharge.                      | Maps, weathering curves<br>spreadsheets, spill reports | 24 hours<br>Cedre                     |
|                   | MOTHY,<br>(under development)  | World Wide                       |                           | Arcinfo<br>GIS   | Atmospheric forecast provided by wind and sea-level pressure forecast from European Met. Office.<br>Tide forcing including Channel  | 5 days with five-hours interval | Location. Pollutant type and volume. Duration of discharge.                                     | Maps   | 24 hours<br>Météo France<br>Cedre.    |

| Contracting Party   | Name of tool         | Applicable area                     | Specific type of software | GIS related                       | Calculation parameter(s)   | Time horizon   | Input  | Output                                | Availability            |
|---|----------------------|-------------------------------------|---------------------------|-----------------------------------|--|--|--|---------------------------------------|-------------------------|
|   |                      |                                     |                           |                                   | & Bay of Biscay.   |  |  |                                       |                         |
| Germany   | BSHdmod              | Regional                            | Special programme         | N/A.                              | Using stored and updated tidal current and wind data calculated in a hydrodynamic model. Particles are transported as a result of advection by tidal currents and turbulent diffusion, simulated by a Monte Carlo method. Account is taken of main physical processes. | Past and 36 hours in the future.<br>It can be used in the back-tracking mode to trace the originator of a spill. | Date, time and position, amount, type of substance, continuous or spontaneous release. | Maps                                  | 24 hours                |
| Ireland   | Oilmap Chemmap       | Irish Pollution Responsibility Zone | *                         | Yes, GIS is based on MapInfo MapX | Vectorial addition of current and wind and characteristics of oil in relation to behaviour   | Depending in input data  | Date, time, position, location, type and amount of pollution                           | Maps, mass on water, shoreline impact | 24/7 (ASA Product)      |
| <p>* The OILMAP model comprises several integrated components. The spill model itself predicts the movement of oil on the water surface and the distribution of oil in the environment (evaporated, in the water column, on the shoreline). For these calculations the spill model relies on environmental data such as wind and currents, physical data such as the proximity of shorelines, and the chemical data that defines the type of oil. Each of these types of data can be input and edited using the appropriate OILMAP component.</p> <p>Spill models available:</p> <p>The basic model is the <b>trajectory and fates model</b> which tracks the oil's movement on the water surface and determines the amount evaporated, dispersed into the water column, and stranded on the shoreline over time.</p> <p><b>Subsurface model</b> follows the oil's movement both on the water surface and in the water column.</p> <p><b>Stochastic model</b> performs a large number of oil trajectory simulations using different wind conditions.</p> <p><b>Receptor model</b> is essentially the stochastic model run in reverse.</p> |                      |                                     |                           |                                   |  |  |  |                                       |                         |
| The Netherlands   | SIMAP/OILMAP         | Worldwide                           | Windows environment       | Yes                               | Generic theory on wind and current impact and characteristics of oil in relation to the behaviour.   | Depending on input data.   | Date, time, position. Location. Type and amount of pollutant.                          | Maps, mass on water, shore sediment.  | 24 hours, (ASA product) |
| Norway, 1   | Oil Weathering model | Area dependent                      | Special programme         | N/A                               | Based on detailed laboratory weathering studies of each particular oil. Spreading, evaporation, natural dispersion, emulsification, pour point, flash point, emulsion stability, mass balance.   | Hours to weeks   | Laboratory weathering data, wind, temperature, slick thickness, rate                   | Graphics, text                        |                         |
| Norway 2  | Oil Spill            | Worldwide                           | Windows                   | Yes                               | Oil Weathering, mass balance,  | Minutes to years   | Oil types, release   | .                                     |                         |

| Contracting Party   | Name of tool                               | Applicable area  | Specific type of software | GIS related | Calculation parameter(s)  | Time horizon    | Input  | Output   | Availability |
|---|--|------------------|---------------------------|-------------|---|-----------------|--|--|--------------|
|   | Contingency and Response (OSCAR) model *** |                  |                           |             | spill trajectory, strategic response. Incorporates the SINTEF OIL Weathering MODEL (OWM) and Deep Blow models. Strategic analysis of alternate oil spill response. Net environmental benefit analysis (NEBA). Natural resource damage assessment (NRDA), Environmental Impact Factor (EIF) analysis   |                 | specifications (rates, surface vs subsurface, multiple sources etc) winds, currents, bathymetry, coastline (from supplied worldwide databases. |  |              |
| <p>*** <b>OSCAR, DREAM and ParTrack</b> comprise a state-of-the-art 3-dimensional suite of oil spill and chemical release models that resolves releases with up to 200 separate chemical components or component groups, including degradation products. This allows for detailed and realistic environmental impact and risk analysis. Integrated capabilities include:</p> <ul style="list-style-type: none"> <li>• Laboratory-and field-calibrated oil weathering based on an international standard established by SINTEF</li> <li>• 3-dimensional dynamic simulation and visualization of surface, subsurface, and coastal pollutant distributions and concentrations</li> <li>• Advanced gas and oil blowout simulation from deep and shallow waters</li> <li>• Stochastic environmental risk and net environmental benefit analysis (NEBA)</li> <li>• Natural resource damage assessment (NRDA)</li> <li>• Detailed analysis of alternate spill response strategies for oil spill contingency and response</li> <li>• Environmental Impact Factor (EIF) analysis for oil spills and operational releases such as produced water, drill muds and cuttings</li> <li>• Exposure of organisms, and dynamic body burden calculations</li> </ul> |  |                  |                           |             |   |                 |  |  |              |
| Norway  | Deep Blow                                  | Area independent | Special programme         | No          | Lagrangian buoyant jet/plume model simulating sub-sea blowouts from oil wells. Compute dilution of a plume formed from a sub-sea blowout with oil and gas in stratified water masses. Includes potential hydrate formation. Behaviour of plume at sea surface, including oil slick formation. Integrated into OSCAR oil spill contingency and response model. | Seconds to days | Spill rate and water depth. Sea temperature and salinity.  | Underwater plume. Dilution, concentration. Spreading at surface. Size and thickness of slick |              |
|   | ShipDrift (statistical ship drift model)   | World Wide       | Fortran                   | Yes         | Drift time, influence area  | Adjustable      | Wind and current, ship specifications  | Ship drift trajectories  | On demand    |

| Contracting Party | Name of tool  | Applicable area                              | Specific type of software     | GIS related | Calculation parameter(s)  | Time horizon  | Input   | Output   | Availability               |
|-------------------|---|--|-------------------------------|-------------|---|---|---|--|----------------------------|
|                   | OilTraj<br><br>(statistical oil drift model)                    | World Wide                                   | Fortran                       | Yes         | Oil mass balance, drift time, influence area  | Adjustable  | Wind and Current, Oil weathering properties   | Oil spill spreading (surface, subsurface, stranding)   | On demand                  |
|                   | ActLog<br>(Operational Oil Spill Response and planning toolkit) | World Wide                                   | ArcView<br>ArcIMS             | Yes         | Response time, Met-Ocean conditions, Vulnerable areas, Shoreline impact   | N/A   | Accidental event  | Maps, GIS event tracker, Web interface   | On demand                  |
| Sweden            | Seatrack Web  | The Baltic Sea and westwards to longitude 6E | Windows and Java<br>Web start | Yes         | Current from HIROMOB model, wind from Hirlam weather model  | Forecasts two days ahead and hindcasts 10 days in the past. | Date, time, position, discharge.  | Maps   | 24 hours<br>SCG HQ<br>SMHI |
| United Kingdom    | OSIS<br>VMIS  | UK waters and North Sea                      | Windows                       | Yes         | Vectorial wind and tide oil and chemical type, volume. Input wind speed and direction, temperature, fore and hind cast modelling. | Adjustable  | Date, time, position, weather and oil type. Evaporation, dispersion, emulsification, drift. | GIS display of oil/chemical trajectory over time. Predicted evaporation, emulsification dispersion. Likely effectiveness of dispersants in time frame. For oils and chemicals. | 24 hours                   |

**CHEMICALS**

| Contracting Party | Name of tool                  | Applicable area | Specific type of software  | GIS related | Calculation parameter(s)   | Time horizon     | Input   | Output  | Availability                   |
|-------------------|-------------------------------|-----------------|--|-------------|--|------------------|---|---|--------------------------------|
| Germany           | RESY-B                        | Worldwide       | DOS  | No          | None<br>Oil and Chemical Database  | N/A              | UN-number, Name<br>CAS-number or<br>Fragments   | Text  | 24 hours<br>German<br>language |
| The Netherlands   | SIMAP/<br>Chemical M<br>(USA) | Worldwide       | Windows  | Yes         |  |                  |   |   | 24 hours                       |
| The Netherlands   | SISTER                        | -               | Special<br>database  | No          | Database containing over 2000<br>chemicals frequently<br>transported to Rotterdam.   | N/A              | UN-number, Name<br>CAS-number   | Hazardous profile.<br>Applicable Dräger<br>tubes.                           |                                |
| Norway            | MigMod                        | Worldwide       |  | Yes         | Movement of marine<br>organisms within a given<br>population, biological<br>exposure and uptake of<br>pollutants.  | Days to years    | Behaviour and<br>population<br>parameters. Output<br>from oil or chemical<br>spill model.   | Distribution of<br>exposures and<br>effects.                                | Sintef                         |
|                   | DREAM and<br>Par Track ***    | Worldwide       | Windows,<br>dynamic<br>map-based<br>simulation<br>tools for<br>operational<br>and<br>accidental<br>discharges of<br>complex<br>mixtures of<br>chemicals,<br>drill muds<br>and cuttings | Yes         | Mass balance, 3-dimensional<br>fates and effects of complex<br>mixtures of chemicals,<br>including oils, Net<br>environmental benefit analysis<br>(NEBA). Natural resource<br>damage assessment (NRDA).<br>Environmental Impact Factor<br>(EIF) analysis | Minutes to years | Chemical profile of<br>release (up to 200<br>chemical<br>components), release<br>specifications (rates,<br>surface vs<br>subsurface, multiple<br>sources, etc), winds,<br>currents, bathymetry,<br>coastline (from<br>supplied worldwide<br>databases | 3D dynamic maps,<br>natural resource<br>exposures, risk<br>assessment maps. |                                |
| *** See page 3/6  |                               |                 |  |             |  |                  |   |   |                                |
| UK                | VMIS<br>CHEMSIS               | UK waters       | Windows  | Yes         | Chem database floater, sinker,<br>evaporator, dissolver co-<br>efficients. Vectorial wind tide.  | Hours to months  | Chem species wind<br>speed/direction, date,<br>time, position,<br>temperature.  | Evaporate,<br>dissolve, sink,<br>percentage<br>geographical track.          | 24/7                           |

## Floating objects

| Contracting Party | Name of tool | Applicable area | Specific type of software | GIS related        | Calculation parameter(s)  | Time horizon   | Input   | Output     | Availability                       |
|-------------------|--------------|-----------------|---------------------------|--------------------|---|--|---|------------|------------------------------------|
| France            | Conteneurs   | Worldwide       |                           | cf. MOTHY (p. 1/5) | cf. MOTHY (p. 1/5)  | cf. MOTHY (p. 1/5)   | Location rate of immersion (10% to 90%).                              | Maps       | 24 hrs Météo France contact Cedre. |
| Germany           | BShd mod     | Regional        | Special programme         | No                 | Using stored and updated tidal current and wind data calculated in a hydrodynamic model. Particles are transported as a result of effectuation by tidal currents and turbulent diffusion, simulated by a Monte Carlo method. Account is taken to main physical processes. | Past and 36 hours in the future<br>It can be used in the back-tracking mode. | Date, time, position, proportion above/under sea surface.             | Maps       | 24 hrs                             |
| The Netherlands   | SIMAP        | Worldwide       | Windows                   | Yes                | Depending on object.  | Adjustable   | Wind and current.<br>Position.<br>Proportion above/under sea surface. | Maps       | 24 hrs                             |
| UK                | SARIS        | UK Sea Area     | Windows<br>VMIS           | Yes                | UKHO tidal atlas with wind vectorial  | Hours/days   | Position, date, time  | Trajectory | 24/7                               |

**Gas clouds**

| Contracting Party | Name of tool | Applicable area                       | Specific type of software | GIS Related | Calculation parameter(s)  | Time horizon                            | Input  | Output   | Availability                           |
|-------------------|--------------|---------------------------------------|---------------------------|-------------|---|---|--|--|--|
| France            | EPI          | Area Independent                      | Special programme         | No          | Simulation model of dispersion of gas or evaporating chemicals in atmosphere.   |   | Chemicals discharge.<br>Wind.  | Maps<br>Tables                                       | 24 hours<br>Cedre                      |
| Germany           | DEGADIS      | Worldwide                             | Special programme         | N/A         | Simulates a variety of dense or neutrally buoyant releases from point or area sources, including steady-state releases and prescribed time -varying (transient) releases.<br>Accounts for the three regions of dispersion and for the effects due to energy exchange between dispersion cloud and the underlying surface. | Dynamically until stationary condition. | Meteorological data, chemical and physical data of the substance, amount, surface roughness. | Maps   | 24 hours                               |
| The Netherlands   |              | Netherlands<br>Continental Shelf only |                           |             |   |   |  | Maps.<br>Prediction of behaviour.<br>Hazard profile. | Contract with semi-commercial company. |

## NATIONAL CONTACT POINTS

A full list of national contact points can be found on the Bonn Agreement website at the following url:

<http://www.bonnagreement.org/activities/operations>

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## POLICY STRATEGY OF OIL POLLUTION COMBATING

### 22.1 THREAT TO RESOURCES

Oil spilled at sea threatens individual organisms, resources in the immediate vicinity and the ecosystem as a whole. It also poses a potential threat to the shore and to estuaries. Damage to the ecosystem will depend *inter alia* on the quantity and type of oil, the location where the oil is spilt and the time of year. Effects may be direct or indirect.

#### 22.1.1 OIL AT SEA

.1 An oil slick at sea can present an immediate hazard in three ways:

- (i) it can cause catastrophic damage to birds and mammals at the water surface by coating and affecting their protective outer coverings with a layer of oil;
- (ii) the dissolving and dispersing fractions can exert a toxic stress on subsurface organisms and, in some cases, cause mortality or become assimilated;
- (iii) because of the evaporation of light fractions, an oil slick may in some circumstances pose an explosion hazard and risks to human health.

In some particular instances, such as shallow waters with high sediment loads, oil can sink to the sea bed and cause a continuing source of pollution. It can lead to the death of benthic organisms both in the short and long term.

.2 In waters deeper than 20 metres and not in the vicinity of ecologically valuable areas, there will normally be adequate water to dilute the dispersing and dissolving oil to safe levels, and the immediate threat to subsurface organisms is unlikely to be severe except in the case of a massive and prolonged release of oil such as a blow-out or a major tanker accident.

.3 The explosion hazard is also unlikely, in normal conditions, to present a severe problem. The lighter fractions of crude oil will usually have evaporated after the oil has been on the water surface for 30-60 minutes, and during the period of evaporation the lower explosive limit contour will usually remain within the slick boundaries. Provided response teams remain alert to the risk of explosion and to their health, and take due precautions and protective measures, the hazard will be small.

.4 At sea, therefore, the main threat posed by an oil slick is usually that of physical damage to organisms at the water surface. In the North Sea Area<sup>1</sup> the main organisms at risk are sea birds and seals, and in some areas at certain times of year the hazard is a severe one. Although there are concentrations of marine mammals in many areas, these are unlikely to be at risk in open waters.

#### 22.1.2 OIL ASHORE

.1 Once the oil arrives in inshore waters and starts to come ashore, its potential to cause damage is much wider. Resources at risk include ecologically important areas, fisheries, zones of high amenity and industrial installations. Almost every part of a coastline has some resource which can be damaged by oil including the health of response teams where there are insufficient protective measures.

.2 Some types of shoreline, such as hard, sandy beaches can be cleared of gross oil contamination fairly easily, although even in areas such as this, cleaning operations are usually more expensive per tonne of oil than a clean-up operation at sea. In other coastal areas, clean-up will be difficult and protracted, and in some areas it will not be possible to remove the contamination without causing more damage than the oil itself.

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<sup>1</sup> The North Sea Area covers the North Sea, the English Channel, the waters around Ireland and parts of the Western Approaches and the Norwegian Sea.

### 22.1.3 OIL IN ESTUARIES

.1 Should oil be spilt in, or drift into, an estuary it can pose particular problems due to the shallow water depth, high sediment load in the water and the presence of mud flats and salt marshes.

.2 The effects of an oil slick in estuaries depend on:

- (i) the quantity of oil floating on the water surface;
- (ii) the concentration of oil which is dispersed or dissolved in the water column (the concentration determines uptake by organisms and the eventual toxic effects);
- (iii) the quantity of oil absorbed by the sediment (this is important in the longer term as it may act as a continuing source of oil pollution).

.3 Oil floating on the water surface can contaminate birds, seals, banks and vegetation. Oil dissolved in the water may not be dispersed to safe levels, it can therefore have direct toxic effects on aquatic organisms (plankton). Oil may also be transferred to the sediment and impact on benthic organisms (macro benthos), effects may be long term as a result of accumulation in these organisms. Alteration of the species composition can last up to six years after the spill.

.4 Oil on tidal flats can lead to the death of a large number of benthic organisms possibly resulting in a heavy loss of such animals both in the short and long term. The reduction in the quantity of food (benthic organisms), change in the food composition and accumulation of hydrocarbons may have indirect short and long term effects on the size of the population of fish, birds and seals. For each group of organisms there are different sensitive periods such as spring for breeding birds and fish larvae, summer for benthic organisms and seals, and winter for migratory or wintering birds.

### 22.1.4 REASONS FOR RESPONSE

The reasons for attempting to combat an oil spill while it is still at sea are to protect individual organisms, resources in the vicinity of the slick and the marine environment and to minimise the quantity of oil which comes ashore or into estuaries. In particular everything possible should be done to prevent oil being washed ashore on mud flats and salt marshes as they constitute the most sensitive parts of the North Sea and are difficult, if not impossible, to clean up.

### 22.1.5 ASSESSMENT OF THREAT

.1 In order to decide whether or not a response is necessary, or what sort and extent of response is appropriate, the threat posed by the oil must be evaluated. This requires techniques for predicting the behaviour of the oil, which in turn will rely on timely information about the type and quantity spilled, the location of the spill and weather conditions. Advice on sensitive resources likely to be impacted by the spill will also be needed.

.2 Because of the considerable uncertainty which usually surrounds a spill, and the difficulty of predicting the damage which may be caused to a resource by oil, the assessment of the threat will be tentative at first, becoming more firm as information become available. The response teams, however, will not be able to wait for a firm assessment and an element of judgement will normally be necessary during at least the first stages of the response.

## 22.2 CLEAN-UP PROBLEMS AT SEA

The various techniques available for dealing with oil at sea have been dealt with in detail elsewhere in this manual. In summary, although a number of possible techniques have been evaluated, the only options found to be appropriate in the North Sea Area are:

- (i) to remove the oil from the sea surface;
- (ii) to disperse the oil by chemical or mechanical means;
- (iii) to allow natural forces to dissipate the oil, and

- (iv) to reduce its volume by *in situ* burning. The IMO has included in its Manual on Oil Pollution the possibility of *in situ* burning as one of the means of reducing the volume of spilt oil. However, in general, in the circumstances of western Europe, with high densities of settlement and significant problems of air pollution, *in situ* burning is unlikely to be a technique which will be appropriate. Restrictions on the land-fill disposal of waste oil and other oily wastes may, however, mean that thermal destruction of waste oil and oily waste, under conditions which avoid air pollution, may need to be used to a greater extent than previously.

### 22.2.1 MECHANICAL RECOVERY

.1 Option (i) is in principle the most desirable way of dealing with oil at sea, because it removes the contaminant from the sea surface. Viscosity is no longer a serious problem in most cases - there are skimmers available which will recover very viscous oils. Caution needs to be taken with respect to the explosion hazard arising from both the oil slick and the recovered oil, but the dangers here are understood and can be minimised during contingency planning and operations by taking appropriate precautions. Recent experience has shown vessels engaged in the recovery operations near to the coast can threaten fixed fishing installation, and care must be taken in such situations. The problem, however, is likely to occur only rarely.

.2 The main problems with recovery operations are: the speed with which equipment can be deployed to begin with and this depends on the location of the equipment; the interdependency of recovery rate and weather conditions.

.3 Oils which are still in their liquid phase, that is, above their pour point temperature, spread out rapidly on the sea surface to form very thin films (typically 0.1 millimetres) covering very large areas. The speed at which booms can be towed through the water to collect oil is limited to between 0.5 and 1.0 metre per second (1-2 knots) because of the tendency for oil to be carried below the boom by turbulence. This restricts the collection rate of a 0.1 mm layer to a maximum of 0.18-0.36 tonnes per hour per metre of boom under favourable weather conditions (generally around 75-150 tonnes per hour). The low rate of recovery of a combating vessel can be increased by using a collection boom in combination with a sweeping arm or a skimmer and by using aerial surveillance techniques to direct the recovery vessels to the thicker layers of the oil. In addition the recovery operation by a single ship or small response group formation produces under most conditions far higher recovery rates as major oil spills in European waters under partly complicated operational conditions have proven.

.4 Generally, booms will not retain oil at wave heights of greater than 2 metres, and are increasingly inefficient at heights in excess of 1.5 metres. Such wave heights are present in the Northern part of the North Sea for more than 70% of the time. In the Southern part of the North Sea the situation is more favourable, for 70-80% of the time the wave heights are less than 2 metres. However, breaking waves in shallow, near shore waters, and long waves in the open sea will have significantly different effects on the ability of a boom to retain oil.

.5 In countries with long coastlines there may also be problems in having vessels available to deploy the equipment. Equipment can either be portable, for mounting on ships of opportunity, or fixed in casual or dedicated vessels. Keeping dedicated vessels on permanent stand-by is expensive but permits a reasonably rapid response to an incident within range on the ship's base. Vessels which are normally engaged on other duties will require time to be brought into readiness for combating oil pollution, and this will increase response times. However multi-purpose ships patrolling along the coastline on other maritime tasks (Coastguard, Police Patrol, Customs, Fishery Inspection, Aids to Navigation etc.) can reduce response times and provide highly trained and motivated crew for rapid response operations. Finding a ship which will meet the requirements for at-sea recovery, i.e. with the ability to manoeuvre at slow speed and certified for carrying flammable cargoes, will add even further delays.

### 22.2.2 DISPERSION

.1 Dispersion can, under favourable conditions, reduce both the threat of an oil slick to surface organisms and the amount of oil which will come ashore. However, it increases the threat of subsurface organisms by temporarily enhancing the concentrations of toxic oil fractions entering the water column. In

some circumstances it is possible to disperse a slick using a ship's propellers or by other mechanical means, and as suitable vessels will often be at the scene of a spillage for other reasons this can be a convenient and low cost option. More often, though, chemicals will have to be added to achieve a satisfactory rate of dispersion. The use of chemical dispersants is described in detail in a position paper on dispersants in Chapter 23 of this manual.

.2 In deep waters there will usually be adequate dilution available to reduce the concentration of dispersing oil to a safe level. This will not necessarily be the case in massive or prolonged operations, and in such cases it is important to balance the benefits of destroying the oil slick against the hazard posed to subsurface organisms. In waters shallower than 20 metres the possible impact of the dispersing oil must always be taken into account, regardless of the size of the operation. This, however, need not be a serious problem at the time of an incident if appropriate preparations are made during contingency planning. A strategy for the use of dispersants should be formulated to suit the geographical area, the resources at risk at different times of the year, and weather patterns.

.3 The main problem with the use of chemical dispersants is that they are effective only in relation to light oils. The main factor is the viscosity of the oil. For dispersants to work effectively it is important that they become thoroughly mixed with the oil. Some oils, especially those below their pour point, are too viscous for the dispersant to penetrate into the oil. Most oils will become more viscous over a period of time when floating on the sea. This period depends on the oil and the weather conditions, but can be just a few hours. This makes it important to apply chemical dispersants as quickly as possible after the spill has occurred, and in practice this usually means relying on aircraft as the primary means of application.

### **22.2.3 NATURAL DISSIPATION**

.1 Option (iii) in paragraph 22.2 could be considered the least attractive in that it leaves the oil in an unmodified form on the sea surface, with a potential to harm sea birds or reach the shoreline unchanged. Heavy oil may also sink to the seabed and be harmful there. It is, however, the cheapest option by far, and consequently for smaller oil slicks it is the most commonly used response. Such slicks will often break up and dissipate before they can reach vulnerable areas. However, it should be noted that this option is often the most difficult to handle politically.

.2 For larger slicks, the problem is being able to predict with an appropriate degree of certainty that the oil will not cause damage. Although predictive models of the movement of oil on the water surface have reached an advanced state, the main factor affecting the path of an oil slick is wind, and our ability to forecast wind strength and direction is limited. Hence, if this option is to be used, in cases where there remains doubt about the fate of the oil, the slick should be monitored carefully.

### **22.3 CLEAN-UP PROBLEMS ON SHORE**

.1 Once oil has come ashore the options available and the problems are quite different. Clean-up techniques may be intrinsically quite damaging, and the benefits of cleaning an area must be balanced carefully against the disbenefits of the damage caused by the clean-up activity. This should be done during contingency planning, and reconfirmed at the start of the clean-up operation. Natural dissipation, dispersion, containment and recovery, flushing, absorption and mechanical or manual clearance are all viable techniques and the choice of methods will depend on the type of shoreline. Each of these various options has its own problems, and some of these are summarised in the following paragraphs. However, the over-riding problem at present is that some types of coastline simply cannot be cleaned at all without totally destroying their resource value.

.2 Natural dissipation is the least damaging option as far as the affected area is concerned, but an oiled foreshore, even if clean-up is not essential at the site, can act as a source of contamination for other areas as the oil migrates. Care needs to be taken to ensure that by leaving one area alone, the situation is not made worse for another, possibly more important zone.

.3 Dispersants will not have a significant impact on thick deposits of oil, but will work very efficiently on thin residues for example remaining after gross pollution has been cleared, even on high viscosity oil. However, precautions must be taken to ensure that the dispersant and dispersing oil does not cause

unacceptable damage to adjacent areas. This must be ascertained during the contingency planning stage, so that in an incident clear guidelines are available to the response team.

.4 Containment and recovery can be used very successfully in quiet waters such as harbours, lagoons and bounded areas on beaches; for example, to collect oil flushed out by washing activities. In calm waters this will usually be the technique of choice. However, it is important to recognise that booms will not work in fast-flowing estuaries unless great care is taken in their deployment, and the use of booms in such areas by inexperienced personnel can be dangerous.

.5 High pressure flushing can be effective in hard areas such as sea walls and rocks. It can, however, drive oil into the substrate in softer areas, where, if flushing is required, gentle, low pressure systems must be used. Flushing must always be either accompanied by containment and recovery or used in conjunction with adsorbents, otherwise the released oil will simply contaminate other areas.

.6 There are a number of adsorbents available for use on the shore. It is important, though to use adsorbent systems which can easily be collected up, otherwise the resulting spread of oily adsorbents will simply aggravate the problem.

.7 Clearance techniques can be very effective in areas where the intense level of activity will not damage the substrate. Hard sandy beaches and shingle areas can be cleared mechanically. Rocky areas or compacted substrates are best cleared manually. Care must be taken to minimise damage to seaweed and its associated fauna, and to avoid pushing oil down into the substrate. If significant quantities of oiled material are being removed it is important to take into account the potential impact on coastal defences.

.8 The main problem with clearance, which also applies to recovery and the use of adsorbents, is to dispose of the recovered material. In some areas this will be the most difficult part of the operation. Sometimes it may be possible to reduce the amount of material to be disposed of by washing it and returning cleaned material to the beach. Use of demulsifiers to remove trapped water can also make a significant impact. The most important way, though, of minimising the quantities of materials to be disposed of is to ensure that proper care is taken on the foreshore to remove as high a proportion of oil to substrate as possible.

.9 The costs associated with shoreline clean-up involve the standing charge of maintaining specialist equipment on stand-by (though most of the equipment used will be standard civil engineering equipment and will not need to be kept on stand-by), and the cost of deploying manpower and equipment. In addition, there will be costs associated with the disposal of oily wastes. By way of example, the United Kingdom's beach cleaning stockpiles are valued at about £1 000 000 and cost about £100 000 per year to store, maintain and exercise. These costs will vary from country to country depending on the length and nature of the coastline.

.10 At the time of the clean-up operation, the costs will depend on the nature of the coastline and the type of response chosen. However, as indicated above, the type of coastline will itself be the main factor in choosing the response technique, and there will be little scope for making choices on the basis of cost effectiveness. One particular decision which can be contemplated and which will make a significant impact on costs is whether or not to clean up an area which could in principle be cleaned. If it can be demonstrated that clean-up would have no significant advantages for the area in question and that the area would not act as a source of contamination to other resources, then a clean-up operation would be a waste of money.

#### 22.4 CLEAN-UP PROBLEMS IN ESTUARIES

Based on the effects of oil mentioned in 22.1.3 and the special circumstances for estuaries (tide, high strength of currents and the accessibility of the area), oil clean-up techniques must attempt to satisfy the following criteria:

- (i) no disturbance of the ecosystem or physical damage to mud flats and salt marshes;
- (ii) rapid removal of floating oil without increasing the oil concentration in the water and the sediment;
- (iii) the stimulation of biological breakdown if necessary.

In practice this means *inter alia* that:

- control of a floating oil slick in the vicinity of an estuary should, where possible, be limited to active mechanical control;
- if mechanical control is impossible, the most favourable technique is to divert the spill on to sandy beaches or sandy shoals;
- the priority is to prevent oil being washed up on mud flats and marshes. Where strong tidal currents or other factors make mechanical control or diversion impractical, the use of dispersants must be considered in order to protect these areas from floating oil.

## 22.5 CONCLUSIONS

- .1 The techniques chosen should not cause more damage to the environment than the oil spill itself.
- .2 The main problems with dealing with oil at sea are:
  - the slowness of existing recovery techniques and their dependency on reasonable weather situations;
  - the ineffectiveness of dispersants on viscous or weathered oil; and
  - the difficulty of being sufficiently certain of the fate of oil to be confident about leaving it to dissipate naturally.
- .3 When cleaning the shoreline, the main problems are:
  - to ensure that the techniques chosen do not cause undue physical damage to the shoreline; and
  - to find ways of disposing safely of the oil and contaminated materials.
- .4 When dealing with oil in estuaries the main problems are:
  - prevention of damage to the ecosystem and structure of mud flats and marshes;
  - rapid removal of floating oil, without increasing the concentration of oil in the water and sediment; and
  - ensuring everything is done to prevent oil being washed ashore on mud flats and marshes.
- .5 All of these problems have long been recognised and work is proceeding to ameliorate them, although there are no immediate signs of a dramatic breakthrough. At the same time it is important to pay careful attention to any new ideas or techniques which may complement or replace existing methods.
- .6 Because of the limited choice of techniques available, the question of cost-effectiveness is in most cases academic. However, on the one hand dealing with oil at sea, on shore or in estuaries is expensive and, on the other, oil will normally dissipate and degrade naturally if left alone. The “do nothing” option must always be considered, therefore, and adopted where it can be predicted with reasonable confidence that the oil will not damage resources to a greater extent than would a clean-up operation.

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## DISPERSANTS

### 23.1 PRESENT SITUATION

Use of dispersants by Contracting Parties, national regulations for acceptance and use, specific national criteria.

#### 23.1.1 Belgium

There are no specific regulations or test procedures for approval of dispersants in Belgium. Their use is regulated by law. In case of an oil pollution incident, the first priority is the use of mechanical recovery equipment. The use of oil dispersant is a second option in oil pollution combating. Their use can only be permitted by MUMM, when an evaluation of the circumstances indicates that the chemical treatment will result in a global reduction of the anticipated negative effects of the pollution on the marine environment compared with natural processes or other combating methods (Concept of NEBA) and no formal evaluation procedure.

#### 23.1.2 Denmark

.1 The Danish policy concerning the use of dispersants was taken as a follow-up to the “blow out” in 1978 at the Norwegian oil field Ekofisk in the North Sea. That same year, an expert panel analysed the issue and the resulting general advice was that dispersants should only be used in exceptional cases. The panel comprised all relevant government agencies and ministries as well as people from the university world.

.2 The advice from the expert panel was incorporated into the official Danish oil contingency planning and preparedness plans. At that time, a test was carried out by DANTEST (as mentioned in the Bonn Agreement manual) but no further test has been carried out since that time. If Denmark decided to use dispersants, the decision would be taken on the received information from the Admiral Danish Fleet concerning the oil type, the amount, time of the year and the geographical position, in other words decisions would be taken on a case-by-case basis. The use of dispersants for the purpose of cleaning beaches or stony coastlines is limited to protect the biota in the surface layers. Mechanical methods are preferred in view of the toxicity of dispersed oil.

.3 Denmark does not have any requirements for approval and generally accepts dispersants which are approved by 2 or 3 other Bonn Agreement countries and in the list published in the Bonn Agreement (BP 1100 X, Enersperse 1583). Dispersants are used only if mechanical combating is impossible or less suitable. In principle, the “discharge” of dispersants is prohibited. Permits may be granted by the Ministry of the Environment, on the advice of the Danish EPA, after the product has cleared a pre-evaluation by an independent laboratory. The Danish EPA is only inclined to accept the use of chemical dispersants if, for example, human beings are in danger or if larger concentrations of sea fowl or particularly valuable coastal areas are threatened by severe oil pollution incidents or if it is the only way to protect other valuable areas. Normally the Danish EPA oil combating force will already be on the scene and evaluating the use/non-use of dispersants.

#### 23.1.3 France

Chemical dispersion is one of the response options as well as mechanical recovery; however the use of dispersants is subject to meteorological, environmental and oil dispersibility conditions. Geographical boundaries have been drawn, beyond which the use of dispersants can be considered without major risks to the marine environment. These boundaries have been defined on the basis of realistic scenarios of spillages of 10, 100 and 1 000 tonnes, and they take into account the presence of resources that are sensitive to dispersed oil (fisheries, aquaculture, ...) in the zone. Inside the boundaries, special precautions are taken when using dispersants. The boundaries may be changed in the course of the treatment by the Maritime

Prefect, in consultation those bodies of the French administration which are concerned (mainly IFREMER and Cedre). There is an approval procedure based on standard laboratory tests for efficiency, toxicity and biodegradability of the dispersant. The list of accepted products is published on CEDRE's Website.

#### 23.1.4 Germany

.1 The use of dispersants is limited to a minimum in the coastal regions; their application is less restrictive on the open sea, but, weather permitting, mechanical recovery has priority in all cases.

.2 In Germany, dispersants can be used only with the approval of the official administration (Havariekommando in Cuxhaven). In the North Sea, dispersants must not be used in shallow waters (less than 10 m depth). Restricted use is possible within the range of 10 to 20 m depth. There is no restriction in waters deeper than 20 m. In the Baltic Sea, Germany has objections to dispersant application because this sea has poor water exchange and is shallow in wide areas. The Baltic Sea has practically no tidal currents which may dilute the dispersed oil in the water body.

.3 Dispersant use is not a control method of first choice. Due to this fact we have no extra methods for testing dispersants. Up until now, it has seemed quite reasonable to accept a product if it appears on the list of accepted products in France or the UK.

#### 23.1.5 The Netherlands

##### PROVISIONAL TEXT

.1 The Netherlands primary response to an oil spill is mechanical recovery, provided the sea conditions are favourable. Depending on the type and quantity of the floating oil slick, mechanical dispersion is considered as a secondary response option.

- if applicable then the following conditions should be met :

oil volume > 200 m<sup>3</sup>; layer thickness 50-200 um and water depth > 20 mtrs  
oil volume < 200 m<sup>3</sup>; layer thickness 50-200 um and water depth > 5 mtrs.

- no operational limitations exist when :

sufficient visibility (with regard to spraying aircraft)  
oil is one slick or more then one big slicks  
layer thickness is over 50 um  
viscosity is < 5000 cSt and  
wind force between 3 and 7 Bft.

.2 Ecologically sensitive situations and areas have been identified, for example, an oil slick in a remote area that requires a long mobilisation time for a recovery vessel to arrive, with migrating birds in the area. As the birds may get contaminated, spraying dispersants could be a viable option. The Wadden Sea north of the mainland is very sensitive. An oil slick released west of Rotterdam could end up in this Wadden Sea driven by prevailing winds (southwest). Applying dispersants could prevent this happening, as the oil would disperse into the water column and not be influenced by wind.

.3 The dispersants that have been tested in EU, or the Bonn Agreement or HELCOM member states list, will be accepted in Netherlands to avoid the need for additional testing.

.4 Netherlands has not the intention to stock dispersants and would seek assistance from UK since they have both the dispersants and the spraying aircraft. Studying the mobilization time from Southampton and/or Coventry, any part of EEZ can be reached in time.

### 23.1.6 Norway

.1 Dispersants are valuable tools in marine oil spill response. Dispersants can prevent and reduce acute oil pollution. Used properly, modern dispersants reduce the impact on the environment, and are particularly well suited to protection of sea birds and reduction of shoreline oiling. New regulations entered into force on 1. January 2002. The regulations state that dispersants should be used when their use will result in the least environmental damage.

#### **Use of dispersants must be documented in contingency plan**

.2 The use of dispersants - which in many ways can be compared to dishwashing liquids, but which are adjusted to different types of oil – must be documented in a contingency plan. Specific requirements for testing of acute toxicity and efficiency must be met.

#### **Net Environmental Benefit**

.3 The dispersants will only be used when the response in overall terms will benefit the environment. They will not be used on spawning grounds. The Norwegian Pollution Control Authority, SFT, will carefully assess whether they can be used in areas with poor water exchange and in shallow, coastal waters.

.4 Acute oil spills can cause great damage on the marine environment. The potential for damage will largely depend on the natural resources that are exposed to the oil spill, the type of oil and the volume of oil spilled. The potential for damage does not always coincide with the size of the spill.

#### **Response against oil pollution**

.5 Today mechanical containment and recovery and dispersants are used to prevent and to respond to oil pollution. Monitoring of oil pollution is also regarded as a means of response.

#### **Regulating the use of dispersants**

.6 The composition and use of dispersants are described in the new regulations. The purpose is to combat acute pollution efficiently. The regulations allow the use of dispersants when this is the best alternative for the environment.

.7 Private enterprises or municipalities that wish to use dispersants must state in their contingency plans the oil spill situations in which they would use this response. SFT will then consider whether the criteria for use are met.

#### **Must apply to use dispersants**

.8 In situations where dispersants would be beneficial, but where the user has not preplanned such a response, an application for authorisation must be made to SFT. SFT has a 24-hour response centre to handle incidents of acute pollution, and will consider the application immediately.

#### **More information**

.9 Ann Mari Vik, Norwegian Pollution Control Authority, tel: + 47 22 57 34 00; e-mail: [ann-mari.vik@sft.no](mailto:ann-mari.vik@sft.no).

### 23.1.7 Sweden

Dispersants are not used in Sweden.

### 23.1.8 United Kingdom

.1 The UK's primary response to an oil spill is the aerial application of dispersants, although some mechanical recovery equipment is held as a secondary response option. Dispersants are used when an oil spill threatens damage to UK resources and the spill cannot be left to evaporate and degrade naturally ; they are used when weather conditions are appropriate and the oil is amenable to dispersion.

.2 Dispersant action will be initiated only where it is likely to be effective and in the judgement of experts, there is a significant threat of damage to birds or marine life on the coast of the UK.

.3 No dispersant use can take place in water depths of 20 metres or less, or within one mile of such depth, without the approval of the relevant Fisheries Department. Such approval will be given on a case-by-case basis if they are satisfied, after consultation with the relevant statutory conservation agency, that the marine environment will not suffer.

.4 Under Part 2 of the Food and Environmental Protection Act of 1995 and the Deposits in the Sea (Exemption) Order 1985, only dispersants which have passed the relevant tests may be used.

**Table 1 : national policies concerning the use of dispersants**

| Country        | Use of dispersants :                     | Geographical limits   | Approval tests existing :  |  |  | List of approved products  |
|----------------|--|---|--|--|--|--|
|                |  |   | efficacy   | toxicity                                   | biodegradability   |  |
| <b>Belgium</b> | As a 2 <sup>nd</sup> option (after NEBA) | None<br>(only restrictions : volume of used dispersant < 20% of the volume of oil treated + no more than 100 t. of chemical products to use per pollution)                              | None   | None                                       | None   | None<br>MUMM<br>(Federal Service of Secretary of State for Envir.) advises on the use of the products accepted by the other Contracting Parties. |
| <b>Denmark</b> | As a last resort                         | None<br>(case - by - case)  | Danish Institute for Testing & Verification (DANTEST)  |  | None   | <b>yes :</b><br>list from the Danish EPA + those approved by at least two Contracting Parties.   |
| <b>France</b>  | As a 2 <sup>nd</sup> option              | 3 limits : <ul style="list-style-type: none"> <li>• Depending on the volume of oil spilled (10,100 or 1000 t)</li> <li>• Special adjustments when sensible sites are at risk</li> </ul> | By CEDRE (the product must pass the efficacy test before being tested for toxicity and biodegradability) | By the MNHN (Lab. in Concarneau, Brittany) | INERIS + tests for the non-inhibition of the biodegradation by the product | <b>yes :</b><br>list from the CEDRE  |
|                |  |   | Validity of the tests = 5 years  |  |  |  |

|                       |  |  |   |   |      |  |
|-----------------------|--|--|---|---|------|--|
| <b>Germany</b>        | As a last resort (after a NEBA)  | Use : <ul style="list-style-type: none"> <li>• authorized in waters deeper than 20m</li> <li>• restricted in waters between 20 and 10 m depth</li> <li>• forbidden in waters less than 10m deep.</li> <li>• forbidden in the Baltic Sea area &amp; in the Wassen Sea (hauts fonds)</li> <li>• sensitivity maps (to protect sensitive areas)</li> </ul> | None  | None  | None | None :<br>Use of the ones approved by France or UK   |
| <b>Netherlands</b>    | As a last resort   | If the oil slick has: <ul style="list-style-type: none"> <li>• Thickness between 50 and 200µm,</li> <li>• Viscosity &lt;5000cSt; then:</li> <li>• For a vol. &gt;200m<sup>3</sup>, water depth &gt;20m</li> <li>• For a vol.&lt;200m<sup>3</sup>, water depth &gt;5m</li> </ul>  | Use of the products approved by the other Contracting Parties so : <ul style="list-style-type: none"> <li>• No test is being conducted in NL</li> <li>• No stock</li> </ul> |   |      |  |
| <b>Norway</b>         | As a 2 <sup>nd</sup> option (the application must be made with the authorization of the Norwegian Pollution Control Authority) | On a case-by-case basis – generally not less than 20 metres deep and not less than 200 metres from shore.  | Tests for efficacy and toxicity must be conducted by the companies dealing with oil products (refineries, oil terminals = ExxonMobile, Statoil, Hydro)                      |   | None | None   |
| <b>Sweden</b>         | None   | None   | None  | None  | None | None   |
| <b>United Kingdom</b> | As a 1st option :  | Limits for pre-authorization : <ul style="list-style-type: none"> <li>• In water more than 1 nautical mile beyond the 20 meter depth or coastline (otherwise, in shallow waters, DEFRA must be consulted)</li> <li>• Sensitivity maps</li> </ul>   | National Environmental Technology Centre of AEA<br><br>(1st test to be conducted)   | CEFAS (Centre for Environment, Fisheries & Aquaculture Sciences)<br>2nd : if the product approved for efficacy) | None | Yes :<br>list of products accepted by the DEFRA (Department for Environment, Food & Rural Affairs) |

## Nationally accepted dispersants (Annex 1)

### 1. Acceptance by countries :

| Products :                                       |  | UK | France | Others  |
|--|--|----|--------|---|
| <b>Conventional dispersants (type 1)</b>         | Arrow Emulsol LW                       | +  |        |   |
|  | BP 1100X                               |    |        | + (Denmark)   |
|  | Gamlen OSR 4000                        | +  |        |   |
|  | Nalfleet Maxi-Clean 2                  | +  |        |   |
|  | Seacare OSD                            | +  |        |   |
| <b>Concentrate dispersants (types 2 &amp; 3)</b> | Agma DR 379                            | +  |        |   |
|  | Agma OSD 569                           | +  |        |   |
|  | Arrow Emulsol Super-concentrate LE 2/3 | +  |        |   |
|  | Bioreco R93                            |    | +      |   |
|  | Caflon OSD                             | +  |        |   |
|  | Compound W-2096                        | +  |        |   |
|  | Corexit 9500                           |    | +      |   |
|  | Corexit 9527                           |    |        | Stocks in Belgium (13 t.)                                       |
|  | Dasic Slickgone EW                     | +  |        |   |
|  | Dasic Slickgone NS                     | +  | +      | Stocks in Belgium (10 t.)<br>Stocks in Norway (~210 t. by NOFO) |
|  | Disperep 8                             |    | +      |   |
|  | Disperep 12                            |    | +      |   |
|  | Dispolene 36S                          |    | +      |   |
|  | Dispolene 38S                          |    | +      |   |
|  | Emulgal C-100                          |    | +      |   |
|  | Enersperse 1040                        | +  |        |   |
|  | Enersperse 1583                        |    |        | + (Denmark)   |
|  | Finasol OSR 51                         | +  |        |   |
|  | Finasol OSR 52                         | +  | +      |   |
|  | Finasol OSR 61                         |    | +      |   |
|  | Finasol OSR 62                         |    | +      |   |
|  | Gamlen OD 4000 (PE 998)                | +  | +      |   |
|  | Inipol IP 80                           |    | +      |   |
|  | Inipol IP 90                           |    | +      |   |
|  | Inipol IPC                             |    | +      |   |
|  | Neutralec C                            |    | +      |   |
|  | NU CRU                                 | +  | +      |   |
|  | Oceania 1000                           |    | +      |   |
|  | OSD/LT Oil Spill Dispersant            | +  |        |   |
|  | OSD – 2B                               |    | +      |   |
|  | Petrotec 25                            |    | +      |   |
|  | Radiagreen OSD                         | +  | +      |   |

|  |                    |   |  |  |
|--|--------------------|---|--|--|
|  | Seacare Ecosperse  | + |  |  |
|  | Superdispersant 25 | + |  |  |
|  | Veclean            | + |  |  |

**2. Dispersants accepted by at least two Bonn Agreement Contracting Parties (UK and France) :**

| Products :                  | UK | France |
|-----------------------------|----|--------|
| <b>DASIC SLICKGONE NS *</b> | +  | +      |
| FINASOL OSR-52              | +  | +      |
| GAMLEN OD 4000 (PE 998)     | +  | +      |
| NU CRU                      | +  | +      |
| RADIAGREEN OSD              | +  | +      |

\*stocks also exist in Norway and Belgium

## EQUIPMENT

Information on equipment for dealing with marine pollution can be found on the European Commission's Common Emergency Community Information System (CECIS) at:

[http://ec.europa.eu/echo/civil\\_protection/civil/cecis.htm](http://ec.europa.eu/echo/civil_protection/civil/cecis.htm)

CECIS facilitates communication between the EU Monitoring and Information Centre (MIC) and national authorities, making response to disasters faster and more effective. The main purpose of CECIS is to host a database on potentially available assets for use in emergencies. MIC contact points are available 24 hours a day.

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## REMOTE SENSING

### 25.1 INTRODUCTION

.1 Remote sensing in general is the detection and identification of phenomena at a distance from the object of interest using human capabilities or special sensors. Modern remote sensing instruments are normally based on optical, electronic or, sometimes, chemical techniques. During the last decades, considerable steps forward have been achieved in the development of new sensors but also in the improvement of existing sensors and their application.

.2 When dealing with oil or chemicals spilled at sea, it is essential to be able to “find” the slick and to identify the type of substance and to estimate the volume. Bearing in mind that slicks are often difficult to see due to thin layers or absence of colours the application of electronic remote sensing techniques is of great value. Observers in spotter planes will have a better chance of finding slicks from the altitude they fly at, but even trained observers need reasonable light conditions. The conditions required are not always available. All Contracting Parties have access to remote sensing facilities and have established an aerial surveillance organisation.

.3 Details of aircraft and sensors installed available to respective Contracting Parties are listed in the Aerial Surveillance Handbook. This chapter provides a summary of the different types of sensors including a brief description of the application.

.4 This annex deals with the remote sensing of surface slicks. It should be pointed out that the use of ship-based equipment such as side-scan-sonar to detect sunken objects or optics for the observation of sunken pollutants falls equally under the heading of this chapter and is just as relevant to the scope of the Bonn Agreement. However, it is not dealt with here.

### 25.2 SENSORS - GENERAL REQUIREMENTS

.1 To be of use in dealing with (oil) pollution incidents, remote sensing instruments have to provide the capability to give a clear and unambiguous indication of the pollution on the sea surface from a reasonable distance under normal conditions. In addition it is desirable to have means to identify the type of pollution and the source the pollution originates from as well as a means of estimating the volume. In this respect it is mentioned here that for estimations of oil pollution the observers in Bonn Agreement member states also make use of the Bonn Agreement Pollution Observation Log (BAPOL). The procedure to quantify a detected slick is described in the Aerial Surveillance Handbook.

.2 For airborne application, the equipment should fit into the selected type of aircraft being compatible with the aircraft power supplies. It is recommended that all sensors are integrated into one operating system and signals are real-time presented on a display as well as recorded on tape or disc, including data annotation. The recorded data can thus be analysed in a ground processing station if required.

.3 Sensors fall into broad categories according to their mode of operation. Active sensors emit a signal, and measure some feature of the interaction of the signal and the target - usually by analysing the return echo. Radar systems and Laser Fluorimetry are examples of active sensors used for pollution detection. Passive sensors do not emit a signal, but rely instead on emissions from the target - usually the reflection or transmission of ambient electromagnetic radiation. Ultra violet and Infra red line scanners as well as passive microwave radiometers are examples of these types of sensors.

.4 In general, active scanners can operate at any time of day and to some extent can penetrate clouds. Passive sensors will only be functional when there is sufficient ambient radiation, and this usually means during daytime.

### 25.3 SIDE LOOKING AIRBORNE RADAR (SLAR)

.1 The SLAR is an active sensor that measures the roughness of the sea surface. Microwaves in the region of three centimetres are transmitted in pulses and the reflection from the surface is used to build up a radar picture on both sides of the aircraft. Capillary waves on the sea surface will give a strong echo and

unusually smooth areas such as those caused by a pollution affecting the surface tension resulting in a dampening of the capillary waves, will show up against the surrounding clear water.

.2 SLAR is the most common device in use at present. Under normal conditions, between wind forces 1 to 7 Beaufort, the system will cover an area of up to 25 kilometres on one side of the aircraft. When flying undisturbed at an altitude along a straight track the image will cover a total area of 50 kilometres (both sides of the aircraft) although there will be a gap directly under the aircraft corresponding to 1.5 times the altitude. Within the area covered, the presence of even thin layers of surface pollution can be detected. The spatial resolution of SLAR lies around 20 metres on average, which means that two objects at the same distance from the antenna should have a separation of at least 20 metres to be detected as two objects. For oil detection the polarisation of the system is Vertical and for ice detection often Horizontal polarisation is used.

.3 The main disadvantage of the SLAR, that counts for all radar systems, is that it responds to any phenomena that suppresses capillary waves. For example certain current patterns, ice and surface slicks associated with biological activity can all produce false targets. Conclusively it is emphasised that though SLAR is the primary long range detection sensor the only information obtained is an indication that "something" is floating at the surface probably requiring further investigation.

#### **25.4 SYNTHETIC APERTURE RADAR (SAR)**

.1 With respect to the subject, detection of surface pollution, the SAR is similar to the SLAR. From a technical point of view there are some important differences. Where the SLAR uses a fixed antenna length, the SAR system can define the antenna length by sampling echoes over a period of time. The mechanical part of the antenna is very small. The advantage of the SAR is its improved spatial resolution that remains the same over the entire area covered. For special applications multi-polarised SAR can be delivered. Improved resolution is strongly related with the cost involved. Resolution down to one metre is possible, but at relatively high costs.

.2 At this stage of development SAR is used in satellites and in special projects such as terrain height mapping. Operational use of SAR in aircraft with the objective of detecting oil is not yet common. As developments continue and bearing in mind the likelihood of lower costs, it might be worthwhile considering a SAR, especially in cases where multi tasking is applicable to the surveillance system.

#### **25.5 ULTRAVIOLET LINE SCANNER OR CAMERA (UV)**

Surface pollution, especially oil, is a good reflector of the ultraviolet component of sunlight. An ultraviolet scanner or camera is a passive device detecting reflected ultraviolet with a wavelength of about 0.3 micrometers. The sensor is mounted vertically in the belly of the aircraft and can build up a continuous image of an entire slick, even the extremely thin areas, as the aircraft passes over the slick. It cannot distinguish between types of pollution or different layer thickness.

#### **25.6 INFRARED LINE SCANNER (IR-LS)**

.1 The IR-Is is very similar in operation to the UV-Is and the two are very often combined in a UV-IR line scanner. The sensor detects infrared radiation with a wavelength in the band of 8-12 micrometers emitted from the oil. These layers of oil radiate more slowly than the surrounding clear sea and shows up as variations in grey levels (or in defined colours). Thicker layers (greater than about 0.5 millimetres) will absorb sunlight more rapidly than the surrounding sea and show white on the display.

.2 The InfraRed sensor provides the capability within limits to obtain information on the relative layer thickness of oil slicks on the water surface. The sensor does not penetrate the water. It is not as sensitive to oil as the UV and so comparison of the outputs from the two sensors, especially when presented real time parallel to each other on the display, will show the thicker parts of the slick. This information is essential when combating activities are executed, as the combating vessels should concentrate on these thicker parts. It is obvious that other temperature-related effects, such as cooling water discharges, can mislead the IR sensor.

#### **25.7 MICROWAVE RADIOMETER (MWR)**

The passive sensor MWR is rather similar to the UV/IR-Is. It detects microwave radiation with wavelengths between 0.3 and 3 centimetres. Oil appears always to be at higher temperatures than seawater in the

microwave region and the temperature depends on the thickness of the oil layer. The relationship is not a simple one, but by careful selection of operating wavelengths and careful analysis of the results the system provides the capability of a relatively accurate account of the volume of oil in the slick. A minimum layer thickness of 0.1 millimetre of oil is required to make proper use of the system. Recognizing that operational discharges according to the MARPOL regulations or even much higher will not result in layer thickness over 0.1 mm.

### **25.8 LASER FLUORESENSOR (LFS)**

This is an active sensor emitting an intense beam of coherent light, generated by a laser, to the sea surface immediately below the aircraft. The receiving apparatus is designed not to respond to the direct reflection of the beam, but to detect and to analyse the fluorescence of the pollution resulting from the laser strike. Currently laser is being operationally tested in Germany and indications are that it can provide information on the type of pollution. The experience is limited so far.

### **25.9 THERMAL IMAGER**

Related to video cameras, but designed to operate in the infra-red region, imagers will generally not give such precise description of the surface slick as an IR-ls. However, they have the advantage of providing a real-time image of the entire slick, unlike a line scanner that builds the image up line by line as the aircraft passes overhead.

### **25.10 LOW-LIGHT LEVEL TELEVISION CAMERA (LLTV)**

The LLLTV can be filtered to operate in the ultraviolet region and so provide an ultraviolet analogue to the thermal imager. When used in the visible region, LLLTV can provide the possibility of imaging ship's names or other identifying features in near darkness.

### **25.11 IDENTIFICATION CAMERA (IC)**

Detection of discharging ships during hours of darkness is possible by the applications provided by the SLAR or SAR. Identification of the ship is a necessity with respect to gathering evidence. The identification camera is a sensor consisting of an Intensified CCD chip in a camera. The combination of the camera and an infrared flash provides the tool. A snapshot taken can be processed by frame grabbing software resulting in the ship's name. Using the sensor is preferable to pointing a strong light at the ship since this is considered to be an act of hostility.

### **25.12 PHOTOGRAPHIC CAMERA (PHOTO)**

Conventional photography provides a valuable, simple and readily understood record of the scene of an incident or operational discharge. When vertically mounted in the aircraft the camera contributes to the evidence to an official statement. Oblique photography in general satisfies the public and the Courts as part of the evidence rather than the more complex imagery from the other sensors. It is recommended that cameras are an integrated part of the remote sensing system and that on the photographs data-annotation is printed.

### **25.13 VIDEO CAMERA (VC)**

Much the same applies to video recordings as to photography. The advantage of video is that it provides a more instant record and of course a moving picture. After landing the crew can immediately present an overview of the situation at sea, provided required equipment is available.

### **25.14 FURTHER DEVELOPMENTS AND IMPROVEMENTS**

.1 Sensor manufacturers presumably will continue, in some cases at the request of the user, to develop new sensors or improve the existing ones. Proposals are expected in near future, in particular on the difficulties encountered by the operational users concerning the discrimination between substance discharged and capabilities to estimate volumes.

.2 Worth mentioning is the application of spectral imaging scanners. Remote sensing for the purpose of the detection of oil slicks, in some countries, is slowly shifting towards earth observation in the broadest sense. The objective is to make more efficient use of the available means (aircraft) and also to fill gaps in the existing sensor package.

.3 In general it is recommended to closely follow the market and study the new sensors or improvements. Digital photo cameras, improved navigation (dGPS), airborne AIS and others can be very useful tools for the Bonn Agreement members.

### 25.15 SYSTEMS

.1 As already stated, sensor operation can be most effective when handled through one integrated sensor system. A one-man operating system provides the capability to switch on/off the sensors and to route the data to storage and presentation. The operator selects all sensors required and, depending on the data presentation needed to identify the pollution, combines the data from different sensors. Navigational data obtained from the aircraft system is used as input into the operating system and superimposed on the sensor data.

.2 Data handling, for presentation and storage, is important so that the raw data can be processed in a ground processing station after landing. Storage on retractable hard disc, floppy disc, or tape are possibilities. Images as presented on the display to the operator can also be stored on video tape for quick presentation to authorities.

.3 In addition, as a result of data handling in a digitised form it is possible to transmit the data directly to a ground station. Some systems allow for the direct transmission of imagery from an aircraft using either fast but short-range VHF or slower but long-range HF radio. Recognising that when a ship is caught "red-handed" and is bound for a port in the coastal state the advantage of a down link system can be that images or photos are directly sent to the Port State Control authorities.

### 25.16 PLATFORMS

.1 World wide, most experience with remote sensing has been obtained using small fixed-wing aircraft. Selecting a type of aircraft for remote sensing operations depends on a list of aspects based on the objectives to be met once having the tool: the size and weight of the instruments to be installed, the area to be covered and the endurance. Selection of the sensor package also depends on the tasks to be fulfilled. Search-and-Rescue normally requires a homing device; border patrol may be difficult without a 360 radar. The standard package for pollution patrol flights consists of SLAR, UV/IR-Is, photo-cameras and can be extended with a MWR and/or LSF. If operation during darkness is an option an Identification camera is useful.

.2 A number of different types of aircraft are in use by the Bonn Agreement Contracting Parties and can be visited during Bonn Agreement exercises; the aircraft are described in the Aerial Surveillance Handbook.

.3 Attempts have been made to use special sensors, such as cameras and thermal imagers, on board vessels. Mounted on the masts sometimes images can be obtained. However, in general it is found that the platforms are not stable and even when mounted in high masts still too low for good use.

.4 In the event of an actual combat operation captive balloons, lifted from a vessels deck, are useful tools. Mounted on a platform hanging under the balloon, a video camera and preferably an IR-camera provides details on the oil slick to be combated directly to the master of the vessel. The imagery assists the master to manoeuvre his ship towards and into the oil slick (thicker parts).

### 25.17 SATELLITES

.1 The detection of oil and other harmful substance discharges by means of remote sensing systems in aircraft has been described in previous paragraphs. Relatively new is remote sensing by means of satellites. The synthetic aperture radar (SAR) on board the satellites, as installed in the ENVISAT, the ERS-2 and the Radarsat, proved in various international test programmes to be able to detect water surface phenomena even as small as 200 m<sup>2</sup>, from an altitude of 900 km. The Low Resolution SAR images (100 metre) are considered to be comparable to SLAR with regard to detectability.

.2 Although the satellite SAR does not discriminate the type of pollution, it provides an indication of a possible pollution as well as a clear indication of the location and the dimensions. It is reiterated that the satellite cannot (yet) identify the pollution nor the possible polluter and in that respect has the same qualification as the airborne SLAR or SAR. The detected spot has to be verified. Other disadvantages compared to airborne surveillance are the inflexibility of the system as a result of fixed orbit and the repeating cycle. On the other hand, satellite recordings are independent of weather conditions that are limiting aircraft (like fog or freezing rain). Also the width of the radar coverage path is an advantage; 100 kilometres in case of the ERS-2, up to 500 kilometres of Radarsat.

.3 Satellite data, if received in near real time (minimum within 1 hours after the satellite pass), is useful as an early warning system in case of combatable spills. The use of near real-time satellite data requires a user community with the capability to verify possible surface pollution (oil slicks) by an aircraft. The combined use of satellite and aerial surveillance may provide a cost-effective solution for countries with certain geographical and climatological conditions.

.4 In order to take advantage of the availability of satellite SAR images it is recommended to prepare an inventory of the orbits of the satellite and the area covered. The covered area can then be incorporated into the aircraft routing. Furthermore the acquisition schedule of the satellite can be used to adjust the flight program of a remote sensing aircraft or even reduce the number of flights by having the aircraft on stand-by if the satellite covers the area of interest. On receipt of the imagery obtained from satellite the aircraft may be diverted to check possible pollution or, on occasions when no pollution has been detected the aircraft may focus on areas not covered by satellite.

.5 It is emphasised that satellite SAR can easily provide an overview of possible floating pollution over relatively large sea areas. An early warning system requires follow-up by airborne surveillance at least to verify by human eye the existence of the detected slick. In many studies a general conclusion is that satellite SAR contributes valuable information but will not replace aerial surveillance.

.6 To follow the latest developments on satellite surveillance, the EC has established a European Group of Experts on Satellite Monitoring and Assessment of Sea-Based Oil Pollution (EGEMP). The Secretariat of EGEMP is managed by EC-JRC. More information is available on <http://EGEMP.JRC.IT>.

### **25.18 MAJOR POLLUTION INCIDENT**

.1 When dealing with an oil spillage, the initial function of the remote sensing aircraft will be to build up a picture of the extent of the pollution, and to identify the areas of most concern. The aircraft should run across the affected area using SLAR/SAR at an altitude that provides the best overall image of the slick(s).

.2 The preliminary investigation can then be supplemented by scanning the larger or more threatening parts of the slick(s) using close range sensors, such as infrared, ultraviolet, microwave radiometry and laser. Photographs or video should be taken whenever possible, including some of the casualty causing the pollution. Monitoring the spreading and weathering of the slicks should be continued at regular intervals.

.3 Another role of the remote sensing aircraft is to direct and guide recovery vessels or spraying aircraft. This will require extended periods in the area identifying relatively thicker parts or more threatening patches of oil.

.4 It is particularly important during an incident that the crew of the reconnaissance aircraft reports to the control centre at regular intervals, both to relay the current situation and to check for a change in instructions - the first stages of an incident are always particularly fluid. Regular returns to base will be necessary to provide the hard-copy imagery for the on-scene and overall commanders, unless direct down-link facilities are available to transmit imagery from the aircraft to surface vessels and offices.

### **25.19 ROUTINE PATROLS**

.1 The primary objective in routine patrolling is to detect combatable oil slicks at an early stage, to encounter ships and platforms in the act of discharging oil illegally, and to gather sufficient evidence for a prosecution. Contracting Parties have agreed a co-operative approach to aerial surveillance, and this is set out in Chapter 4 of this manual.

.2 Prior planning of the pattern of surveillance is important. Baseline information from earlier surveillance or from ad-hoc observations will indicate those areas in which most effort should be concentrated. Statistical techniques can be used to relate surveillance intensity to the probability of intercepting an illegal discharge - this will indicate the level of effort necessary and allow conclusions to be drawn about the incidence of MARPOL contravention.

.3 During a mission the crew will maintain the BONN AGREEMENT POLLUTION OBSERVATION LOG, noting all relevant information on mystery slicks and actual polluters observed. A separate form will be used for reporting polluting vessels according to IMO regulations.

.4 Possible offenders should be imaged and photographed using the techniques set out in sections 25.10-25.13. It is important that the photographs and imagery show that the vessel is the only possible source of the oil. The vessel's name should be photographed, if possible in a way that identifies it unambiguously as the offender, and recorded in the log. Communication should be established to invite the person on the bridge to provide information on last port of call and destination as well as to explain the discharge observed.

.5 On return to base, if not directly from the air, the evidence from the offence should be treated as evidence to court and all precautions required by the law of the land should be applied in securing it and transferring it to the competent authorities. For each routine mission, the logs should be taken for interpretation and statistical analysis and the results recorded in a database for use in periodic reports and future planning.

## Hazardous Materials

### 26.0 Hazardous material spills

26.0.1 This chapter of the Counter Pollution Manual deals with incidents involving Hazardous and Noxious Substances (HNS). It contains brief information for Operational Control Authorities (OCA) and On-Scene Co-ordinators (OSC) about the procedures to be followed, and possible measures to be taken, after notification has been received that an accidental spillage of bulk “chemicals” or packaged goods containing hazardous substances other than oil has occurred.

26.0.2 In this chapter, categories of chemical substances (based on their physico-chemical characteristics) are described according to their behaviour, together with the risks posed to human health and the environment so that the appropriate techniques for responding to the spill, and measuring and detecting the spill, can be selected.

26.0.3 The procedure that should be followed to assess the risks posed by a chemical spill and to decide on the most appropriate way to respond is outlined in the following flow diagram:

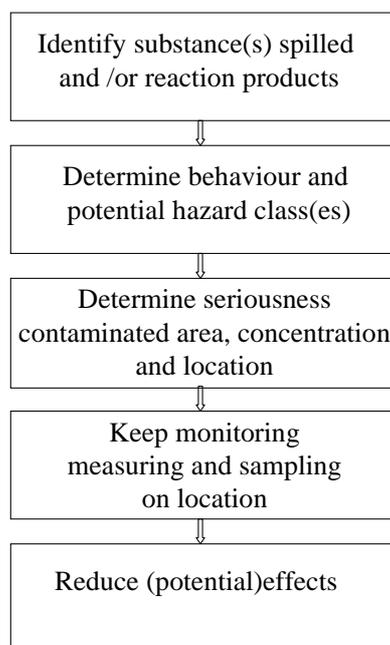


Figure 1 Flow diagram of general approach to a chemical spill

26.0.4 Once the hazardous substance that has been released has been identified (Name, UN number and/or IMDG class) an assessment of the potential risks can be made. If there is a reaction with water or air the reaction products also need to be taken into account.

26.0.5 Based on the state of aggregation, the density, solubility and vapour pressure, the behaviour class can be identified (see Figure 3). Once the behaviour class is known the potential hazards can be identified (see Figure 4).

26.0.6 For decision making purposes it is important to determine first the seriousness of the spill situation. Computer models in combination with on scene measurements and/or sampling can be used for this purpose. In sections 26.2 and 26.3 rules of thumb and back of envelope calculations are given to determine the contaminated area. By defining the seriousness of the situation, an informed decision can be made about the most appropriate way of responding to the situation. Use of the classification systems described in

paragraph 26.1 is a fast and relatively simple way to select the most appropriate response action from those described in paragraph 26.6.

## 26.1 Categorisation of hazardous substances

26.1.1 Thousands of different chemical substances are transported by sea in bulk or in packaged form. Modern chemical tankers vary in size from 1 000 to 50 000 ton dead weight. Most tankers used to transport chemicals and dangerous goods are double hulled, in order to prevent the release of cargo in the event of a collision or grounding. A large tanker can contain up to 35 different tanks each containing a different chemical. Chemical tankers have to abide by specific regulations controlling the storage of substances. Packaged goods are often transported in containers with numerous different substances on board of one vessel. Less dangerous liquid cargoes are transported in single hull vessels.

26.1.2 The probability of an accident is limited but always present as recent ship incidents involving chemicals have shown. Dealing with individual chemicals during a chemical spill is complex and requires chemical expertise. Chemical substances have therefore been grouped in behaviour categories and hazard effect categories to facilitate decision making in the case of a chemical spill. This is in order to limit the number of standard response approaches to chemical spills. The choice of the appropriate approach is based on (1) short term behaviour of a spill released into the water and (2) the potential hazards of a possible release.

26.1.3 When gases, liquids or solids enter the marine environment various types of behaviour are possible. This depends on the solubility, density and vapour pressure of the substance involved.

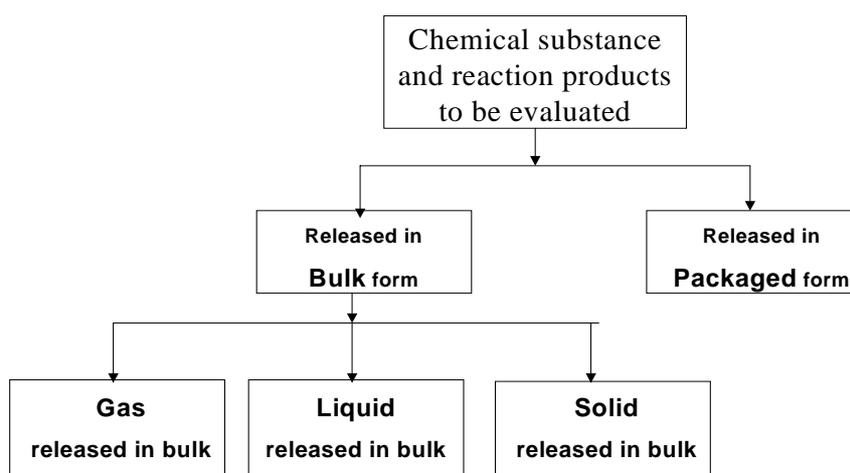


Figure 2 Primary release forms of chemical substances spilled in the marine environment

26.1.4 Released substances can form gas clouds, evaporate from the water surface, float on the water surface, dissolve into the water column, sink to the bottom, or show combinations of these behaviour types. Physico-chemical properties such as solubility, density and vapour pressure mainly determine the short-term behaviour of the substances in the marine environment. Based on the short-term behaviour which is most relevant for response actions, released chemical substances can be divided into four major behaviour categories and ten sub-behaviour categories (see Figure 3).

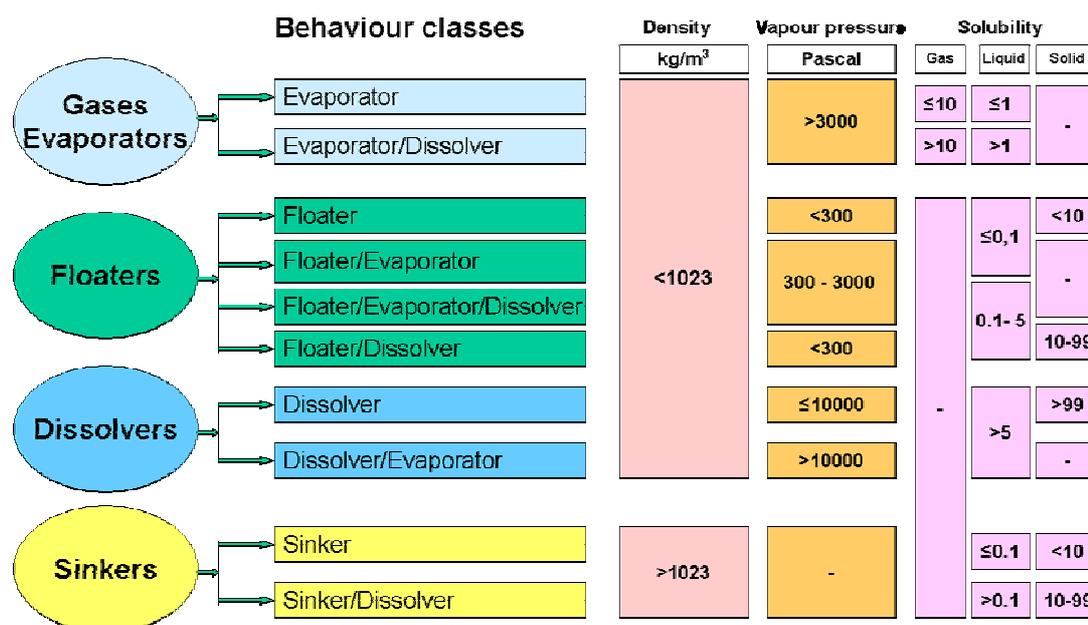


Figure 3 Categories of chemical substances and the physico-chemical characteristics (density, vapour pressure and solubility) on which the categorisation is based. The density is specified as 1023kg/m<sup>3</sup>, this might vary in different locations depending on the salinity.

26.1.5 Human populations as well as the marine environment can be exposed to spilled hazardous chemical substances. Nine potential hazards can be distinguished when chemical substances enter the marine environment. The hazards are listed in Figure 4 and described accordingly for each behaviour category.

Figure 4 Most relevant hazards of chemical substances within a behaviour category for humans and the marine environment.

| Potential hazards      | Behaviour category * | Human health | Marine environment |
|------------------------|----------------------|--------------|--------------------|
| Toxicity by inhalation | G/E/F                | X            |                    |
| Explosiveness          | G/E                  | X            |                    |
| Flammability           | G/E/F                | X            |                    |
| Radioactivity          | G/E/F/D/S            | X            | X                  |
| Corrosiveness          | G/E/F/D/S            | X            | X                  |
| Carcinogenicity        | G/E/F/D/S            | X            | X                  |
| Aquatic toxicity       | D/S                  |              | X                  |
| Bioaccumulation        | D/S                  |              | X                  |
| Persistence            | D/S                  |              | X                  |

\* G = Gases; E = Evaporators; F = Floaters; D = Dissolvers and S = Sinkers

26.1.6 Substances released into the marine environment could pass into the air (gas clouds), onto the water surface (floaters), into the water column (dissolvers), to the water bottom (sinkers), or a combination of these. Each behaviour has its own relevant hazard aspects. For example, toxicity to human populations and explosivity are typical hazard aspects of substances which pass into the air after a release.

Figure 5 gives some examples of chemicals in the different behaviour groups.

|                                      | Group      | Properties                      | Examples  |
|--------------------------------------|------------|---------------------------------|---|
| <b>Evaporate Immediately (Gases)</b> | <b>G</b>   | Evaporate immediately           | Propane, butane, vinyl chloride   |
|                                      | <b>GD</b>  | evaporate immediately, dissolve | ammonia   |
| <b>Evaporate Rapidly</b>             | <b>E</b>   | float, evaporate rapidly        | benzene, hexane<br>cyclohexane  |
|                                      | <b>ED</b>  | evaporate rapidly, dissolve     | methyl-t-butyl ether<br>vinyl acetate   |
| <b>Float</b>                         | <b>FE</b>  | float, evaporate                | heptane, turpentine<br>toluene, xylene  |
|                                      | <b>FED</b> | float, evaporate, dissolve      | butyl acetate<br>isobutanol<br>ethyl acrylate   |
|                                      | <b>F</b>   | float                           | Phthalates, vegetable oils, animal oils<br>dipentene, isodecanol                                  |
|                                      | <b>FD</b>  | float, dissolve                 | butanol<br>butyl acrylate   |
| <b>Dissolve</b>                      | <b>DE</b>  | dissolve rapidly, evaporate     | Acetone, monoethylamine<br>propylene oxide  |
|                                      | <b>D</b>   | dissolve rapidly                | some acids and bases, some alcohols,<br>glycols, some amines, methyl ethyl ketone                 |
| <b>Sink</b>                          | <b>SD</b>  | sink, dissolve                  | dichloromethane<br>1,2-dichloroethane   |
|                                      | <b>S</b>   | sink                            | butyl benzyl phthalate, chlorobenzene<br>creosote, coal tar,<br>tetraethyl lead, tetramethyl lead |

Source Helcom, *Manual on Co-operation in Response to Marine Pollution*

Figure 5 Examples of chemicals in the different behaviour groups

26.1.7 The advantage of such an approach is that it limits the response action plans that need to be worked out, and there is no need for an action plan for each separate chemical substance. In addition, training courses on how to deal with chemical spills are simpler and do not require a thorough knowledge of chemical substances. As long as one can put place a spilled chemical in the correct response category, it will be easier to take decisions on how to deal with the spilled substance.

26.1.8 Seven response categories are distinguished based on the behaviour class and the relevant hazard aspects (potential effects).

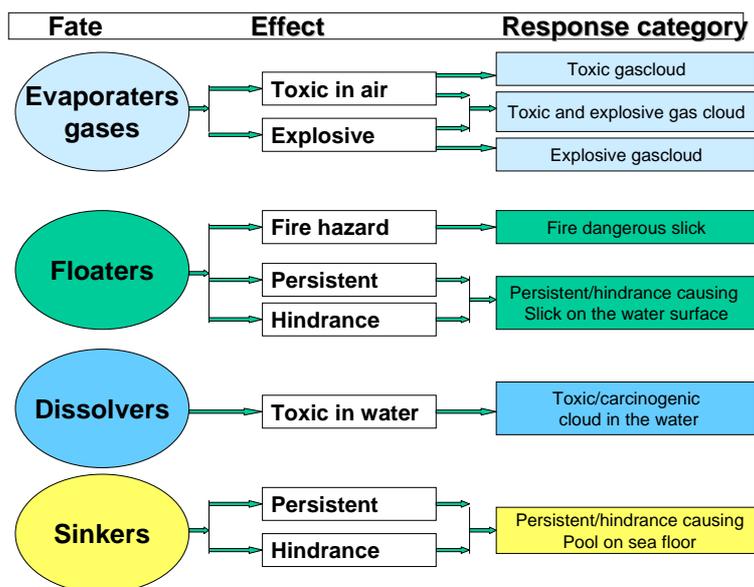


Figure 6 Summary of possible response categories

26.1.9 Lost packages could contain very dangerous substances which could escape into the water because of damage to the package or, in the long term, due to corrosion and therefore need to be recovered. Packages could float, submerge or sink. Their potential danger is dealt with in the same way as bulk substances. It should be recognized, however, that packaged chemicals would always be present in smaller volumes than bulk chemicals.

26.1.10 A scenario which is not covered by the response categories based on behaviour and potential hazards is the scenario in which chemicals react or where there is a potential danger for reaction. Polymerisation, reactions between different chemicals on board, reaction of chemicals with water or reaction caused by heat or fire are some examples. In all such circumstances, decision making is more complex as experts are required to predict the possible consequences of such reactions not only to the environment but also to the ship's construction. Although a substance may not be particularly harmful in itself, the results of any reaction could be extremely dangerous. Information is therefore needed about the type of reaction products that are formed with water, acids, bases, metals, organic compounds, flammable substances, and oxidising and reducing agents. Other factors which must be taken into account when assessing the hazards associated with particular substances are the subsidiary phenomena that accompany these reactions, such as: formation of foam; formation of fog; change of colour; reactions in which poisonous or flammable substances are formed; fire; spattering; heat release.

26.1.11 It is of vital importance that people working in areas where dangerous chemicals are involved should be aware of the reaction risks involved.

26.1.12 Chapter 26 further deals with the steps to be taken in the case of an accidental spills of hazardous materials other than oil, e.g:

- Notification/verification (see 26.2)
- Initial measures (see 26.3)
- Hazard assessment (Situation analysis) (see 26.4)
- Decision making (see 26.5)
- Response actions (see 26.6)

A property glossary is given in chapter 26.9.

## 26.2 Notification and verification

26.2.1 Accurate information must be obtained as quickly as possible about the position of the casualty and other vessels involved, and about the type of substance released and its quantity. This information will need to be confirmed after the first report. Verification of the information can be obtained first by direct communication, via coastal radio station, with the master or pilot of the stricken vessel, and then by local reconnaissance, preferably by helicopter or aircraft with an expert from the competent operational control authority. Information can also be obtained or verified through the agent of the vessel, and also through the port authorities of the last port of call or the port of destination. Later, if it is safe to do so, a response vessel can be brought close to the casualty for further inspection.

26.2.2 A major problem at the initial stage of accidents involving hazardous materials is the lack of adequate information. Sometimes there is a problem in the precise identification of the cargo and loading plan. Much of the information contained in the initial report will be incorrect, and will need to be verified:

- obtain an accurate position for all vessels involved;
- confirm type and quantity of substances involved;
- confirm estimates of quantity of substance released;
- determine exact location of the released substance(s);
- determine if reactions are likely (polymerisation, between chemicals or with water).

26.2.3 This should be done by: direct communication with the casualty vessel via radio link; aerial reconnaissance by helicopter and experienced observers; an expert team on board a vessel based close to the casualty or contacts with ship owners, cargo owners, last port of call etc.

26.2.4 Determining the exact location of the discharged substance(s) is one of the first actions to be taken after a release of chemical(s) has occurred. The location of the release and its trajectory as a function of time needs to be determined. Local conditions at the spill site (i.e. weather, currents, wave heights, and water depth) have to be known, because these conditions will determine the fate and effects of a spill at sea.

26.2.5 The following are rules of thumb on how to determine the location of the spilled substance(s):

- **Gases or evaporators:** The cloud will travel in the general direction of the prevailing wind. It will tend to broaden and become more diluted the further it travels, lessening the toxicity and the explosivity risks. The danger-zone associated with the cloud will be roughly elliptical or teardrop in shape. From the point of release, the cloud will move with the actual wind speed in the prevailing wind direction in a triangular area with an angle of 30-60°. The area defined from a 30° angle is the danger zone. The 60° angle can be used as an additional safety factor.
- **Floaters:** From the point of release a slick will move at a rate of 3% of the actual wind speed in the prevailing wind direction and 100% of the tidal current speed in the tidal current direction.
- **Dissolvers:** From the point of release the dissolved cloud in the water will move with the actual tidal current speed in the prevailing tidal current direction in a triangular area with an angle of 30-60°. The area defined from a 30° angle is the danger zone. The 60° angle is used as an additional safety factor.
- **Sinkers:** From the point of release the sinker will move with the actual current speed in the current direction as long it is submerged and not on the seabed. The sinking speed can be roughly calculated using Stoke's Law e.g. the sinking speed  $S$  (m/s) is a function of the gravitational force  $g$  ( $9,81 \text{ m.s}^{-2}$ ) times the density differences between water and oil  $\Delta\rho$  ( $\text{kg.m}^{-3}$ ) times the diameter size of the droplets/lumps  $d$  (m) to the power 2 divided by the dynamic viscosity of the water  $\eta$  ( $9.81 \times 10^{-3} \text{ kg.m}^{-1}.\text{s}^{-1}$  at 20 °C) times 18. The sinking time is the depth divided by the sinking speed.

26.2.6 The location and trajectory of a spill can be defined more precisely with the help of computer models. When the response team is in the vicinity of a spill, more precise identification of the spill needs to be assessed. This can either be done visually or by measuring and sampling techniques.

### 26.3 Initial measures

26.3.1 The activation of emergency measures depends on the nature of the chemical, the source location and the prevailing weather conditions, taking into account local hydrodynamic and meteorological information. High priority has to be given to the protection of involved ship(s) crew(s) and the safety of passing ships and emergency measures in order to minimise or eliminate further outflow of hazardous substances.

26.3.2 Certain measures may be necessary as emergency steps before the situation has been fully evaluated:

- decide whether or not there is an imminent threat to important resources or to human health;
- ensure appropriate protection for the crews of involved vessels;
- ensure the safety of passing vessels;
- alert responsible and relevant authorities;
- take necessary steps to minimise or eliminate further outflow.

26.3.3 In the initial stage of an accident where chemicals are involved it is also important to do “back of the envelope” worst case calculations to determine the largest area that can become affected by a harmful/damaging concentration. This is a rough estimate and prediction made on the basis of the first data available in order to establish a first basis for the initial response. Mathematical models should verify this calculation at a later stage in the incident as soon as more complete and accurate data becomes available.

#### Calculations for gas clouds

26.3.4 The worst case for gas clouds e.g.  $m^3$  of air polluted will be: the estimated amount of chemical spilled (in mg) divided by the MAC (Maximum Allowable Concentration) value (in  $mg/m^3$ ). To determine the area polluted one can assume an average height of the gas cloud of 10 m and divide the  $m^3$  air polluted by 10.

#### Calculations for clouds in the water column

26.3.5 The size ( $m^2$ ) of the worst case cloud in the water will be the estimated amount of chemical spilled (in kg) divided by 1% of the  $LC_{50(96)}$  value (mg/l) of the chemical involved and divided by assumed average depth (m) at the spill location.

#### Some initial response measures could be:

26.3.6 **Stop or (partly) reduce release:** The release can be either completely stopped or reduced. It is one of the most effective response methods if it can be applied. Since hazardous substances may be involved, response measures associated with the source of release may be particularly dangerous. Stopping the release and the overloading of cargo from the damaged tank/hold to an undamaged tank/hold or even to another vessel is one of the first options to consider. Holes in a damaged hull should be closed with the help of magnetic material, stoppers or any available material to close the hole. In the case of packages, nets can be used to prevent further losses and oversized drums can be used for damaged packages.

26.3.7 **Change position of source:** The main aim of changing the position of the source or cargo is to restrict the possible outflow or to reduce other hazards, simply by transferring the cargo (bulk or packaged goods) to a place where the threat posed by the substance is reduced. Methods applicable may include: removing containers from the deck; transshipping the cargo; towing the ship to a less vulnerable location.

26.3.8 **Controlled release from source:** Controlled release might be applied in order to reduce the dangers presented by the substance if there is risk of an uncontrolled release. Methods applicable may include destruction/explosion of the package or destruction/explosion of the ship.

26.3.9 **Containment/diverting substance:** Containment and diverting substances or packages from their course may enable them to be collected more easily. This method may also be used to prevent their further movement. Methods applicable may include using containment booms or using chemical booms (herders).

26.3.10 In the initial phase of the response, in the case of a ship accident in which chemicals are involved or potential losses in the marine environment are expected, the necessary measures need to be taken as quickly as possible in order to reduce or limit the effects.

26.3.11 In the case of gas clouds, a warning for aerial operations should be issued as soon as possible with an indication of the duration of the measure.

## 26.4 Hazard assessment

26.4.1 Risk assessments for the transport of chemicals and the hazard evaluation of a potential outflow must form part of the national ability to respond to major spills or pollution. The extent of the threat from the incident must be evaluated in order to identify the level and nature of response necessary.

26.4.2 The fate and effects of the released substance should be ascertained taking into account its behaviour, the local oceanography and meteorology, the proximity of sensitive organisms, habitats or resources, and their vulnerability to the chemicals involved.

26.4.3 Dividing the chemicals into different subcategories (E, ED, FE, F, FD, FED, DE, D, SD, and S) leads to a need for a relatively small number of generally applicable response options in the event of an accident. It is important to be aware of the hazards that chemicals can cause when released into the marine environment. The most important aspect of situation analysis is determining the hazards of an accidental spill in order to prepare a plan of action.

26.4.4 In the event of an accident at sea, pollutants may contaminate the air, the water surface, the water column and/or the sea floor and, indirectly, all the organisms in these compartments and other users of these compartments. The degree of seriousness depends amongst others on the properties of the substance released and the fate and transport of the substance in the marine environment.

26.4.5 **Gases or evaporators** will evaporate fast after release in or on the water and will form a gas cloud in the air. A gas cloud can be toxic or explosive or a combination of these. Inhalation of a gas or evaporator by humans or marine organisms on or near the water surface can lead to respiratory toxicity or carcinogenicity. Dense gases (heavier than air) will disperse much more slowly than gases that are lighter than air. An appreciable number of a wide range of industrial chemicals regularly transported by sea could form poisonous gas clouds if released into the marine environment. The presence of such clouds would pose a considerable threat to all those in the area. A distinction can be made between the severity of the effects caused by exposure to toxic substances i.e.

- slight irritation, watering of the eyes and choking;
- serious irritation, which stops when exposure ceases;
- damage to health;
- reversible damage to health;
- irreversible damage to health;
- death.

26.4.6 In the case of toxic gas clouds the inhalation risk presents the greatest hazard. The effect of exposure to toxins is principally determined by two factors (1) the period of exposure and (2) concentration in the atmosphere.

26.4.7 A vapour or gas cloud will drift with the wind, disperse and become diluted as a result of the turbulence in the atmosphere. The extent of the turbulence depends on the stability of the atmosphere and the roughness of the sea over which the cloud passes.

26.4.8 **Floaters** stay on the water surface for a certain period of time. There is little threat to the human population from hazardous substances as long as the substances float on the water surface. The pollution effects include external coating (birds) or direct toxic action to marine organisms, inhibition of natural reaeration of the waterway, and restriction of recreational and water supply uses. Even more problems arise when such a spill reaches the coast or when such a spill occurs in wintering or feeding areas for birds. In winter, many species of birds are extremely sensitive and small spills of persistent floating substances can affect the functioning of thousands of birds. Mammals can be smothered by a floating chemical, which can affect their respiratory system. However, mammals mostly tend to flee from floating layers of substances.

26.4.9 There are two main hazards associated with floaters: fire and dangers due to natural dispersion in the water column affecting the aquatic environment. Moreover, floaters may drift on the wind or current and can reach sensitive areas along the coast or wetlands. Little damage to fish is likely to be caused by hazardous substances as long as the substance floats on the surface. More problems arise when a spill occurs in or reaches shallow waters or when a spill happens in the breeding season for mammals and birds.

26.4.10 **Dissolvers** are substances which will quickly dilute into the water column after release. The greatest danger caused by dissolvers, due to their aquatic toxicity, is a high concentration of the hazardous substance in the water during the escape phase. In the open sea, the most seriously threatened animals are mammals (seals, porpoises, etc.), pelagic fish (herring, sprat, etc.) and zooplankton (especially larvae and eggs). In the open sea, however, most of the chemical will dilute quickly and a “no effect concentration” will soon be attained. Exceptions to this dilution phenomenon are the bio-accumulative and persistent substances that even at low concentrations must be considered harmful. Many fish species have rather restricted spawning areas in open sea, or in coastal areas. From there, eggs and larvae are transported with the currents to specific nursery areas. Often these nursery areas are productive tidal areas along the coast, such as estuaries. Spills in these areas may cause severe losses to the population, because the juvenile stages are generally much more sensitive than the adults and also occur in more concentrated numbers.

26.4.11 A dissolved chemical concentration in the water may have lethal effects. The higher the exposure concentration, the shorter the time it takes before lethal effects appear. In an actual spill situation the concentration in the water is not constant and will also decrease over time due to dilution in the water. Dissolved chemicals may cause acute effects if the concentration exceeds a certain level for a certain exposure time. At low concentrations, and/or at short exposure times, only limited effects may be expected.

26.4.12 Knowledge of water mixing characteristics will result in a better understanding of the risks to aquatic ecosystems as a result of acute pollution into the water column. The theoretical concentration of a particular spill scenario, assuming that the chemical has been dissolved into the water, can be calculated (Predicted Environmental Concentration (PEC)) and compared with toxicity effect threshold concentrations as given in 26.3.

26.4.13 Dilution of chemicals in estuaries and seawater is predominantly dictated by oscillations from wind and tide currents. The concentration in the water depends primarily on the mixing capacity (dilution rate) of the water body.

26.4.14 Due to the turbulence of the receiving water, the chemical will dilute in all directions and will at some point reach levels where no effects will occur. Hence, knowledge about the range and degree of mixing in relation to local hydrology is important for establishing criteria and standards that can be used for the risk assessment of dissolved substances.

26.4.15 The concentration primarily depends on the amount of substance spilled, and on the depth of the water. Secondly, the horizontal spread of the dissolved substance in the water determines the dilution and by that the concentration as a function of time. As a consequence, the initial concentration will be high, but the number of exposed organisms is limited, while later on there will be an enormous increase of exposed organisms due to the increased volume of water containing the diluted substance, but only at a much lower exposure concentration.

26.4.16 Spills in this group (Dissolvers) lead to a cloud/plume of dissolved substance that will drift away with the current. Often it is assumed here that organisms are exposed continuously to the cloud/plume, and that the concentration decreases in time as a result of dilution. This is a conservative assumption, since only planktonic organisms (algae, zooplankton) are transported with the water current; benthic organisms are fixed at one place and will only be exposed for the time it takes the polluted water volume to pass; for mobile organisms like fish, the exposure time is rather unpredictable, but will be shorter than ‘continuous’.

26.4.17 In waters with a high mixing energy, such as the North Sea, the risk of dissolved substances is much lower than in low mixing waters such as harbour areas. The PEC in the water column is determined by the initial dilution over the water column (from water surface to water bottom or mixing depth) followed by a horizontal dilution factor depending on specific hydrological conditions of the receiving water body.

26.4.18 **Sinkers** are substances that will sink to the seabed due to their density and stay on the sea floor for a certain period. Sinkers are generally hazardous to the marine environment due to aquatic toxicity, whereas

direct danger to human beings is very limited. In the open sea, the most sensitive areas are the spawning grounds. Chemical spills may directly affect benthic fish and their predators. Mammals avoid pollution by sinkers and, therefore, mammals will be affected minimally. Pelagic fish also share this mechanism by avoiding pollution. Problems could occur when large quantities of bulk substances are released on the seabed. The major effect in such cases is the blanketing of the seabed, thereby covering the zoöbenthos. The contribution of zoöbenthos to the biomass of the food chain is prominent in coastal waters and intertidal zones. Spills in these waters can, therefore, cause severe losses to zoöbenthos and if the spill penetrates the sediment by bioturbation or otherwise, losses may occur over long periods.

## 26.5 *Decision making*

26.5.1 Once an accidental spill has occurred, the type and degree of damage to human health and the marine environment will to a considerable extent be a matter of chance. The type and degree of damage depends partly on fortuitous circumstances and partly on the actions taken to minimise damage. Each spill will have its own detrimental effects in the aquatic environment. The damage may range from insignificant to catastrophic. The primary aims of a chemical substance spill response are to:

- protect human health and safety;
- minimise environmental impacts; and
- restore the environment, as far as is practicable, to pre-spill conditions.

26.5.2 The range of counter pollution measures to be applied will depend upon the location of the spill, type and quantity of the pollutant, the environmental sensitivity and biodiversity of the area affected. Good management and planning, as well as the response actions put into effect by the responsible authority can minimise the environmental impact of a chemical or hazardous substance spill.

26.5.3 Decision-making systems must be based on adequate information about: (1) Hazard analysis (kind of substance released, reaction ability, behaviour, potential outflow and potential impact) and (2) Response options (methods and techniques for minimising input and recovery of released substances; measures for maintaining safety of navigation; alerting measures for safety of adjacent populated areas and appropriate protection for response teams).

26.5.4 Decision-making must incorporate an evaluation of the threat posed by the released chemical to human health and the marine environment and related interests. Before decision-making can start, the following information about the (potential) spill(s) needs to be known:

- the behaviour category and/or sub categories
- the potential hazards
- the ability to reaction (polymerisation, reaction with water or with air etc)
- the spill location and predicted trajectory.

26.5.5 Once the dimensions and/or concentrations of the spill are known the impact of the spill can be assessed. The sensitivity of the area between the initial spill and its final destination also determines the seriousness of a spill. Once a spill or package has been localised, concentration measurements for assessing the potential impact to human beings and/or the marine environment can be executed. A theoretical approach to determining the impact can be done with the help of computer model predictions. Measurements on scene will determine the actual situation.

26.5.6 After the seriousness of the spill has been determined there are two possibilities:

1. Impact likely: response actions need to be taken; or
2. Impact not likely: no response actions needed (always keep monitoring).

26.5.7 The main factors on which the selection of response methods is based are the physical behaviour of the substances released and the relevant hazard aspects.

26.5.8 Based on the damage estimations, the nature, extent and the long-term effects of the chemical contamination, the following steps have to be taken in accordance with the National Contingency Planning:

- Once the hazards has been evaluated, the appropriate teams should be activated promptly. Early advice to coastal authorities might now need to be adjusted.
- Alert or warn - if necessary – the adjacent population with particular regard to beach resorts; local authorities competent for counter measures; ships traffic by broadcasting navigational warnings; fishing boats and fishing harbours. In serious cases evacuation of threatened population from restricted areas.
- Alert skilled personnel, well trained to overcome safety problems during recovery, cargo transfer or lightening operations, i.e. fire brigade, civil defence corps, salvage operator, chemical industry.
- Mobilise adequate recovery or lightening equipment. Contact tanker owners if lightening capacity is needed for cargo transfer or temporary storage of chemical-water-mixture.
- Ensure a safe and continuous management at sea by:
  - demanding ships and aircraft/helicopter for monitoring at sea and aerial surveillance/assistance at recovery
  - contact tanker owners if lightening capacity is needed for cargo transfer or temporary storage of chemical-water-mixture
  - initiate precautions by delimitation of restricted or prohibited areas to ensure safety of navigation and continuous recovery or cargo transfer
  - preparation of land based confined areas for containment of recovered substances, mixtures or packaged chemicals
  - availability of suitable storage tank capacity for the disposal of liquid substances or mixtures
- At the scene, the On-Scene-Commander must ensure: continuous measurements of atmospheric concentrations; detection of toxic contaminants, explosive, combustible atmosphere or vapours; detection of other harmful gases or vapours; suitable protective clothing and respiratory equipment; suitable over-packs for damaged or leaking packages containing harmful substances.
- Request for personnel or technical assistance is advised if national forces and services cannot cope with the chemical disaster and its effects on strike teams and the marine environment.

26.5.9 The selection of the response method is highly dependent on the nature of the spill, the local circumstances, weather conditions, availability of and accessibility to equipment, and the properties of the pollutant. In addition to the criteria mentioned, political considerations can play a prominent part in decision-making. Sometimes it is difficult to assess which response technique is most suitable for the spill concerned. The first priority is always to ensure the safety of those involved in the spill clean up. The second priority is to remove as much as possible of the pollutant without causing any further damage to the marine environment.

26.5.10 If it has been recognised that removal of the substance from the environment is not necessary or possible, then consideration should be given to establishing a monitoring regime around the area likely to be affected. The objectives of the monitoring should be to alert the authorities to a release of the chemical into the environment, to provide information on the extent of the release and the behaviour of the chemical, and to measure its impact on the adjacent environment. Water, sediments, air and biota might need to be sampled and analysed depending on the particular circumstances, which will also dictate the necessary spatial and temporal distribution of the samples.

26.5.11 Considerable expertise is necessary to set up a monitoring programme that will meet the objectives without unnecessary expense. An occasional sample from the water column or seabed near the wreck will rarely be of any value.

26.5.12 Monitoring and measuring of spills at sea is one of the most essential parts of response to accidents involving chemicals, not only to determine the seriousness of the spill, but also to determine when the situation is safe again. In contrast to oil, chemicals are often invisible once released into the marine environment or into the air. For the detection of the various chemicals, different methods are required to measure the concentration (in the air or in the water column) or the size and layer thickness (on the water surface or on the seabed).

26.5.13 Computer models are essential for determining the right location to measure and to predict the concentration in case measurement is impossible due to lack of measuring equipment or lack of time. On the basis of computer prediction, or rule of thumb, one should determine the place to do the measurements and/or sampling. Obviously near a ship in distress one should take measurements continuously, but once the spill is released, computer predictions are necessary as the cloud or slick will move due to external factors such as wind and/or current.

26.5.14 Remote sensing aircraft normally used for oil detection can also be used for floating slicks of chemical spills. For sinkers, ROVs or divers need to be used to locate the pool of hazardous substance on the sea floor. To measure concentrations in the air and in the water column, a vessel needs to go on scene with the appropriate measuring and sampling tools.

## 26.6 Response actions

26.6.1 The aim of a counter pollution action is to reduce or eliminate the hazardous effects of a spill. The choice of the most appropriate counter pollution action depends on the behaviour and the dangers of the substance released. For measuring/detection purposes, as well as for response, a distinction can be made between the following response categories:

1. Toxic gas clouds
2. Toxic and explosive gas clouds
3. Explosive gas clouds
4. Fire dangerous slicks
5. Persistent/hindrance causing slicks on the water surface
6. Toxic/carcinogenic clouds in the water column
7. Persistent/hindrance causing pools on the sea floor

26.6.2 Another category of response is “(Sunken) packaged goods or complete vessels containing chemicals”. This category is different from the seven mentioned above where the risk is associated with the substance and its behaviour. It has to do with the way hazardous substances accidentally enter the marine environment, irrespective of their characteristics and risks. It therefore will be dealt with separately. Each response category will be discussed in the following paragraphs.

26.6.3 **Toxic and/or explosive gas clouds:** This group of chemicals can rarely be combated at sea. Response to this group of chemicals is mostly limited to reducing exposure to the chemicals by restricting access to the area of trajectory of the gas cloud. Appropriate computer models are needed to predict the size and trajectory of such a gas cloud in combination with on-scene concentration measurements. The cloud can be made visible by giving it a colour using specific reagents. When clouds are made visible the exact position, dimensions and track can be followed much more easily.

26.6.4 For **toxic gas clouds** a comparison with the Maximum Allowable Concentration (MAC) values or Threshold Limit Values (TLV) of the substance(s) could be used as an indication of the seriousness. If the concentration is less than 10% of the MAC/TLV the situation can be assumed to be safe again. Use of protective clothing/breathing apparatus and (partial) evacuation can be considered as possible response options. When skin contact with a dangerous substance is inevitable or likely to happen, preventive counter measures should be taken in the form of special body protection clothing. Breathing apparatus can be used for the protection of the respiratory organs if toxic gases are released. Breathing apparatus can be worn in combination with other protective clothing.

26.6.5 For **explosive gas clouds** a comparison with the Lower Explosion Limit (LEL) value of the substance(s) could be used as an indication of the seriousness. If the concentration is less than 1% of the LEL concentration the situation can be assumed to be no longer explosive.

26.6.6 All sources of ignition that may cause ignition of a flammable or explosive material must be removed. This makes it impossible for an explosion or combustion to take place. Possible sources of ignition are electric apparatus, hot surfaces, and naked flames and sparks.

26.6.7 As a rule of thumb, when the concentration of a gas in the air is over 1% of the LEL, care must be taken in order to avoid an explosion. The concentration at which the gas cloud could be toxic is much lower than the concentration at which a gas cloud could be explosive.

26.6.8 **Fire dangerous slicks:** This group of chemicals can be combated with the so-called first line oil recovery vessels. As this group of chemicals is fire and explosion dangerous the LEL needs to be continuously measured during the recovery actions.

26.6.9 Due to evaporation, this kind of spill will disappear from the water surface after some time. For this group, computer models are essential to predict the seriousness, the size and potential trajectory of the slick, the length of time it will take the slick to disappear from the water surface if only partial recovery or no recovery takes place.

26.6.10 Controlled combustion is a possibility to be considered if the substance layer is of sufficient thickness (> 3 mm). The risk associated with this method is high. The reaction products should be known and people should maintain a safe distance from the source. The weather conditions should be suitable.

26.6.11 Sampling, monitoring and calculations with the aid of models can estimate the size of the threatened area. Access to the polluted area has to be restricted as long as the concentration is higher than 1 % of the LEL value. Activities in the area, which can cause ignition, may also have to be restricted. Once the area is declared safe the restriction should be lifted.

26.6.12 When skin contact with a dangerous substance is inevitable or likely to happen, preventative counter measures should be taken in the form of special body protection clothing. It is safe to recover the substance when the concentration in the air measured on board the recovery vessel is less than 1% of the LEL. One should never go into a polluted area (slick) when the gas concentration is too high, not even with a first line recovery vessel.

26.6.13 **Persistent/hindrance causing slicks on the water surface:** This group of chemicals can be combated with oil spill response means such as skimmers, booms and sweeping systems. For the safe recovery from the water surface of chemical substances with a flash point < 61 ° C, only vessels complying with tanker regulations (so called first line oil recovery vessels) should be used.

26.6.14 As a lot of floaters are invisible to the naked eye, remote sensing tools need to be used to detect such slicks on the water surface. For this group, computer models are essential to predict the seriousness and the potential size and trajectory of the slick.

26.6.15 Mechanical recovery involves the containment of the floating pollutant and removing it from the sea surface by means of: skimmers, sweeping systems and, in the case of very viscous or solid substances, netting. Although there are many different types of skimmers and other recovery devices to remove oil from the water surface, the choice of response equipment depends on the type of chemical (viscosity, corrosivity etc.) released.

26.6.16 **Toxic/carcinogenic clouds in the water column:** This group of chemicals, once released into the water and dissolved, cannot be recovered at sea. Response to this group of chemicals is limited to reducing exposure to the toxic effects of the substance by restricting access to the area of trajectory of the cloud. This needs appropriate computer models to predict the size and trajectory of such a cloud in the water column, the time period it will take to affect benthic habitats, in combination with on scene measurements. Very promising results have been reached with the use of a bio monitor using mussels to detect the dissolved substance in the water column. With a flow through Mussel Monitor® the seriousness of the spill can be detected on scene.

26.6.17 The spill (cloud in the water column) can be given a colour/tracer in order to make it visible. This can be done using specific reagents. When clouds in the water column are made visible the exact position, dimensions and track can be assessed much more easily.

26.6.18 Sampling and calculations with the aid of models can estimate the size of the threatened area. Access to this area has to be restricted. Activities in the area may also have to be restricted. Once the area is declared safe the restriction should be lifted.

26.6.19 A concentration of a toxic substance can have one of these three effects on organisms:

- no effect; this level is normally taken as 1% of the LC<sub>50</sub>(96);
- a sub lethal effect (for example, inhibition of growth);
- a lethal effect (LC<sub>50</sub>(96)).

26.6.20 The effects on organisms depend on many factors (kind of organism, exposure time, the condition of the organism, etc.). The situation can be assumed safe again when the concentration is < 1% of the GESAMP B1 rating or the LC<sub>50</sub>(96) of the substance involved.

26.6.21 The toxic effect of a “Dissolver” will be more serious if the substance is bioaccumulative and/or persistent (does not easily biodegrade in the marine environment). The effect of a chemical in the marine environment is a combination of the concentration and the exposure time to organisms living in the water. The higher the concentration the more serious the effect (e.g. bioaccumulation increases the concentration in the organisms exposed and so increases the effects). The longer the exposure time the more serious the effect of a chemical will be (e.g. chemicals which are non-biodegradable, or slowly biodegradable, will stay longer in the marine environment and so increase the exposure time resulting in more serious effects).

26.6.22 **Persistent/hindrance causing pools on the sea floor:** Substances in this group will stay on the sea floor giving some time to react and to determine the best combating option. This group of chemicals can theoretically be combated with existing dredging equipment. The best solution for dealing with this category of sunken chemicals needs to be determined on an ad hoc basis. Availability, depth, type of substance and many other factors will determine which dredging tools will suit best.

26.6.23 Dredging is usually described as a system for the removal of underwater material. Therefore it can be used as a response method for substances that are heavier than water. A choice can be made between hydraulic, mechanical and pneumatic dredgers. The use of vacuum units is an alternative response method.

26.6.24 Detection of sunken substances could cause problems, as there are no particular detection techniques for sinkers. ROV and/or divers could be needed. Computer models could assist in finding the place where the sinker will rest.

26.6.25 Sampling and calculations with the aid of computer models can estimate the size of the threatened area. Access to the area has to be restricted. Activities in this area may also have to be restricted. Once the area is declared safe the restriction should be lifted.

26.6.26 Immobilising a substance by burying it will prevent further movement of the substance. It is a mechanical method which leaves the substance in the environment. Therefore the need to remove the substance from the seabed should be evaluated.

26.6.27 **(Sunken) packaged goods or complete vessels containing chemicals:** There are several salvage techniques to recover packages and sunken vessels from the sea floor. It is not the substance in the package or ship that determines the best response option but factors such as water depth, strength of the package/ship and current. As is the case with sunken substances (sinkers), the major problem is the detection of packages on the sea floor. Once found, salvage companies have the ability and the required skills to remove the packages. During salvage operations one should always be prepared for the possibility that the packages/ships might break and that substances could be released into the marine environment. Depending on the category the substance(s) belongs to, one of the above-mentioned measures should be taken.

26.6.28 Many liquid chemicals are transported in 200-litre steel drums. Figure 7 shows the typical data for such drums that can be used when calculating the buoyancy in water when filled with various chemical liquids. Figure 8 and Figure 9 show results from such calculations and indicate when drums might float or sink. Figure 8 gives examples of low density liquid chemicals which are often carried in 200-litre steel drums, and which, due to their density, will cause the drums to float in water. Figure 9 gives examples of high density liquid chemicals which, due to their density, will cause the drums to sink in water.

*NB: Cans and drums filled with solid chemicals will always sink in water.*

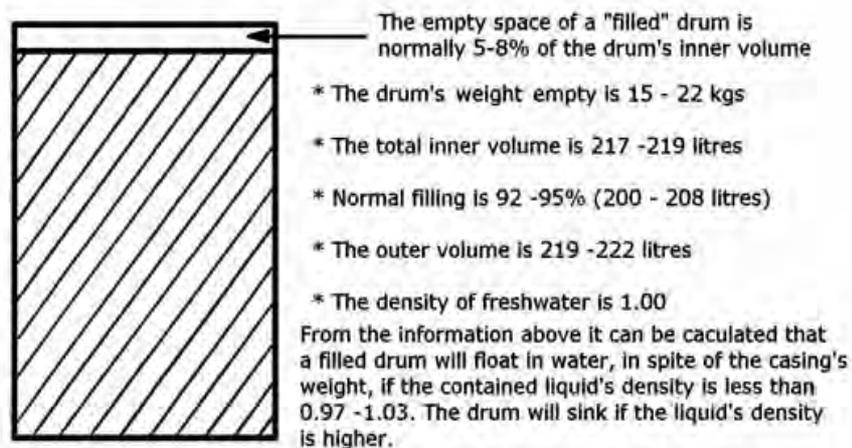


Figure 7 Calculating the buoyancy of drums

| Types of chemicals | Examples  |
|--------------------|---|
| Hydrocarbons       | hexane, benzene, toluene, xylene  |
| Alcohols           | methanol, ethanol, n-propanol, isopropanol, n-butanol, isobutanol                               |
| Ketones            | acetone, methyl ethyl ketone (MEK), methyl isobutyl ketone, cyclohexanone, methyl cyclohexanone |
| Ethers             | diethyl ether, ethyl butyl ether  |
| Esters             | methyl acetate, ethyl acetate, butyl acetate  |
| Amines             | monoethylamine, diethylamine, ethylene diamine, diethylene triamine, diethylene tetramine       |
| Aldehydes          | formaldehyde, acetaldehyde, butyraldehyde, acrolein   |

Figure 8 Examples of low density liquid chemicals which, due to their density, will cause the drums to float in water.

| Types of chemicals       | Examples   |
|--------------------------|--|
| Acids                    | acetic acid, acrylic acid, formic acid, phosphoric acid, sulphuric acid  |
| Bases                    | sodium hydroxide solution, potassium hydroxide solution  |
| Glykols                  | ethylene glycol, diethylene glycol, propylene glycol   |
| Chlorinated hydrocarbons | carbon tetrachloride, trichloroethylene, tetrachloroethylene, methylene chloride, ethylene dichloride, trichloroethane |
| Miscellaneous            | carbon disulphide, toluene diisocyanate, tetramethyl lead, tetraethyl lead   |

Figure 9 Examples of high density liquid chemicals which due to their density will cause the drums to sink in water

## 26.7 Summary

26.7.1 Risk assessments for the transport of chemicals and the hazard evaluation of a potential outflow must form part of national ability to respond to major spillages at sea.

In the present situation:

- Floating substances, presuming that the necessary safety precautions have been taken, can mostly be combated with the help of first line oil recovery vessels and other oil response equipment (booms, skimmers and/or dispersants);
- Sunken substances can be recovered with dredging equipment;
- Lost cargoes and sunken ships can be recovered by salvage companies.

26.7.2 However for the most common response categories, the Evaporators (gas clouds) and the Dissolvers, there are hardly any recovery techniques available and there is no time available for response at open sea. Response measures will be limited to restricting access to the threatened area while the substance dilutes naturally and the situation becomes safe again. Once the area is declared safe the restriction should be lifted.

26.7.3 Natural dilution of a gas cloud in the air or a dissolved cloud in the water column will decrease the concentration and therefore the seriousness of the release. On the one hand the concentration will become lower, but on the other hand the area polluted will become larger.

26.7.4 In all cases of chemical spills, the use of computer models is essential: (1) to determine the actual location; (2) to select the location for on-scene measurements; (3) to select the location for taking samples; (4) to determine the seriousness; (5) to predict the trajectory; and (5) to determine the mass balance.

26.7.5 Ships in distress containing chemicals need to be given special attention in national contingency plans. Such ships could contain several different chemicals still on board but which could enter the marine environment if the ship sank or broke. A critical decision will need to be made between, on one hand bringing such a ship in distress to a sheltered place (in order to repair the damage or to unload the cargo) or on the other hand, sending the ship as far away from the coastline as possible. Next to safety, economic and environmental factors play a role in this decision.

26.7.6 In the case of sunken packages, the environmental consequences of the release of its contents determines the need to recover such packages. Determining the solution rate per time unit sometimes requires experiments as such information is not available and is required to predict the possible environmental consequences. Submerged and floating packages/containers containing chemicals always need to be salvaged independently from their content as such packages form a collision danger for shipping and could wash ashore.

26.7.7 Contracting Parties to the Bonn Agreement should be informed in accordance with Article 5 of the Agreement (see Chapter 29 of this Manual). Request bilateral assistance within the framework of bilateral plans or other conventions for co-operation, or request multilateral assistance within the framework of the Bonn Agreement. Requests for experienced personnel and specialist expertise should be made through the Task Force Assistance of the European Community through the MIC in Brussels.

26.7.8 Note: Requests for personnel or technical assistance is advised if national forces and services cannot cope with the chemical disaster and its effects on strike teams and the marine environment.

## 26.8 Background information

26.8.1 Further details and background information is provided in the IMO Manual on Chemical Pollution: Section 1 “Problem Assessment and Response Arrangements”, Section 2 “Search and Recovery of Packaged Goods Lost at Sea” and The revised GESAMP Hazard Evaluation Procedure for Chemical Substances Carried by ships.

26.8.2 The HASREP pilot project “Response to harmful substances spilled at sea” sponsored by the European Commission, Directorate General Environment Civil Protection Unit in the Community framework for co-operation in the field of accidental or deliberate marine pollution.

## 26.9 Property glossary

The properties listed are those which will provide an indication of a spilled chemical's environmental behaviour, effects and possible counter pollution actions.

### Bioaccumulation

We can distinguish two kinds of accumulation, reversible and irreversible accumulation. These terms state the manner in which the material is bound to the tissue. With reversible accumulation, the material can be excreted again. With irreversible accumulation, the material is permanently bound to the organism. When the bond is reversible and the exposure is constant, a constant equilibrium concentration is established. There are two kinds of reversible accumulation which distinguish themselves by their method of uptake of the toxin. When the toxin is absorbed from the water phase, it is called bioaccumulation. The concentration can be described by the bioaccumulation factor. This factor is the quotient of the concentration in the organism and the concentration in the water-column.

### Flash point

The flash point refers to the lowest temperature at which a liquid still gives off enough vapour to be capable of ignition. The ignition source supplies an amount of energy, which is necessary to heat an explosive or flammable vapour, or gas mixture locally to a given temperature, which will produce an explosion or fire. This local temperature is referred to as the ignition temperature, which is dependent on the oxygen concentration, time, pressure and the presence of catalysts.

### GESAMP

**A-value hazards profile** The GESAMP bioaccumulation ratings are a means of ranking the likelihood that particular substances become concentrated in living organisms.

+ = bioaccumulative to a significant extent and known to produce a hazard to aquatic life or human health;

Z = bioaccumulative with an attendant risk to aquatic organisms or human health, but with a short retention time of the order of one week or less;

T = bioaccumulative, liable to cause tainting of seafood;

0 = no evidence to support one of the above ratings.

**B-value hazards profile** The GESAMP ratings for assessing damage to living resources specified are defined below.

|                           | 96 hr TLm  |      |
|---------------------------|------------|------|
| 4 = highly toxic          | < 1        | mg/l |
| 3 = moderately toxic      | 1 - 10     | mg/l |
| 2 = slightly toxic        | 10 - 100   | mg/l |
| 1 = practically non-toxic | 100 - 1000 | mg/l |
| 0 = non-hazardous         | > 1000     | mg/l |

D = substance likely to blanket the seabed

BOD = substance with oxygen demand

**C-value hazards profile** The oral intake rating describes the hazards posed to human health due to the oral intake of certain substances. Three categories of hazard can be distinguished.

2 = hazardous

1 = slightly hazardous

0 = non-hazardous

**E-value hazards profile** The GESAMP reduction of amenities rating. The effects that substances are likely to have on the availability of amenities can be rated in the following manner:

\*\*\* = highly objectionable because of persistence, smell or poisonous or irritant characteristics. As a result, beaches are liable to be closed. Rating also used when there is clear evidence that the substance causes cancer in human beings;

\*\* = moderately objectionable because of the above characteristics. Short-term effects lead to temporary interference with the use of

beaches. Rating used when there is credible evidence that the substance is an animal carcinogen, but when no clear evidence is available to suggest that the substance causes cancer in human beings;

\* = slightly objectionable, non interference with use of beaches;

0 = no problems envisaged.

### IMDG-Code

Maritime Organisation Dangerous Goods (IMDG) Code. The International Maritime Organisation (IMO) approved a system of classifying chemical substances on the basis of the physical hazards involved at the International Conference on Safety of Lives at Sea in 1974. The IMO classification, given below, is an internationally recognised standard, which has been accepted in virtually all countries.

- Class 1 explosives
- Class 2 gases: compressed, liquefied or dissolved under pressure
  - Class 2.1 inflammable gases
  - Class 2.2 non-inflammable gases
  - Class 2.3 poisonous gases
- Class 3 inflammable liquids
  - Class 3.1 inflammable liquids: low flash point group. Flash point below -18 °C, or possessing a low flash point in combination with other dangerous properties apart from inflammability
  - Class 3.2 inflammable liquids: intermediate flash point group. Flash point of -18 °C up to, but not including, 23 °C
  - Class 3.3 inflammable liquids: high flash point group. Flash point of 23 °C up to and including 61 °C
- Class 4 inflammable solids
  - Class 4.1 inflammable solids
  - Class 4.2 substances liable to spontaneous combustion
  - Class 4.3 substances emitting inflammable gases when in contact with water
- Class 5 oxidising substances (agents)
  - Class 5.1 oxidising substances (agents)
  - Class 5.2 organic peroxides
- Class 6 poisonous (toxic) substances
  - Class 6.1 poisonous (toxic) substances
  - Class 6.2 infectious substances
- Class 7 radioactive substances
- Class 8 corrosives
- Class 9 miscellaneous dangerous substances

### LC<sub>(50)</sub>

Lethal concentration fifty LC<sub>(50)</sub> is a calculated concentration which is expected to kill 50% of the population of experimental animals. Dosage is the most important factor in determining whether a given hazardous substance will produce a toxic effect. For comparisons of the toxicity of different hazardous substances, the median lethal concentration LC(t)50 (t = 96 hours), is normally used as a yardstick. The higher the LC(t)50 value, the lower the hazard.

| description           | LC(96)50 values |      |
|-----------------------|-----------------|------|
| Highly toxic          | < 1             | mg/l |
| Moderately toxic      | 1 - 10          | mg/l |
| Slightly toxic        | 10 - 100        | mg/l |
| Practically non-toxic | 100 - 1000      | mg/l |
| Non-hazardous         | >1000           | mg/l |

Mortality of an organism is a clear measure. With experiments the percentage of a specific kind of organism which dies within a certain time can be measured. For example LC-50 (96): The Lethal Concentration for 50 % of the test organisms within 96 hours. Other percentages (n) and exposure times (t) are possible (LC-n (t)).

### LEL

The Lower Explosion Limit (LEL) is determined as the minimum percentage of vapour (gas) at which a vapour or gas mixture can be made to explode. Below the lower explosion limit, reaction only takes place when there is a

continuous supply of external heat. In the case of concentrations above the lower explosion limit, combustion may occur.

**MAC**

The Maximum Allowable Concentration (MAC) of a substance given in  $\text{ml/m}^3$  = ppm or  $\text{mg/m}^3$  is defined as the maximum concentration of that substance in ppm of air in which people can work safely for a period of eight hours, five days a week.

|                      |                         |           |
|----------------------|-------------------------|-----------|
| Minimum hazard       | - substances with a MAC | >500 ppm  |
| Some hazard          | - substances with a MAC | >100 <500 |
| Moderately hazardous | - substances with a MAC | >10 <100  |
| Severely hazardous   | - substances with a MAC | <10 ppm   |

For substances with a very low MAC value, one should be very careful even if the substance is not classified as "Evaporator"

**Marine pollution Category**

The GESAMP hazard categories provide a basis on which to assess the severity of marine pollutants. Four categories can be distinguished ranging from A to D, in descending order of importance:

Category A: Substances which are bioaccumulative and liable to produce a hazard to aquatic life or human health, or which are highly toxic to aquatic life;

Category B: Substances which are bioaccumulative with a short retention time of the order of one week or less, which are likely to taint seafood, or which are moderately toxic to aquatic life;

Category C: Substances which are slightly toxic to aquatic life;

Category D: Substances which are practically non-toxic to aquatic life, or which cause the seabed to be covered with deposits.

**No Effect Level**

When a toxicity experiment for sub-lethal effects is done, it is possible to find the so-called "No Effect Level". The 96 hour  $\text{LC}_{50}$  gives an indication of the concentration which, if exceeded, will be lethal; it is available for a wide range of chemicals and can be used to predict likely safe concentrations. Where a chemical spilled in the marine environment is neither persistent nor bioaccumulative, then acute, chronic or sub-lethal effects are rarely seen in organisms at concentrations of less than 0.01 times the 96 hour  $\text{LC}_{50}$  to the test species. In the absence of counter-indications, therefore, 1% of the  $\text{LC}_{50}$  can be taken as a "safe" No Effect Level (N.E.L). (see also No Observed Effect Level).

**No Observed Effect Level**

No Observed Effect Level (N.O.E.L). It is possible to apply a conservative safety factor of 0.01 in translating acute L.C.(50) values to life cycle no-adverse-effect level. This still provides a large margin of safety between exposure limits and effect levels. (See also "No Effect Level").

**Octanol-water partition coefficient**

The ratio of concentration of the chemical at equilibrium in octanol and water phase is related to bioaccumulation. The experience with a wide variety of organic compounds indicates that if this partition coefficient exceeds 1000, the probability of measurable bioaccumulation in aquatic species is high. Often this is expressed in  $\text{Pow}$ , the logarithm of the octanol/water partition coefficient, which gives an indication on the lipophilicity rate of a chemical. When a chemical has a  $\text{Pow}$  larger than 3 or 4 (1000 to 10 000 as it is the Logarithm), it is able to pass the lipophilic membranes of the cells and accumulate in the fat resources. Not only bioaccumulation, but also sediment bonding can be described with the  $\text{Pow}$  values. A high rate of bonding to the sediment is related with a high  $\text{Pow}$ .

**Relative gas density**

The densities of the common gaseous products transported by sea are mostly given in  $\text{kg/m}^3$ . By comparing the density of a particular gas with that of air ( $1.29 \text{ kg/m}^3$ ), an estimate can be made of whether the substance will rise into the atmosphere or tend to remain on the water surface. The value obtained is equal to the ratio of the weight of a given volume of vapour to the weight of an equal volume of dry air at the same conditions of temperature and pressure.

Using the ratio  $M/29$ , where  $M$  is the molecular weight of the substance concerned, may approximate this.

**TLM<sub>(96)</sub>**

Tolerance Limit median, See  $LC_{50}$

|                       |                    |      |
|-----------------------|--------------------|------|
| highly toxic          | TLM less than 1    | mg/l |
| moderately toxic      | TLM 1 - 10         | mg/l |
| slightly toxic        | TLM 10 - 100       | mg/l |
| practically non toxic | TLM 100 - 1000     | mg/l |
| non-hazardous         | TLM more than 1000 | mg/l |

**TLV**

Threshold Limit Values refers to an airborne concentration of a product expressed in parts per million by volume in air. This is the time-weighted concentration believed to be safe for the average person during an 8-hour workday and 40-hour working week for prolonged periods. The equilibrium concentration of a gas, which can be produced by a liquid, can be calculated as follows:

Concentration (ppm) = vapour pressure in mm of Hg x 1300 or

Concentration (ppm) = vapour pressure in Pa x 9.75

If concentrations are higher than three times the TLV level, warnings should be issued of possible health risks for people in the area of dissemination, with advice on what to do.

NB There are four annexes to this document. The files are pdf files.

Names of files:

Chapter26\_Add.1\_Evaporators.pdf “Intervention on gases and evaporators, card number F1.1, F1.2, F1.3”

Chapter26\_Add.2\_Floaters.pdf “Intervention on floaters, card number F2.1, F2.2”

Chapter26\_Add.3\_dissolvers.pdf “Intervention on dissolvers, card number F3”

Chapter26\_Add.4\_sinkers.pdf “Intervention on sinkers, card number F4”

# INTERVENTION ON GASES AND EVAPORATORS

CARD NUMBER: **F 1.1**, **F 1.2** and **F 1.3**

|              |   |
|--------------|---|
| <b>F 1.1</b> | <b>Toxic and Explosive gas cloud</b> – Always use this card if the chemical nature of the gas is unknown. |
| <b>F 1.2</b> | <b>Toxic gas cloud.</b>   |
| <b>F 1.3</b> | <b>Explosive gas cloud.</b>   |

Applicable for groups **G, GD, E, ED, FE, FED, DE**  
(in the SEBC code, all groups with **G** or **E**).



Estimation of the zone where the RISK is non negligible:

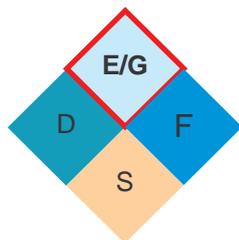
| F1.1      |   |   |  |
|-----------|---|---|--|
|           | F1.2                                    |   | F1.3   |
| SPILL     | HEALTH RISKS                            |   | FIRE /<br>EXPLOSION<br>RISKS   |
| Compounds | Ammonia,<br>Vinyl Chloride,<br>Chlorine | Methane (LNG),<br>Propane, Butane (LPG),<br>Ethylene,<br>Butylene,<br>Butadiene | Ammonia,<br>Vinyl Chloride,<br>Methane (LNG),<br>Propane, Butane (LPG),<br>Ethylene,<br>Butylene,<br>Butadiene |
| Tons      | Km                                      | Km  | Km   |
| 0.1       | 1                                       | 0.2   | 0.2  |
| 1         | 2                                       | 0.4   | 0.4  |
| 10        | 5                                       | 1   | 1  |
| 100       | 10                                      | 2   | 2  |
| 1,000     | 20                                      | 4   | 4  |

Such estimates should always be regarded with reservations and **never be alternatives** for monitoring.

These estimates can also be applied to liquid chemicals which are flammable and/or hazardous for health. The spread of evaporated gas, from spills of E, ED, FE and FED chemicals, can be calculated very roughly by multiplying the values in the table by  $V_p/100$ , where  $V_p$  is the liquid's vapour pressure in kPa, which is less than 100 at ambient temperature.



# F1.1



## EVAPORATORS / GAS

|                 |         |
|-----------------|---------|
| Density         | < Water |
| Vapour Pressure | > 3 kPa |
| Solubility      | < 5%    |
| Toxicity        | High    |

### MAJOR RISKS



Toxic



Explosive



Flammable



Corrosive

## EMERGENCY

### TO PROTECT

- To evacuate the leeward zone
- To cut ignition sources out
- To stop the leakage

### TO ALERT

- Immediate alert of the site owner & emergency team
- Urgent alert in the leeward zone (civil people)

### TO RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## PRIORITY STRATEGIES

- Consider an UNKNOWN gas as DANGEROUS
- Make sure people on site are safe
- Always be aware of the weather forecast (wind & rain)
- Wear the appropriate equipment (Self-contained breathing apparatus...)
- Monitoring clouds vapour: Explosively, Flammability, Toxicity, Corrosivity, Carcinogenicity, Radioactivity

## EMERGENCY RESPONSES

### Forecasting gas cloud behaviour

**Emergency Softwares:** (ALOHA, ELSA, CHEMMAP...)  
 Difficulty to get accurate & efficient information.  
 Never substitute this information to monitoring.

*Shoreline*    *Harbour*    *Open sea*

X

X

X

### Monitoring (performed by equiped & qualified personnel)

#### Trace gas (delimitate a safety zone)

|                           |                             |                             |
|---------------------------|-----------------------------|-----------------------------|
| Gas detection tubes       | Photoionization instruments | Portable gas chromatographs |
| Semiconductor instruments | IR trace gas detectors      | Mobile mass spectrometers   |

X

X

-

#### Flammability & Explosiveness

|                 |                          |
|-----------------|--------------------------|
| Explosive meter | Combustible gas detector |
|-----------------|--------------------------|

X

X

-

#### Oxygen-deficiency

|                            |
|----------------------------|
| Chemical celloxygen meters |
|----------------------------|

X

X

-



## EMERGENCY RESPONSES (Continued)

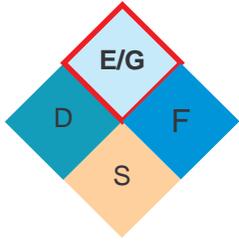
|   | Shoreline | Harbour | Open sea |
|---|-----------|---------|----------|
| <b>Recovery systems</b>   |           |         |          |
| <b>To seal the breach with specific mechanical or pneumatical tools (requirement: avoid sparks)</b>   | X         | X       | X        |
| <b>Recondensing leaking gases</b><br>Covering the container with a flat tarpaulin.<br>Collecting the jet stream with a tarpaulin made as a funnel or a cone.  | X         | X       | X        |
| <b>Water spray (water mist)</b><br>Wash down water soluble gas clouds<br>Cooling down hot surfaces<br>Stop, steer or dispers gas clouds<br><b>IMPORTANT: Containment and recovery of polluted water</b> | X         | X       | -        |
| <b>To mark the clouds with specific substances to make it better visible (ammoniac for instance)</b>  | -         | -       | X        |

### Accident feedback

|  |  |                                     |   |  |   |
|--|--|-------------------------------------|---|--|---|
| <b>YUYO MARU</b><br>N°10<br>(1974 – Japan) | Collision in Tokyo Bay                           | <b>Propane, butane, naphtha</b> [G] | Flammable gaseous products.   | Towing and anchoring out at sea in Tokyo Bay.<br>Ship attacked by fire   |   |
| <b>MULTITANK ASCANIA</b><br>(1999 – GB)    | Fire on-board ship due to bad weather conditions | <b>Vinyl acetate</b> (1 750 t) [ED] | Flammable and polymerisable product, natural product possibly carcinogenic. | Evacuation of the crew because of a fire on-board. Ship stranded at least half a mile from the coast. Establishment of a temporary 5km exclusion zone, necessitating the evacuation of 200 inhabitants. Reconnaissance by helicopter of the hot spots on-board (risk of explosion) using the ship's IR camera. Towed by a tug. | Advantages of a « chemical » exercise two weeks earlier.<br>Positive action taken by the crew before abandoning ship.<br>Importance of an intervention team in time of chemical risks.<br>Importance of the disposal of emergency towing equipment. |



# F1.2



## EVAPORATORS / GAS

|                 |         |
|-----------------|---------|
| Density         | < Water |
| Vapour Pressure | > 3 kPa |
| Solubility      | < 5%    |
| Toxicity        | High    |

### MAJOR RISKS



Toxic



Corrosive

## EMERGENCY

### TO PROTECT

- To evacuate the leeward zone
- To stop the leakage

### TO ALERT

- Immediate alert of the site help & public help
- Urgent alert in the leeward zone

### TO RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## PRIORITY STRATEGIES

- Only the responders team on site
- Always be aware of the weather forecast (wind & rain)
- **Wear the appropriate equipment (Personal Protective Equipment, gloves...)**

### Level A



A fully encapsulating chemical protective suit in which a Self-Contained Breathing Apparatus (SCBA) is worn beneath the suit.

### Level B



A chemical resistant suit with an external SCBA.

### Level C



Body is protected with chemical resistant clothing, gloves and boots. Only a full-face mask air-purifying respirator.

- **Monitoring clouds vapour: Toxicity, Corrosivity, Carcinogenicity**



# EMERGENCY RESPONSES

**Shoreline   Harbour   Open sea**

**Forecasting gaz cloud behaviour (see F1.1)**

X

X

X

**Monitoring (performed by equipped & qualified personnel) (see F1.1)**

X

X

X

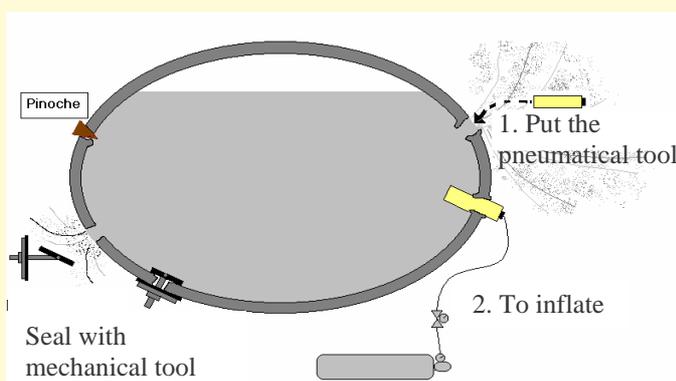
## Recovery systems

**To seal the breach with specific mechanical or pneumatical tools (requirement: avoid sparks)**

X

X

-



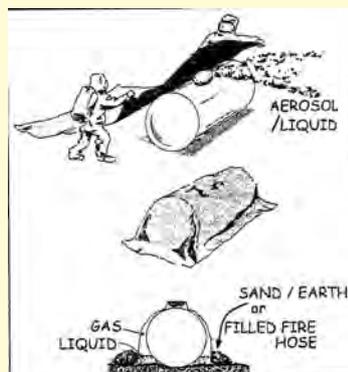
## Recondensing leaking gases

Covering the container with a flat tarpaulin.  
Collecting the jet stream with a tarpaulin made as a funnel or a cone.

X

X

-



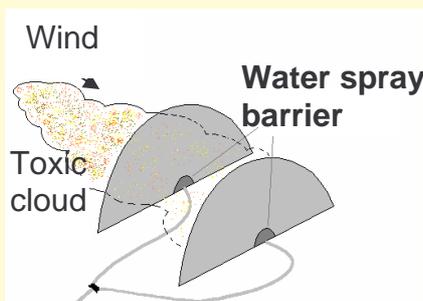
## Water spray (water mist)

Avoid using water on **cold** liquified gases  
Wash down water soluble gas clouds  
Cooling down hot surfaces  
Stop, steer or disperse gas clouds  
**IMPORTANT: Containment and recovery of polluted water (if possible)**

X

X

-



**To mark the clouds with specific substances to make it better visible (ammoniac for instance)**

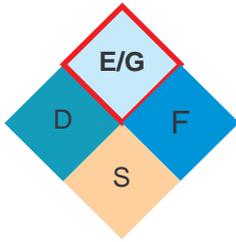
X

X

-



# F1.3



## EVAPORATORS / GAS

|                 |         |
|-----------------|---------|
| Density         | < Water |
| Vapour Pressure | > 3 kPa |
| Solubility      | < 5%    |
| Toxicity        | ~ 0     |

### MAJOR RISKS



Explosive



Flammable

## EMERGENCY

### TO PROTECT

- To evacuate the leeward zone
- To cut ignition sources out
- To stop the leakage

### TO ALERT

- Immediate alert of the site help & public help
- Urgent alert in the leeward zone

### TO RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## PRIORITY STRATEGIES

- Only the responders team on site
- Always be aware of the weather forecast (wind & rain)
- Wear the appropriate equipment (Personal Protective Equipment, gloves...)



**Level D:** This level is the lowest level of protection and consist of basic work clothing such as coveralls, gloves and safety shoes.

- Monitoring clouds vapour: Explosivity, Flammability.



## EMERGENCY RESPONSES

|   | <i>Shoreline</i> | <i>Harbour</i> | <i>Open sea</i> |
|---|------------------|----------------|-----------------|
| <b>Forecasting gaz cloud behaviour (See F1.1).</b>  | X                | X              | X               |
| <b>Monitoring (performed by equiped &amp; qualified personnel) (see F1.1)</b>                           | X                | X              | -               |
| <b>Recovery systems</b>   |                  |                |                 |
| To seal the breach with specific mecanical or pneumatical tools   | X                | X              | -               |
| Recondensing leaking gases  | X                | X              | -               |
| Water spray (water mist), water barrier   | X                | X              | -               |
| To mark the clouds with specific substances to make it better visible (ammoniac for instance)           | X                | X              | -               |
| <b>It is necessary to avoid thermic equipment (engine...) and to suppress spark, flame formation...</b> |                  |                |                 |



## INTERVENTION ON FLOATERS

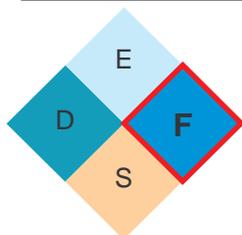
CARD NUMBER: **F 2.1** and **F 2.2**

|              |  |
|--------------|--|
| <b>F 2.1</b> | <b>Fire dangerous slick.</b>                                       |
| <b>F 2.2</b> | <b>Persistence / hindrance causing slick on the water surface.</b> |

**Applicable for groups F, FE, FED and FD (in the SEBC code, all groups with F).**



## F 2.1



# FLOATERS

|                 |         |
|-----------------|---------|
| Density         | < Water |
| Vapour Pressure | < 3 kPa |
| Solubility      | < 5%    |

### MAJOR RISKS



Pollutant



Toxic



Flammable



Explosive

## EMERGENCY

### TO PROTECT

- To cut ignition sources out
- To stop the leakage

### TO ALERT

- Immediate alert of the site help & public help
- Urgent alert in the leeward zone

### TO RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## PRIORITY STRATEGIES

- Only the responders team on site due to the explosive risk,
- Always be aware of the weather forecast and the meteo-oceanic conditions (water temperature, swell, currents...),
- Wear the appropriate equipment (Personal Protective Equipment, gloves...),
- Monitoring the drift of the slick, containment and recovery options,
- Monitoring the spread of the vapor clouds: Toxicity, Corrosivity, and Carcinogenicity.



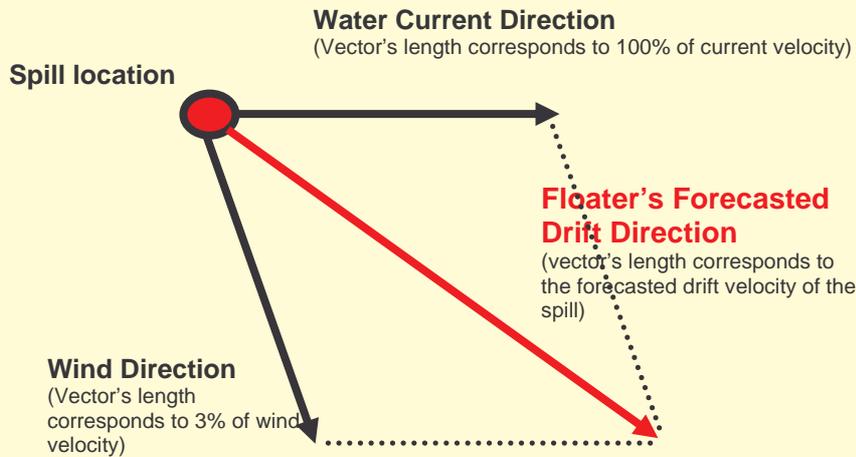
# EMERGENCY RESPONSES

Shoreline Harbour Open sea

## Forecasting the drift of the slick at the sea surface

**Softwares:** (MOTHY, OSIS, CHEMMAP...)

Difficulty to get accurate & efficient information.  
Never substitute this information to monitoring.



This figure shows how a floating chemical slick's drift can be calculated by means of a vector diagram. However, most chemical spills, except for F and Fp categories, will disappear by evaporation and / or dissolution within roughly 10 hours.

X X X

## Monitoring (performed by equipped & qualified personnel)

### Trace gas (delimitate a safety zone)

|                           |                             |                             |
|---------------------------|-----------------------------|-----------------------------|
| Gas detection tubes       | Photoionization instruments | Portable gas chromatographs |
| Semiconductor instruments | IR trace gas detectors      | Mobile mass spectrometers   |

### Flammability & Explosiveness

|                 |                          |
|-----------------|--------------------------|
| Explosive meter | Combustible gas detector |
|-----------------|--------------------------|

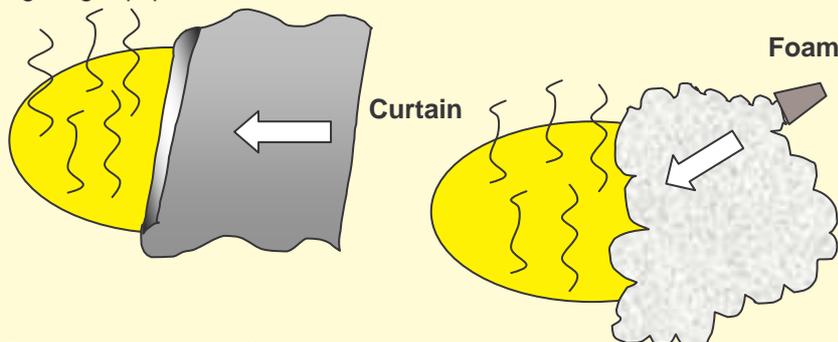
### Oxygen-deficiency

|                            |
|----------------------------|
| Chemical celloxygen meters |
|----------------------------|

X X -

## To reduce the vaporisation process and the risk of fire and explosion

Suppressing vapours by applying curtain or foam by means of fire fighting equipment



The curtain and the foam can temporarily suppress vapour formation from the spill and thus reduce the risk of formation of noxious and or flammable gas concentration.

X X -



## F2.2

# FLOATERS

|                 |           |
|-----------------|-----------|
| Density         | < Water   |
| Vapour Pressure | < 0.3 kPa |
| Solubility      | < 5%      |

### MAJOR RISKS:



Pollutant



Toxic



Corrosive

## EMERGENCY

### To PROTECT

- To cut ignition sources out
- To stop the leakage

### To ALERT

- Immediate alert of the site help & public help
- Urgent alert in the leeward zone

### To RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## PRIORITY STRATEGIES

- Always be aware of the weather forecast and the meteo-oceanic conditions (water temperature, swell, currents...),
- Wear the appropriate equipment (Personal Protective Equipment, gloves...),
- Monitoring the drift of the slick, containment and recovery options.



## EMERGENCY RESPONSES

*Shoreline    Harbour    Open sea*

**Forecasting the drift of the slick at the sea surface (See 2.1)**

X

X

X

**Monitoring (performed by equipped & qualified personnel) (See 2.1)**

X

X

X

**To recover the floating spills**

Spills of substances that float on the water surface and form high viscosity layers or lumps that neither evaporate into the air nor disperse in the water column.

X

X

-

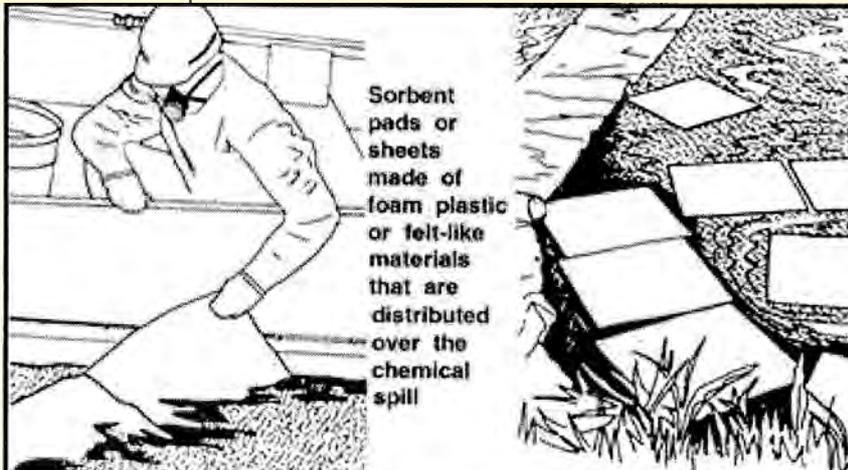
**by using sorbent**

Distributing sorbents over the floating spill on the water surface and recovery of the sorbent-spill mixture.

X

X

-



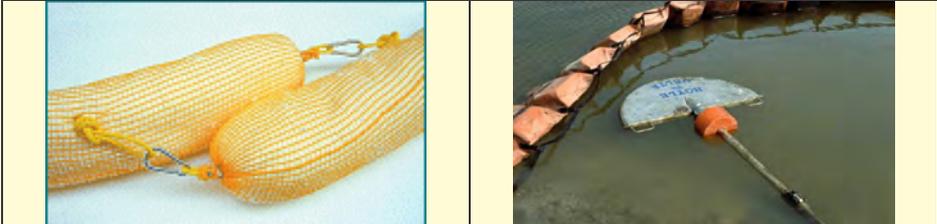
Helcom, 2002



Powder sorbent spread on the slick.



## EMERGENCY RESPONSES *(Continued)*

|   | Shoreline | Harbour | Open sea |
|---|-----------|---------|----------|
| <p><b>by using conventional oil response equipment (skimmer, booms...)</b><br/>                     The floating chemicals can be contained with booms and recovered with skimmers. In some case, this response may be facilitated by pretreatment with sorbents (pads or / and powder).</p>  | X         | X       | X        |
|  <p>Booms on a river to stop the drift of slicks.</p>   |           |         |          |
|  <p>Booms in sorbent.      Skimmer well adapted for small slick.</p>  |           |         |          |
| <p><b>by trawling</b><br/>                     A trawl system consists of the guide booms, the entrance net, and detachable trawl bags. Bags can be disconnected and recovered during the operations at sea.</p>  | -         | -       | X        |
|  <p>Slick of palm nut oil at sea and rubbery balls of oil on the shoreline after the Allegra spill in the Channel (1997).</p> <p><i>On 1 October 1997, in the Channel, just offshore Guernsey, the Liberian parcel tanker the Allegra was involved in a collision and subsequently spilled 900 tonnes of palm nut oil. The oil solidified quickly forming a slick measuring 800 by 400 metres. Several fisher boats were involved in trawling operations.</i></p> |           |         |          |
| <p><b>To disperse the floating spills</b><br/>                     The slick can be dispersed if the released compounds are non toxic and if environmental conditions are respected (sea water column depth...).</p>  | -         | -       | X        |
|    |           |         |          |



# INTERVENTION ON DISSOLVERS

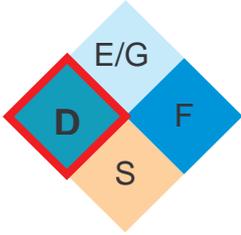
CARD NUMBER: **F 3**

|            |   |
|------------|---|
| <b>F 3</b> | <b>Toxic / Carcinogenic cloud in the sea water column</b> |
|------------|---|

**Applicable for groups GD, DE, FED, FD, DE, D and SD (in the SEBC code, all groups with D).**



**F 3**



## DISSOLVERS

|                 |         |
|-----------------|---------|
| Density         | < Water |
| Vapour Pressure | < 3 kPa |
| Solubility      | > 5%    |

### MAJOR RISKS:



Pollutant



Toxic

## EMERGENCY

### To PROTECT

- To shut down the leaks
- To stop the leakage

### To ALERT

- Immediate alert of the site operators
- The responders teams

### To RESPOND

- To identify substance and define spillage location
- To estimate volume spilled & contaminated zone
- To delimit danger area & control the access

## EMERGENCY RESPONSES

- Only the responders team on site,
- To locate and to monitor the spread of the cloud in the seawater column and, if necessary, to shut down the sea water pumping,
- Wear the appropriate equipment (Personal Protective Equipment, gloves...).



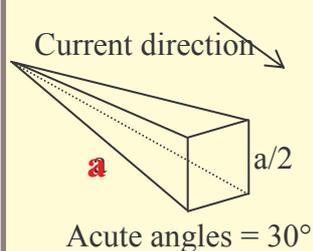
## EMERGENCY RESPONSES

**Shoreline   Harbour   Open sea**

### Forecasting the spread of the cloud in the water column

**Softwares:** (MOTHY, CHEMMAP...)

The spreading of a pollution in the water column (group D) can be calculated according to the Figure and the Table below. This method cannot be applied for stagnant (or almost stagnant water) or for very turbulent waters and also for chemicals which have a density very different from the water density.



| Spill (tons) | Concentration (mg/L) | Concentration (µg/L) |
|--------------|----------------------|----------------------|
|              | <b>a</b> (km)        | <b>a</b> (km)        |
| 1            | 0.5                  | 5                    |
| 10           | 1                    | 10                   |
| 100          | 2                    | 20                   |
| 1000         | 4                    | 40                   |

X

X

X

### Monitoring by sampling or by *in situ* measurements

Water samples must be stored in glass bottles and must be kept in fridge.

Several equipments are fully adapted for *in situ* measurements (pH meter, UV-spectrofluorimeter, GC-MS...).

X

X

X

### Neutralising agents

In cases of acid or base chemicals spills. Two neutralising agents can be used to neutralise pH variations: sodium carbonate for acids ( $\text{NaHCO}_3$ ) and sodium di-hydrogen-phosphate for base spills ( $\text{NaH}_2\text{PO}_4$ ).

-

X

-

### Purification techniques

Contaminated sea water can be filtered by using:

- An adsorption process (activated carbon, clays...),
- Ionic exchangers resins,
- Flocculation agents which can precipitate.

In all cases, the agents should be recuperated.

-

X

-



## INTERVENTION ON SINKERS

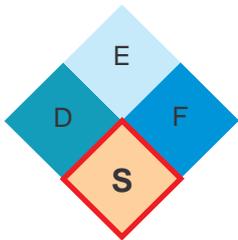
CARD NUMBER: **F 4**

|            |   |
|------------|---|
| <b>F 4</b> | <b>Persistent / hindrance causing pool on sea floor</b> |
|------------|---|

Applicable for groups S and SD (in the SEBC code, all groups with S).



# F 4



## SINKERS

|                 |         |
|-----------------|---------|
| Density         | > Water |
| Vapour Pressure | -       |
| Solubility      | < 5%    |

**MAJOR RISKS**



Pollutant



Toxic

## EMERGENCY

| <u>TO PROTECT</u>  | <u>TO ALERT</u>  | <u>TO RESPOND</u>   |
|--|--|---|
| <ul style="list-style-type: none"> <li>To cut ignition sources out</li> <li>To stop the leakage</li> </ul> | <ul style="list-style-type: none"> <li>Immediate alert of the site owner / operators</li> <li>The responder teams</li> </ul> | <ul style="list-style-type: none"> <li>To identify substance and define spillage location</li> <li>To estimate volume spilled &amp; contaminated zone</li> <li>To delimit danger area &amp; control the access</li> </ul> |

## EMERGENCY RESPONSES

- Only the responders team on site,
- To locate and to monitor the sunken slick and, if necessary, to shut down the sea water pumping,
- Wear the appropriate equipment (Personal Protective Equipment, gloves...),
- To evaluate the containment and recovery options.

## EMERGENCY RESPONSES

|  | Shoreline | Harbour | Open sea |
|--|-----------|---------|----------|
| <div style="background-color: #fff9c4; padding: 5px; border: 1px solid gray;"> <p style="color: #0056b3; margin: 0;"><b>Forecasting the pouring of the slick on the sea bed</b></p> </div>   | X         | X       | X        |
| <div style="border: 1px solid gray; padding: 5px;"> <p style="color: #0056b3; margin: 0;"><b>Monitoring by sampling</b></p> <p style="margin: 0;">To follow the behaviour of the slick.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p style="font-size: small; transform: rotate(-90deg); position: absolute; left: -40px; top: 50px;">Yves Gladu</p> <p style="margin: 0;">Sampling of a pollutant on the sea bed.</p> </div> <div style="text-align: center;">  <p style="margin: 0;">Remote Operating Vehicle.</p> </div> </div> </div> | X         | X       | X        |



# EMERGENCY RESPONSES

Shoreline Harbour Open sea

## Recovery systems

Sunken spills on the bottom can be recovered by different kinds of dredging techniques and there are various types of suitable **dredges**. Different dredges are more or less suitable for removal of chemicals from the bottom. The airlift pneumatic dredges should be mentioned as successful examples used in well-documented accidents.



Dredge with suction pump.



Trailing suction hopper dredges.



Mechanical dredge.

## Mechanical recovery (backhoe, vacuum truck...)



Backhoe in harbour.



Vacuum truck.

X

X

-

X

X

-



## PLACES OF REFUGE

### 27.1 RATIONAL APPROACH FOR THE DESIGNATION AND USE OF PLACES OF REFUGE

27.1.1 The Contracting Parties endorsed the following rational approach in events involving:

- fire,
- explosion,
- damage to the ship,
- collision,
- pollution,
- impaired vessel stability,
- grounding,

for the designation and use of places of refuge.

27.1.2 In such cases, a careful assessment of risks related to the identified event and accompanying circumstances must take into account:

- safety of those on board,
- threats to public safety,
- designated environmental areas,
- sensitive habitats and species,
- fisheries,
- economic/industrial facilities,
- amenity resources,
- facilities and manpower available,
- weather, sea and geographical conditions,
- bathymetry,
- tides and seasonal effects.

27.1.3 Contingency planning for an area suitable for a place of refuge should include:

- roles and responsibilities of authorities and the responders in charge,
- response equipment needs and availability,
- response techniques required and permitted,
- international, regional or bilateral co-operation,
- existing logistics for emergency response, such as lightening, towage, stowage, salvage and storage,
- customs and financial implications to be considered in response operations;
- the vulnerability of the area concerned.

27.1.4 The Contracting Parties noted that the designation and use of places of refuge could encounter local opposition and involve political decisions. Therefore, granting access to a place of refuge could involve a political decision. Such a decision can only be taken on a case-by-case basis, with due consideration given to the balance between:

- a. the advantages for the affected ship and for the environment resulting from bringing the ship into a place of refuge; and
- b. the risk to the environment resulting from that ship being near the coast.

27.1.5 It should be made clear to the authorities and the public involved that a well defined place of refuge can limit the extent of coastline threatened by the scale of dangers arising from the casualty.

27.1.6 International guidelines, such as those agreed by IMO (Assembly resolution No A.949(23)) aim to provide internationally approved checklists both for the authorities requested to designate places of refuge and for the master of a ship in need of such a place because of her specific situation. The wording of the following guidelines uses phrases from the body and annexes of the IMO Assembly Resolution

No. A.949(23). Contracting Parties which are EU Member States will need to take account of Article 20 of Directive 2002/59/EC and they and other Contracting Parties will need to take account of national legislation in this field.

27.1.7 Structured information on the incident, on the ship's specifics, on the accompanying safety questions, on the kind of assistance needed, on the insurance coverage and so forth will enable coastal States to identify more easily the risks involved. Decisions on suitable methodology and on how to respond, as well as the identification of suitable places of refuge (both for general types of incident and on a case-by-case basis), will be speeded up by such structured information.

27.1.8 In an evolving situation where persons on board find themselves in distress, the rules applicable to rescue operations under the SAR Convention and the IAMSAR Manual and the documents derived from those instruments have priority over the present guidelines and the procedures derived from them.

## **27.2 PRINCIPLES OF DECISION-MAKING FOLLOWING A REQUEST FOR A PLACE OF REFUGE**

27.2.1 Under international law, a coastal State may require the ship's master (or the company owning or managing the ship) to take appropriate action within a prescribed time limit with a view to halting a threat of danger. In cases of failure or urgency, the coastal State can exercise its authority by taking response action appropriate to the threat. It is therefore important that coastal States establish procedures to address these issues, even if no established damage and/or pollution has occurred, preferably through a maritime assistance service. For each place of refuge, maritime authorities and, where necessary, port authorities should make an objective analysis of the advantages and disadvantages of allowing a ship in need of assistance to proceed to the place of refuge, taking into consideration the result of its event-specific analysis.

27.2.2 An event-specific assessment should analyse the following points:

- the seaworthiness of the ship concerned (buoyancy, stability, availability of means of propulsion and power generation, docking ability etc.);
- the nature and condition of cargo, stores, bunkers, in particular hazardous goods;
- the distance and estimated transit time to a place of refuge;
- whether the master is still on board;
- the number of other crew and/or salvors and other persons on board, and an assessment of human factors, including fatigue;
- the legal authority of the country concerned to require action of the ship in need of assistance;
- whether the ship concerned is insured or not;
- if the ship is insured, the identity of the insurer, and the limits of liability available;
- whether there is agreement by the master of the ship and the company owning or managing the ship to the proposals of the coastal State/salvor to proceed, or to be brought, to a place of refuge;
- the provisions of the financial security required;
- any commercial salvage contracts already concluded by the master of the ship or the company owning or managing the ship;
- information on the intention of the master and/or salvor;
- the designation of a representative of the company owning or managing the ship in the coastal State concerned;
- the risk evaluation factors identified in Appendix 2 of IMO Assembly Resolution No. A.949(23); and
- any measures already taken.

27.2.3 When appropriate, and if time allows, an inspection team designated by the coastal State should board the ship, for the purpose of gathering evaluation data. The team should be composed of persons with expertise appropriate to the situation.

27.2.4 The analysis should include a comparison between the risks involved if the ship remains at sea and the risks that it would pose to the place of refuge and its environment. Such a comparison should cover the following points:

- the safeguarding of human life at sea;
- the safety of persons at the place of refuge and in its industrial and urban surroundings (risk of fire or explosion, toxic risk, etc.);
- the risk of pollution;
- if the place of refuge is a port, the risk of disruption to the port's operation (channels, docks, equipment, other installations);
- an evaluation of the consequences if a request for a place of refuge is refused, including the possible effect on neighbouring States.

27.2.5 Due regard should be given, when drawing up the analysis, to the preservation of the hull, machinery and cargo of the ship in need of assistance.

27.2.6 When the final analysis has been completed, the maritime authorities concerned should be informed about it. When permission to access a place of refuge is being considered, there is no obligation on the coastal State to grant it, but the coastal State should weigh all factors and risks in a balanced manner, and give shelter whenever that is reasonably possible.

27.2.7 In the light of the outcome of the assessment provided for above, the coastal State should decide whether to allow or to refuse admittance, and reach decisions, where necessary, on any practical requirements. The action of the coastal State does not prevent the company owning or managing the ship, or its representative, from being called upon to take steps to arrange for the ship in need of assistance to proceed to a place of refuge. As a general rule, if the place of refuge is a port, a security in favour of the port will be required to guarantee payment of all expenses which may be incurred in connection with its operations, such as: measures to safeguard the operation, port dues, pilotage, towage, mooring operations, miscellaneous expenses, etc.

### **27.3 INFORMATION-CHECKLIST FOR AN AUTHORITY WHICH HAS RESPONSIBILITIES OF THIS KIND**

An authority responsible for drawing-up an event-specific analysis, or for taking a decision on whether to permit access to a place of refuge, should use the following check-list of relevant information:

- vessel identification data;
- flag state, crew data;
- cargo, bunker, ballast data;
- position of casualty, meteorological and tidal situation;
- distance to preferred place of refuge, limitations;
- geographic and hydrographic data for place of refuge and approaches;
- what communication means are available;
- owner, local agent, insurer, embassy/consulate;
- assistance/salvage contract in existence/intended, who is/will be contractor;
- type of accident/distress, risks involved;
- priority ranking of assistance measures, time frame for decisions;
- type of expertise and equipment for response measures needed;
- availability of equipment and manpower, transport means;
- definition of maximum risks for the coastline/population/connected interests and possible responses;
- involvement of other responsible agencies in the decision-making process;
- access to place of refuge for assistance/salvage/cargo lightening operations from the shore/from the sea;
- limitations on anchorage or berthing at place of refuge;
- is there an imminent threat from a risk of accidental emission of hazardous substances,
- expected public acceptance of measures;
- what can be done to assist the media and how they can participate;

- whether a disaster relief/response plan exists for place of refuge;
- to what extent are risks involved in response measures covered financially by insurance;
- provision of bank guarantee by owner/manager,
- other interests possibly touched by response measures (amenity, tourism, fisheries, wildlife protection, etc.)

#### **27.4 CHECKLIST FOR THE PROVISION OF INFORMATION BY A VESSEL IN DISTRESS**

Except in extreme circumstances, a vessel in need of assistance can be expected to provide the following information:

- vessel identification data;
- flag state, crew data;
- cargo, bunker, ballast data;
- present position, meteorological and tidal situation, forecast;
- distance to preferred place of refuge, limitations on;
- pilot/escorting assistance required;
- what communication means are available;
- type and state of the engine and propulsion gear; what auxiliary power is available; whether the rudder is functioning or not;
- whether the ship is afloat or aground; whether the anchor is ready for dropping;
- what hull or other damage has occurred;
- risk/presence of fire, explosion, or emission or discharge of dangerous substances; and, if so, the source, nature and quantity of those substances;
- details of the owner, local agent, cargo recipient(s), insurer, and embassy/consulate;
- whether a contract of assistance/salvage exists or is intended; and, if so, the name and address of the contractor;
- the estimated time of arrival (ETA) of the salvor/contractor;
- the types of accident/distress and risks involved;
- whether evacuation of crew is necessary or not;
- whether abandonment of the ship intended or not; what alternatives are available;
- what response/precautionary measures have been initiated by crew; whether these measures have been successful or not; the next steps planned to be taken; the operational safety situation on board;
- a priority ranking of assistance measures;
- the anticipated time frame for decisions;
- the type of expertise and equipment needed for response measures;
- any further assistance required to be on stand-by.

#### **27.5 FINAL REMARKS**

27.5.1 Maritime authorities, port authorities, authorities responsible for shore-side safety and generally all government authorities concerned should ensure that:

- a. an appropriate system for information-sharing exists;
- b. communications and alert procedures are established as appropriate, and
- c. a plan exists for the modalities for a joint assessment of the situation.

27.5.2 In sea areas where bilateral or multilateral co-operation between States has been established by an agreement, appropriate information-sharing formats, communication and alert procedures and plans for a joint assessment of the situation should be incorporated in the agreement.

## **EMERGENCY TOWING - GUIDELINES FOR CONTRACTING PARTIES**

### **28.1 Introduction**

This chapter sets out operating guidelines and general procedures which could be considered by those Contracting Parties which have implemented or are considering the implementation of state-funded Emergency Towing Vessels (ETVs).

These guidelines do not supersede, contradict or in any way interfere with individual Contracting Parties' own operating instructions and procedures.

The primary task of an ETV is to remove the threat of significant pollution.

### **28.2 Suggested Secondary Roles**

Secondary roles of an ETV may be defined and delegated by individual Contracting Parties and may include all or some of the following responsibilities.

- a) Counter Pollution
- b) Search and Rescue
- c) Guardship / Detection and warning of drifting objects (e.g. Containers)
- d) Surveillance and TSS Identification
- e) Customs/Police/Fishing/Law Enforcement/Military
- f) Assistance to other Governmental maritime authorities
- g) Hydrographic surveying
- h) Fire fighting

Examples of the above categories are given in paragraphs 11 - 19

### **28.3 Availability**

The Contracting Parties' individual needs and policies will define ETV availability. For various reasons Contracting Parties should consider the possibility of using ETVs on alternative tasks. When doing so, the ETV managers should ensure that this does not compromise the primary task.

For chartered ETVs, Contracting Parties should consider ensuring the availability of replacement vessels in case of hire.

### **28.4 Positioning of ETVs**

Risk assessments are recommended to support decisions on geographical positioning, operating area and capabilities of ETVs. Risk assessments should as a minimum include:

- traffic density
- navigational dangers
- prevailing meteorological conditions
- possible joint arrangements
- off-shore installations/platforms
- environmentally sensitive areas
- vessel type

### **28.5 Capability and Design**

Contracting Parties should give high consideration to their requirements for capability and design of ETVs. The following factors should as a minimum be considered:

- on-board equipment
- arrangements to include salvage expertise
- manoeuvrability under bad weather conditions
- bollard pull
- draft restrictions
- configuration
- protective arrangements
- navigation, positioning and communication equipment
- regular training, exercises (offshore, simulator)
- expertise and number of crew (sufficient for boarding operations)

An ETV should be capable of fulfilling the task of an OSC Vessel during emergency towing, counter-pollution in addition to Search and Rescue operations. Other considerations may include whether the vessel should be time-chartered, leased or owned /operated by Contracting Parties. The training of the crew is also an important factor for the vessels' capability for successful ETV operations.

### **28.6 Command and Control**

Contracting Parties, where necessary, will make their own administrative and operational arrangements for management of ETVs. Consideration for these tasks should include:

- a) Ensuring agreements/contractual arrangements are met including any operational and financial arrangements with regard to contracted ETV tasks
- b) Ensuring arrangements for training/exercises/operations are undertaken
- c) Ensuring close liaison between owners/charterers/operators is maintained
- d) Ensuring operational instructions are followed by the ETV and the designated controlling station/authority.

### **28.7 Operational Control**

One national centre (e.g. MRCC) or competent authority should have operational control particularly where direct communications are available. If an ETV moves into the area of responsibility of an adjacent control centre, a formal handover of operational control should be considered.

### **28.8 ETV Utilisation**

Contracting Parties considering to adopt and use ETVs may consider appropriate operating parameters and procedures. Consideration should be given to situations where:

- a) The Master of a vessel in need of assistance requests assistance or
- b) The competent authority of the Contracting Parties considers a vessel to be in a state of need of assistance poses a threat of significant pollution or risk of life.

The decision to despatch an ETV is dependent, inter alia, upon distance, weather, urgency and availability of other vessels (tugs).

The legal basis for rendering assistance or imposing ETV service on the disabled vessel should be clearly described and in most Contracting Parties this will be based on the International Intervention Convention (Brussels 1969).

### **28.9 Commercial or Salvage Considerations**

It is the prerogative of Contracting Parties to decide whether any chartered ETV should be allowed to undertake commercial or salvage work. Any agreement to undertake such work should be stated explicitly to all participants. On each occasion an appropriate risk assessment should be carried out.

### **28.10 Secondary Roles**

Normally, the possible secondary roles of ETVs will be subject to its prime requirement and qualification of crew as laid down by the competent authority. The status of the ETV should be stated explicitly to all participants at all times.

Consideration should be given to the additional tasks or roles listed below.

### **28.11 Counter Pollution**

Contracting Parties' contingency arrangements may include instruction on the use of ETVs in pollution or potential pollution incidents where appropriate.

### **28.12 Search and Rescue**

An ETV on occasions can provide an excellent resource for Search and Rescue duties in addition to any formally established facilities, particularly to undertake 'On Scene Commander' responsibilities.

### **28.13 Guard vessel tasks**

Where special operations are being undertaken, i.e. cable laying, survey work, it is normally the responsibility of the contractor undertaking this work to provide appropriate guard vessels. This task should not normally be a nominated function of the chartered ETVs.

However, where an accident has constituted danger to navigation or hazard to shipping, i.e. an unmarked wreck, urgent consideration should be given to using contract ETVs as guard vessels to ensure that a promulgated Danger Zone is given proper attention by shipping.

### **28.14 Traffic Survey and Surveillance Tasks**

The ETVs may occasionally be required to identify and record traffic density levels in appropriate areas, defined by the Contracting Party.

### **28.15 Law Enforcement (Customs, Police, Military, etc)**

Contracting Parties will define their own requirements or agree on joint international requirements.

### **28.16 Assistance to other Government Departments**

Contracting Parties may wish to defray costs of operating an ETV by using the vessel for other tasks that can be conveniently undertaken by an ETV. These duties could include maritime and hydrographic research, environmental studies, navigational training, ice breaking, fishery inspection etc.

### **28.17 Communications**

Where ETV(s) are utilised, the method of communicating with any ETV is a matter for the controlling state. In addition to the appropriate carriage requirement relevant to that vessel, considerations should include Marine VHF and appropriate secure means of transmitting data. Clear unambiguous instructions for operational requirements should be agreed between the controlling station and the vessel, including a clear "tasking" requirement. An example of such a tasking format, also available in hard copy, is attached at Appendix 1. As with any vessel which may operate in hazardous conditions consideration to the establishment of a "reporting" regime should be made. A list of questions at first contact by the ETV with the vessel in distress should be agreed on (a draft list can be supplied).

**28.18 Training**

The ETVs and crews should be experienced in Emergency Towing procedures, and hold appropriate language competencies.

Simulation training combined with equipment exercises and exchange of experiences at workshops and seminars should be considered to ensure that the navigators and the maritime crew are prepared for ETV operations. The Contracting States should ensure that exercises with neighbouring States, where appropriate, are held on an opportunity basis. Consideration should be given to a range of training activities and requirements that may include helicopter operations, emergency towing procedures with other vessels, deployment of Counter Pollution equipment and SAR operations.

Training at off-shore exercises should include different types of vessels (e.g. tanker, container vessel, passenger/ Ro-Ro- vessel/ferry). Reports on exercises or real operations should be communicated within all partners.

**28.19 Fire fighting**

Emergency towing capacity could be equipped with fire fighting monitors in order to assist the ship crew or the salvage company in controlling a fire on board a passenger liner or ferryboat. A ship on fire is not only a potential dangerous area for inexperienced crew and passengers, but as a result of the fire there could be threat to the marine environment.

**Appendix 1**

**ETV TASKING FORMAT**

Contract Tug Tasking Report No ...../06/07 (V/L name SITREP No)

Contract Tug (N A M E) is to: Standby\*/Proceed\*

at: Full\*/Economical\*speed

1. Reason for tasking (prevention of pollution/SAR/CNIS/other - designate)

2. Vessel details (where available)

Name.....Callsign .....

POR .....Flag..... POB.....

Draught .....Cargo ..... Quantity .....

Type of vessel .....GRT .....

Position .....Latitude ..... Longitude.....

Bearing/Distance.....

Owners/Agents.....

Contact No.....

Assistance required .....

WX on Scene .....

WX FX (sea area) .....

Communications: VHF Channel ..... MF Channel .....

Phone ..... Fax.....

Inmarsat .....

3. Other co-operating units .....

.....

.....

4. Incident start time ..... Time ETV alerted .....

Times of:

- a. Tasking .....
- b. Proceeded .....
- c. On Scene .....
- d. Time-off prime contract .....
- e. Tow Connected .....
- f. Commenced Tow .....
- g. Arrival at Destination .....
- Specify Destination .....
- h. Off Task .....
- i. Returned .....
- j. Time back on prime Contract .....

5. Summary of Incident/Remarks:

**EMERGENCY TOWING VESSELS**

The following Contracting Parties operate/are considering state funded Emergency Towing Vessels:

| Country        | ETVs   |
|----------------|--|
| United Kingdom | Anglian Monarch<br>Anglian Sovereign<br>Anglian Prince<br>Anglian Princess |
| Netherlands    | Mellum, Neuwerk, Oceanic   |
| Germany        | Mv. "Waker" <sup>1</sup>   |
| France         |  |
| Norway         | KV Chieftain, KV Harstad, MV<br>Beta                                       |
| Sweden         |  |

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<sup>1</sup> The Netherlands and Germany have entered into a MOU on ETV that foresees that in the area north of the Wadden Islands there will always be one tug on station.

**Agreement for cooperation in dealing with pollution of the North Sea  
by oil and other harmful substances, 1983**

**as amended by the Decision of 21 September 2001 by the Contracting Parties to  
enable the Accession of Ireland to the Agreement**

The Governments of the Kingdom of Belgium, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Republic of Ireland, the Kingdom of the Netherlands, the Kingdom of Norway, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland and the European Union,

Recognising that pollution of the sea by oil and other harmful substances in the North Sea area may threaten the marine environment and the interests of coastal States,

Noting that such pollution has many sources and that casualties and other incidents at sea are of great concern,

Convinced that an ability to combat such pollution as well as active co-operation and mutual assistance among States are necessary for the protection of their coasts and related interests,

Welcoming the progress that has already been achieved within the framework of the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil, signed at Bonn on 9 June 1969,

Wishing to develop further mutual assistance and co-operation in combating pollution,

Have agreed as follows:

**ARTICLE 1**

This Agreement shall apply:

- (1) whenever the presence or the prospective presence of oil or other harmful substances polluting or threatening to pollute the sea within the North Sea area, as defined in Article 2 of this Agreement, presents a grave and imminent danger to the coast or related interests of one or more Contracting Parties; and
- (2) to surveillance conducted in the North Sea area as an aid to detecting and combating such pollution and to preventing violations of anti-pollution regulations.

**ARTICLE 2**

For the purpose of this Agreement, the Greater North Sea and its wider Approaches means the area of sea comprising:

- (a) the North Sea proper southwards of latitude 63° 38 10.68N;

- (b) the Skagerrak, the southern limit of which is determined east of the Skaw by the latitude 57°44' 43.00"N;
- (c) the English Channel and its approaches bounded on the south and west by the line defined in Part I of the Annex to this Agreement;
- (d) the other waters, comprising the Irish Sea, the Celtic Sea, the Malin Sea, the Great Minch, the Little Minch, part of the Norwegian Sea, and parts of the North East Atlantic, bounded on the west and north by the line defined in Part II of the Annex to this Agreement.

### ARTICLE 3

- (1) The Contracting Parties consider that the matters referred to in Article 1 of this Agreement call for active co-operation between them.
- (2) The Contracting Parties shall jointly develop and establish guidelines for the practical, operational and technical aspects of joint action and co-ordinated surveillance as referred to in Article 6A.

### ARTICLE 4

Contracting Parties undertake to inform the other Contracting Parties about:

- (a) their national organisation for dealing with pollution of the kind referred to in Article 1 paragraph 1 of this Agreement, and for enforcing anti-pollution regulations;
- (b) the competent authorities responsible for receiving and dispatching reports of such pollution and for dealing with questions concerning measures of mutual assistance and co-ordinated surveillance between Contracting Parties;
- (c) their national means for avoiding or dealing with such pollution, which might be made available for international assistance;
- (d) new ways in which such pollution may be avoided and about new effective measures to deal with it;
- (e) major pollution incidents of this kind dealt with;
- (f) new developments in the technology of conducting surveillance;
- (g) their experience in the use of surveillance means and techniques in the detection of pollution and the prevention of violations of anti-pollution regulations, including use in co-operation with other Contracting Parties;
- (h) information of mutual interest derived from their surveillance activities;
- (i) their national programmes for surveillance, including co-operative arrangements with other Contracting Parties.

### ARTICLE 5

- (1) Whenever a Contracting Party is aware of a casualty or the presence of oil or other harmful substances in the North Sea area likely to constitute a serious threat to the coast or related interests of any other Contracting Party, it shall inform that Party without delay through its competent authority.

(2) The Contracting Parties undertake to request the masters of all ships flying their flags and pilots of aircraft registered in their countries to report without delay through the channels which may be most practicable and adequate in the circumstances:

- (a) all casualties causing or likely to cause pollution of the sea;
- (b) the presence, nature and extent of oil or other harmful substances likely to constitute a serious threat to the coast or related interests of one or more Contracting Parties.

(3) The Contracting Parties shall establish a standard form for the reporting of pollution as required under paragraph 1 of this Article.

#### **ARTICLE 6**

(1) For the sole purpose of this Agreement the North Sea area is divided into the zones described in the Annex to this Agreement.

(2) The Contracting Party within whose zone a situation of the kind described in Article 1 of this Agreement occurs, shall make the necessary assessments of the nature and extent of any casualty or, as the case may be, of the type and approximate quantity of oil or other harmful substances and the direction and speed of movement thereof.

(3) The Contracting Party concerned shall immediately inform all the other Contracting Parties through their competent authorities of its assessments and of any action which it has taken to deal with the oil or other harmful substances and shall keep these substances under observation as long as they are present in its zone.

(4) The obligations of the Contracting Parties under the provisions of this Article with respect to the zones of joint responsibility shall be the subject of special technical arrangements to be concluded between the Parties concerned. These arrangements shall be communicated to the other Contracting Parties.

#### **ARTICLE 6A**

Surveillance shall be carried out, as appropriate, by the Contracting Parties in their zone of responsibility or zones of joint responsibility referred to in Article 6 of this Agreement. The Contracting Parties may bilaterally or multilaterally conclude agreements on or make arrangements for co-operation in the organisation of surveillance in the whole or part of the zones of the Parties concerned.

#### **ARTICLE 7**

A Contracting Party requiring assistance to deal with pollution or the prospective presence of pollution at sea or on its coast may call on the help of the other Contracting Parties. Contracting Parties requesting assistance shall specify the kind of assistance they require. The Contracting Parties called upon for help in accordance with this Article shall use their best endeavours to bring such assistance as is within their power taking into account, particularly in the case of pollution by harmful substances other than oil, the technological means available to them.

#### **ARTICLE 8**

(1) The provisions of this Agreement shall not be interpreted as in any way prejudicing the rights and obligations of the Contracting Parties under international law, especially in the field of the prevention and combating of marine pollution.

(2) In no case shall the division into zones referred to in Article 6 of this Agreement be invoked as a precedent or argument in any matter concerning sovereignty or jurisdiction.

(3) The division into zones referred to in Article 6 of this Agreement shall in no way restrict the rights of Contracting Parties to carry out in accordance with international law surveillance activities beyond the limits of their zones.

#### **ARTICLE 9**

(1) In the absence of an agreement concerning the financial arrangements governing actions of Contracting Parties to deal with pollution which might be concluded on a bilateral or multilateral basis or on the occasion of a joint combating operation, Contracting Parties shall bear the costs of their respective actions in dealing with pollution in accordance with subparagraph (a) or subparagraph (b) below:

(a) if the action was taken by one Contracting Party at the express request of another Contracting Party, the Contracting Party requesting such assistance shall reimburse to the assisting Contracting Party the costs of its action;

(b) if the action was taken by a Contracting Party on its own initiative, this Contracting Party shall bear the costs of its action.

(2) The Contracting Party requesting assistance may cancel its request at any time, but in that case it shall bear the costs already incurred or committed by the assisting Contracting Party.

(3) Unless otherwise specified in bilateral or multilateral agreements or arrangements, each Contracting Party shall bear the costs of its surveillance activities carried out in accordance with Article 6A.

#### **ARTICLE 10**

Unless otherwise agreed the costs of action taken by a Contracting Party at the request of another Contracting Party shall be calculated according to the law and current practice in the assisting country concerning the reimbursement of such costs by a person or entity liable.

#### **ARTICLE 11**

Article 9 of this Agreement shall not be interpreted as in any way prejudicing the rights of Contracting Parties to recover from third parties the costs of action to deal with pollution or the threat of pollution under other applicable provisions and rules of national and international law.

#### **ARTICLE 12**

(1) Meetings of the Contracting Parties shall be held at regular intervals and at any time when, due to special circumstances, it is so decided in accordance with the Rules of Procedure.

(2) The Contracting Parties at their first meeting shall draw up Rules of Procedure and Financial Rules, which shall be adopted by unanimous vote.

(3) The Depositary Government shall convene the first meeting of Contracting Parties as soon as possible after the entry into force of this Agreement.

**ARTICLE 13**

Within the areas of its competence, the European Union is entitled to a number of votes equal to the number of its Member states which are Contracting Parties to the present Agreement. The European Union shall not exercise its right to vote in cases where its Member States exercises theirs and conversely.

**ARTICLE 14**

It shall be the duty of meetings of the Contracting Parties:

- (a) to exercise overall supervision over the implementation of this Agreement;
- (b) to review the effectiveness of the measures taken under this Agreement;
- (c) to carry out such other functions as may be necessary under the terms of this Agreement.

**ARTICLE 15**

(1) The Contracting Parties shall make provisions for the performance of secretariat duties in relation to this Agreement, taking into account existing arrangements in the framework of other international agreements on the prevention of marine pollution in force for the same region as this Agreement.

(2) Each Contracting Party shall contribute 2.5% towards the annual expenditure of the Agreement. The balance of the Agreement's expenditure shall be divided among Contracting Parties other than the European Union in proportion to their gross national product in accordance with the scale of assessment adopted regularly by the United Nations General Assembly. In no case shall the contribution of a Contracting Party to this balance exceed 20% of the balance.

**ARTICLE 16**

(1) Without prejudice to Article 17 of this Agreement, a proposal by a Contracting Party for the amendment of this Agreement or its Annex shall be considered at a meeting of the Contracting Parties. Following adoption of the proposal by unanimous vote the amendment shall be communicated by the Depositary Government to the Contracting Parties.

(2) Such an amendment shall enter into force on the first day of the second month following the date on which the Depositary government has received notifications of approval from all Contracting Parties.

**ARTICLE 17**

(1) Two or more Contracting Parties may modify the common boundaries of their zones described in the Annex to this Agreement.

(2) Such a modification shall enter into force for all Contracting Parties on the first day of the sixth month following the date of its communication by the Depositary Government unless, within a period of three months following that communication, a Contracting Party has expressed an objection or has requested consultation on the matter.

**ARTICLE 18**

(1) This Agreement shall be open for signature by the governments of the States invited to participate in the Conference on the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, held at Bonn on 13 September 1983, and by the European Economic Community.

(2) These States and the European Union may become Parties to this Agreement either by signature without reservation as to ratification, acceptance or approval or by signature subject to ratification, acceptance or approval followed by ratification, acceptance or approval.

(3) Instruments of ratification, acceptance or approval shall be deposited with the Government of the Federal Republic of Germany.

**ARTICLE 19**

(1) This Agreement shall enter into force on the first day of the second month following the date on which the Governments of all the States mentioned in Article 18 of this Agreement and the European Economic Community have signed the Agreement without reservation as to ratification, acceptance or approval or have deposited an instrument of ratification, acceptance or approval.

(2) Upon the entry into force of this Agreement, the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil, done at Bonn on 9 June 1969, shall cease to be in force.

**ARTICLE 20**

(1) The Contracting Parties may unanimously invite any other coastal State of the North East Atlantic area to accede to this Agreement.

(2) In such a case article 2 of this Agreement and its Annex shall be amended as necessary. The amendments shall be adopted by unanimous vote at a meeting of the Contracting Parties and shall take effect upon the entry into force of this Agreement for the acceding State.

**ARTICLE 21**

(1) For each State acceding to this Agreement, the Agreement shall enter into force on the first day of the second month following the date of deposit by such State of its instrument of accession.

(2) Instruments of accession shall be deposited with the Government of the Federal Republic of Germany.

**ARTICLE 22**

(1) After this Agreement has been in force for five years it may be denounced by any Contracting Party.

(2) Denunciation shall be effected by a notification in writing addressed to the Depositary Government which shall notify all the other Contracting Parties of any denunciation received and of the date of its receipt.

(3) A denunciation shall take effect one year after its receipt by the Depositary Government.

**ARTICLE 23**

The depositary Government shall inform the Contracting Parties and those referred to in Article 18 of this Agreement of:

- (a) any signature of this Agreement;
- (b) the deposit of any instrument of ratification, acceptance, approval or accession and of the receipt of any notice of denunciation;
- (c) the date of entry into force of this Agreement;
- (d) the receipt of any notification of approval relating to amendments to this Agreement or its Annex and of the date of entry into force of such amendments.

#### **ARTICLE 24**

The original of this Agreement, of which the English, French and German texts are equally authentic, shall be deposited with the Government of the Federal Republic of Germany, which shall send certified copies thereof to the Contracting Parties and which shall transmit a certified copy to the Secretary-General of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

In witness whereof the undersigned, being duly authorised thereto by their respective Governments, have signed this Agreement.

Done at Bonn, this thirteenth day of September 1983.

**“ANNEX TO THE AGREEMENT FOR COOPERATION IN DEALING WITH  
POLLUTION OF THE NORTH SEA BY OIL AND OTHER HARMFUL SUBSTANCES,  
1983**

**Description of the  
Atlantic boundary of the North Sea area and of  
the zones referred to in Article 6 of this Agreement**

(as amended by the agreement between Denmark, Norway and Sweden of 25 January 1994<sup>1</sup>, the decision of the Contracting Parties of 21 September 2001 and the modifications under article 17 made by Denmark, France, the Federal Republic of Germany, the Netherlands, Norway and the United Kingdom of Great Britain and Northern Ireland on 21 September 2001)

**THE ATLANTIC BOUNDARY OF THE NORTH SEA AREA**

**PART I: THE LINE BOUNDING THE ENGLISH CHANNEL AND ITS APPROACHES TO THE SOUTH AND WEST**

The line bounding the English Channel and its approaches to the south and west shall be a line which:

- (i) commences at the southernmost point of the island of Ushant;
- (ii) from that point, then follows the parallel of latitude 48° 27' 00.00" N westwards to the point where it intersects with a line (hereafter referred to as "the 1983 Bonn Agreement line") drawn 50 nautical miles west of a line joining the Isles of Scilly and the island of Ushant;
- (iii) from that point of intersection, then follows the 1983 Bonn Agreement line northwards as far as its intersection with the line marking the boundary of the continental shelf between France and the United Kingdom of Great Britain and Northern Ireland, as defined in the arbitration decision of 30 June 1977;
- (iv) from that point of intersection, then follows the line of that boundary westwards as far as the point 48° 10' 00.00" N 9° 22' 15.91" W; and
- (v) from that point, then follows the parallel of latitude 48° 10' 00.00" N westwards as far as the point 48° 10' 00.00" N 10° 0' 00.00" W.

**PART II: THE LINE BOUNDING TO THE WEST AND NORTH THE OTHER WATERS COVERED BY THE AGREEMENT**

The line bounding to the west and north the other waters covered by the Agreement, comprising the Irish Sea, the Celtic Sea, the Malin Sea, the Great Minch, the Little Minch, part of the Norwegian sea and parts of the North East Atlantic, shall be a line which

- (i) commences at the point 48° 10' 00.00" N 10° 0' 00.00" W;

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<sup>1</sup> Agreement between Denmark, Norway and Sweden on the modification of the Annex to the agreement of 13 September 1983 for co-operation in dealing with pollution of the North Sea by oil and other harmful substances, done at Stockholm, 25 January 1994. This took effect for these three States from 9 April 1995 and came into force for other Bonn Agreement Contracting Parties on 1 October 1995.

- (ii) from that point, then follows the western boundary of the Irish sea pollution responsibility zone (that is, a line which is at every point 200 nautical miles distant from the nearest point on the baselines established for the purposes of the Maritime Jurisdiction Acts, 1959 to 1988, of Ireland) as far as the point 56° 42' 00.00" N 14° 0' 00.00" W;
- (iii) from that point, then follows the western boundary of the zone established by the Merchant Shipping (Prevention of Pollution) (Limits) Regulations 1996 of the United Kingdom, as amended by the Merchant Shipping (Prevention of Pollution) (Limits) Regulations 1997 (that is, the lines joining the points listed in Table 1 below in the order in which they are listed) as far as the point 63°38'10.68"N and 0°30'00.00"W; and
- (iv) from that point follows the parallel of latitude 63°38'10.68"N eastwards to the coast of Norway.

**TABLE 1: POINTS AND LINES OF THE WESTERN BOUNDARY OF THE ZONE ESTABLISHED BY THE MERCHANT SHIPPING (PREVENTION OF POLLUTION) (LIMITS) REGULATIONS 1996 OF THE UNITED KINGDOM, AS AMENDED**

| <b>Points as referred to in the United Kingdom Regulations, as amended, and their coordinates</b> | <b>Line segment between these points</b>  |
|---|---|
| 27. 56° 42' 00.00" N 14° 0' 00.00" W  | 27-28 Meridian of Longitude   |
| 28. 56° 49' 00.00" N 14° 0' 00.00" W  | 28-29 Parallel of Latitude  |
| 29. 56° 49' 00.00" N 14° 30' 34.00" W   | 29-30 Arc measured 200 nautical miles from the relevant basepoints on St. Kilda from which the breadth of the territorial sea is measured |
| 30. 57° 52' 22.00" N 14° 53' 22.00" W   | 30-31 Arc measured 200 nautical miles from the relevant basepoints on St. Kilda from which the breadth of the territorial sea is measured |
| 31. 58° 30' 00.00" N 14° 48' 58.00" W   | 31-32 Arc measured 200 nautical miles from the relevant basepoints on St. Kilda from which the breadth of the territorial sea is measured |
| 32. 59° 0' 00.00" N 14° 35' 07.00" W  | 32-33 Arc measured 200 nautical miles from the relevant basepoints on St. Kilda from which the breadth of the territorial sea is measured |
| 33. 59° 40' 54.00" N 13° 58' 10.00" W   | 33-34 Arc measured 200 nautical miles from the relevant basepoints on St. Kilda from which the breadth of the territorial sea is measured |
| 34. 59° 50' 00.00" N 13° 46' 24.00" W   | 34-35 Parallel of Latitude  |
| 35. 59° 50' 00.00" N 5° 0' 00.00" W   | 35-36 Meridian of Longitude   |
| 36. 60° 10' 00.00" N 5° 0' 00.00" W   | 36-37 Parallel of Latitude  |
| 37. 60° 10' 00.00" N 4° 48' 00.00" W  | 37-38 Meridian of Longitude   |
| 38. 60° 20' 00.00" N 4° 48' 00.00" W  | 38-39 Parallel of Latitude  |
| 39. 60° 20' 00.00" N 4° 24' 00.00" W  | 39-40 Meridian of Longitude   |
| 40. 60° 40' 00.00" N 4° 24' 00.00" W  | 40-41 Parallel of Latitude  |
| 41. 60° 40' 00.00" N 4° 0' 00.00" W   | 41-42 Meridian of Longitude   |
| 42. 61° 0' 00.00"N 4° 0' 00.00" W   | 42-43 Parallel of Latitude  |
| 43. 61° 0' 00.00" N 3° 36' 00.00" W   | 43-44 Meridian of Longitude   |
| 44. 61° 30' 00.00" N 3° 36' 00.00" W  | 44-45 Parallel of Latitude  |
| 45. 61° 30' 00.00" N 3° 0' 00.00" W   | 45-46 Meridian of Longitude   |

|     |                  |                 |                             |
|-----|------------------|-----------------|-----------------------------|
| 46. | 61° 45' 00.00" N | 3° 0' 00.00" W  | 46-47 Parallel of Latitude  |
| 47. | 61° 45' 00.00" N | 2° 48' 00.00" W | 47-48 Meridian of Longitude |
| 48. | 62° 0' 00.00" N  | 2° 48' 00.00" W | 48-49 Parallel of Latitude  |
| 49. | 62° 0' 00.00" N  | 2° 0' 00.00" W  | 49-50 Meridian of Longitude |
| 50. | 62° 30' 00.00" N | 2° 0' 00.00" W  | 50-51 Parallel of Latitude  |
| 51. | 62° 30' 00.00" N | 1° 36' 00.00" W | 51-52 Meridian of Longitude |
| 52. | 62° 40' 00.00" N | 1° 36' 00.00" W | 52-53 Parallel of Latitude  |
| 53. | 62° 40' 00.00" N | 1° 0' 00.00" W  | 53-54 Meridian of Longitude |
| 54. | 63° 20' 00.00" N | 1° 0' 00.00" W  | 54-55 Parallel of Latitude  |
| 55. | 63° 20' 00.00" N | 0° 30' 00.00" W | 55-56 Meridian of Longitude |
| 56. | 63° 38' 10.68" N | 0° 30' 00.00" W |                             |

## BOUNDARIES OF ZONES OF RESPONSIBILITY REFERRED TO IN ARTICLE 6 OF THIS AGREEMENT

### PART III: BOUNDARIES OF THE ZONES OF NATIONAL RESPONSIBILITY

1. **General:** Where the limits of a zone of responsibility are specified by a series of lines joining the points in a list, the nature of those lines shall be the nature specified against each point as the nature of the line joining it to the following point.
2. **Denmark:** The zone of national responsibility of Denmark shall be limited by the following series of lines:
  - (a) a line starting at the point where the boundary of the zone of joint responsibility of Denmark and Germany described in Part IV below intersects a line from the point 55° 10' 03.40"N 7° 33' 09.60" E towards the point DK1 (DE1) in the table below, and following that line to the point DK1 (DE1);
  - (b) a series of lines joining the following points in the order in which they are listed:

| Points defining the boundary of the zone | Nature of the line joining a point to the following point | Other points with the same coordinates |
|--|---|--|
| DK1 55° 30' 40.30" N 5° 45' 00.00" E     | Geodesic  | DE1                                    |
| DK2 55° 15' 00.00" N 5° 24' 12.00" E     | Geodesic  | DE2                                    |
| DK3 55° 15' 00.00" N 5° 9' 00.00" E      | Geodesic  | DE3                                    |
| DK4 55° 24' 15.00" N 4° 45' 00.00" E     | Geodesic  | DE4                                    |
| DK5 55° 46' 21.80" N 4° 15' 00.00" E     | Geodesic  | DE5                                    |
| DK6 55° 55' 09.40" N 3° 21' 00.00" E     | Arc of Great Circle                                       | DE6                                    |
| DK7 56° 5' 12.00" N 3° 15' 00.00" E      | Arc of Great Circle                                       | UK23, NO23                             |
| DK8 56° 35' 30.00" N 5° 2' 00.00" E      | Arc of Great Circle                                       | NO24                                   |
| DK9 57° 10' 30.00" N 6° 56' 12.00" E     | Arc of Great Circle                                       | NO25                                   |
| DK10 57° 29' 54.00" N 7° 59' 00.00" E    | Arc of Great Circle                                       | NO26                                   |
| DK11 57° 37' 06.00" N 8° 27' 30.00" E    | Arc of Great Circle                                       | NO27                                   |
| DK12 57° 41' 48.00" N 8° 53' 18.00" E    | Arc of Great Circle                                       | NO28                                   |
| DK13 57° 59' 18.00" N 9° 23' 00.00" E    | Arc of Great Circle                                       | NO29                                   |
| DK14 58° 15' 41.20" N 10° 1' 48.10" E    | Arc of Great Circle                                       | NO30, SE4                              |
| DK15 58° 8' 00.10" N 10° 32' 32.80" E    | Geodesic  | SE3                                    |
| DK16 57° 49' 00.60" N 11° 2' 55.60" E    | Geodesic  | SE2                                    |

|                                      |     |
|--------------------------------------|-----|
| DK17 57°44' 43.00" N 11° 7' 04.00" E | SE1 |
|--------------------------------------|-----|

3. **Federal Republic of Germany:** The zone of national responsibility of the Federal Republic of Germany shall be limited by the following series of lines:

- (a) a line starting at the point where the boundary of the zone of joint responsibility of Denmark and Germany described in Part IV below intersects a line from the point 55° 10' 03.40"N 7° 33' 09.60" E towards the point DE1 (DK1) in the table below, and following that line to the point DE1 (DK1);
- (b) a series of lines joining the following points in the order in which they are listed:

| Points defining the boundary of the zone | Nature of the line joining a point to the following point | Other points with the same coordinates |
|--|---|--|
| DE1 55° 30' 40.30" N 5° 45' 00.00" E     | Geodesic  | DK1                                    |
| DE2 55° 15' 00.00" N 5° 24' 12.00" E     | Geodesic  | DK2                                    |
| DE3 55° 15' 00.00" N 5° 9' 00.00" E      | Geodesic  | DK3                                    |
| DE4 55° 24' 15.00" N 4° 45' 00.00" E     | Geodesic  | DK4                                    |
| DE5 55° 46' 21.80" N 4° 15' 00.00" E     | Geodesic  | DK5                                    |
| DE6 55° 55' 09.40" N 3° 21' 00.00" E     | Arc of Great Circle                                       | DK6                                    |
| DE7 55° 50' 06.00" N 3° 24' 00.00" E     | Arc of Great Circle                                       | UK24                                   |
| DE8 55° 45' 54.00" N 3° 22' 13.00" E     | Arc of Great Circle                                       | NL19                                   |
| DE9 55° 20' 00.00" N 4° 20' 00.00" E     | Arc of Great Circle                                       | NL20                                   |
| DE10 55° 0' 00.00" N 5° 0' 00.00" E      | Arc of Great Circle                                       | NL21                                   |
| DE11 54° 37' 12.00" N 5° 0' 00.00" E     | Arc of Great Circle                                       | NL22                                   |
| DE12 54° 11' 12.00" N 6° 0' 00.00" E     | Arc of Great Circle                                       | NL23                                   |
| DE13 53° 59' 56.80" N 6° 6' 28.20" E     |   | NL24                                   |

- (c) landwards of the last mentioned point, a line from that point towards the point 53° 59' 56.80" N 6° 6' 28.20" E as far as the intersection of that line with the boundary of the zone of joint responsibility of Germany and the Netherlands described in Part IV below.

4. **Ireland:** The zone of national responsibility of Ireland shall be limited by the following series of lines:

- (a) to the north, a series of lines joining the points listed in Table 3 in the order in which they are listed;
- (b) to the west, the western boundary of the North Sea area and its Approaches;
- (c) to the east and to the south, a series of lines joining the points listed in Table 2 in the order in which they are listed.

5. **The Netherlands:** The zone of national responsibility of the Netherlands shall be limited to the south by the parallel of latitude 51°51' 52.1267" N, and to the north of this parallel of latitude by the following series of lines:

- (a) a series of lines joining the following points in the order in which they are listed:

| Points defining the boundary of the zone | Nature of the line joining a point to the following point | Other points with the same coordinates |
|--|---|--|
| NL1 51°51' 52.1267" N 2° 31' 48.0975" E  | Arc of Great Circle                                       | UK42                                   |

|      |                  |                 |                     |      |
|------|------------------|-----------------|---------------------|------|
| NL2  | 51° 59' 00.00" N | 2° 37' 36.00" E | Arc of Great Circle | UK41 |
| NL3  | 52° 1' 00.00" N  | 2° 39' 30.00" E | Arc of Great Circle | UK40 |
| NL4  | 52° 5' 18.00" N  | 2° 42' 12.00" E | Arc of Great Circle | UK39 |
| NL5  | 52° 6' 00.00" N  | 2° 42' 54.00" E | Arc of Great Circle | UK38 |
| NL6  | 52° 12' 24.00" N | 2° 50' 24.00" E | Arc of Great Circle | UK37 |
| NL7  | 52° 17' 24.00" N | 2° 56' 00.00" E | Arc of Great Circle | UK36 |
| NL8  | 52° 25' 00.00" N | 3° 3' 30.00" E  | Arc of Great Circle | UK35 |
| NL9  | 52° 37' 18.00" N | 3° 11' 00.00" E | Arc of Great Circle | UK34 |
| NL10 | 52° 47' 00.00" N | 3° 12' 18.00" E | Arc of Great Circle | UK33 |
| NL11 | 52° 53' 00.00" N | 3° 10' 30.00" E | Arc of Great Circle | UK32 |
| NL12 | 53° 18' 06.00" N | 3° 3' 24.00" E  | Arc of Great Circle | UK31 |
| NL13 | 53° 28' 12.00" N | 3° 1' 00.00" E  | Arc of Great Circle | UK30 |
| NL14 | 53° 35' 06.00" N | 2° 59' 18.00" E | Arc of Great Circle | UK29 |
| NL15 | 53° 40' 06.00" N | 2° 57' 24.00" E | Arc of Great Circle | UK28 |
| NL16 | 53° 57' 48.00" N | 2° 52' 00.00" E | Arc of Great Circle | UK27 |
| NL17 | 54° 22' 48.00" N | 2° 45' 48.00" E | Arc of Great Circle | UK26 |
| NL18 | 54° 37' 18.00" N | 2° 53' 54.00" E | Arc of Great Circle | UK25 |
| NL19 | 55° 45' 54.00" N | 3° 22' 13.00" E | Arc of Great Circle | DE8  |
| NL20 | 55° 20' 00.00" N | 4° 20' 00.00" E | Arc of Great Circle | DE9  |
| NL21 | 55° 0' 00.00" N  | 5° 0' 00.00" E  | Arc of Great Circle | DE10 |
| NL22 | 54° 37' 12.00" N | 5° 0' 00.00" E  | Arc of Great Circle | DE11 |
| NL23 | 54° 11' 12.00" N | 6° 0' 00.00" E  | Arc of Great Circle | DE12 |
| NL24 | 53° 59' 56.80" N | 6° 6' 28.20" E  |                     | DE13 |

- (b) landwards of the last mentioned point, a line from that point towards the point 53° 59' 56.80" N; 6° 6' 28.20" E as far as the intersection of that line with the boundary of the zone of joint responsibility of Germany and the Netherlands described in Part IV below.

6. **Norway:** The zone of national responsibility of Norway shall be limited to the north by the parallel of latitude 63° 38' 10.68"N and to the west, south and east by the following series of lines:

- (a) a series of lines which joins the points listed in Table 4 in the order in which they are listed;
- (b) southwards from the last point mentioned in that table, a series of lines which join the following points in the order in which they are listed:

| <b>Points defining the boundary of the zone</b> | <b>Nature of the line joining a point to the following point</b> | <b>Other points with the same coordinates</b> |           |
|---|--|---|-----------|
| NO23  | 56° 5' 12.00" N 3° 15' 00.00" E                                  | Arc of Great Circle                           | UK23, DK7 |
| NO24  | 56° 35' 30.00" N 5° 2' 00.00" E                                  | Arc of Great Circle                           | DK8       |
| NO25  | 57° 10' 30.00" N 6° 56' 12.00" E                                 | Arc of Great Circle                           | DK9       |
| NO26  | 57° 29' 54.00" N 7° 59' 00.00" E                                 | Arc of Great Circle                           | DK10      |
| NO27  | 57° 37' 06.00" N 8° 27' 30.00" E                                 | Arc of Great Circle                           | DK11      |
| NO28  | 57° 41' 48.00" N 8° 53' 18.00" E                                 | Arc of Great Circle                           | DK12      |
| NO29  | 57° 59' 18.00" N 9° 23' 00.00" E                                 | Arc of Great Circle                           | DK13      |
| NO30  | 58° 15' 41.20" N 10° 1' 48.10" E (point A)                       | Arc of Great Circle                           | SE4, DK14 |

|      |                  |                            |                     |     |
|------|------------------|----------------------------|---------------------|-----|
| NO31 | 58° 30' 41.20" N | 10° 8' 46.90" E (point B)  | Arc of Great Circle | SE5 |
| NO32 | 58° 45' 41.30" N | 10° 35' 40.00" E (point C) | Loxodrome           | SE6 |
| NO33 | 58° 53' 34.00" N | 10° 38' 25.00" E (point D) |                     | SE7 |

(c) then a line following the Norwegian-Swedish border.

7. **Sweden:** The zone of national responsibility of Sweden shall be limited to the south, by the parallel of latitude 57° 44' 43.00" N, and to the north of this parallel of latitude by a series of lines joining the following points in the order in which they are listed:

| Points defining the boundary of the zone        | Nature of the line joining a point to the following point | Other points with the same coordinates |
|---|---|--|
| SE1 57° 44' 43.00" N 11° 7' 04.00" E            | Geodesic  | DK17                                   |
| SE2 57° 49' 00.60" N 11° 2' 55.60" E            | Geodesic  | DK16                                   |
| SE3 58° 8' 00.10" N 10° 32' 32.80" E            | Geodesic  | DK15                                   |
| SE4 58° 15' 41.20" N 10° 1' 48.10" E (point A)  | Arc of Great Circle                                       | DK14, NO30                             |
| SE5 58° 30' 41.20" N 10° 8' 46.90" E (point B)  | Arc of Great Circle                                       | NO31                                   |
| SE6 58° 45' 41.30" N 10° 35' 40.00" E (point C) | Loxodrome   | NO32                                   |
| SE7 58° 53' 34.00" N 10° 38' 25.00" E (point D) |   | NO33                                   |

(c) then a line following the Swedish-Norwegian border.

8. **United Kingdom:** The zone of national responsibility of the United Kingdom shall be limited by

(a) to the east, by a series of lines comprising:

- (i) a series of lines joining the points listed in Table 4 in the order in which they are listed;
- (ii) a series of lines joining the following points in the order in which they are listed:

| Points defining the boundary of the zone | Nature of the line joining a point to the following point | Other points with the same coordinates |
|--|---|--|
| UK23 56° 5' 12.00" N 3 15' 00.00" E      | Arc of Great Circle                                       | NO23, DK7                              |
| UK24 55° 50' 06.00" N 3° 24' 00.00" E    | Arc of Great Circle                                       | DE7                                    |
| UK25 54° 37' 18.00" N 2° 53' 54.00" E    | Arc of Great Circle                                       | NL18                                   |
| UK26 54° 22' 48.00" N 2° 45' 48.00" E    | Arc of Great Circle                                       | NL17                                   |
| UK27 53° 57' 48.00" N 2° 52' 00.00" E    | Arc of Great Circle                                       | NL16                                   |
| UK28 53° 40' 06.00" N 2° 57' 24.00" E    | Arc of Great Circle                                       | NL15                                   |
| UK29 53° 35' 06.00" N 2° 59' 18.00" E    | Arc of Great Circle                                       | NL14                                   |
| UK30 53° 28' 12.00" N 3° 1' 00.00" E     | Arc of Great Circle                                       | NL13                                   |
| UK31 53° 18' 06.00" N 3° 3' 24.00" E     | Arc of Great Circle                                       | NL12                                   |
| UK32 52° 53' 00.00" N 3° 10' 30.00" E    | Arc of Great Circle                                       | NL11                                   |
| UK33 52° 47' 00.00" N 3° 12' 18.00" E    | Arc of Great Circle                                       | NL10                                   |
| UK34 52° 37' 18.00" N 3° 11' 00.00" E    | Arc of Great Circle                                       | NL9                                    |
| UK35 52° 25' 00.00" N 3° 3' 30.00" E     | Arc of Great Circle                                       | NL8                                    |
| UK36 52° 17' 24.00" N 2° 56' 00.00" E    | Arc of Great Circle                                       | NL7                                    |

|      |                    |                   |                     |     |
|------|--------------------|-------------------|---------------------|-----|
| UK37 | 52° 12' 24.00" N   | 2° 50' 24.00" E   | Arc of Great Circle | NL6 |
| UK38 | 52° 6' 00.00" N    | 2° 42' 54.00" E   | Arc of Great Circle | NL5 |
| UK39 | 52° 5' 18.00" N    | 2° 42' 12.00" E   | Arc of Great Circle | NL4 |
| UK40 | 52° 1' 00.00" N    | 2° 39' 30.00" E   | Arc of Great Circle | NL3 |
| UK41 | 51° 59' 00.00" N   | 2° 37' 36.00" E   | Arc of Great Circle | NL2 |
| UK42 | 51° 51' 52.1267" N | 2° 31' 48.0975" E | Arc of Great Circle | NL1 |

(b) to the south and west, by the following series of lines:

- (i) a line commencing at the westernmost point of the Isles of Scilly, and joining that point to the point 49° 52' 00.00" N 7° 44' 00.00" W;
- (ii) from that point, a line following the 1983 Bonn Agreement line (as defined in Part I above) southwards to its intersection with the boundary of the continental shelf between France and the United Kingdom of Great Britain and Northern Ireland as defined in the arbitration decision of 30 June 1977;
- (iii) from that point of intersection, the line of that boundary westwards as far as the point 48° 10' 00.00" N 9° 22' 15.91" W; and
- (iv) from that point, a series of lines joining the points listed in Table 3 in the order in which they are listed to the outer limit of the territorial sea adjacent to Northern Ireland at the point 54° 0' 00.00" N and 05° 36' 20.00" W;

(c) to the west and north, by the following series of lines:

- (i) a line joining the point in the territorial sea adjacent to Northern Ireland nearest to the point 55° 31' 13.36" N 6° 45' 00.00" W with that point;
- (ii) from that point, a series of lines joining the points listed in Table 2 in the order in which they are listed as far as the point 56° 42' 00.00" N 14° 00' 00.00" W;
- (iii) from that point, a line which follows the western and northern boundaries of the North Sea area as far as the point 63° 38' 10.68" N and 0° 30' 00.00" W.

**TABLE 2: POINTS AND LINES OF THE BOUNDARY BETWEEN THE RESPONSIBILITY ZONES OF IRELAND AND THE UNITED KINGDOM – EAST AND SOUTH**

| Points defining the boundary of the zones |                 |                | Nature of the line joining a point to the following point |
|---|-----------------|----------------|---|
| IR1/UK50                                  | 48° 10' 00.00"N | 10° 0' 00.00"W | Meridian of Longitude                                     |
| IR2/UK51                                  | 48° 20' 00.00"N | 10° 0' 00.00"W | Parallel of Latitude                                      |
| IR3/UK52                                  | 48° 20' 00.00"N | 9° 48' 00.00"W | Meridian of Longitude                                     |
| IR4/UK53                                  | 48° 30' 00.00"N | 9° 48' 00.00"W | Parallel of Latitude                                      |
| IR5/UK54                                  | 48° 30' 00.00"N | 9° 36' 00.00"W | Meridian of Longitude                                     |
| IR6/UK55                                  | 48° 50' 00.00"N | 9° 36' 00.00"W | Parallel of Latitude                                      |
| IR7/UK56                                  | 48° 50' 00.00"N | 9° 24' 00.00"W | Meridian of Longitude                                     |
| IR8/UK57                                  | 49° 0' 00.00"N  | 9° 24' 00.00"W | Parallel of Latitude                                      |
| IR9/UK58                                  | 49° 0' 00.00"N  | 9° 17' 00.00"W | Meridian of Longitude                                     |
| IR10/UK59                                 | 49° 10' 00.00"N | 9° 17' 00.00"W | Parallel of Latitude                                      |
| IR11/UK60                                 | 49° 10' 00.00"N | 9° 12' 00.00"W | Meridian of Longitude                                     |
| IR12/UK61                                 | 49° 20' 00.00"N | 9° 12' 00.00"W | Parallel of Latitude                                      |
| IR13/UK62                                 | 49° 20' 00.00"N | 9° 3' 00.00"W  | Meridian of Longitude                                     |
| IR14/UK63                                 | 49° 30' 00.00"N | 9° 3' 00.00"W  | Parallel of Latitude                                      |

|            |                 |                |                       |
|------------|-----------------|----------------|-----------------------|
| IR15/UK64  | 49° 30' 00.00"N | 8° 54' 00.00"W | Meridian of Longitude |
| IR16/UK65  | 49° 40' 00.00"N | 8° 54' 00.00"W | Parallel of Latitude  |
| IR17/UK66  | 49° 40' 00.00"N | 8° 45' 00.00"W | Meridian of Longitude |
| IR18/UK67  | 49° 50' 00.00"N | 8° 45' 00.00"W | Parallel of Latitude  |
| IR19/UK68  | 49° 50' 00.00"N | 8° 36' 00.00"W | Meridian of Longitude |
| IR20/UK69  | 50° 0' 00.00"N  | 8° 36' 00.00"W | Parallel of Latitude  |
| IR21/UK70  | 50° 0' 00.00"N  | 8° 24' 00.00"W | Meridian of Longitude |
| IR22/UK71  | 50° 10' 00.00"N | 8° 24' 00.00"W | Parallel of Latitude  |
| IR23/UK72  | 50° 10' 00.00"N | 8° 12' 00.00"W | Meridian of Longitude |
| IR24/UK73  | 50° 20' 00.00"N | 8° 12' 00.00"W | Parallel of Latitude  |
| IR25/UK74  | 50° 20' 00.00"N | 8° 0' 00.00"W  | Meridian of Longitude |
| IR26/UK75  | 50° 30' 00.00"N | 8° 0' 00.00"W  | Parallel of Latitude  |
| IR27/UK76  | 50° 30' 00.00"N | 7° 36' 00.00"W | Meridian of Longitude |
| IR28/UK77  | 50° 40' 00.00"N | 7° 36' 00.00"W | Parallel of Latitude  |
| IR29/UK78  | 50° 40' 00.00"N | 7° 12' 00.00"W | Meridian of Longitude |
| IR30/UK79  | 50° 50' 00.00"N | 7° 12' 00.00"W | Parallel of Latitude  |
| IR31/UK80  | 50° 50' 00.00"N | 7° 3' 00.00"W  | Meridian of Longitude |
| IR32/UK81  | 51° 0' 00.00"N  | 7° 3' 00.00"W  | Parallel of Latitude  |
| IR33/UK82  | 51° 0' 00.00"N  | 6° 48' 00.00"W | Meridian of Longitude |
| IR34/UK83  | 51° 10' 00.00"N | 6° 48' 00.00"W | Parallel of Latitude  |
| IR35/UK84  | 51° 10' 00.00"N | 6° 42' 00.00"W | Meridian of Longitude |
| IR36/UK85  | 51° 20' 00.00"N | 6° 42' 00.00"W | Parallel of Latitude  |
| IR37/UK86  | 51° 20' 00.00"N | 6° 33' 00.00"W | Meridian of Longitude |
| IR38/UK87  | 51° 30' 00.00"N | 6° 33' 00.00"W | Parallel of Latitude  |
| IR39/UK88  | 51° 30' 00.00"N | 6° 18' 00.00"W | Meridian of Longitude |
| IR40/UK89  | 51° 40' 00.00"N | 6° 18' 00.00"W | Parallel of Latitude  |
| IR41/UK90  | 51° 40' 00.00"N | 6° 6' 00.00"W  | Meridian of Longitude |
| IR42/UK91  | 51° 50' 00.00"N | 6° 6' 00.00"W  | Parallel of Latitude  |
| IR43/UK92  | 51° 50' 00.00"N | 6° 0' 00.00"W  | Meridian of Longitude |
| IR44/UK93  | 51° 54' 00.00"N | 6° 0' 00.00"W  | Parallel of Latitude  |
| IR45/UK94  | 51° 54' 00.00"N | 5° 57' 00.00"W | Meridian of Longitude |
| IR46/UK95  | 51° 58' 00.00"N | 5° 57' 00.00"W | Parallel of Latitude  |
| IR47/UK96  | 51° 58' 00.00"N | 5° 54' 00.00"W | Meridian of Longitude |
| IR48/UK97  | 52° 0' 00.00"N  | 5° 54' 00.00"W | Parallel of Latitude  |
| IR49/UK98  | 52° 0' 00.00"N  | 5° 50' 00.00"W | Meridian of Longitude |
| IR50/UK99  | 52° 4' 00.00"N  | 5° 50' 00.00"W | Parallel of Latitude  |
| IR51/UK100 | 52° 4' 00.00"N  | 5° 46' 00.00"W | Meridian of Longitude |
| IR52/UK101 | 52° 8' 00.00"N  | 5° 46' 00.00"W | Parallel of Latitude  |
| IR53/UK102 | 52° 8' 00.00"N  | 5° 42' 00.00"W | Meridian of Longitude |
| IR54/UK103 | 52° 12' 00.00"N | 5° 42' 00.00"W | Parallel of Latitude  |
| IR55/UK104 | 52° 12' 00.00"N | 5° 39' 00.00"W | Meridian of Longitude |
| IR56/UK105 | 52° 16' 00.00"N | 5° 39' 00.00"W | Parallel of Latitude  |
| IR57/UK106 | 52° 16' 00.00"N | 5° 35' 00.00"W | Meridian of Longitude |
| IR58/UK107 | 52° 24' 00.00"N | 5° 35' 00.00"W | Parallel of Latitude  |
| IR59/UK108 | 52° 24' 00.00"N | 5° 22' 48.00"W | Meridian of Longitude |

|            |                 |                |                       |
|------------|-----------------|----------------|-----------------------|
| IR60/UK109 | 52° 32' 00.00"N | 5° 22' 48.00"W | Parallel of Latitude  |
| IR61/UK110 | 52° 32' 00.00"N | 5° 28' 00.00"W | Meridian of Longitude |
| IR62/UK111 | 52° 44' 00.00"N | 5° 28' 00.00"W | Parallel of Latitude  |
| IR63/UK112 | 52° 44' 00.00"N | 5° 24' 30.00"W | Meridian of Longitude |
| IR64/UK113 | 52° 52' 00.00"N | 5° 24' 30.00"W | Parallel of Latitude  |
| IR65/UK114 | 52° 52' 00.00"N | 5° 22' 30.00"W | Meridian of Longitude |
| IR66/UK115 | 52° 59' 00.00"N | 5° 22' 30.00"W | Parallel of Latitude  |
| IR67/UK116 | 52° 59' 00.00"N | 5° 19' 00.00"W | Meridian of Longitude |
| IR68/UK117 | 53° 9' 00.00"N  | 5° 19' 00.00"W | Parallel of Latitude  |
| IR69/UK118 | 53° 9' 00.00"N  | 5° 20' 00.00"W | Meridian of Longitude |
| IR70/UK119 | 53° 26' 00.00"N | 5° 20' 00.00"W | Parallel of Latitude  |
| IR71/UK120 | 53° 26' 00.00"N | 5° 19' 00.00"W | Meridian of Longitude |
| IR72/UK121 | 53° 32' 00.00"N | 5° 19' 00.00"W | Parallel of Latitude  |
| IR73/UK122 | 53° 32' 00.00"N | 5° 17' 00.00"W | Meridian of Longitude |
| IR74/UK123 | 53° 39' 00.00"N | 5° 17' 00.00"W | Parallel of Latitude  |
| IR75/UK124 | 53° 39' 00.00"N | 5° 16' 20.40"W | Meridian of Longitude |
| IR76/UK125 | 53° 42' 08.40"N | 5° 16' 20.40"W | Parallel of Latitude  |
| IR77/UK126 | 53° 42' 08.40"N | 5° 17' 51.00"W | Meridian of Longitude |
| IR78/UK127 | 53° 44' 24.00"N | 5° 17' 51.00"W | Parallel of Latitude  |
| IR79/UK128 | 53° 44' 24.00"N | 5° 19' 19.80"W | Meridian of Longitude |
| IR80/UK129 | 53° 45' 48.00"N | 5° 19' 19.80"W | Parallel of Latitude  |
| IR81/UK130 | 53° 45' 48.00"N | 5° 22' 00.00"W | Meridian of Longitude |
| IR82/UK131 | 53° 46' 00.00"N | 5° 22' 00.00"W | Parallel of Latitude  |
| IR83/UK132 | 53° 46' 00.00"N | 5° 19' 00.00"W | Meridian of Longitude |
| IR84/UK133 | 53° 59' 56.95"N | 5° 19' 00.00"W |                       |

**TABLE 3: POINTS AND LINES OF THE BOUNDARY BETWEEN THE RESPONSIBILITY ZONES OF IRELAND AND THE UNITED KINGDOM - NORTH**

| Points defining the boundary of the zones |                 |                | Nature of the line joining a point to the following point |
|---|-----------------|----------------|---|
| IR85/UK134                                | 55° 31' 13.36"N | 6° 45' 00.00"W | Meridian of Longitude                                     |
| IR86/UK135                                | 55° 28' 00.00"N | 6° 45' 00.00"W | Parallel of Latitude                                      |
| IR87/UK136                                | 55° 28' 00.00"N | 6° 48' 00.00"W | Meridian of Longitude                                     |
| IR88/UK137                                | 55° 30' 00.00"N | 6° 48' 00.00"W | Parallel of Latitude                                      |
| IR89/UK138                                | 55° 30' 00.00"N | 6° 51' 00.00"W | Meridian of Longitude                                     |
| IR90/UK139                                | 55° 35' 00.00"N | 6° 51' 00.00"W | Parallel of Latitude                                      |
| IR91/UK140                                | 55° 35' 00.00"N | 6° 57' 00.00"W | Meridian of Longitude                                     |
| IR92/UK141                                | 55° 40' 00.00"N | 6° 57' 00.00"W | Parallel of Latitude                                      |
| IR93/UK142                                | 55° 40' 00.00"N | 7° 2' 00.00"W  | Meridian of Longitude                                     |
| IR94/UK143                                | 55° 45' 00.00"N | 7° 2' 00.00"W  | Parallel of Latitude                                      |
| IR95/UK144                                | 55° 45' 00.00"N | 7° 8' 00.00"W  | Meridian of Longitude                                     |
| IR96/UK145                                | 55° 50' 00.00"N | 7° 8' 00.00"W  | Parallel of Latitude                                      |
| IR97/UK146                                | 55° 50' 00.00"N | 7° 15' 00.00"W | Meridian of Longitude                                     |
| IR98/UK147                                | 55° 55' 00.00"N | 7° 15' 00.00"W | Parallel of Latitude                                      |
| IR99/UK148                                | 55° 55' 00.00"N | 7° 23' 00.00"  | Meridian of Longitude                                     |

|             |                 |                 |                       |
|-------------|-----------------|-----------------|-----------------------|
| IR100/UK149 | 56° 0' 00.00"N  | 7° 23' 00.00"W  | Parallel of Latitude  |
| IR101/UK150 | 56° 0' 00.00"N  | 8° 13' 00.00"W  | Meridian of Longitude |
| IR102/UK151 | 56° 5' 00.00"N  | 8° 13' 00.00"W  | Parallel of Latitude  |
| IR103/UK152 | 56° 5' 00.00"N  | 8° 39' 30.00"W  | Meridian of Longitude |
| IR104/UK153 | 56° 10' 00.00"N | 8° 39' 30.00"W  | Parallel of Latitude  |
| IR105/UK154 | 56° 10' 00.00"N | 9° 7' 00.00"W   | Meridian of Longitude |
| IR106/UK155 | 56° 21' 30.00"N | 9° 7' 00.00"W   | Parallel of Latitude  |
| IR107/UK156 | 56° 21' 30.00"N | 10° 30' 00.00"W | Meridian of Longitude |
| IR108/UK157 | 56° 32' 30.00"N | 10° 30' 00.00"W | Parallel of Latitude  |
| IR109/UK158 | 56° 32' 30.00"N | 12° 12' 00.00"W | Meridian of Longitude |
| IR110/UK159 | 56° 42' 00.00"N | 12° 12' 00.00"W | Parallel of Latitude  |
| IR111/UK160 | 56° 42' 00.00"N | 14° 0' 00.00"W  |                       |

**TABLE 4: POINTS AND LINES OF THE BOUNDARY BETWEEN THE RESPONSIBILITY ZONES OF NORWAY AND THE UNITED KINGDOM**

| Point defining the boundary of the zones |                  |                  | Nature of the line joining a point to the following point |
|--|------------------|------------------|---|
| NO1/UK1                                  | 63° 38' 10.68"N  | 00° 10' 59.31" W | Geodesic  |
| NO2/UK2                                  | 63° 03' 20.71"N  | 00° 28' 12.51" E | Geodesic  |
| NO3/UK3                                  | 62° 58' 21.06"N  | 00° 33' 31.01" E | Geodesic  |
| NO4/UK4                                  | 62° 53' 29.49"N  | 00° 38' 27.91" E | Geodesic  |
| NO5/UK5                                  | 62° 44' 16.31"N  | 00° 47' 27.69" E | Geodesic  |
| NO6/UK6                                  | 62° 39' 57.99"N  | 00° 51' 29.48" E | Geodesic  |
| NO7/UK7                                  | 62° 36' 20.75"N  | 00° 54' 44.78" E | Geodesic  |
| NO8/UK8                                  | 62° 32' 47.29"N  | 00° 57' 48.32" E | Geodesic  |
| NO9/UK9                                  | 62° 30' 09.83" N | 1° 0' 05.92" E   | Geodesic  |
| NO10/UK10                                | 62° 27' 32.82" N | 1° 2' 17.70" E   | Geodesic  |
| NO11/UK11                                | 62° 24' 56.68" N | 1° 4' 25.86" E   | Geodesic  |
| NO12/UK12                                | 62° 22' 21.00" N | 1° 6' 28.21" E   | Geodesic  |
| NO13/UK13                                | 62° 19' 40.72" N | 1° 8' 30.96" E   | Geodesic  |
| NO14/UK14                                | 62° 16' 43.93" N | 1° 10' 40.66" E  | Geodesic  |
| NO15/UK15                                | 61° 44' 12.00" N | 1° 33' 13.44" E  | Geodesic  |
| NO16/UK16                                | 61° 44' 12.00" N | 1° 33' 36.00" E  | Arc of Great Circle                                       |
| NO17/UK17                                | 61° 21' 24.00" N | 1° 47' 24.00" E  | Arc of Great Circle                                       |
| NO18/UK18                                | 59° 53' 48.00" N | 2° 4' 36.00" E   | Arc of Great Circle                                       |
| NO19/UK19                                | 59° 17' 24.00" N | 1° 42' 42.00" E  | Arc of Great Circle                                       |
| NO20/UK20                                | 58° 25' 48.00" N | 1° 29' 00.00" E  | Arc of Great Circle                                       |
| NO21/UK21                                | 57° 54' 18.00" N | 1° 57' 54.00" E  | Arc of Great Circle                                       |
| NO22/UK22                                | 56° 35' 42.00" N | 2° 36' 48.00" E  | Arc of Great Circle                                       |
| NO23/UK23                                | 56° 5' 12.00" N  | 3° 15' 00.00" E  | Arc of Great Circle                                       |

**PART IV: BOUNDARIES OF THE ZONES OF JOINT RESPONSIBILITY**

The zones of joint responsibility shall be as follows:

(1) *Zone of Joint Responsibility of Belgium, France, the Netherlands and United Kingdom*

The sea area between the parallels of latitude 51°51' 52.1267" N and 51° 6' 00.00"N.

(2) *Zone of Joint Responsibility of France and United Kingdom*

The English Channel south-west of parallel 51° 6' 00.00" N to a line which:

- (a) commences at the westernmost point of the Isles of Scilly, and joins that point with the point 49°52'00.00"N 7° 44' 00.00" W;
- (b) from that point, follows the 1983 Bonn Agreement line (as defined in Part I above) southwards to its intersection with the parallel of latitude 48° 27' 00.00" N; and
- (c) follows that parallel of latitude eastwards to the southernmost point of the isle of Ushant.

(3) *Zone of Joint Responsibility of Denmark and Germany*

The sea area bounded by:

- (a) on the south, the parallel of latitude 54° 30' 00.00" N westwards from the coast of Germany;
- (b) on the west, the meridian of longitude 6° 30' 00.00" E;
- (c) on the north, the parallel of latitude 55° 50' 00.00" N westwards from the coast of Denmark; and
- (d) on the east, the coastline, including the Wadden sea area.

(4) *Zone of Joint Responsibility of Germany and the Netherlands*

The sea area bounded by:

- (a) on the west, the meridian of longitude 6° 0' 00.00" E northwards from the coast of the Netherlands;
- (b) on the north, the parallel of latitude 54° 0' 00.00" N;
- (c) on the east, the meridian of longitude 7° 15' 00.00" E, northwards from the coast of the Federal Republic of Germany; and
- (d) on the south, the coastline, including the Wadden sea area.

#### **PART V: INTERPRETATION**

The positions of the points referred to in this Annex shall be determined according to the European Geodesic System (1950 version)."

## Rules of procedure

### General

1. It shall be the duty of meetings of the Contracting Parties to the Bonn Agreement to take all the necessary decisions in order to reach the objectives of the Bonn Agreement and in particular:
  - a. to exercise overall supervision over the implementation of this Agreement;
  - b. to review the effectiveness of the measures taken under this Agreement;
  - c. to carry out such other functions as may be necessary under the terms of this Agreement.

### Meetings of Contracting Parties and subsidiary bodies

2. Ordinary meetings of the Contracting Parties shall take place at regular intervals, normally annually, on being convened by the Secretary in consultation with the Contracting Party holding the Presidency and with the Contracting Party responsible for the organisation of the meeting. This latter responsibility shall rotate among the Contracting Parties according to English alphabetical order. The time and place of such meetings shall, to the extent possible, be decided by the Contracting Parties either at the preceding meeting or by correspondence between the Contracting Party responsible for the organisation of the meeting and the other Contracting Parties.
3. Extraordinary meetings shall only be convened by the Contracting Party holding the Presidency if requested to do so by at least three delegations.
4. Each Contracting Party shall assign a Head of Delegation and for each meeting as many other delegates as it thinks appropriate.
5. Each Contracting Party should give the Secretary the number and names of delegates, if possible, 14 days before an ordinary meeting.
6. The presence of delegations representing at least two thirds of the Contracting Parties shall constitute a quorum for ordinary and extraordinary meetings.
7. For ordinary meetings of the Contracting Parties, the Secretary shall, in agreement with the Contracting Party holding the Presidency, circulate a proposed draft agenda at least two months before the meeting. Each Contracting Party shall be entitled to ask, up to five weeks before the meeting, for such subjects to be placed on the draft agenda as it desires to have discussed, if possible on the basis of an explanatory memorandum. The draft agenda shall be sent to all Contracting Parties at least one month before the date of the meeting. The draft agenda shall be adopted at the beginning of the meeting. Items may be added to the agenda with the unanimous approval of all Contracting Parties present but decisions on these items can only be taken if all Contracting Parties are represented.
8. A Working Group on Operational, Technical and Scientific Questions (OTSOPA) is established. The meeting of Contracting Parties shall establish annually a work programme for this working group. Except for:
  - a. any question that the Bonn Agreement (other than under article 14(c)) or the Rules of Procedure (other than under rule 2(c)) provide shall be decided by a meeting of the Contracting Parties;
  - b. any question involving a change to the budget of the Bonn Agreement; and
  - c. any items in the OTSOPA work programme where a question is reserved for further consideration by the meeting of Contracting Parties (which should only be done exceptionally);

OTSOPA shall be authorised to approve action on any item in that work programme on behalf of the meeting of Contracting Parties, provided that at least two-thirds of the Contracting Parties are represented at its meeting. Such approval shall be given by consensus in accordance with rule 20.

9. The meeting of the Contracting Parties may set up such working groups as it may deem necessary to provide advice on subjects outside the terms of reference of OTSOPA such as legal issues and in general to perform such functions as may be required by the Contracting Parties.
10. The meetings of the Contracting Parties and of the working groups shall be held in private unless the meeting of the Contracting Parties, without objection of any of the Contracting Parties, decides otherwise.

### **Presidency**

11. The Contracting Parties shall elect one of their number to the Presidency and this office should rotate among the Contracting Parties, normally in English alphabetical order. A Contracting Party whose turn for election to the Presidency falls due may reserve the right to decline its election. The Contracting Party holding the Presidency shall inform in due time the other Contracting Parties of their nominee for Chairman. In acting as Chairman of the meeting of the Contracting Parties, the Chairman shall act in a neutral capacity and not as a delegate of that Contracting Party.
12. The Contracting Party concerned shall hold the Presidency for a period of two years.
13. The duties of the Contracting Party holding the Presidency shall be to preside over the meeting of the Contracting Parties, to carry out any duties entrusted to it by the meeting of the Contracting Parties and, in common with the other Contracting Parties, to take initiatives and put forward proposals to the meeting of the Contracting Parties which could promote the efficient operation of the Agreement.

### **Secretariat**

14. Secretariat functions required by the meeting of the Contracting Parties shall be provided by the Secretariat of the OSPAR Commission as employer. To the extent that the Executive Secretary of the OSPAR Commission performs certain functions which are contained in these Rules and financial rules, he shall report to the meeting of Contracting Parties.
15. For the purposes of these Rules and of the Financial Rules of the Bonn Agreement, "Secretariat" and "Secretary" mean the Secretariat and Executive Secretary of the OSPAR Commission.
16. The Secretary shall be responsible to the meeting of the Contracting Parties for drawing up budgets and calculating contributions and for the income and expenditure of the Agreement in a year in respect of which the Contracting Parties shall grant him discharge. He shall act as Secretary at the meetings of the Contracting Parties and shall perform any other tasks that may be entrusted to him by the meeting of the Contracting Parties or by the Contracting Party holding the Presidency.
17. For meetings of OTSOPA, the Secretariat will be responsible for collecting and circulating information and papers and for preparing the report of the meeting, with assistance of the Chairman of the Working Group as appropriate.
18. If additional ad hoc working groups are considered to be necessary outside the framework of OTSOPA, these will be conducted without the support of the Secretary or the Secretariat. When deciding to create an additional ad hoc working group, the meeting of Contracting Parties shall give due regard to the necessary arrangements for adequate secretarial assistance for the group's meetings.

### **Voting**

19. Each Contracting Party shall have one vote in the meeting of the Contracting Parties, subject to the provisions of Article 13 of the Agreement.
20. Decisions of the Contracting Parties shall be agreed by consensus of the Contracting Parties present and voting except where the Bonn Agreement or these Rules prescribe some other procedures. Delegations abstaining from voting shall be considered as not voting.

21. Decisions under Rule 2.(c) of the Financial Rules shall be taken by unanimous vote of the delegations present and voting at the meeting.
22. In exceptional cases, on a proposal by the Chairman, a written vote may be held between meetings.

### **Documents**

23. All documents of the Bonn Agreement and its subsidiary bodies (including summary records) will be made available by the Secretariat to any person on request (with a payment towards the costs of preparation when appropriate), except documents which the originator, the Agreement or its subsidiary bodies do not consider it appropriate to make publicly available, such as draft reports which could be misleading and documents concerning budgetary, personnel, contractual and similar management issues. In the case of documents prepared by the Secretariat, the Secretary shall exercise the discretion given to the originator until the document is submitted to the Agreement or subsidiary body for which it is prepared. If the Secretary decides that it is not appropriate to make such a document available, the body to which it has been submitted may alter that decision after it has considered the document.

24. Documents which are not to be made publicly available should be clearly marked as **“RESTRICTED”** and should carry the footnote “The Bonn Agreement has decided that all documents of the Agreement can be made publicly available unless otherwise specified. Documents that are marked as **“RESTRICTED”** should not be made available to the public”.

25. All documents submitted for discussion or information of the Bonn Agreement and its subsidiary bodies shall be received by the Secretariat at least 15 working days before the opening of the meeting. Documents received after this deadline will be circulated as late (“L”) documents and will only be discussed if the meeting of the Contracting Parties or the subsidiary body unanimously so decides. Documents prepared by the Secretariat which are not circulated at least 10 working days before opening of the meeting will be marked as **“L”** documents, but may in any case be discussed.

26. Reports of the meetings held within the framework of the Agreement, and proposals and recommendations, shall be sent by the Secretary to all Contracting Parties without delay.

27. The circulation of documents shall be by means of:

- a. placing the documents on the Bonn Agreement website;
- b. sending a notification direct to the contact point of each Contracting Party and observer that the documents have been up-loaded.

Where it is not practicable to circulate a document by electronic means, the Secretariat shall send a paper copy to each Contracting Party and observer.

### **Languages**

28. The official languages of the meeting of the Contracting Parties shall be English and French. A Contracting Party desiring to use any other language shall be entitled to do so if, at its own expense, it provides for translation and/or interpretation into the official languages.

29. Meetings of all subsidiary bodies shall be held in English only. A Contracting Party desiring to use any other language shall be entitled to do so if, at its own expense, it provides for translation and/or interpretation into English.

30. Reports of the Contracting Parties meetings and of OTSOPA meetings shall be made available in English and in French.

**Observers**

31. The meeting of Contracting Parties may grant permanent observer status to States or to international intergovernmental organisations. This status applies only to meetings of Contracting Parties. The meeting of Contracting Parties may also grant permanent observer status to States or international intergovernmental organisations for meetings of OTSOPA.

32. The participation of any occasional observer of a state or of an international intergovernmental organisation in any meeting of the Contracting Parties or of OTSOPA is subject to the approval of all Heads of Delegation, whose views will be sought in each case by the Secretary. If no objections are made, the party concerned shall be invited to attend the meeting. A period of at least 15 days shall be allowed to Heads of Delegation to object to the presence of observers at meetings of the Contracting Parties or of OTSOPA; silence shall be taken as assent.

33. The participation of observers in other working groups, or in certain parts of these other working groups, is subject to the approval of all Heads of Delegation, whose views will be sought in each case by the Secretariat. If no objections are made, the party concerned shall be invited to attend the meeting. A period of at least 15 days shall be allowed to Heads of Delegation to object to the presence of observers at other working group meetings; silence will be taken as assent.

34. Upon receipt of requests from non-governmental organisations to attend particular meetings of the Contracting Parties or of working groups, perhaps only for certain items of the agenda or only for the opening of the meeting, the Secretary or the Secretariat will seek the views of Heads of Delegation and only accede to the request if there are no objections. Non-governmental organisations may submit information documents to the meeting.

35. Each Contracting Party or Head of Delegation to meetings has the right to ask the observers to withdraw for certain items of the agenda or for the discussion of a particular agenda item.

36. At meetings of the Contracting Parties, the Parties may also nominate observers to attend meetings of other international organisations.

**Other**

37. A Contracting Party more than 12 months in arrears with its contributions shall not be eligible for election to the Presidency.

38. The meeting of the Contracting Parties shall decide what further action should be taken in respect of a Contracting Party more than 12 months in arrears with its contributions.

39. The financial arrangements of the Agreement are set out in the Financial Rules of the Bonn Agreement as at the Annex (including its appendices).

40. The meeting of Contracting Parties may nominate members of the Secretariat or delegates of Contracting Parties as representatives to meetings organised by other international organisations. Between meetings of the Contracting Parties, the Contracting Party holding the Presidency may make such nominations after consulting the Heads of Delegations of Contracting Parties. Where such a representative may have to express views on behalf of the Bonn Agreement, the Secretariat shall ensure that agreed guidance is provided to him/her. The representative shall follow such guidance. The function of such representatives is to act as a channel of communication between the Bonn Agreement and its Contracting Parties and other international organisations. They have no authority to enter into commitments or obligations on behalf of the Bonn Agreement or its Contracting Parties.

41. These Rules, including the Annex, may be amended at any meeting of the Contracting Parties by a unanimous vote. Proposals for amendment of these Rules should be circulated to Heads of delegations at least two months before a meeting.

**Annex****Financial Rules of the Bonn Agreement****The Financial Year**

1. The Agreement's financial year shall be from 1 January to 31 December.

**The Budget**

2. Preparation and adoption of the budget:
  - (a) A draft budget shall be prepared by the Secretary for approval by the meeting of the Contracting Parties. The draft budget shall be accompanied by accounts showing the amount of appropriations and expenditure incurred for the preceding financial year and the amount of appropriations for the current financial year and shall be divided by function into chapters;
  - (b) The draft budget for the ensuing year shall be circulated by the Secretary to the Contracting Parties not less than 60 days before the meeting at which the budget is to be adopted. It shall include a draft statement of the contributions of Contracting Parties;
  - (c) The meeting of the Contracting Parties shall adopt the budget which shall contain all planned expenditure and all estimated revenue, the receipt of which can be estimated with confidence, for the financial year to which it relates;
  - (d) A non-binding outline budget of estimated expenditure for the three subsequent years shall be circulated at the same time.
3. The appropriations agreed by the meeting of the Contracting Parties for the ensuing financial year shall constitute an authorisation to the Secretary to incur obligations and make payments for the purposes for which the appropriations were voted and up to the amounts so voted unless the meeting of the Contracting Parties decides otherwise.
4. Appropriations shall be made available for obligations during the financial period to which they relate. Any excess of income over expenditure in a financial year, as revealed by the audited accounts at the end of the said financial year, shall be transferred to the General Fund.
5. Transfers within the same chapter of the budget may be effected by the Secretary, who shall report thereon to the meeting of the Contracting Parties.
6. In cases where special necessity arises, transfers from one chapter of the budget to another within the ceiling of the approved budget may be effected by the Secretary after having obtained the approval of the Contracting Party holding the Presidency and shall be reported to the meeting of the Contracting Parties.
7. When expenditure exceeding the ceiling of the budget as a whole or for a purpose not covered in the budget is necessary, the Secretary shall consult the Contracting Party holding the Presidency and prepare a supplementary budget. The Secretary shall send a copy of this supplementary budget by telefax and mail to the Head of each Delegation.
8. If the provision for additional expenditure in such a supplementary budget does not exceed the amount standing to the credit of the Working Capital Fund on the date when the supplementary budget is sent by telefax to the Heads of Delegation, the supplementary budget shall be deemed to be approved by the Contracting Parties three weeks after that date, unless before the end of that day one or more Contracting Parties have notified the Secretary that they cannot approve it. If every such notification is subsequently withdrawn, the budget shall be deemed to be approved on the day of the last withdrawal of such a notification. In other cases a supplementary budget shall be adopted in the same manner as an ordinary budget.

9. If by 1 December in any year the budget for the ensuing year has not been adopted, the Secretary, until such time as the budget is adopted, shall be authorised to collect contributions and incur expenditure up to 25% of the contributions and chapters of the budget provided for in the current year.

### **Provision of Funds**

10. Each Contracting Party shall meet the expenses of its delegates.
11. Each Contracting Party shall contribute towards the annual expenditure of the Agreement in accordance with Article 15(2) of the Agreement.
12. The Bonn Agreement shall review from time to time its contribution to the salary budget of the OSPAR Commission in consultation with the Chairman of the OSPAR Commission.
13. As soon as the meeting of the Contracting Parties has approved the budget for a financial year, the Secretary shall send a copy thereof to all Contracting Parties, notifying them of their yearly assessments during the financial year. Contributions to the budget shall be due in the currency of the country in which the Secretariat is located within thirty days of receipt of the information from the Secretary or on the first banking day of the financial year at the seat of the Secretariat, whichever is later. Contributions shall be received by the Secretariat by 15 February of the financial year at the latest.
14. Contracting Parties shall bear any bank charges arising from the transfer of funds.
15. New Contracting Parties whose membership of the Agreement becomes effective during the first six months of any year shall pay the full amount of the annual contribution. New Contracting Parties whose membership of the Agreement becomes effective during the last six months of any year shall pay half the amount of the annual contribution. The contribution shall be paid within ninety days of depositing the instrument of accession with the Depositary Government.
16. Except for contributions or debts from Contracting Parties, any debt receivable by the Agreement shall be written off, at the latest in the third year following that in which the debt becomes due.
17. The meeting of Contracting Parties shall consider, before approving the budget for any year, what action to take in respect of any contribution or debt still owing from any Contracting Party.

### **Funds**

18. A General Fund is established for the purpose of accumulating any surplus of income over expenditure until such time as it is disbursed following a decision by the meeting of Contracting Parties.
19. Any cash surplus in the General Fund as revealed by audited accounts shall be used to offset the contributions of Contracting Parties in an ensuing financial year unless the meeting of Contracting Parties decides otherwise.
20. A Working Capital Fund is established to provide reserve funds for emergency situations. The Working Capital Fund shall be restricted to a level of 10% of estimated gross expenditure. It shall be maintained at the appropriate level by budget contributions.

### **Statements of Account**

21. The Secretary shall:
  - (a) maintain proper accounts and ensure effective financial control.
  - (b) ensure that all payments are supported by vouchers and other documents which ensure that the services or goods have been received and that payment has not previously been made.
22. The Secretary shall prepare a Statement of Account at the end of each financial year. The statement shall show the income of the Agreement and, under separate heads, expenditure; it shall also give such

information as may be appropriate to indicate the current financial position of the Agreement. The Secretary shall attach to the Statement of Account for each financial year an explanatory memorandum.

23. In exercising his financial responsibilities the Secretary shall take due account of the guidelines in Appendix 1.

#### **External Audit**

24. An External Auditor shall be appointed by the meeting of the Contracting Parties.

25. In exercising his responsibilities the Auditor shall take due account of the guidelines in Appendix 2.

26. The Auditor shall prepare a report on the accounts certified, and on any matters on which the meeting of the Contracting Parties may from time to time give specific instructions.

27. The Secretary shall submit final accounts to the Auditor not later than 31 March following the end of the financial year to which the accounts relate and the Auditor shall submit his report to the meeting of the Contracting Parties not later than 30 April following the end of the said financial year. At their next meeting the Contracting Parties shall decide on the discharge to be given to the Secretary in respect of the implementation of the budget.

#### **Decisions involving expenditure**

28. The meeting of the Contracting Parties shall take no decision involving expenditure unless it has before it a report from the Secretary on the administrative and financial implications of the proposal.

29. Where in the opinion of the Secretary the proposed expenditure cannot be met from the existing appropriation it shall not be incurred until the meeting of the Contracting Parties has made the necessary appropriation, in accordance with §§ 2-6 of these Rules.

**Appendix 1****Guidelines on the financial responsibilities of the Secretary**

1. The Secretary shall:
  - (a) establish detailed financial rules in order to ensure effective financial administration and the exercise of economy;
  - (b) designate the officers who may receive monies, incur obligations, and make payments on behalf of the Agreement; the Secretary may delegate to other officials of the Secretariat such of his powers as he considers necessary for the effective implementation of the Financial Rules;
  - (c) maintain an internal audit which shall provide for an effective current examination and/or review of financial transactions.
2. No member of the Secretariat shall incur any liability for expenditure without written authorisation from the Secretary.
3. The Secretary shall make suitable arrangements under which the Agreement will be protected against loss on account of the conduct of officials who may be entrusted by him with the custody and disbursement of funds of the Agreement.

**Appendix 2****Guidelines on the responsibilities of the auditor**

1. The auditor shall perform such audit as he deems necessary to certify:
  - (a) that the financial statements are in accord with the books and records of the Agreement;
  - (b) that the financial transactions reflected in the statements have been in accordance with the rules and regulations, the budgetary provisions, and other applicable directives;
  - (c) that the monies on deposit and on hand have been verified by certificate received direct from the Agreement's depositaries or by actual count;
  - (d) that the assets and liabilities of the Agreement are in accord with the books and records of the Agreement.
2. Subject to the directions of the meeting of the Contracting Parties, the auditor shall be the sole judge as the acceptance in whole or in part of the certifications by the Secretary and may proceed to such detailed examination and verification of all financial records as he chooses including those relating to supplies and equipment.
3. The auditor and his staff shall have free access at all convenient times to all books of account and records which are, in the opinion of the auditor, necessary for the performance of the audit. On application to the Secretary, information classified in the records of the Secretariat as confidential, and which is required for the purposes of the audit shall be made available to the auditor.
4. The auditor, in addition to certifying the accounts, may make such observations as he deems necessary with respect to the efficiency of the financial procedures, the accounting system, the internal financial controls and, in general, the financial consequences of administrative practices. In no case, however, shall the auditor include criticism in his audit report without first affording the Secretary an opportunity of explanation to the auditor on the matter under observation. Audit objections to any item in the accounts shall be immediately communicated to the Secretary.

## **CHECKLIST OF ADMINISTRATIVE AND ORGANISATIONAL PROBLEMS WHICH COULD ARISE IN ASSISTANCE OPERATIONS AND POSSIBLE SOLUTIONS TO THOSE PROBLEMS**

### **30.1 TRANSFRONTIER MOVEMENT OF AIRCRAFT, STATE-OWNED AND STATE-CONTROLLED SHIPS, NAVAL VESSELS, STATE-CONTROLLED VEHICLES, PERSONNEL AND EQUIPMENT**

International formalities could cause inconvenient delays in an emergency situation and differ from one State to another. Possible remedies:

- a. the assisted State should make all appropriate efforts to facilitate transfrontier movements in an emergency situation and should send a liaison officer able to communicate with the assisting personnel in a language known to them to meet the assisting Party at the border. The rank of the liaison officer is left to the decision of the assisted State in each case;
- b. in cases of joint counter-pollution operations and joint exercises, and in implementing the aerial surveillance programme, Contracting Parties should undertake to facilitate the granting of all clearances and permissions required for the aircraft of other Contracting Parties to carry out their mission in their airspace and over their territory;
- c. each Contracting Party's formal procedures governing transfrontier movements could be recorded briefly in the Manual.

### **30.2 CUSTOMS QUESTIONS**

30.2.1 There are at least four possible courses of action:

- a. instead of taking any specific action, solutions are left to be found on an ad hoc basis at the time of joint operations;
- b. bodies which are likely to be involved in joint operations should receive instructions in the Manual outlining the procedures to be followed in the event of joint operations involving the completion of customs formalities;
- c. the customs authorities should be asked to take part in the preparation of contingency plans for joint operations in order to advise on solutions to problems of formalities in both the despatch and receipt of assistance; where possible, documents should be prepared in advance. As well as customs documents, detailed lists of goods to be transported could be prepared before the operation begins;
- d. a mutual assistance network should be established so that there is a customs correspondent in each country who can be contacted by his opposite number in another country to facilitate operations.

30.2.2 It is necessary to recall that there is a customs duty to be paid on goods that are used in joint operations; such duty should be relieved by one or other of the following methods:

- a. if the goods are not to be re-exported (e.g. dispersants), they should enjoy relief from import duties;
- b. if the goods are to be re-exported (e.g., mechanical recovery means), they should be granted temporary importation arrangements.

### **30.3 SPECIAL TAXES AND TRAFFIC FEES APPLICABLE TO VEHICLES FOR ASSISTANCE PURPOSE**

Possible remedies:

- a. The imposition of special taxes and traffic fees on assisting vehicles could be lifted on the initiative of the assisted State. Alternatively the State concerned should use all its influence to renounce the fees or special taxes arising at border passage; in future such costs could be a component of the later reimbursement by the assisted State.
- b. Information about national traffic regulations stipulating conditions for using vehicles to be given when necessary to the assisting Party at the border.

### **30.4 CONDITIONS OF WORK**

There is no problem with the crew of vessels. For assistance on land, there would probably be difficulties in waiving the national laws of the assisted State, and in requiring the assisting State to comply with rules other than those applicable to them nationally.

Possible remedies:

It could be the responsibility of the SOSC to ensure that national rules are observed for personnel under his command. It should be the responsibility of the NOSC to ensure that the personnel under his command comply with the national rules of the assisting country. The respective authorities of the assisted State are responsible for informing the heads of strike teams about relevant labour protection regulations.

### **30.5 INSURANCE OF PERSONNEL**

Possible remedies:

The insurance of Government personnel and employees of private firms under contract to Government should be the responsibility of the assisting Government which may claim reimbursement of costs from the assisted Government. The insurance of personnel of private firms acting independently would not be the responsibility of the Government.

### **30.6 CIVIL LIABILITY FOR INJURIES OR DAMAGE**

Possible solution:

- a. Disputes over injuries or damages should be settled according to the rules of civil liability. Responsibility for the payment of costs would rest with the assisted State except in cases of ill intent, grave fault or gross negligence.
- b. The assisted Party should always be informed when a dispute with a third party is to be settled before a court of law. Where this is within the territory of the assisted State, the latter should help the assisting Party or person concerned.

### **30.7 ACCOMMODATION AND MEALS**

Possible solution:

It should be the responsibility of the assisted State to arrange accommodation and meals for assisting personnel when necessary or wanted.

**30.8 MEDICAL TREATMENT**

Possible solution:

The assisted Party should always make provision for the medical treatment of personnel of the assisting Party when necessary or wanted.

**30.9 EQUIPMENT AND REPAIRS**

Possible solution:

The assisted Party should help the assisting Party to the best of its ability with maintenance and repairs of equipment which cannot be carried out by personnel of the assisting Party.

**30.10 PASSAGE THROUGH THE TERRITORY OF A THIRD STATE**

Possible solution:

The transit State, if member of the Bonn Agreement, should use its best endeavours to facilitate the passage of equipment through its territory.

**30.11 LEADERSHIP AND AUTONOMY OF ASSISTANCE TEAMS**

Possible solution:

- a. The assistance teams should be led by a civil servant of sufficient rank to deal with authority with the administration of the assisted State.
- b. The assistance teams on land should, like strike teams at sea, be allowed to be as autonomous and self-sufficient as possible.

### **Guidelines for the evaluation of maritime incidents**

In the Bonn Agreement Counter Pollution Manual the chapters are regularly revisited in order to update their contents or check the validity.

Chapter 31 originally was titled:

#### **GUIDELINES FOR REPORTING PERFORMANCE OF COUNTER-MEASURES IN POLLUTION INCIDENTS**

In the 2012 meeting of the OTSOPA working group a proposal was adopted to revise the contents of the Chapter 31 to include the Common Assessment Framework for Lessons Learned: response during major oil pollution incidents at sea developed in the EU Consultative Technical Group under the European Maritime Safety Agency. The reporting format is not mandatory, but Contracting Parties recommended that it should be used in order to report on incidents.

The process of assessing lessons learned, if properly structured, should allow identification of areas for special focus in improving preparedness and response, thus appropriate actions can be taken to avoid similar problems or mistakes being repeated in the future. Although it could seem obvious that the response to pollution incidents at sea should be analysed and assessed to reveal areas for improvement, lessons learned from past spills are not always put into practice. Therefore the importance of analysing the response and focussing on areas for improvement should not be underestimated. Challenges and problems encountered can also in certain circumstances justify the need for further investment in pollution response staff, procedures, training or equipment.

#### **How to use the methodology**

1. A standard set of incident information is included for each spill incident. The response is then divided into 16 categories, with specific parameters to be assessed / answered for each. Not all categories will be applicable to every spill and space is provided at the end of each category for the user to give comments/additional information. For each parameter, the user should fill in Yes/No, N/A (not applicable) or give specific values where asked.
2. The methodology is based on technical considerations of spill response and therefore assumes a degree of experience for the person filling it in. The appropriate person to fill it in should be a matter for each Contracting Party to decide, however as a guideline the 'incident commander' or director of the lead agency are suggested, with input from other agencies/institutions and those persons responding in the field where appropriate. The term 'lead agency' has been used throughout the methodology to refer to the authority or organisation who had overall responsibility for dealing with the oil spill incident.
3. The final category 'general conclusions and recommendations' gives the user an opportunity to identify the 3 most significant findings and give specific proposals for addressing the problems encountered in the future, through commitments to training, investment and contingency planning.

**Common Assessment Framework for Lessons Learned: response during major oil pollution incidents at sea**

*1. Incident information (general)*

|   |                       |
|---|-----------------------|
| <b>Name of the incident</b>             |                       |
| Date                                    | Ship name             |
| Location (latitude/longitude)           | IMO nr                |
| Incident area                           | Ship type             |
| Type of pollutant                       | Gross Tonnage         |
| Quantity spilled                        | Flag                  |
| Incident nature (reason for the spill)  | Year built            |
| Nature of the pollutant                 | Cargo transported     |
| Weather conditions at time of incident  | Amount of bunker fuel |
| Lead agency                             | Name of the user      |
| <b>Comments/additional information:</b> |                       |

2. *The Contingency Plan (general)*

|  |            |
|--|------------|
| <b>Notes – this section should be used to give specific recommendations or suggestions of modifications/additions to the contingency plan, if appropriate including comments from the persons responding in the field.</b> |            |
| <b>Assessment Factors</b>  | <b>Y/N</b> |
| Was a contingency plan in place?   |            |
| Did the contingency plan identify a lead agency?   |            |
| Was the plan relevant?   |            |
| Was the plan up to date?   |            |
| Was the plan activated in time?  |            |
| Was the plan useful (did it provide guidance to the lead agency in all of the areas of the response)?  |            |
| Were the people involved in the response trained in the use of the contingency plan?   |            |
| Was the response conducted according to the contingency plan?  |            |
| Is there an agreed mechanism for feedback of lessons learned into the contingency plan?  |            |
| <b>Comments/additional information:</b>  |            |
| <b>Main assessment results (lessons learned):</b>  |            |

3. *Initial notification and first response (general)*

|   |            |
|---|------------|
| <b>Notes – this section is focussed on the response by the lead agency with overall responsibility for responding to the oil spill (rather than vessel crew, salvors, etc.)</b> |            |
| <b>Assessment Factors</b>   | <b>Y/N</b> |
| Were actions to stop the spill of oil (shutdown, stabilising vessel, emergency towing, emergency lightering etc.) taken quickly?  |            |
| Was the first aerial surveillance flight carried out quickly and by trained observers?  |            |
| Was adequate information available to the lead agency on the initial situation?   |            |
| Did the initial alert and notification process work quickly and effectively?  |            |
| Were response resources (equipment and personnel) mobilised quickly after receiving the alert?  |            |
| Did those personnel involved in the initial response know their roles and responsibilities?   |            |
| Were roles and responsibilities for initial response defined in the contingency plan?   |            |
| <b>Comments/additional information:</b>   |            |
| <b>Main assessment results (lessons learned):</b>   |            |

4. *Monitoring and surveillance of oil and its fate/behaviour (at-sea response)*

|   |            |
|---|------------|
| <b>Notes – if applicable, poor weather should be mentioned under comments/additional information as a significant limiting factor to the effectiveness of monitoring and surveillance operations.</b> |            |
| <b>Assessment Factors</b>   | <b>Y/N</b> |
| Were regular aerial surveillance flights conducted by trained observers and information fed to the lead agency?   |            |
| Were satellite images (if available) requested quickly?   |            |
| Once satellite images were available, was interpretation (confirm presence of oil) performed by a suitably trained person?  |            |
| Was remote sensing conducted regularly to verify the appearance and thickness of the oil?   |            |
| Was remote sensing performed effectively by suitably trained crews?   |            |
| Was access to local meteorological and oceanographic data available?  |            |
| Was access to oil spill modelling software available?   |            |
| Did the oil spill model output provide a reasonable projection of oil location, extent and fate (compared to the actual situation)?   |            |
| Was remote sensing used to verify model predictions?  |            |
| Was oil / water sampling performed?   |            |
| <i>How much did monitoring and surveillance cost approximately throughout the entire operation?</i>   | €          |
| <b>Comments/additional information:</b>   |            |
| <b>Main assessment results (lessons learned):</b>   |            |

5. Choice of response strategy (at-sea response)

| Assessment Factors  | Y/N |
|---|-----|
| <i>Please specify the oil type, extent and physical condition of the oil and response strategy (or sequence/combination of strategies chosen)</i> |     |
| Was the overall choice of response strategy/ies (mechanical recovery/dispersants/monitoring /shoreline clean-up) made quickly?                    |     |
| Was a formal decision-tree used to decide the response strategy/ies?  |     |
| Was the overall choice of response strategy/ies made based on environmental and technical considerations only?                                    |     |
| Did media and/or public perception affect the response decision?  |     |
| Were all relevant parties involved in the decision-making process?  |     |
| Were the decisions regularly reviewed and re-evaluated?   |     |
| <b>Requests for external assistance</b>   |     |
| <i>Please specify what type of assistance (personnel, equipment, aircraft etc.) was requested.....</i>  |     |
| Was assistance requested through regional agreement?  |     |
| Was EMSA assistance requested?  |     |
| Was other international assistance requested?   |     |
| Once decided that it was required, was international/regional assistance requested according to defined procedures?                               |     |
| Was the request sufficiently detailed, and easy to understand and interpret?  |     |
| Were there any delays in processing the request for international assistance?   |     |
| Were there significant delays in the assistance being delivered/deployed on site?   |     |
| Did the assistance provided meet the stated objectives?   |     |

|  |   |
|--|---|
| Approximately how much did equipment/resources provided by external assistance cost approximately throughout the entire operation? | € |
| <b>Comments/additional information:</b>  |   |
| <b>Main assessment results (lessons learned):</b>  |   |

#### 6. Salvage operations (general)

| Notes –   |     |
|---|-----|
| Assessment Factors  | Y/N |
| Was emergency intervention (salvage, availability of Emergency Towage Vehicles) addressed in the national contingency plan? |     |
| From the Member State(s) involved, was there a single representative with ultimate responsibility for salvage operations?   |     |
| Were public resources used in the salvage intervention?   |     |
| Were private resources used in the salvage intervention?  |     |
| Was a commercial salvage contract concluded between the relevant parties?   |     |
| Was anchoring possible?   |     |
| Could the ship be accessed by helicopter?   |     |
| Did the event occur in an area of high traffic density?   |     |
| Was there adequate sea room and depth of water to allow the ship to drift?  |     |
| Had places of refuge been identified in advance for the area concerned?   |     |

|  |  |
|--|--|
| Were appropriate procedures in place to ensure access to the place of refuge?  |  |
| Had a maritime assistance service (MAS) been established?                      |  |
| Were sea safety zones or restrictions established in the surrounding sea area? |  |
| <b>Comments/additional information:</b>  |  |
| <b>Main assessment results (lessons learned):</b>                              |  |

7. Mechanical recovery (at-sea response)

|   |            |
|---|------------|
| <b>Notes –Heavy weather should (if applicable) be mentioned in comments/additional information as a significant limiting factor to the effectiveness of mechanical recovery (operational limitations of equipment and personnel safety considerations).</b> |            |
| <b>Assessment Factors</b>   | <b>Y/N</b> |
| <i>Please specify the type of equipment used.....</i>   |            |
| Was mechanical recovery the only response chosen?   |            |
| Was a sweeping arm used?  |            |
| Was a combination of boom and skimmer used?   |            |
| Was a pump used?  |            |
| Was sufficient equipment available?   |            |
| Did the equipment perform as expected?  |            |
| Were protective booms deployed?   |            |
| Was mechanical recovery equipment deployed quickly (no significant delays in sourcing local/national equipment)?  |            |

|  |                        |
|--|------------------------|
| Was there enough mechanical recovery equipment available to respond to the volume of oil spilt?  |                        |
| Were sufficient vessels available to deploy all equipment?   |                        |
| Was mechanical recovery equipment deployed properly (without damage) and effectively by trained crew?  |                        |
| Did vessels and pumps have sufficient heating capacity for recovery of heavier/viscous oils (if applicable)?   |                        |
| Did vessels have sufficient oil/water separation systems to minimise the quantity of water taken up with recovered oil?  |                        |
| Were there limitations to on board storage capacity?   |                        |
| If additional storage (lightering) capacity was required, was adequate capacity available?   |                        |
| If additional storage (lightering) capacity was required, was this sourced and deployed quickly and effectively?   |                        |
| Was aerial support available to guide response vessels to highest concentrations of oil?   |                        |
| Were operations performed at night?  |                        |
| Were there any problems of compatibility/interoperability (e.g. connecting different types of boom)?   |                        |
| Was mechanical recovery stopped at the right time (i.e. not continued once no longer effective or needed)?   |                        |
| <i>How long was mechanical recovery equipment deployed for as proportion of total time spent on site?</i>  |                        |
| <i>How much oil was recovered in the first X (please specify) hours of deployment?</i>   |                        |
| <i>How much oil was recovered in total?</i>  | <i>t/m<sup>3</sup></i> |
| <i>How much oil was recovered in total as a proportion of the total amount spilt?</i>  | <i>%</i>               |
| <i>Approximately how much did deployment of mechanical recovery equipment (excluding that from international assistance) cost throughout the entire operation?</i> | <i>€</i>               |
| <b>Comments/additional information:</b>  |                        |

|   |
|---|
| <b>Main assessment results (lessons learned):</b> |
|---|

*8. Chemical dispersants (at-sea response)*

|  |                        |
|--|------------------------|
| <b>Notes – as dispersants are not commonly accepted as a response strategy across Europe, disregard this section if dispersants were not used.</b>   |                        |
| <b>Assessment Factors</b>  | <b>Y/N</b>             |
| <i>Please specify the oil type and type of dispersant(s) used</i>  |                        |
| Was using dispersants the right choice (whether used alone or in combination with other techniques) for this spill, based on environmental factors i.e. environmental effects of treated oil versus untreated oil (net environmental benefit)? |                        |
| Was the decision to use dispersants taken quickly enough (window of opportunity) for dispersants to be effective?  |                        |
| Were dispersants applied properly so as not to cause undue environmental damage?   |                        |
| If necessary, was access to environmental expertise regarding the use of dispersants available?  |                        |
| Was a proper calculation made of the amount of dispersant needed based on the amount of oil spilled (20:1 ratio)?  |                        |
| Were there enough dispersants available?   |                        |
| Were dispersants applied/sprayed (from aircraft and/or vessels) properly by trained operators?   |                        |
| Were dispersants effective at dispersing the oil into the water column?  |                        |
| Was application of dispersants stopped at the right time (i.e. discontinued once no longer effective or needed)?   |                        |
| <i>How much oil was dispersed as a proportion of the total amount spilled?</i>   | <i>t/m<sup>3</sup></i> |
| <i>Approximately how much did dispersant application cost in total?</i>  | €                      |
| <b>Comments/additional information:</b>  |                        |

|   |
|---|
| <b>Main assessment results (lessons learned):</b> |
|---|

*9. Shoreline clean-up (shoreline clean-up)*

|  |                                   |
|--|-----------------------------------|
| <b>Notes – this section can be divided into primary clean-up (removing free oil and heavy contamination) and secondary (removal of residue) clean-up stages as necessary. Waste management issues are addressed separately below and specific issues of security and volunteers are under Health and Safety.</b> |                                   |
| <b>Assessment Factors</b>  | <b>Y/N</b>                        |
| <i>Please specify the type of shoreline(s), type of clean-up equipment and technique(s) used</i>   |                                   |
| Was shoreline clean-up properly organised and planned?   |                                   |
| Was the combination of equipment and techniques (mechanical, manual and chemical) appropriate for the oil type and physical state of the oil?  |                                   |
| Was the combination of equipment and techniques appropriate for the shoreline type (e.g. rocky shore, salt marsh etc.)?  |                                   |
| Was there enough shoreline clean-up equipment (mechanical and manual) available?   |                                   |
| Was there enough labour (people) available to undertake shoreline clean-up?  |                                   |
| Were regular assessments made of the extent of shoreline oiling and information passed back to the lead agency?  |                                   |
| Was a reasoned assessment, based on technical and environmental considerations, made on when to stop the clean-up?   |                                   |
| <i>What length of shoreline was contaminated by oil and to what extent?</i>  | <i>Km/heavy/<br/>light oiling</i> |
| <i>How much oil was recovered from the shoreline?</i>  | <i>m<sup>3</sup></i>              |
| <i>How many people were used for shoreline clean-up in total?</i>  |                                   |

|   |   |
|---|---|
| <i>How much did shoreline clean-up operations cost?</i> | € |
| <b>Comments/additional information:</b>                 |   |
| <b>Main assessment results (lessons learned):</b>       |   |

*10. Waste Management (shoreline clean-up)*

|  |            |
|--|------------|
| <b>Notes – long term treatment and disposal methods are not considered.</b>                                |            |
| <b>Assessment Factors</b>  | <b>Y/N</b> |
| <i>Please specify the type of waste generated</i>  |            |
| Was a waste management plan already in place?  |            |
| Were proper decontamination procedures (waste minimisation) implemented as part of the shoreline clean-up? |            |
| Was waste properly segregated and categorised (e.g. standard waste, hazardous waste)??                     |            |
| Were there any legal implications to be considered as a result of the categorization?                      |            |
| Was sufficient equipment available for temporary storage of oily waste?                                    |            |
| Were there any delays in sourcing equipment for temporary storage of oily waste?                           |            |
| Were suitable locations with adequate access available for temporary storage of oily waste?                |            |
| Were suitable locations available for disposal of oily waste?  |            |
| Were there any delays in sourcing equipment for transport of oily waste to disposal sites?                 |            |
| Was it possible to recover/reuse any oily waste?   |            |
| Was it possible to clean and return any oiled beach material (e.g. sand) to its original location?         |            |

|  |                        |
|--|------------------------|
| <i>How much waste was generated in total?</i>                                  | <i>t/m<sup>3</sup></i> |
| <i>Approximately how much did shoreline clean-up operations cost in total?</i> | €                      |
| <b>Comments/additional information:</b>  |                        |
| <b>Main assessment results (lessons learned):</b>                              |                        |

### 11. Environmental Impacts in the Marine Environment (general)

| <b>Notes –</b>   |            |
|--|------------|
| <b>Assessment Factors</b>  | <b>Y/N</b> |
| Was a formal assessment conducted (e.g. post-hoc Environmental Impact Assessment, Natural Resource Damage Assessment)?                             |            |
| Were any threatened, endangered or rare species impacted?  |            |
| Were any sites of special scientific interest impacted?  |            |
| Was the area impacted part of a nature reserve, natural park, or otherwise identified area of ecological importance or outstanding natural beauty? |            |
| Were fisheries impacted?   |            |
| Were amenity beaches impacted?   |            |
| Was there an impact on marine mammals (e.g. sea otters, dolphins, seals)?  |            |
| Was this quantified?   |            |
| Was there an impact on reptiles and amphibians?  |            |
| Was this quantified?   |            |

|   |  |
|---|--|
| Was there an impact on fish?  |  |
| Was this quantified?  |  |
| Was there an impact on invertebrates?   |  |
| Was this quantified?  |  |
| Was there an impact on marine flora?  |  |
| Was this quantified?  |  |
| Did the accident occur during a period of particular importance (e.g. bird migrations, fish spawning)?  |  |
| Was a wildlife response operation undertaken?   |  |
| Was any environmental restoration/remediation undertaken?   |  |
| Was water analysis undertaken?  |  |
| <b>Comments/additional information (if any studies were conducted and/or remediation work undertaken, please indicate how long these took):</b> |  |
| <b>Main assessment results (lessons learned):</b>   |  |

*12. Health and safety (at sea and during shoreline clean-up)*

|  |            |
|--|------------|
| <b>Notes –</b>   |            |
| <b>Assessment Factors</b>  | <b>Y/N</b> |
| <b>General</b>   |            |
| Was a thorough assessment made of the health risks of spilled oil? |            |

|  |  |
|--|--|
| Was air sampling undertaken?   |  |
| Was vessel and/or site security adequately addressed?  |  |
| Were there any serious accidents/injuries?   |  |
| <b>At sea</b>  |  |
| Were health and safety aspects on board vessels monitored?   |  |
| Had the crew of Oil Spill Response Vessels received adequate training?                                       |  |
| Did the vessels apply safe working practices in accordance with written procedures?                          |  |
| Was adequate personal protective equipment (PPE) available for all staff on board response vessels?          |  |
| <b>Shoreline</b>   |  |
| Were there sufficient personnel available for shoreline clean-up for the duration of the response operation? |  |
| Were shoreline clean-up personnel properly briefed and (if necessary) trained?                               |  |
| If volunteers were used in the shoreline clean-up, were they properly briefed and trained?                   |  |
| Were health and safety aspects of shoreline clean-up operations supervised and monitored?                    |  |
| Was adequate PPE available for all shoreline clean-up personnel and volunteers?                              |  |
| <b>Comments/additional information:</b>  |  |
| <b>Main assessment results (lessons learned):</b>  |  |

*13. Management and coordination (general)*

| <b>Assessment Factors</b>  | <b>Y/N</b> |
|--|------------|
| Were there any issues raised in relation to jurisdiction?  |            |
| Was it clear which entity should take lead responsibility?   |            |
| Does the contingency plan provide a clear command structure?   |            |
| Were response personnel trained for their roles and responsibilities?  |            |
| Was there good cooperation between the different governmental authorities involved?                          |            |
| Was there good cooperation between the technical teams/persons (e.g. operations, planning, logistics, etc.)? |            |
| If external contractors were used, did they achieve their agreed objectives?                                 |            |
| Did the lead agency have adequate access to specialised information from other agencies/organisations?       |            |
| <b>Comments/additional information:</b>  |            |
| <b>Main assessment results (lessons learned):</b>  |            |

*14. Communications and information (general)*

| <b>Notes – categories can be divided further if necessary and particular areas where there was a lack of information should be highlighted.</b> |            |
|---|------------|
| <b>Assessment Factors</b>   | <b>Y/N</b> |
| <b>Communication between stakeholders and public relation procedures</b>  |            |
| Was there an adequate flow of information between lead agency and the responsible party (e.g. ship owner or representative)?                    |            |

|  |  |
|--|--|
| Was there an adequate flow of information between lead agency and political level of government?         |  |
| Was there an adequate flow of information between lead agency and public?                                |  |
| Was a communications/Public Relations plan already in place?   |  |
| Were dedicated personnel identified to deal with media enquiries?  |  |
| Was there an adequate flow of information between lead agency and media?                                 |  |
| Was a log kept of all telephone calls made and received within the lead agency?                          |  |
| Were all documents/emails/faxes relating to the response catalogued and recorded?                        |  |
| <b>Internal Communications</b>   |  |
| Was there an adequate flow of information between aircraft/vessels/shoreline responders/central command? |  |
| Were there adequate tools and equipment for communications in the field?                                 |  |
| Did enough information pass between the different technical teams/persons (operations, logistics, etc.)? |  |
| <b>Comments/additional information:</b>  |  |
| <b>Main assessment results (lessons learned):</b>  |  |

*15. Cost recovery and claims management (general)*

|  |            |
|--|------------|
| <b>Notes –</b>   |            |
| <b>Assessment Factors</b>  | <b>Y/N</b> |
| Was a financial controller appointed at the beginning of the incident? |            |
| Was there sufficient record keeping?                                   |            |

|   |  |
|---|--|
| Were there adequate templates (matrix, forms, logging) in place to facilitate record keeping?   |  |
| Had a price structure for response equipment and personnel been defined before the incident?  |  |
| Were the equipment tariffs and personnel costs considered as reasonable and justifiable when settling the claim?  |  |
| Does the national contingency plan include a section on cost recovery?  |  |
| Were the EU States Claims Management Guidelines used?   |  |
| Were other publications/manuals on pollution damage used during the incident and when compiling the dossier?  |  |
| Does the national legislation in force offer a satisfactory basis for claiming compensation?  |  |
| Were the relevant International Conventions ratified at the time of the incident?   |  |
| Were the compensation limits in place under the relevant Conventions reached?   |  |
| Was there adequate cooperation between the responsible party (e.g. ship owner or representative) and the national authorities in charge of the response operations? |  |
| Was a financial security provided by the ship owner at an early stage of the incident?  |  |
| <b>Comments/additional information:</b>   |  |
| <b>Main assessment results (lessons learned):</b>   |  |

### 16. General Conclusions and Recommendations (Lessons Learned)

| <b>Assessment Factors</b>   | <b>Y/N</b> |
|---|------------|
| Was the response proportionate to the pollution threat?   |            |
| How long did the response operation last?   |            |
| Were there any new/atypical considerations that need to be taken into consideration and analysed in the future? |            |

|  |                                     |
|--|-------------------------------------|
| What do you think should be approached differently next time?                |                                     |
| <i>What are the 3 most significant findings from the previous sections?</i>  | <i>1.</i><br><i>2.</i><br><i>3.</i> |
| <i>What investment needs have been identified?</i>                           | <i>Detail</i>                       |
| <i>What training needs and for which persons/teams have been identified?</i> | <i>Detail</i>                       |
| <i>What modifications are required to the contingency plan?</i>              | <i>Detail</i>                       |

## **Guidelines for the Exchange of Oil Samples/Results between countries, and on Oil Spill Identification**

### **Preliminary remark**

Oil spill identification is conducted by experienced and specialised laboratories in order to determine whether a relationship exists between spilled oil samples and suspected source samples. A table of laboratories participating in the annual ring tests organised by Bonn-OSINet is available on the Bonn-OSINet section of the Bonn Agreement website.

In the case of “mystery” oil spills, i.e. where there is no suspected source, chemical investigations can be of great help in identifying possible sources.

The ensuing expert’s report can then be used in criminal and civil proceedings to help identify or confirm the responsible party. Chemical analytical results are thus used to attach responsibilities, assess penalties, and help recover cleanup costs incurred during an incident.

The Guidelines for the Exchange of Oil Samples/Results between countries, and on Oil Spill identification consists of two parts:

### **Part 1 - Oil sampling for the purpose of source identification and**

### **Part 2 - Analytical method and reporting**

- Part 1 describes oil sampling and should be at hand when an oil spill is observed. Therefore chapter 32 of the Counter Pollution Manual describes sampling in detail and is freely available on the Bonn Agreement website.
- Part 2 deals with the analytical method that should be used by the laboratory. Therefore Chapter 32 of the Counter Pollution Manual does not describe the method but refers to CEN/TR 15522-2:2012.

Part 1 is approved by the network of experts on oil spill identification within the Bonn Agreement (Bonn-OSINET).

Relationship with deliverables of the European Committee for Standardization (CEN):

The techniques of sampling for oil spill identification given in these guidelines are also reflected in CEN/TR 15522-1:2006: “Oil Spill Identification – Waterborne petroleum and petroleum products - Part 1: Sampling”.

A joint analytical methodology (Part 2) has been produced by Bonn-OSINET. This methodology has been approved by CEN and is available through national standardisation bodies:

CEN/TR 15522-2:2012 “Oil spill identification - Waterborne petroleum and petroleum products - Part 2: Analytical methodology and interpretation of results based on GC-FID and GC-MS low resolution analyses”.

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## Part 1 – Oil sampling for the purpose of source identification

### *Introduction*

Forensic investigations may form part of a whole chain of activities undertaken to gather information about a given oil spill. Sampling is the first step in the process of obtaining information about the spill. Information about the physical and chemical properties as well as behaviour will facilitate decision-making during response to the oil spill. The many different purposes of sampling, and how sampling activities can be organised, are described in Annex 3.

The oil sampling activities described in this manual are limited to forensic investigations.

### *1 Background*

1.1 This manual is intended to aid the sample taking person in the proper procedures involved in oil sampling for source identification. If the sampling is not done in a proper way the results of the analysis will not be as accurate as they could otherwise be.

1.2 Samples can be taken from the water surface, suspected polluter or the shore line. Oil spill sampling of released oil is described in Section 3. Oil sampling on board vessels is described in Section 4.

1.3 Handling of samples and documentation of samples is described in Section 5. At the end of the document sampling kits are presented, and oil spill sampling is summarized in the form of a sampling checklist.

### *2 Training*

2.1 All personnel involved in sampling need to be trained to ensure that the sampling is performed in a correct way. This is also something that will be questioned by lawyers in the legal process following an oil spill. When samples are taken at a suspected polluter it is important that the sampler has been working on board ships. This will ensure that he/she has knowledge and experience of the piping systems in machinery spaces and cargo systems.

2.2 Training should be ongoing to make sure the level of competence is maintained over time.

### *3 General remarks*

3.1 **All** spills encountered and **all** potential sources of spills should be sampled. It is important to take samples from both spill and source even when it is clear where the spill originates from. From the outset, the type of sampling equipment and routines described in this document should be used.

3.2 Sampling procedures which are connected to liability investigations must be performed with great care and accuracy concerning spills as well as suspected sources. Every action should be taken to prevent a deterioration in the samples' value as evidence.

3.3 Even if an oil spill has scattered, and only a thin sheen remains, every possible effort should be made to take at least a small sample. No sample volume is too small to be shipped to the laboratory. The laboratory can often analyse very small oil samples – for example, water samples that seemingly consist of pure water or sample pads that do not show any visible traces of oil.

3.4 If any part of the oil spill differs in any respect from other parts, take extra samples to check if more than one spill has occurred in the area.

3.5 If the spill response operation continues for more than one day, samples should be taken every day to make it possible to determine the degree of weathering of the oil as well as possible contamination by other oils.

3.6 If an oil sample is suspected of containing contaminants, take blank samples, if possible, of the contaminant. Surface waters in harbours and estuaries may contain traces of various petroleum products. When spills in such waters are sampled, it is therefore also important to provide the laboratory with blank samples of the water.

3.7 Samples and sampling equipment should be handled and stored so that the samples cannot be manipulated, mixed up, or be contaminated by other substances. Samples should be handled as legal evidence and should be kept in a “chain of custody” until identification and possible legal procedures have been completed. Therefore, always use the sealable and individually numbered safety bags described later in this document.

3.8 A bottle containing a sample should not be placed in the sampling kit containing the clean equipment. Reusable sampling equipment should always be very carefully cleaned, and put into clean plastic bags, before restoring it to the sampling kit case. Used sample bottles must not be used again - not even after careful washing.

3.9 Make notes of all relevant information about samples and sample sites. Use a digital camera or a video camera to record observations which are considered important to the investigation.

3.10 The samples should be sent as soon as possible to the laboratory. Quick handling of samples is important. If the transmission is delayed, the samples should be kept at a temperature of less than +4°C (but not be frozen).

3.11 Used equipment should be replaced as soon as possible so that the sampling kit case is always fit for use, and so that new samples can always be quickly packed and sent away.

#### 4 *Oil spill sampling*

##### **Thick waterborne layers, oil globules and tar balls**

4.1 Focus the sampling on thick parts of the spill. If the spill is large, it is important to take samples in several positions within the spill to get a representative sample selection.

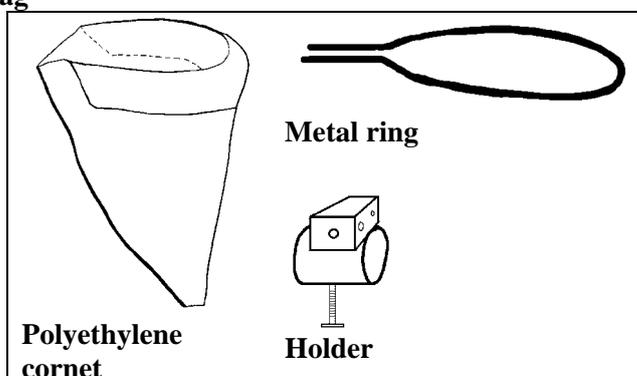
##### **Use of a sample bottle directly**

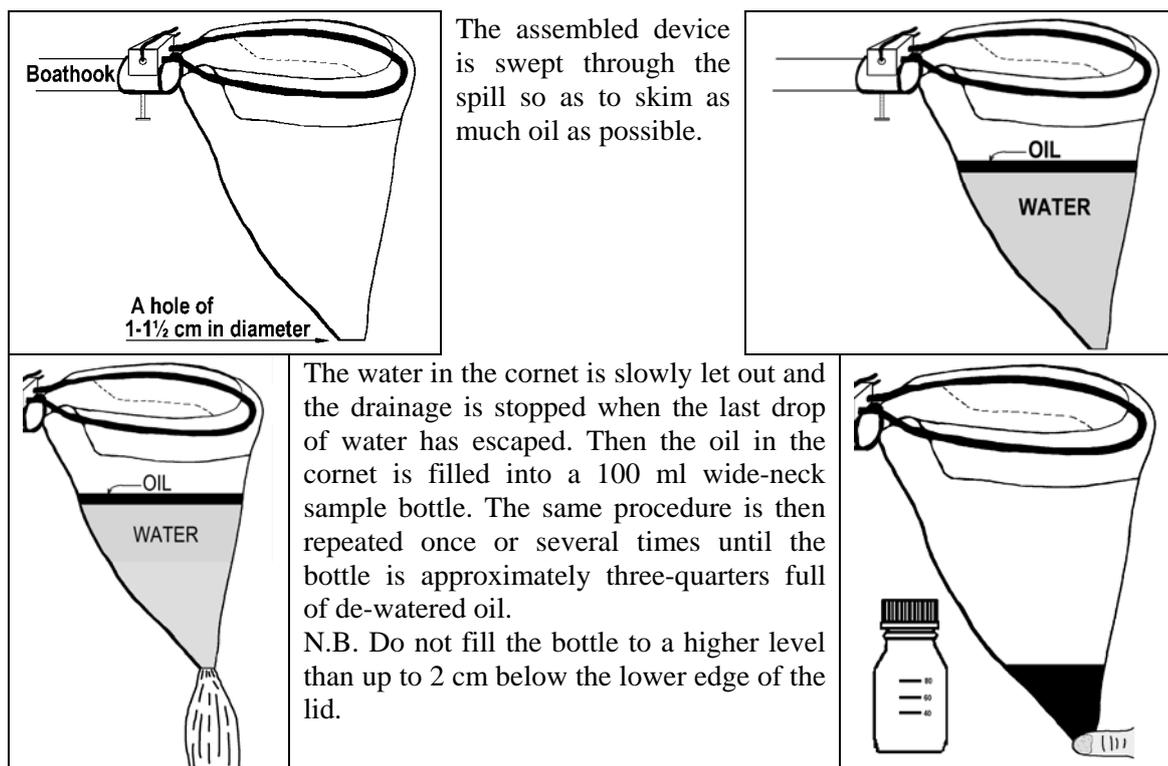
4.2 Globules, balls and thick parts can often be sampled directly with a sample bottle. Fill the bottle with as many balls as possible or skim oil from the surface by repeated sweeps with the bottle. Remove the water which has entered the bottle. One method of doing this is to close the lid and hold the bottle upside down for a minute to let the oil float upwards to the bottom of the bottle so that the water can be drained by careful opening of the lid. Then continue to skim oil and try to get the bottle approximately three-quarters full of de-watered oil (i.e. 50-70 ml). Further techniques to concentrate the oil into the sampling bottle:

##### **Polyethylene cornet or conical Teflon® bag**

Floating brown oil layers or tar balls on the water surface can often be sampled by a polyethylene cornet. The cornet should have a wide hem into which a metal ring can be threaded. First cut off the tip of the cornet as shown in the picture.

A holder is fitted onto the ring and by means of this holder the device can be fastened to a boathook or the like.





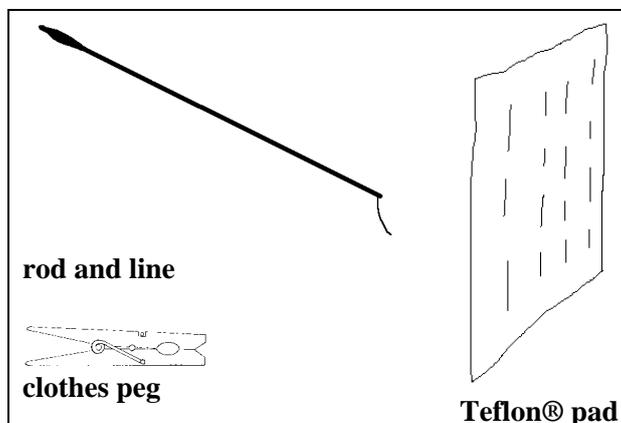
### Clean bucket with small holes

4.3 One useful refinement of the skimming technique involves the use of a bucket with small holes in the bottom allowing much of the water to drain away from the oil. After drainage of water, the skimming technique may be repeated several times to increase the amount of oil in the bucket. Finally, the oil may be transferred to the sample container by means of a stainless-steel or Teflon<sup>®</sup> scraper used to scrape the sides of the bucket.

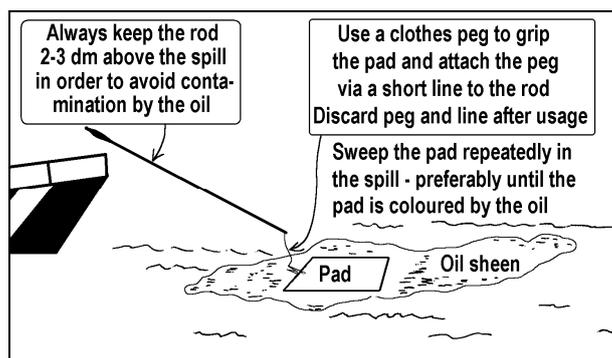
### Sampling of thin oil films (sheens)

4.4 A special Teflon<sup>®</sup> pad can be used if the oil film on the water surface is very thin (“rainbow sheen”, “blue sheen”, “silvery sheen”). The use of a Teflon<sup>®</sup> pad can dramatically increase the amount of oil sampled. The pad material should be Teflon<sup>®</sup> (or a similar inert polyfluoropolymer) because other materials interfere with the subsequent analytical processes in the chemical laboratory.

A practical arrangement for handling a pad is shown in the figures to the right. Great care must be taken during sampling to avoid contamination of the sheen by traces of oil from the sampling vessel or from other sources. The pad should be swept in the spill preferably until it is coloured by the oil. However, it should be emphasized that the pad may have absorbed a sufficient amount of oil even if the pad has no sign of brown colour.



After a sufficient number of sweeps the Teflon<sup>®</sup> pad is carefully put into a sample bottle. The peg can be used to push the pad into the bottle. Another clean wooden peg of any kind can, if necessary, be used to assist in the procedure. It is important to avoid contact with any item that might contain traces of strange oils.



Teflon<sup>®</sup> pad on watersurface

### Taking oil samples on beaches and from oiled animals

4.5 Take samples in every continuous oil slick. In the case of a spill which is scattered over a long coastline many samples should be taken to enable a mapping of the oil distribution on the shores.

4.6 The oil should be scraped off oiled items and transferred into sample bottles. Avoid, if possible, contamination in the bottles by sand, grass and other debris. In exceptional cases when it is difficult to obtain clean oil samples, it is acceptable to place small oiled items (pebbles, small pieces of wood, etc.) in the bottles.

4.7 Any remaining traces on the shore from earlier oil spills must be carefully avoided during sampling a specific new spill. Take extra samples if there is any suspicion of more than one oil spill in the area (differing colour, consistency, etc.). Always take blank samples in instances of hesitation. This is especially important when oil samples are scraped from creosote-impregnated wood.

4.8 Never take whole animal samples, body tissues, etc. which may become rotten during shipment. Try to cut off small parts of oiled feathers, fur, etc. Put the material directly into a sample bottle.

### Use of sampling buoy from an airplane

4.9 It is possible to drop a sampling buoy into an oil spill from an air craft. Attached to the buoy there is a Teflon<sup>®</sup> pad. Below are instructions on how such a sampling buoy should be handled when recovered from the surface of the sea.



1. Take a record of position, wind and sea currents.
2. Lift the buoy from the water **without touching the sample pad with fingers**.
3. Allow excess water to drain off from the sample pad. Check that the sample does not contain animal tissue which might rot during transport.
4. Insert the sample pad into a sample bottle. Pushing the pad with a clean peg of any kind can facilitate the insertion of a sample pad. Perform this **without touching with fingers** or contact with items that might contain disturbing contaminants.



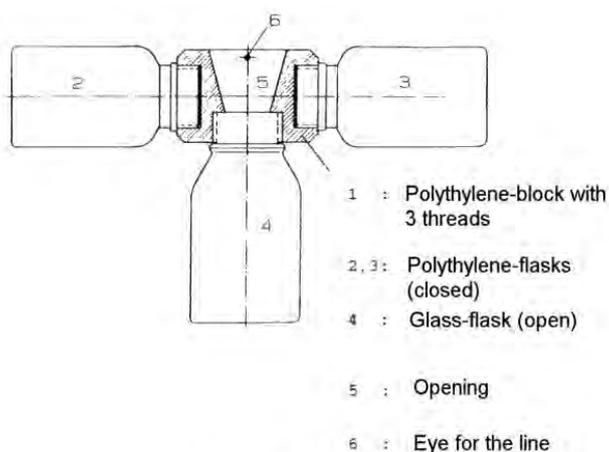
The samples should be immediately transported to a sampling coordinator. Quick handling of samples is important. The samples should be kept below a temperature of +4°C.

### **Use of helicopter sampling device**

4.10 Oil samples can be taken with equipment attached to a helicopter.



4.11 The figure below shows the helicopter sampling device.



4.12 Due to the buoyancy of the 3 empty bottles, initially the apparatus floats horizontally on the water surface, so that water and surface layer film can flow into the sampling bottle (4). After filling, this bottle sinks down and thereby directs the opening upwards, so that water can no longer flow into or out of the bottle.

4.13 Under adverse conditions (rough seas, thin oil films) a small stripe of a Teflon<sup>®</sup>-net may be attached to the sampler (kept in place by two plastic screws). When the sampler is lowered to the sea surface, this Teflon<sup>®</sup> net is thus laid upon the oil film. After sampling, the Teflon<sup>®</sup> net is put into the glass bottle.



As can be seen in the right-hand picture above, enough oil for the following trace analysis is sampled in this way (right-hand picture, sample on the left: sample taken without Teflon® net, no visible oil ; sample on the right: “clean water” taken beside the oil film).

4.14 This sampling device may also be used from bigger ships or from bridges in harbours.

## 5 *Investigations and oil sampling on board vessels*

### Introduction

5.1 Samples must be taken on board ships observing appropriate caution in accordance with current safety regulations. During sampling on board ships the recommendations below in paragraphs 5.4 – 5.10 “General advice and directions for safety routines” should be followed carefully.

5.2 It is often difficult to obtain relevant oil samples on board suspected sources. Yet, it must be emphasized that it is of the utmost importance for an oil spill investigation that suspected sources of the spill are traced as far as possible and that reference samples are taken. Sometimes during sampling on board a vessel it is necessary to get assistance by the crew under control. However, it is quite wrong to accept unknown samples which are handed over by representatives from the ship or the shipping company.

5.3 Use a digital camera or a video camera to record observations which are judged to be valuable for the investigation.

### General advice and directions for safety routines

5.4 Directions must be obtained from the ship's officers about how sampling should be performed in the light of the safety regulations current on board the ship. Sampling in tanks and spaces within the ship's Hazardous Areas should preferably be carried out by the ship's own crew. Sampling performed by the ship's crew should be strictly supervised by the personnel responsible for the sampling in order to avoid manipulation.

5.5 If the ship has its own sampling equipment, this should be used if possible. If this is not possible, sampling should be performed by means of external equipment only after approval by the ship's officers or by a ship-surveyor.

5.6 When samples are taken in tanks containing volatile petroleum products the following advice should be observed:

- a. Filter masks with a combination filter should be brought and used whenever necessary.
- b. The sampler should stand neither on the windward nor the leeward side of the hatch. A side wind gives the smallest risk of breathing gas.
- c. Only one hatch should be opened at a time.
- d. Avoid breathing petroleum gases, especially if they come from sour crude (smell of rotten eggs).

- e. One person should perform the sampling and another should supervise the sampler (safety guard). The latter should watch the sampler's condition in order to ensure that he/she is removed to a safe place if he/she is affected by petroleum gases (intoxication symptoms).
- f. Only explosion-proof equipment (marked EEx) should be used.
- g. The sampler should not have loose items in his/her pockets that could fall into the tank.

5.7 The following safety directions are based on the "International Safety Guide for Oil Tankers & Terminals" (ISGOTT):

#### During loading

5.8 Equipment made of metal for sampling and ullage-sounding must not be brought into the tank, or be left in the tank, during loading or within 30 minutes after loading has stopped. Examples of such equipment are steel measuring tapes and steel measuring sticks. Non-conducting equipment without metal parts may generally be used at any time. Cords, however, used for lowering equipment into tanks must be made of natural fibres (not synthetic materials).

#### After loading

5.9 Equipment made of metal for sampling and ullage-sounding can be used 30 minutes after loading has stopped. However, it is important that the equipment is firmly grounded to the ship's hull before it is brought into the tank. The equipment must remain grounded until after it has been removed from the tank.

#### Miscellaneous

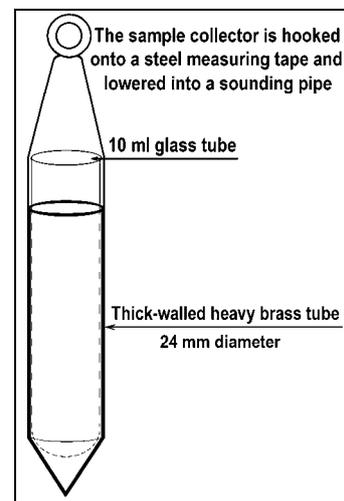
5.10 Taking soundings and samples by means of pipes which are designed for this purpose is allowed at any time.

#### Sampling techniques

5.11 The following guidance is given on the taking of samples.

It may be difficult to obtain oil samples from tanks on board ships without opening manhole covers or drawing off pipes or pumps. However, it is often possible to use sounding pipes with a sample collector and glass tubes according to the adjacent figure. It is used with a steel measuring tape equipped with a carbine hook and a ground wire.

A clean, unused 10 ml glass tube is put into the sample collector which is hooked onto a steel measuring tape which must be grounded before starting the sampling. The oil sample is collected through a sounding pipe and transferred to a 100 ml sample bottle. The glass tube is discarded and the sample collector must be thoroughly cleaned!



The bottom of the sample collector has the shape of a cone, which makes it lie down horizontally on the bottom of a tank. This makes it possible to get samples even from very shallow oil layers in a tank.

The sample collector and the steel measuring tape are reused and must therefore be cleaned off properly after usage. This is done by wiping them off with a cloth. Very small amounts of oil which cannot be wiped off will not contaminate the sample as long as the sample is proportionally much larger.



Sample collector with steel measuring tape.



**Left**

The steel measuring tape must always be grounded to the ship's hull when oil samples are collected through a sounding pipe.

**Right**

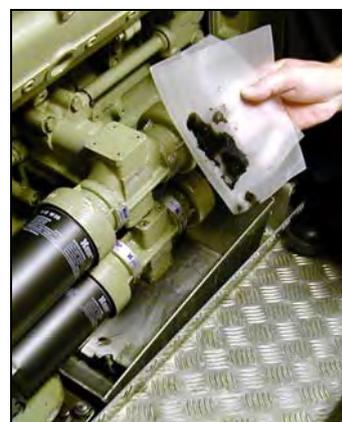
The sample collector can also be used for taking samples from other places with difficult access in the machinery room.



If the oil sample is very small a Teflon<sup>®</sup> pad can be used. The pad is dipped into the sample and then absorbs a sufficient amount of oil. The whole pad is sent for analysis. The pad is made of Teflon<sup>®</sup> because other materials might contaminate the sample and disturb the succeeding analysis.

The Teflon<sup>®</sup> pad is very easy to use. However, the pad is much more sensitive to contaminations than the sample collector as the amount of oil in the pad is usually very small. The pad should therefore be used only when necessary and must be handled carefully so that it is not contaminated by other oils than the sample oil.

The Teflon<sup>®</sup> pad may well be attached to a cord and lowered down into machinery spaces which are difficult to reach.



Teflon<sup>®</sup> pad.

### Checklist for sampling in cargo oil systems

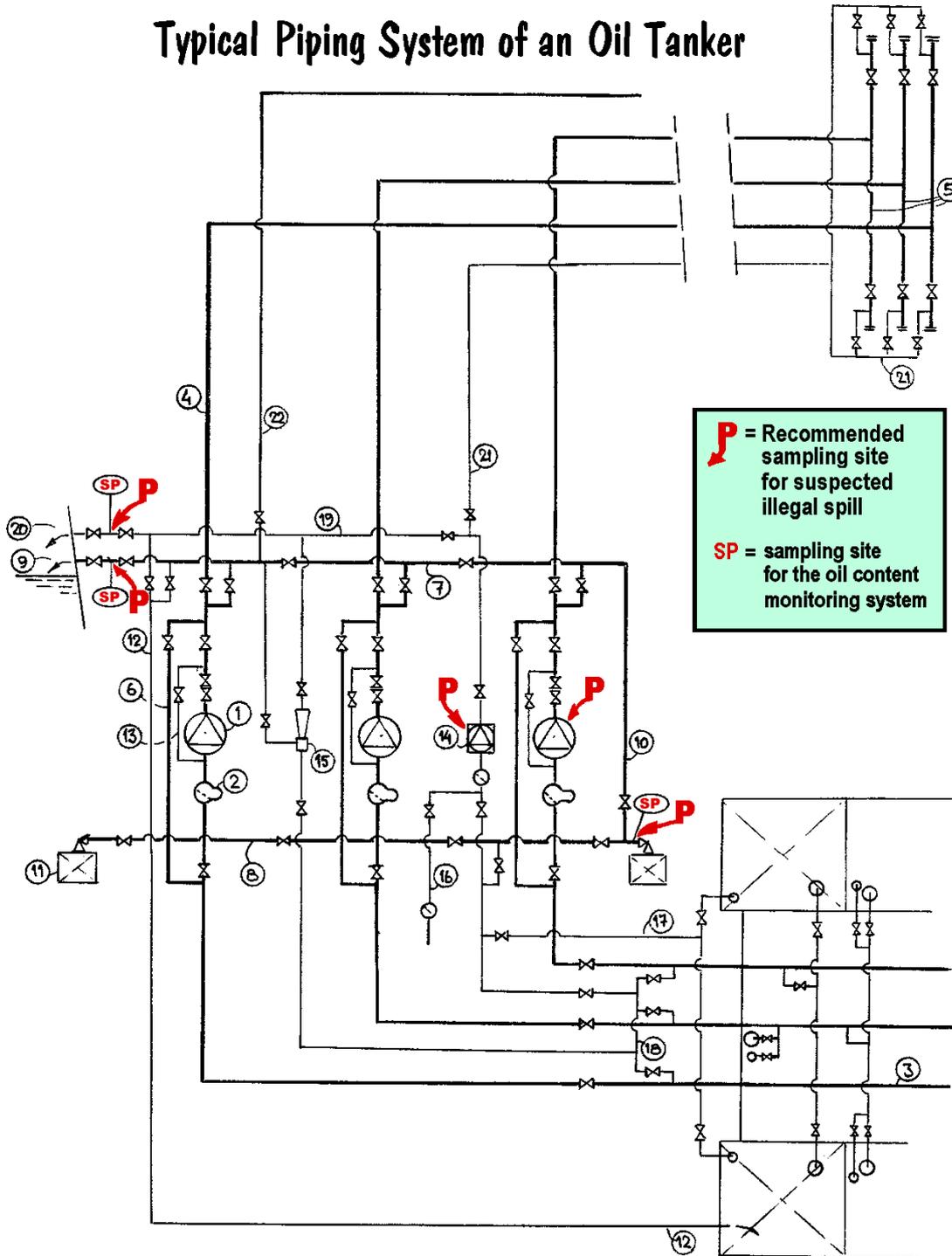
5.12 The following is a checklist for sampling in cargo oil systems:

- a. Find out the ship's category according to the MARPOL convention (COW, SBT, CBT or standard ballasted tanker below 40,000 tdw). Make a copy of the IOPP certificate.
- b. Note the ship's state of loading (cargo/ballast) and make a copy of the Bill of Lading for the current (latest) cargo voyage.
- c. Check the Oil Record Book concerning the whole cycle loading-unloading-ballasting-tank washing. Check that it is signed by the Master. Make a copy of the pages which may be of current interest.

- d. If possible, get hold of a copy of a drawing of the ship's piping system for loading and ballasting.
- e. Check the printouts from the oil-content meter and make a copy of the printout for the current voyage.
- f. Verify current state of ballast (or loading) and check ballasted tanks as well as tanks ballasted during earlier part of voyage.
- g. Check the ship's status in the cargo/ballast cycle, i.e. whether the ship carries departure ballast or arrival ballast, whether tank cleaning has been performed and whether collecting tanks (slop tanks) have been emptied.
- h. Document all oil samples carefully by means of sample bottle labels. Take samples of all oil types which the ship has carried recently and of all oil mixtures which may have been created on board the ship. Take samples of oil residues from all possible sites.
- i. Observe the following:
  - i. The ship's own reference oil samples
  - ii. Slop tanks (also oil-water interface levels, slop volume and water volume)
  - iii. Tanks which contain or have contained oily ballast
  - iv. Pump room keel
  - v. Stripping pumps
  - vi. Overboard piping (both sides)
  - vii. Ballast discharge piping (both sides)
  - viii. Cargo manifolds on deck
- j. Check the records of the Oil Discharge Monitoring System. Oil tankers have a Oil Discharge Monitoring System (ODMS). The ODM is fitted with a recording device to provide a continuous record of the discharge in litres per nautical mile and the total quantity discharged or the oil content and rate of discharge.
- k. Note other observations that may be of value for making a judgement about possible discharges. Take photos of sample sites and other places that may be of value for the investigation.

Piping system of an oil tanker

Typical Piping System of an Oil Tanker



Legend for the above figure

1. Cargo oil pump, usual centrifugal type, 2-4 pcs
2. Pump mudbox, often combined with a vacuum tank for pump evacuation
3. Cargo oil piping in cargo tanks with branchings and connections to the cargo tanks
4. Pump riser to deck and piping on deck
5. Manifold with land connections

6. Pump shunts that allow loading through the piping system (these are sometimes arranged directly from the deck pipes to the bottom pipes, so called “drop lines”)
7. Cross-over at the pumps’ pressure side, simultaneous connection overboard (sometimes separate pipes)
8. Pipe at the pumps’ suction side with connection to sea valves
9. Discharge overboard from the pumps’ connection pipe at the pressure side
10. Ballast pump pipe from the pumps pressure side to sea valve. (This is an earlier alternative to discharge according to 9, and in such case arranged at both sides. The alternative according to 9 is required on new ships. Arrangements according to both 9 and 10 do not exist at the same time.)
11. Sea inlet, usually from both sides
12. Return pipe from overboard connection to slop tank
13. Shunt for drainage of cargo pipes to the suction side of the system
14. Stripping pump, usually plunger type, 1-3 pcs
15. Stripping ejector, 1-3 pcs, sometimes none
16. Suction pipe from the pump room keel
17. Stripping pump’s direct suction from slop tanks
18. Stripping suction pipe from the cargo oil piping
19. Stripping system’s connection pipe at the pressure side with overboard pipe
20. Stripping system’s overboard outlet (may be combined with 9)
21. Stripping pump’s pipe for drainage to land
22. Feeding to the tank washing system

### Sampling in machinery spaces

5.13 The following is a checklist for sampling in machinery spaces:

- a. Check whether the ship has IOPP certificate, and note whether the ship is certified for 100 ppm or 15 ppm separator standard. Note also whether the ship is exempted from any requirement regarding equipment. Make a copy of the certificate.
- b. Study the Oil Record Book for the engine room and copy the pages for the last 30 days
- c. Figures in the engine log book should be in agreement with the figures in the oil record book.
- d. Check all levels and contents, and take samples of the following:
  - i. Bilge sump
  - ii. Bilge water tank (note down a remark if it does not exist)
  - iii. Waste oil tank (may be more than one)
  - iv. Repletion tank connected to oil fuel tanks
  - v. Separator sludge tanks
  - vi. Empty bunker tanks used for ballast water
- e. Take samples also from:
  - i. Fuel day tanks
  - ii. Bilge water separator outlet
  - iii. Sludge pump outlet

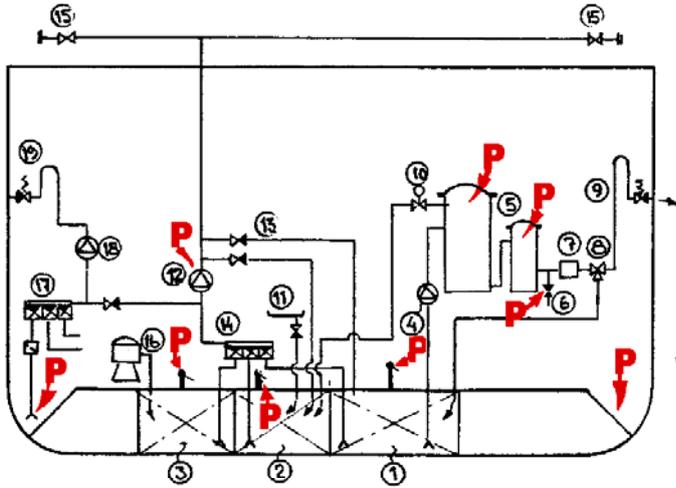
5.14 In addition, the sampler should be aware that oil from the engine room may have been discharged by the emergency bilge pump. This is usually done by an ejector driven by the fire pump or a sea water pump which can also be used as a bilge pump. If there is any suspicion of this:

- a. Examine the bilge water separator. Check the liquid in the plug cock and (if there is any suspicion) insist that the filtering unit is opened.
- b. Examine the tank top for sludge.

- c. Make notes of the types of cleaning agents used in the engine room as well as the stated consumption of them.
- d. If the ship is larger than 10,000 GT and has a 15 ppm separator, the oil content meter and its printout should be examined. Make a copy of the printout for the current time.
- e. Make notes of other observations that are relevant for making a judgement about possible discharges. Take photos of sampling sites and other places which may be relevant for the investigation.

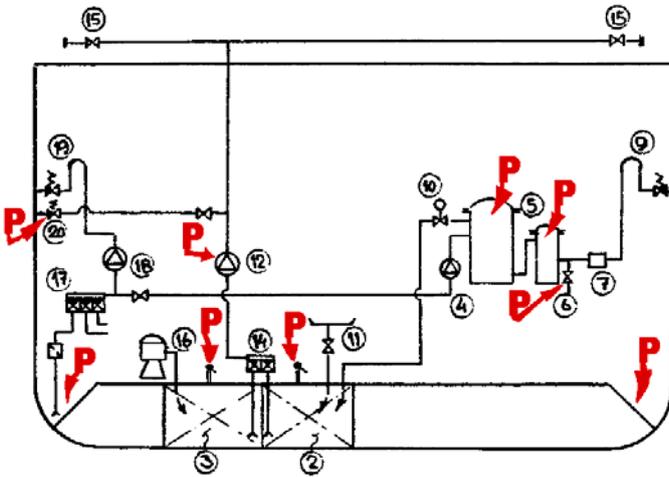
**Basic oil handling systems**

5.15 The following diagram shows the basic oil handling system of a well-equipped modern ship, a common ship and ships smaller than 400 GT:



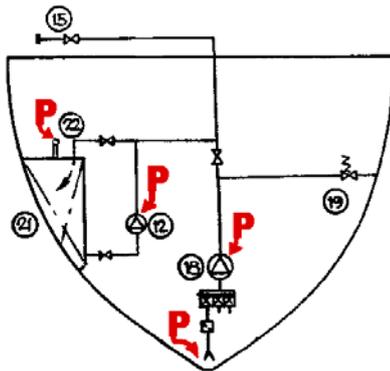
**Machinery Room  
Systems for  
Bilge Water and  
Oil Residues**

**Well-equipped  
Modern Ship**



**P** = Recommended  
sampling site  
for suspected  
illegal spill

**Common  
System**



**Small Ship**

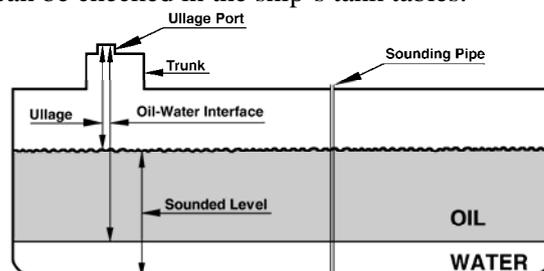
## Legend for the above figure

1. Bilge water tank
2. Waste oil tank
3. Sludge tank
4. Bilge water pump/feed water pump to bilge water separator
5. Bilge water separator, 100 ppm or 15 ppm standard
6. Sampling tap in separator outlet
7. Monitoring instrument for high oil content in separator outlet (compulsory on some occasions only)
8. three-way valve for returned cleaned bilge water
9. Overboard pipe from bilge water separator
10. Automatic drainage of oil from bilge water separator
11. Oil sump under drainage sites
12. Transfer pump for sludge and oil residues to deck. This pump can also be used for transferring bilge water from bilge sumps to bilge water tank
13. Transfer pipe for bilge water from bilge sumps to bilge water tank
14. Suction pipes from tanks for transfer to deck
15. International land connection on deck
16. Centrifugal separators for fuel oil and lubrication oil
17. Suction pipe from bilge sumps
18. Main bilge pump which may be used in emergency situations only, and for draining bilge water from the keel to bilge water tank
19. Overboard pipe from main bilge water pump (should be locked in closed position, however not compulsory)
20. Overboard pipe from sludge transfer pump (improper arrangement but not forbidden)
21. Collection tank for all types of dirty water
22. Transfer pipe for dirty water to collection tank

### Taking soundings of ullage and oil-water interface levels

5.16 In some investigations there is a need to calculate the oil volume in a tank where water has penetrated. This can be done by gauging or sounding the tank's ullage and oil-water interface level (see the figure below).

5.17 Ullage and interface gauging is done in cargo and bunker tanks. Taking soundings is the most common method for ballast and fresh water tanks, cofferdams, etc. Whether a given tank gauge figure is an ullage or a sounding value can be checked in the ship's tank tables.



5.18 All gauging must be performed according to the safety advice and directions given in paragraphs 5.4 – 5.10 above.

5.19 Gauging should preferably be carried out by the ship's own crew using the ship's own equipment, under supervision of the personnel responsible for the operation.

5.20 Taking soundings of interface level and ullage is normally done by means of a steel measuring tape equipped with a ground wire. The steel measuring tape must be grounded by way of connecting the grounding wire to the ship's hull. Before a sounding pipe or a manhole is opened, it is important to check

that the cable clamp is safely contacted to the hull, if necessary by scraping off paint, rust, etc. There is no risk of sparks from static electricity if the steel tape is electrically connected to the ship's hull.



5.21 What is called “**water-finding paste**” may well be used on a normal steel measuring tape to sound the oil-water interface level. The tape is coated with this paste which turns red upon contact with water. The interface level can then be read on the tape. Alternatively the steel tape can be chalked with ordinary blackboard chalk. On some occasions the contrast between oil and water on the steel tape will be better with chalk than with water-finding paste.

5.22 The level of the oil-water interface level can also be established by a special **oil-water interface meter** which may consist of a steel measuring tape with a probe in one end and a handle, with an indicator, in the other end. The indicator gives a response for the conductivity of the medium into which the probe is immersed. When the probe is immersed only in the oil, the conductivity is rather low, but when the probe reaches the water interface the conductivity increases considerably. At this point, the probe's (and thus the interface's) distance from the handle can be read on the steel tape.

## 6 *Handling samples*

### Sample custody and documentation

Samples and sampling equipment should be handled and stored so that the samples cannot be manipulated, mixed up, or otherwise be contaminated by strange oils. Samples should be handled as legal evidence and should be kept in a “chain of custody” until identification and possible legal procedure has been completed. Therefore, always use approved sealable and individually numbered safety bags with three detachable adhesive number labels with identical number (the same as on the bag).

Each safety bag number is unique for one specific sample. The number is the identification of the sample. One of the detachable number labels shall be affixed onto the glass sample bottle. The next number label shall be placed on the outer plastic jar and the third label on the Letter of Request (described below).

A sample label (see below) shall be affixed to each sample bottle.



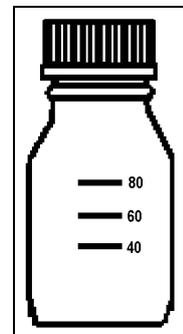
|   |  |
|---|--|
| (Space for a number label<br>from an individually numbered safety bag)  | <b>Sampling date.</b>  |
|   | <b>Judged date for spill:</b>                                      |
|   | <b>Sampling site:</b>  |
| <input type="checkbox"/> Spill <input type="checkbox"/> Ref. sample (e.g. from a ship) <b>Suspected source:</b> |  |
| <b>TEMP. °C</b> <b>Water:</b> <b>Air :</b>  | <b>Spill information (volume, extension, judged oil type etc.)</b> |
| <b>SAMP- Name:</b> <b>Field unit:</b><br><b>LER</b>   |  |
| <b>Phone:</b> _____ <b>Alt. phone:</b> _____  |  |

### Important documentation for the taking and shipping of oil samples

- ◆ **A Letter of Request** with a specification of the request and information on enclosed samples (Appendix 1). Necessary information in the Letter of Request and/or in the sample bottle label is the following:
  - District, sampler, unit
  - Date and position (or sampling site on board vessel) of sampling
  - Spill's volume/appearance, oil type
  - Suspected source
- ◆ **Sample labels** shall be affixed onto all sample bottles.
- ◆ **Number labels** from individually numbered safety bags shall be affixed onto all sample bottles.

### Filling and labelling of sample bottles

1. As sample containers use 100 - 250 ml thick-walled wide-neck borosilicate glass bottles. A suitable inner neck diameter is 30 mm. The lid tightening should be of high quality. Use a new (unused) sample bottle for each sampling site.
2. If possible, avoid getting water into the bottle. One method to remove water from the bottle is to close the lid and hold bottle upside down for a minute. Then let the oil float upwards to the bottom of the bottle so that the water can be drained by opening the lid carefully.
3. Do not fill the bottle to a higher level than to 2 cm below the lower edge of the lid. If the bottle is completely filled of cold oil it may later leak when the oil volume increases at room temperature.
4. Check that the bottle lid gasket is undamaged and that the lid fits tightly. Carefully wipe excess oil and water from the outside of the bottle.
5. Affix a filled-in sample label onto each bottle.



### Packing of samples

1. An oil sample must be packed appropriately before it can be shipped to a laboratory for analysis. The sample is usually in either of the following forms:
  - ◆ Free oil
  - ◆ Sample pad containing oil

- ♦ Oiled item (feather, piece of wood, stone, etc)
2. Allow excess water to drain off from the sample. Check that the sample does not contain animal tissue which might rot during transport. Insert the sample into a sample bottle. The insertion of a sample pad can be facilitated by pushing the pad with the used clothes peg or a clean peg of any kind. Perform this without touching with fingers or contact with items that might contain disturbing contaminants.
  3. Affix a sample label onto the sample bottle and a number label from an individually numbered safety bag.
  4. Insert the bottle into a safety bag and seal the bag according to the bag's instruction.
  5. Put the bottle package into a 600 ml plastic jar which is used as an outer container. Affix the second number label onto the outside of this jar (keep the third number label for the Letter of Request).
  6. The samples should be immediately sent to the Sample Co-ordinator. A quick handling of samples is important. If the transmittal is delayed the samples should be kept under a temperature of less than +4°C. The Sample Co-ordinator watches the continued shipping of the samples.
  7. The plastic jar (with its content of a sample bottle in a sealed safety bag) should be placed in a cardboard box, before shipment, as shown in the figure to the right. If prescribed in local regulations the whole packaging must be approved and the cardboard box must wear an inscription which shows this approval (see the example under the cardboard box).

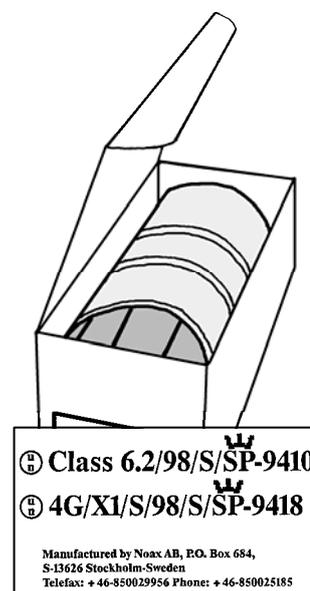


### Shipping of oil samples

The Sample Co-ordinator collects all samples and fills in a Letter of Request which is sent to the laboratory together with the samples.

The Sample Co-ordinator should also call in special personnel if required from an Industrial Laboratory for conducting physical analyses. The purpose is to take samples on board a ship to investigate if an oil is persistent according to the specifications of the International Oil Pollution Compensation Funds. The Sample Co-ordinator judges if it is more appropriate for the local samplers to perform this work. In this case the Sample Co-ordinator acquires special sample containers from the Industrial Laboratory.

Oil samples are to be considered as dangerous goods when they are shipped. However, if contained and packaged as described above, they can normally be shipped as "limited quantities" which means simpler shipping requirements than for normal dangerous goods. **Local regulations should always be followed.**



### Examples of sampling kits

| Case with equipment for sampling of oil spills        | No. |
|---|-----|
| Metal ring (for polyethylene cornet)                  | 1   |
| Holder for metal ring                                 | 1   |
| Polyethylene cornet                                   | 20  |
| Teflon <sup>®</sup> pad (20x30 cm) for thin oil films | 15  |

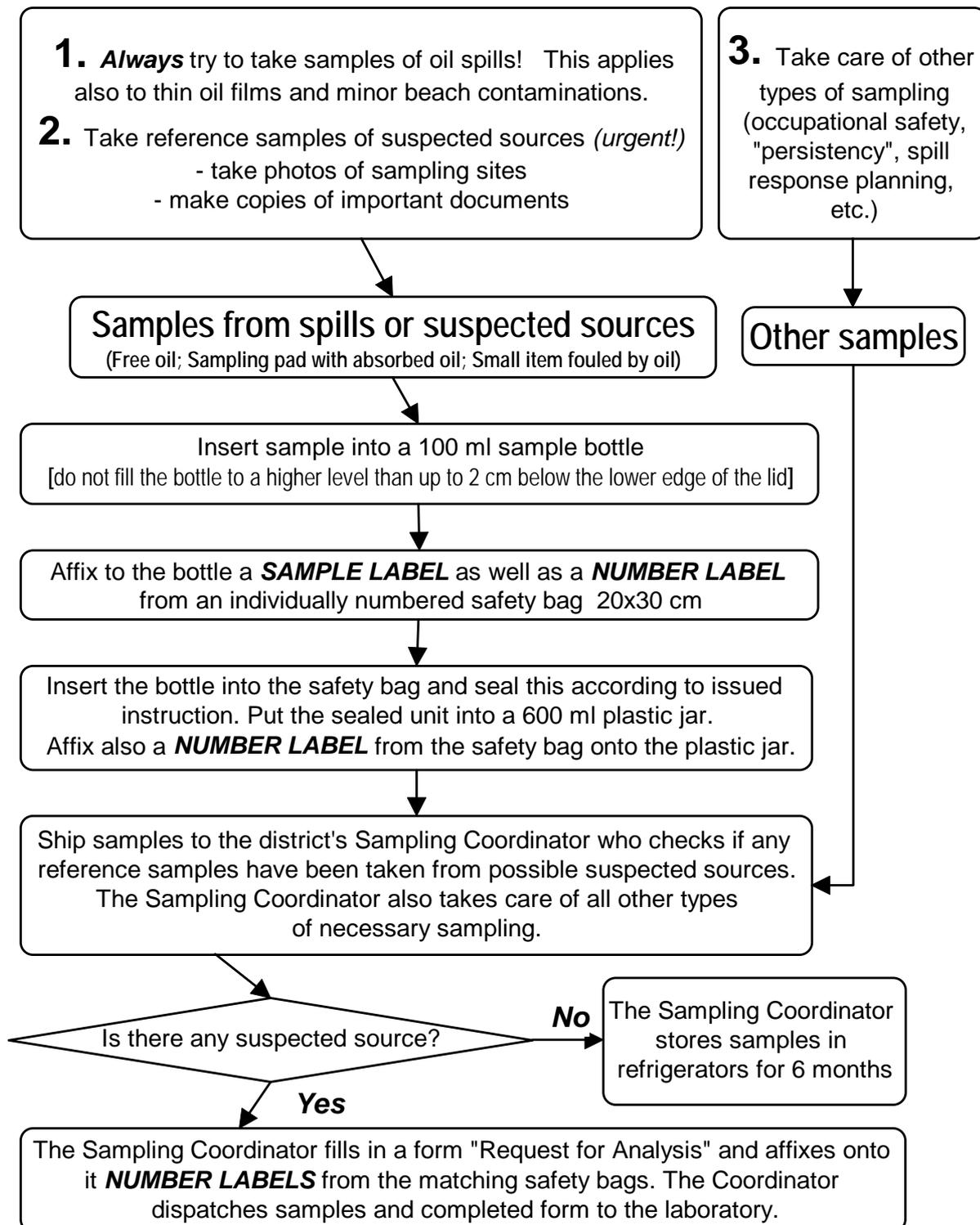


| <b>Case with equipment for sampling on board ships</b>                                  | <b>No.</b> |
|---|------------|
| Sample collector of brass for sounding pipes (to be hooked on the steel measuring tape) | 1          |
| Steel measuring tape  | 1          |
| Brass weight (to be hooked on the steel measuring tape)                                 | 1          |
| Ground wire (to be hooked on the steel measuring tape)                                  | 1          |
| Water finding paste   | tube       |
| Blackboard chalks (for chalking steel measuring tapes)                                  | package    |
| Glass tube 10 ml (with lid) for sample collector  | 10         |
| Teflon <sup>®</sup> pad (20x30 cm) for thin oil films                                   | 15         |
| Line  | coil       |
| Sample bottle, 100 ml thick-walled borosilicate glass                                   | 20         |
| Sample label  | 50         |
| Safety bag (20x30 cm), approved, sealable, individually numbered                        | 50         |
| Writing-pad (with cover and pen)  | 1          |
| Wiping cloth (or paper)   | package    |
| Disposable gloves   | package    |
| Sampling peg (for scraping small samples of oil)  | 50         |
| Plastic bag (for filled sample bottles, garbage etc.)                                   | 20         |
| Earplugs  | 30x2       |
| Laminated oil sampling flow diagram (cf. Annex3, Section 5)                             | 1          |
| Laminated equipment list  | 1          |



**Oil sampling flow diagram**

The sampling flow chart below highlights important observations in the sampling procedure and shows the order of the steps that should be taken.



**ANNEX 1: Request for analysis**



**Sending Unit**

Date

Commanding Officer

To: *Laboratory name and address*

## Request for analysis

Request analysis of the samples listed below

**Sampling date:**

**No. of samples:**

**No. of pages:**

| <u>General information</u><br>(Occurred incident, weather, spill size, suspected source, judged oil type, etc.) | Number label from safety bag | Information which is not given on the sample bottle * |
|---|------------------------------|---|
|   |                              |   |
|   |                              |   |
|   |                              |   |
|   |                              |   |

\*Information: Sampler: Name/field unit  
 Spill : Latitude & longitude, and sampling site's geographical name  
 Ship: Ship name and sample site on board the ship

Signature

Name in block letters

Rank

## ***ANNEX 2: Checklists for oil sampling***

### **General**

1. Samples should be taken with sampling devices and containers of glass, Teflon<sup>®</sup> or stainless steel. Use disposable devices if possible and make sure they are used only once.
- 6 2. Preferably, at least 1 ml of oil should be sampled but no sample should be considered too small. If possible, a larger sample volume is recommended for additional analyses (100 ml).
3. If contamination of the sample is suspected, take blind samples from the possible contamination.
4. To permit cross-checking, three parallel samples should be taken from some of the localities. In larger spills, one sample per locality should be sufficient.
5. The sampling container should be properly labelled with all relevant information before sealing of the safety bag.
6. A sampling log book with all relevant information from the samples and the sampling environment should be kept.
7. The samples should be taken and handled under the supervision of authorized personnel. A chain of custody should be maintained until the identification process is concluded by the relevant authority.
8. If stored, all oil samples should be kept under lock and key in darkness at a maximum temperature of +4°C (but not be frozen).
9. Oil samples should be taken to an authorized laboratory without unnecessary delay.
10. Packing and transport should be carried out in such a way that damage to the samples is avoided. Sorbent material should be used.
11. National regulations for transport of flammable materials should be followed.
13. Samples should be handled as legal evidence.

### **Collection of samples from the water surface**

1. Try to concentrate the oil fraction in the sample container by skimming the oil from the water. A conical Teflon<sup>®</sup> bag or polyethylene cornet or a clean bucket with small holes can be used to concentrate the oil into the container.
2. Do not fill the container completely. Allow for thermal expansion of the sample.
3. If possible, sample oil from the thickest part of the slick.
4. In highly contaminated waters, e.g. harbours, take blind samples.
5. If a combat action against a waterborne oil spill lasts for several days, take oil samples every day for documentation of weathering and possible additional spills from other sources.
23. 6. If other suspicious slicks occur, i.e. their appearance differs, or if slicks are observed a long distance away from the expected site, also take samples here for identification of other possible sources.

**Collection of samples from beaches**

1. Take samples from the geographical edges of the polluted area to document the range of the spill.
2. Take samples from different localities within the polluted area to document the spill distribution.
3. Old tar balls, earlier oil spills, creosote from pier logs, etc. can contaminate the sample. Take blind samples if contamination is suspected.
4. Take samples for identification of other possible sources whenever anything unusual or suspicious (colour, texture, etc.) is observed in the polluted area.
5. When seaweed, small pieces of wood or debris are contaminated by oil, the complete specimen can be placed in the sampling container.

**Obtaining samples from oiled animals**

1. Contaminated feathers and fur may be cut off and placed in the sample container.
2. Dead, oiled birds or other animals may be collected in plastic bags, labelled and frozen before sending to a laboratory.
3. Before sending any animals, make contact with the relevant authority to make proper arrangements for transport and storage.
4. Samples with large amounts of organic materials should be frozen to avoid biological decomposition.

### ***ANNEX 3: Oil sampling organization***

#### **1 Background**

1.1 A whole chain of activities leads to the information to be presented about a certain spill. Sampling is the first step in the process of obtaining information about the spill. If the sampling is not done in a proper way the results of the analysis will not be as accurate as possible.

1.2 Samples can be taken from the water surface, suspected polluter or the shore line. It is important to take samples as often as possible. One reason is that the personnel will keep up their know-how. Another reason is that even if there is no suspected polluter when an oil spill is observed one might be identified at a later stage.

1.3 This document presents the purpose of sampling and how sampling activities can be organised.

#### **2 Training**

2.1 All personnel involved in sampling need to be trained to assure the sampling is performed in a correct way. This is also something that will be questioned by lawyers in the legal process following an oil spill. When samples are taken at a suspected polluter it is important that the sampler has been working on board ships. This will make sure he/she will have the knowledge and experience of the piping systems in machinery spaces and cargo systems.

2.2 Training should be ongoing to ensure that the level of competence is maintained over time.

#### **3 Purpose of sampling**

##### **General**

3.1 Sampling and subsequent analysis shall answer questions regarding the spills' origin as well as their properties and effects. To accomplish this, samples should be taken for several different purposes, which are dealt with in this section.

3.2 Some spills may involve contacts and co-ordination with other countries regarding sampling and analysis. On some occasions, the International Oil Pollution Compensation Funds in London needs supplementary information. Occasionally, foreign agencies should be contacted to exchange samples, analysis results, examination reports, etc.

##### **Occupational safety**

3.3 When necessary, the spill should be examined (analysed) to establish whether there are any health risks for the response personnel. The substance may be flammable and cause fire and/or explosion, or may be toxic and cause danger to health if inhaled or exposed to skin.

##### **Penal liability of the polluter**

3.4 The responsible polluter should, if possible, be identified and be charged for the spill. This can be done by comparing chemical analyses of samples from the spill with samples from suspected sources. If identity is established between the spill and a suspected source, this can help to identify the polluter.

##### **Economic liability of the polluter**

3.5 The results of sampling have often been used as a basis for compensation claims against the polluter. These claims may concern costs associated with response and cleanup measures, or damage to property, fishery, recreational areas, etc. Above all, it is important to tie the suspected polluter to the damage in order to confirm the claims. Supplementary analyses are sometimes needed to show if the oil has such properties ("is persistent") so that compensation can be obtained from the International Oil Pollution Compensation Funds in London.

### **Spill response planning**

3.6 On some occasions, special analyses can give important support information for the planning of response and cleanup work. It is important to study chemical and physical property data of the substance when selecting equipment and methods as well as safety routines for the response operation.

### **Short term environmental protection**

3.7 The substance's acute deleterious effects on the environment may vary considerably depending on its properties. Extremely viscous oils have lower tendency to smear beaches, plants and animals. Medium viscous oils create high risk for smearing. Low viscous oils give low risk for smearing, but dissolve greater amounts of dangerous components into the water body. Besides the substance itself it may also be necessary to sample and analyse the water column, sediment, organisms, etc.

### **Long term environmental protection**

3.8 Certain substances may cause long-term deleterious effects on the environment, and some species may be knocked out, or the environment be polluted for a long time. Assessment should be made to judge how the environment can be restored. It may be necessary to sample and analyse the substance itself, as well as water, sediment, organisms, etc.

### **Information service**

3.9 Many, and sometimes tricky, questions are asked about the substance's properties and effects, especially when facing a large or hazardous spillage. In such cases it is important to give rapid and correct information in order to reduce public concern and the spread of rumours. Sampling and analysis can thereby provide the basis for information to be given and for the choice of information channels. When informing the public, and those who are directly affected by the spill, it is important to account for certain data, for example:

- a. the spill's origin and extension
- b. the substance's properties and spread in the environment
- c. effects on human and environment
- d. consequences for various parties and bodies
- e. ongoing work regarding response, cleanup and disposal.

### **Disposal**

3.10 The selection of techniques for the subsequent disposal is based on the spill's volume and its properties. For instance, certain disposal plants cannot process oils with a water content which is too high. Others cannot process oils which contain too much debris. Certain oils may contain toxic (for example chloroorganic) compounds. Such impurities may put heavy demands on the disposal process technique. On such occasions, a special examination is needed to establish the oil's properties and impurities.

### **Summary of purpose and types of samples**

3.11 The table below summarises the various purposes of sampling, and types of samples that may be necessary to take during major spills of oil and hazardous materials at sea. The table also states by whom the various types of samples should be taken.

| <b>PURPOSE</b>                                | <b>SAMPLES</b> (examples)   | <b>SAMPLER</b> (examples)   | <b>SAMPLE USER</b> (examples)   |
|---|---|---|---|
| <b>1. Occupational safety</b>                 | Air samples taken with trace gas detection devices  | Coastguard<br>Municipality  | Response Commander  |
| <b>2. Penal liability of polluter</b>         | Several samples (0.1-100 ml), taken with the Coastguard oil sampling kit, both from spills and suspected sources        | Coastguard<br>Shipping Administration<br>Police<br>Municipality   | Coastguard<br>Police<br>Prosecutor  |
| <b>3. Economic liability of polluter</b>      | Samples according to 2;<br>Also extra samples (at least 100 ml) for examination of "persistence";<br>Biological samples | Coastguard<br>Municipality<br>Local Government  | Insurance Company<br>International Oil Pollution Compensation Funds<br>Central Government<br>Rescue Services Agency |
| <b>4. Spill response planning</b>             | Samples according to 2;<br>Also extra samples (at least 100 ml) for examination of viscosity, density, etc.             | Coastguard<br>Municipality  | Coastguard<br>Municipality<br>Local Government  |
| <b>5. Short-term environmental protection</b> | Samples from spill, water body, sediment, organisms, etc., for chemical-biological analyses                             | Local Government<br>Municipality  | Municipality<br>Local Government<br>Environmental Protection Agency<br>Fisheries Management Agency                  |
| <b>6. Long-term environmental protection</b>  | Samples according to 5  | Municipality<br>Local Government<br>Environmental Protection Agency<br>Fisheries Management Agency      | Municipality<br>Local Government<br>Environmental Protection Agency<br>Fisheries Management Agency                  |
| <b>7. Information service</b>                 | Samples according to 2;<br>Also extra samples (at least 100 ml) for special analyses                                    | Coastguard<br>Municipality<br>Local Government<br>Environmental Protection Agency<br>Board of Fisheries | Authorities<br>Mass Media<br>Public<br>Fishermen<br>Scientists  |
| <b>8. Disposal</b>                            | Sample (1 litre) for examination of water content, debris, etc., that can effect the disposal process                   | Coastguard<br>Municipality  | Local Government<br>Municipality<br>Transport Business<br>Disposal and Recycling Plants                             |

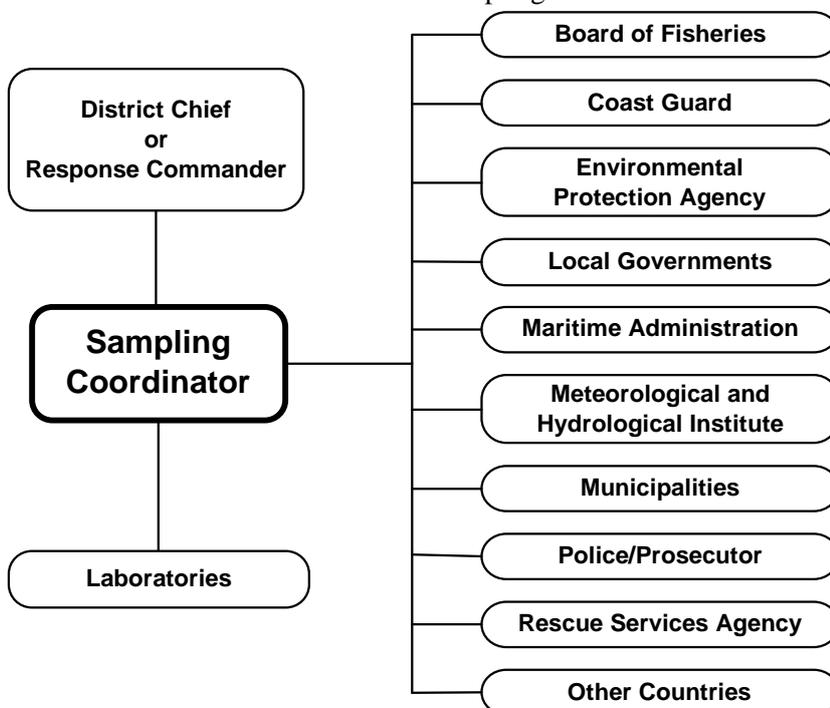
### Responsibilities during sampling

3.12 Spills of oil and hazardous materials occur every day in the marine environment as well as in the inland aquatic environment. Although most of the spills are very small, they still often require sampling to get a chance of linking them to the responsible polluters and assessing the damage to environment. It is therefore important to trace all conceivable polluters as soon as possible. There is a great need for co-ordination as the sampling activities for spills and suspected sources may go on simultaneously at different places. This work may be performed by a **permanent Sampling Co-ordinator** within the environmental response organisation. This Co-ordinator should be subordinated to the District Chief of the Environmental Response Organisation. During the Organisation's everyday work the Sampling Co-ordinator keeps record of spill samples from various sites and initiates sampling on board suspected sources when overlooked by the field officers.

3.13 The sampling activities may increase considerably during more significant accidents involving spills of oil and hazardous materials. Many different samples are taken for several different purposes. Many authorities and institutions may be involved in the sampling activities and a confusing situation may arise where different bodies work, perhaps without being aware of each other. On such occasions, it is crucial to co-ordinate the activities to avoid duplication of work, as well as to avoid missing chances of important sampling. Such co-ordination could also promote prevention of public concern and the spread of rumours that often occur during major and hazardous spill accidents. In this situation, the Environmental Response Commander should appoint an **ad hoc Sampling Co-ordinator** to be responsible for the overall co-ordination of all sampling work during the course of the response operation.

3.14 Whenever there is co-operation in a major spill accident between two or more different national response services, an agreement should be settled on a joint ad hoc Sampling Co-ordinator. The Sampling Co-ordinator should be responsible for the overall co-ordination of all sampling on land and at sea during the run of the response operation. When the accident response phase is finished, and the long-term cleanup work has started, the responsibility for sampling is normally handed over to the local Municipality. However, it is convenient that the original ad hoc Sampling Co-ordinator maintains the duty for sampling concerning the polluter's penal and economic liabilities.

3.15 The contact network for the Sampling Co-ordinator and other bodies is shown in the chart below.



### The duties of the Sampling Co-ordinator

3.16 The sampling coordinator, following the above tables, should:

- a. Establish a plan for documentation of the sampling work.

- b. Make arrangements for appropriate sampling if health risks are liable to occur.
- c. Make sure that necessary samples are taken concerning extent and accuracy both of spill, contaminated items and suspected sources.
- d. Judge whether the oil has such properties (“is persistent”) that compensation can be obtained from the International Oil Pollution Compensation Funds in London. In such a case, provide for appropriate sampling and analysis.
- e. Judge whether special examinations of the spill are needed to facilitate spill response measures.
- f. Judge whether short-term and/or long-term environmental impact may be expected. In such a case, contact appropriate agencies according to the table in Section 3.10.
- g. Judge whether special examinations and analyses are needed when providing for general and specific needs for information.
- h. Contact responsible bodies for transport and disposal. Check what special information is needed in this context and make arrangements for relevant analyses.

#### **4 Handling of spill information**

4.1 A whole chain of activities lead to the information to be presented about the spill. This chain consists of:

- a. Sampling
- b. Sample keeping and transmittal
- c. Identification, labelling, documentation
- d. Chemical, physical and biological analyses
- e. Judgement of the analysis results
- f. Presentation of the analysis results

4.2 Each step must be taken with care and accuracy. This is a prerequisite for compilation of an information report which is as comprehensive, clear and effective as the circumstances allow. Examples of points to be observed during sampling and the subsequent handling of samples are:

- a. Several samples must be taken from spills which cover large areas or which are divided between several locations.
- b. Use as much disposable equipment as possible to minimize the potential of contamination.
- c. Sampling from a source which is suspected of being responsible must be performed very carefully, so that the suspected polluter can be tied to the spill with certainty, or cleared of responsibility.
- d. All samples must be labelled so that they unmistakably refer to the correct sampling points.
- e. Sample containers must be labelled, sealed and kept in such a way that any suspicion of confusion or manipulation can be excluded.
- f. All sampling documentation, as well as other evidence, must be available throughout the investigation, but must also be protected from loss, confusion or manipulation.
- g. Records must be kept continuously and contemporaneously of all transmissions between officials of samples, other evidence and documentation.

4.3 The Sampling Co-ordinator is responsible for transmission of samples to the appointed laboratories.

4.4 It is recommended that laboratories which will be used for the analysis are contacted prior to any oil spill to make sure templates for request for analysis (Appendix 2) are available and to establish channels for contact in case quick analyses are necessary.

4.5 It is important that a complete chain of custody is maintained. The samples should be kept under control from the initial sampling until the legal process is finalized.

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## **GUIDELINES CONCERNING COSTS FOR ASSISTANCE AND CLAIMS MANAGEMENT IN THE CONTEXT OF THE BONN AGREEMENT**

The annex to this chapter contains an example of a form of contract.

### **33.1 Introductory considerations**

.1 This chapter discusses the arrangements between Contracting Parties to the Bonn Agreement when assistance is required in the case of an incident and costs have to be settled. With regard to these financial arrangements a distinction is made between the costs involved for rendering assistance from one Contracting Party to another and the recovery of costs by the affected Contracting Party.

.2 Costs for assistance would preferably be based on a contract between Contracting Parties, namely the requesting Contracting Party and the assisting Contracting Party. An example contract is provided in Annex 1.

.3 In the unfortunate situation that a Contracting Party is confronted with a maritime incident requiring response measures in the widest sense the polluter will be held liable and responsible for appropriate measures and reimbursement for costs encountered by the affected Contracting Party. "Claims Management" covers all the legal and financial matters to be dealt with in an incident. In 2010 the European Maritime Safety Agency completed a first draft of "EU Guidelines for Claims Management" which can be found in the public domain of the EMSA website: [www.emsa.europa.eu](http://www.emsa.europa.eu).

### **33.2 The Bonn Agreement**

.1 Articles 5 to 12 of the Bonn Agreement describe the communication between Contracting Parties and the aspects for assistance. When the Agreement was founded in 1969 the most important objective was the assistance, the mutual interest between Contracting Parties in combating a pollution.

Article 7 states:

*"A Contracting Party requiring assistance to deal with pollution or the prospective presence of pollution at sea or on its coast may call on the help of the other Contracting Parties. Contracting Parties requesting assistance shall specify the kind of assistance they require. The Contracting Parties called upon for help in accordance with this Article shall use their best endeavours to bring such assistance as is within their power taking into account, particularly in the case of pollution by harmful substances other than oil, the technological means available to them."*

.2 When a Contracting Party in its zone of jurisdiction has to deal with a maritime incident it is the responsibility of that Contracting Party to take appropriate action. With reference to the POLREP communication system that is applied in the Bonn Agreement, that Contracting Party will inform either the Bonn Agreement Contracting Parties at large or only those that may be affected by the incident.

.3 The POLFAC part of the POLREP system is used to call for assistance. However, in practice direct telephonic communication will be established between a requesting Contracting Party and other Contracting Parties to discuss assets available.

.4 If assistance is agreed, it is recommended to consider detailed paperwork. Any arrangement should be put on paper and signed by both parties. It is considered essential to maintain accurate notes and documents in order to satisfy the Claims Management process.

### 33.3 Polluter Pays Principle

.1 In environmental law, the polluter pays principle is enacted to make the party responsible for producing pollution responsible for paying for the damage done to the natural environment. It is regarded as a regional custom because of the strong support it has received in most countries in both the Organisation for Economic Co-operation and Development (OECD), and in the European Union (EU). In international environmental law it is mentioned in Principle 16 of the Rio Declaration on Environment and Development.

.2 "Polluter pays" is also known as extended polluter responsibility (EPR). This is a concept that was probably first described by the Swedish Government in 1975. EPR seeks to shift the responsibility for dealing with waste from governments (and thus, taxpayers and society at large) to the entities producing it. In effect, it internalises the cost of waste disposal into the cost of the product, theoretically meaning that the producers will improve the waste profile of their products, thus decreasing waste and increasing possibilities for reuse and recycling.

.3 OECD defines EPR as:

*"a concept where manufacturers and importers of products should bear a significant degree of responsibility for the environmental impacts of their products throughout the product life-cycle, including upstream impacts inherent in the selection of materials for the products, impacts from manufacturers' production process itself, and downstream impacts from the use and disposal of the products. Producers accept their responsibility when designing their products to minimise life-cycle environmental impacts, and when accepting legal, physical or socio-economic responsibility for environmental impacts that cannot be eliminated by design."*

.4 Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (ELD) establishes a framework based on the "polluter pays" principle, according to which the polluter pays when environmental damage occurs. This principle is already set out in the Treaty establishing the European Community (Article 191(2) TFEU). As the ELD deals with the "pure ecological damage", it is based on the powers and duties of public authorities ("administrative approach") as distinct from a civil liability system which is more appropriate for "traditional damage" (damage to property, economic loss, personal injury).

.5 The ELD was already amended twice through Directive 2006/21/EC on the management of waste from extractive industries and through Directive 2009/31/EC on the geological storage of carbon dioxide and amending several directives. Directive 2006/21/EC broadened the scope of strict liability by adding one more dangerous activity ("management of extractive waste") to the list of dangerous occupational activities in Annex III of the ELD. Directive 2009/31/EC adds another dangerous activity ("operation of storage sites pursuant to Directive 2009/31/EC") but includes also genuine responsibility and financial security provisions separate from the ELD.

.6 All Contracting Parties to the Bonn Agreement have implemented the "Polluter Pays Principle" in their Response Organisations. The principle is known and honoured or well respected by shipping as well as offshore industry and all conventions related to compensation for pollution understand the purpose.

### 33.4 Guidelines

.1 A Contracting Party that is in charge of handling a maritime casualty will define the response measures and also the type of assistance required. Within the Bonn Agreement network (as in other regional agreements) direct contact at personal level may be established to discuss the assistance required and options available.

.2 Assets can be disclosed and made available depending on the requirements defined by the requesting Contracting Party. In the direct communication the availability of equipment can be checked with regard to the actual status of maintenance and readiness.

.3 Although it is the sovereign decision of the assisting Contracting Party what costs will be charged to the requesting Contracting Party it is strongly recommended to provide a detailed overview of all costs involved – up to two decimals – and to avoid offering assistance free of charge. A government to government discount may be used against that assisting Contracting Party in another incident.

.4 In the aftermath of the response operation and on completion of the incident the process starts for reimbursement of costs and it is recommended that all assisting Contracting Parties are compensated by the requesting Contracting Party. The Contracting Party that was in charge of handling the incident will claim all costs from the polluter, unless otherwise agreed between parties.

### 33.5 Types of assistance

.1 It is not the intention to provide an exhaustive list of types of assistance that can be made available. However, whilst in the early years of the Agreement assistance dealt with equipment only, nowadays management support could also be essential.

.2 Types of assistance to consider are:

- Surveillance aircraft (including crew; downlink equipment)
- Aerial surveillance coordinator
- Dispersant spray aircraft
- Response vessel
- Oil booms
- Oil collection systems (busters)
- Oil pumps
- Powerpacks (in most cases a package is supplied, comprising a powerpack with other components)
- Storage tanks
- Maintenance equipment
- Engineers
- Response staff
- Response coordinator
- Expertise for judging offered equipment
- Expertise for preparing costs recovery

.3 Depending on the type of assistance offered, the contractual documents should clearly state:

- The capacity of the offered system
- The cost per hour in operation, in stand-by
- Cost for cleaning and maintenance (repair)

- Cost per hour for vessels in operation and waiting. Also state extra costs for fuel and lubricants, possible crew change, hotel costs
- Port fees, pilot service if deemed necessary
- In the case of aircraft, state costs per flight hour (including or excluding crew); landing fee; fuel; hotel costs
- Diplomatic clearance
- Transportation costs
- Custom clearance
- In the case of staff and other experts, the costs per hour.
- State the duration of the assistance, even when this indicative
- Define periodical payment. Invoices could be forwarded on a weekly basis
- Define VAT arrangements  
(it is experienced that a polluter registered outside the EU could claim reimbursement for VAT)

.4 It is recommended that the requesting Contracting Party clearly describes what they expect the assisting Contracting Party to do and what administrative rules their staff has to comply with. A daily report is a suggested registering method, that may provide essential input for the preparation of the cost overview.

### **33.6 Evaluation and lessons learned**

.1 Contracting Parties are invited to evaluate a maritime incident, for the purpose of this chapter, especially a case where assistance was requested and provided, and that lessons learned are reflected in further improvements of the issues addressed.

{name, address of assisting party}

A contract made on the ..... day of ..... between:

- The government of {country}, represented by:  
being agents / owners of the assisting unit :.....{name of the unit}.....  
hereinafter referred to as "**owner**" of the assisting unit

and

.....

the assistance requesting authority/party/enterprise

hereinafter referred to as "**requesting party**"

RECOGNIZING the purpose of the assistance as described in: {POLFAC nr} or Fax nr.

HAVE HEREBY AGREED as follows:

- 1 In order to act as aforesaid the requesting party will contact the owners of the required assisting unit by written mail or fax and describe the assistance needed. Upon agreement between the requesting party and the owner both exchange general modalities as there are i.e.
  - .2 Daily and/or hourly costs of the assisting unit, modalities for operations and cleaning,
  - .3 Estimated time of arrival ( ETA ) at agreed position or port,
  - .4 Necessary preparatory procedures like diplomatic clearance and/or customs clearance,
  - .5 provision of liaison personnel, OSC, communication channels and procedures,
  - .6 Logistics arrangements (crew change, bunkers, spare parts, stores) and crew change frequency (cost estimation).
  - .7 Operational command, aerial surveillance, reporting system, mission orders
  - .8 Application of aerial spraying of dispersants.
- 2 Without prejudice to clause 3 the assisting unit will act as aforesaid under the direction of the head of staff (Supreme on Scene Commander) authorized by the requesting party from the time of its arrival and given notice of readiness to the Supreme on Scene Commander ( SOSC ) until the unit is relieved from its duties by the SOSC and returned to the orders of the owner.
  - .2 The assisting unit will not act against the orders of the SOSC or his nominee.
  - .3 However, the master of the assisting unit shall at all times have the ultimate decision as to the use and safety of the unit. He is not obliged to follow any orders of the SOSC and/or his nominee that in his opinion could endanger his unit and/or crew. In such case he has to inform the SOSC or his nominee on his decision and the possible consequence.
- 3 The assisting unit is obliged to declare readiness for the requested operation to the SOSC with a functioning recovery system, but not entitled to provide additional skimmers, booms, hoses and lightering systems that do not belong to its standard equipment package.
 

However the variety of equipment transported with the unit should fulfil the initial request for assistance of the other party.

  - .2 Damage affecting the unit's response equipment during transportation lies within the responsibility of the transport unit.

|    |   |
|----|---|
|    | Damage affecting the unit's response equipment in operation lies within the responsibility of the master of the assisting unit for reasons of bad practice and negligence in handling the equipment.  |
| .3 | If, as result of instructions by the SOSC or his nominee, damage occurs to the response equipment, the SOSC is liable for the damage  |
| 4  | Upon request by the SOSC and/or considering the filling status of the unit's storage capacity for the recovered pollutant the assisting unit shall approach the selected reception facility arranged for by the SOSC and discharge the recovered pollutant to the reception facility until the unit's storage capacity is empty and safe for further recovery operations. After finalization of the discharge the unit will report its status to the SOSC and request new mission orders.   |
| 5  | Without prejudice to clause 2 the assisting unit will inform the SOSC or his nominee in case the operational efficiency of the unit declines for different reasons, i.e. when mission tasks given by SOSC do not correspond with the unit's capabilities or when there are no longer recoverable pollutants accessible.   |
| .2 | In such cases the SOSC or his nominee shall officially declare to the owner of the assisting unit that at a defined date the assistance activities of the contract will end, or will propose the prolongation of the contract for other purposes within the scope of the relevant marine pollution response activities where the assisting unit could further be effectively utilized.  |
| .3 | In case the owner of the assisting unit does not agree to the aforesaid prolongation of the contract, he may end the assistance activities by the unit and prepare for its transfer to home base in line with the contract stipulations   |
| 6  | Without prejudice to clauses 2 and 4 the owner may request the immediate return of the unit to his orders in case major emergencies involving a significant threat of marine pollutant release effect or threaten to effect the coastal waters for which the unit is built for as a major contingency measure.  |
| 7  | Any costs incurred by the assisting unit for dues and charges in the area where assistance is provided like (un)berthing, pilots, port dues, lightering charges, agents charges, cleaning material, pre- cleaning of unit and equipment prior to transfer back home are to be paid for by the requesting party.   |
| 8  | In line with stipulations of clause 7 the owner of the assisting unit is to receive: <ul style="list-style-type: none"> <li>- Remuneration at the rate of ..... <b>per day/hour in operation</b> from the date and time of departure and until date and time of arrival at the point of departure with clearance for the original service.</li> <li>- The following rate is to be calculated .....<b>per day/hour of stand- by time</b>. Stand- by time is the time in which the assisting unit is not sailing and operating and not contaminated by pollutants but standing-by in the operation area.</li> <li>- The following rate is to be calculated .....per flight hour calculated from blocks off to blocks on.</li> </ul> |
| .2 | The costs of the above remuneration includes all running costs of the fully equipped unit including crew wages, insurance, bunkers, lubrication oil, victuals and all regular items and substances needed for the operations.<br><br>Costs for crew changes are charged additionally.   |
| .3 | The final cleaning of the unit and equipment at a place where such an operation can be professionally undertaken at competitive costs and in view of the circumstances that enable the owner to bring it back as soon as possible into the original service is to be chosen by the owner and agreed with the assistance requesting party.<br><br>With respect to the quality of cleaning, the standard is "ready for paint."<br><br><b>* it is strongly advised to clean the units in the area of the response operation in order to avoid oil losses from the hull of recovery vessels in transfer to their home port.</b>   |
| 9  | Apart from the remuneration according to clauses 7 and 8 owners shall be paid: <ul style="list-style-type: none"> <li>- For all proved damages incurred by the owners by entering into this contract, if owners have indicated before entering into this contract that such damages may be incurred and if so,</li> <li>- The maximum amount of such damages, for all extra payments to master and crew of the unit entitled to such payments by the hazardous and difficult nature of recovery operations under emergency conditions, if owners have indicated the possibility and approximate magnitude of such payments to the assistance requesting prior to concluding the contract.</li> </ul>                              |

- 10 No claims for loss, damage or delay arising during the period of this contract shall be made against the assisting unit, master, owner and crew even if caused by negligence except if caused by gross negligence or intention of the aforesaid.
- .2 The requesting party shall indemnify and hold the owners of the assisting unit free from such claims.
- .3 The requesting party shall hold harmless and indemnify the owners, master and crew of the assisting unit against all claims arising by reason of any incident occurring or any act, error or omission committed while operating under command of the SOSOC, even if arising from negligence except if caused by gross negligence or intention of the owners of the assisting unit or their master, crew and other personnel, including claims for loss of life or personal injury of master and crew together with all costs charged and expenses suffered or incurred in connection with any such claims, and against all loss or damage suffered by the owner of the assisting vessel.
- 11 The owner of the assisting unit may at any time replace the unit by any other unit which is suitable for the purpose of this contract and at a time and condition which is acceptable to the assistance requesting party and thereafter the replacement unit shall be subject to all terms of this contract.  
  
The relieved unit shall then return to its home base under conditions referred to in clauses 7, 8 and 9.
- 12 In case any dispute in the interpretation of the clauses of this contract arises between its parties the .....( *i.e. District Court Hamburg* ) shall determine the remuneration and /or cost compensation in accordance with this agreement and the International Law of the Sea. Such decision is binding for both contractual parties
- 13 The contract is executed in English which language is binding in cases of dispute between the contract parties

For the owner of the assisting unit

{name, date}

For the assistance requesting party

{name, date}

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## WILDLIFE RESPONSE

### 34.1 Introduction

.1 This chapter provides operating guidelines which could be considered by those Contracting Parties which under given circumstances of an oil spill incident would seek the assistance of wildlife response experts, expert groups or special equipment from abroad, from other Contracting Parties. In most countries the expertise lies with Non Governmental Organisations and therefore due consideration should be given to the optimal integration of these foreign resources into the national response organisation.

.2 Although this chapter is focusing on wildlife response in the aftermath of an oil spill, the same principles would apply if a wildlife problem was caused by e.g. HNS or an algal bloom.

.3 Part 1 of this chapter provides a set of guidelines and principles that will facilitate the integration of foreign wildlife response experts or teams in a national response organisation.

.4 Part 2 highlights the lines in respectively Pollinf and PolFAC that can be used for an international alert or request for oiled wildlife response.

.5 Part 3 provides a set of guidelines for the development of national oiled wildlife response plans that would support the international mobilisation of expertise from abroad.

### Part 1: General principles and guidelines for the integration of foreign expertise into a national oiled wildlife response

#### 33.2 General principles

General principles of good practice with regard to oiled wildlife response include, but are not limited to, the following:

- Ensuring health and safety of responders and the general public are always the first priority of response
- Objectives and strategy are clearly defined at the start of the response by being an organic part of pre-spill planning
- National legislation applies at all times
- Foreign response groups can only work under licence and supervision provided by national authorities
- Foreign response groups require an official invitation by the competent national authorities
- Criteria and procedures for euthanasia and release, that are indicated also in the oiled wildlife response plan, are set by national authorities and can only be applied under their supervision
- Activities always aim at meeting highest standards of animal welfare. Rehabilitation is only conducted if adequate set up can be provided, with reasonable expectation of minimised suffering and maximised post-release survival of treated animals. Euthanasia is included as a means of diminishing suffering and to replace rehabilitation where needed.
- It is clearly defined how the contributions (if any) of response groups and volunteers will be integrated into the response activity, and how these contributions will be coordinated and controlled.

#### 33.3 Health and safety standards

Foreign response groups and volunteers will have to comply with the standards for health and safety and environment (HSE) of the Requesting Party. These standards will be made available to invited groups in a communicable format, e.g. translated into English if possible. HSE issues that should be considered in connection with an oiled wildlife response are explained in the box below.

**Box: HSE issues to be considered for oiled wildlife response in the Bonn Agreement area**

Oiled wildlife responders typically face two categories of HSE issues while responding to oiled wildlife:

1. HSE issues related to working in an oil polluted environment
2. HSE issues related to working with oiled wildlife both in the field and in facilities

With regard to onshore wildlife response (the collection of live and dead animals), and the specific requirements for dealing with oil pollution, the general HSE standards of oil spill response will apply. This includes protocols and training with regard to

- cautious behaviour in natural hazardous areas,
- the use of adequate personal protective equipment (ppe) when entering and working in polluted zones,
- minimising polluted waste and secondary pollution

With regard to dealing with live oiled animals, additional health and safety standards must apply. These include protocols and training with regard to 5 basic principles (IPIECA, 2004):

- the maintenance of safe working conditions and procedures
- the understanding of occupational health
- an understanding of potential hazards of working with oiled wildlife
- the wearing of adequate personal protective equipment (ppe)
- the practice of good personal hygiene

### 33.4 Ringing and post release monitoring

An attempt to rehabilitate oiled animals should always be undertaken with the aim of releasing the cleaned and rehabilitated animals with a high probability that they will survive and reproduce as if they had never been oiled. The use of internationally recommended rehabilitation protocols provides a proper basis for this. Nevertheless, the ultimate evidence of the rehabilitation success must come from scientific observations that are made on the breeding colonies. Although the ringing of successfully rehabilitated and released animals is part of international good practice, it is still hard to collect the necessary evidence from field observation programmes that released animals actually have rejoined their natural (breeding) population. Rings that are provided to the rehabilitated birds before their release cannot easily be read at sea or at breeding colonies. Therefore most registered readings come from dead seabirds that have washed ashore some time after their release. This tends to give an unfavourable bias to the perceived success rate of rehabilitation programmes.

The absence of evidence from breeding colonies does not disqualify rehabilitation as a useful approach in oiled wildlife response, but it is clear that more intensive research programmes are needed to allow better scientific assessment of post release survival in relation to rehabilitation methodologies. Possible roads for new research programmes in the field of oiled wildlife response include e.g. the use of colour rings or radiotags for rehabilitated birds, better scientific documentation of the development and use of rehabilitation methodologies and more structured reporting of ring observations to rehabilitation centres. Larger incidents in particular provide interesting opportunities for post-release studies. These should be integrated into the response plan, especially into the release protocols. In this way information on the survival of relatively large numbers of rehabilitated birds can be obtained.

Bonn Agreement strongly recommends the ringing or radio tagging of rehabilitated animals according to international standards and encourages research projects and stronger efforts to quantify and document post release survival of rehabilitated animals.

### 33.5 Customs and border crossing

With regard to wildlife response there are two main areas in which customs and border crossings need to be considered:

- The entrance of invited responders and/or equipment into a country
- The transport of oil affected animals across borders in order to have them rehabilitated in a neighbouring country

The first area is already covered by Chapter 30 of the Bonn Agreement Counter-Pollution Manual.

The international transport of oil-affected animals could be considered under the following circumstances:

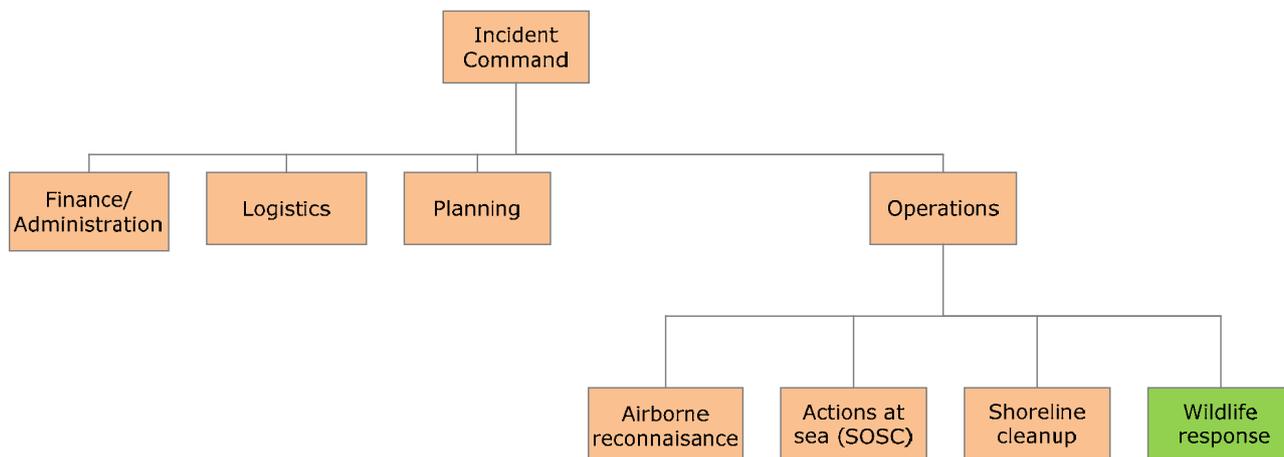
- A relatively large incident has affected two or more neighbouring countries. In the coordinated international response the countries in question share their resources and the optimal use of these facilities may require that animals are transported to a facility abroad.
- An oil incident has affected a country with only limited facilities; however, facilities are available in a neighbouring country or state in close proximity to the area affected by oil.

For the transport of animals over distances of up to several hundreds of kilometres protocols and guidelines exist and are best applied in close consultation with experts.

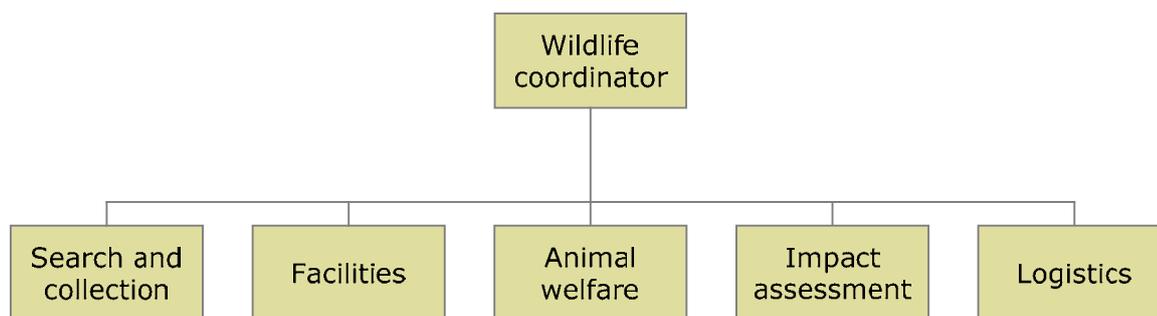
The transport of marine animals normally needs a permit from both the countries in question. Such a permit could be facilitated by an enhanced procedure that can be followed as part of the national response plan and bi- and multilateral agreements between Bonn Agreement countries that have been made in advance.

### 33.6 Command structure and operational management

Requesting Party provides a clear command structure for oiled wildlife response as an integrated part of the overall oil spill response command structure (see figures 1 and 2 for examples). Assisting Party will be informed about this structure and given a clear role and responsibility as part of that command system.



**Figure 1:** Wildlife response is often integrated into the overall incident command system as part of “Operations”, but the actual organisation structure will differ from country to country.



**Figure 2:** Example of a simple oiled wildlife response organisation chart. The contributions of foreign experts often include the set up and running of a rehabilitation facility, impact assessment, search and collection, and/or management coaching. Other Groups or individuals can be integrated into the organisation chart accordingly.

Assisting Party is expected to have its own command structure, including a mission leader with controlling power over the group. The Assisting Party will provide the names and the affiliation of the experts in the proposed team, as well as their internal command structure, the expertise they provide and their operational needs if integrated into the national response. The mission leader will liaise directly with the national wildlife response coordinator.

### 33.7 Operational communication with Assisting Party

Assisting Party will be kept informed at all times by the national authorities. Requesting Party provides all means feasible to maximise the contribution that the foreign experts could bring to the success of the national response. Requesting Party identifies a wildlife response centre (WRC) where all relevant information is brought together. Mission leader of Assisting Party will have access to this wildlife response centre and its information.

### 33.8 Financial aspects

The general rules for reimbursement of costs of assistance are included in Chapter 33 of the Counter-Pollution Manual.

*Note:* These rules will be applicable also to oiled wildlife response operations and no changes will be needed in the Manual in this respect if the legal basis of the Agreement is extended to deal with oiled wildlife response.

The probability of a successful claim can be maximised if the wildlife response is carried out in an organised and coordinated manner, following an agreed plan, involving trained expertise and applying proven methodologies and acknowledged protocols. The Contracting Parties are recommended to follow the IOPC Fund Claims Manual (pg 23) with regard to the claims of costs of oiled wildlife response.

### 33.9 Exercises

Oiled wildlife response exercises can be integrated, where applicable, into the existing Bonn Agreement exercise structures described in Chapter 7 of the Manual (BONNEX BRAVO, CHARLIE, DELTA).

Additionally, each Contracting Party is encouraged to invite observers of the other Contracting Parties to participate in their national exercises.

## 9. International guidelines related and available

Bonn Agreement Contracting Parties jointly recognise and take into consideration the following guidelines and documents that can be applied in preparedness and response in the Bonn Agreement area.

- Guide to Oiled Wildlife Response Planning (IPIECA, 2004)<sup>1</sup>
- Handbook on good practices for the rehabilitation of oiled birds in the aftermath of an oil spill incident (Anon. 2007)<sup>2</sup>
- Handbook on Wildlife Impact Assessment (Anon. 2007)
- Handbook Impact Assessment Seabirds<sup>3</sup>
- A European Oiled Wildlife Response Plan<sup>4</sup>
- IOPC Funds Claim Manual<sup>5</sup>

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<sup>1</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

<sup>2</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

<sup>3</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

<sup>4</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

<sup>5</sup> [www.iopcfunds.org/publications.htm](http://www.iopcfunds.org/publications.htm)

**Part 2: The use of POLREP for oiled wildlife incidents**

Lines 53-56 of POLINF should be used as follows:

## PART II (POLINF)

- 53. Report on oiled wildlife
- 54. Action taken on oiled wildlife
- 55. Forecast oiling of wildlife
- 56. Evidence taken from oiled wildlife
- 57. Spare
- 59. Spare
- 60. Acknowledge

Lines 88-90 of POLFAC should be used as follows:

## PART III (POLFAC)

- 88. Request for wildlife response assistance
- 89. Pre-arrangement for wildlife response assistance
- 90. To where wildlife assistance should be rendered
- 91. Spare
- 98. Spare
- 99. Acknowledge

### Part 3: Recommended guidelines for national oiled wildlife response planning

## Guidelines on wildlife response planning

The Guideline reflects the recommendations from the Guide to Oiled Wildlife Response Planning (IPIECA, 2004, see References) and the practical experience from planning processes and incident responses in different European countries. Many further backgrounds and details can be found in the IPIECA Guide.

### 1. WILDLIFE RESPONSE PLANNING

The relevance of an integrated wildlife response plan in place is that objectives, preferred strategies and resources are defined and need not to be negotiated during spill response. This guarantees swift mobilisation of officers and resources. It also provides the best guarantee for the use of appropriate response, rehabilitation and health and safety protocols, efficient use of resources and likelihood of a successful claim to a P&I Club and/or International Oil Pollution Compensations Funds (IOPC Funds) afterwards.

An agreed and published plan is also of great communication value: the details of the plan can be used to explain ongoing activities to the media and to the general public (e.g. via a website).

In developing a plan it should be considered to include a separate section that explains where, when, why and how a decision would be made to call in assistance from abroad. A published English translation or an executive summary would allow the smooth communication with pre-defined international actors and who could use this information to optimize their contribution to the response.

The smooth integration of wildlife responders from abroad into a national or sub-national/local response is facilitated if the wildlife response plan is based on internationally agreed standards of good practice which are familiar to both the local and international responders.

Therefore, the Contracting Parties are recommended to make available and exchange relevant details on wildlife response plans that would facilitate the converging of aims, strategies and methodologies in the Bonn Agreement area, including:

- When was the wildlife response plan established? Date of last update.
- Who is the owner of the plan?
- How is this plan integrated to the existing plan(s) for oil spill response?
- Is an English version or executive summary available (+downloadable)?
- What is/are the main objective (s) of wildlife response?
- What is the agreed strategy of wildlife response?
- Who are the participants in the response plan? Is their contribution formalized?
- Is a tiered response designed?
- How are health, safety and environment (HSE) issues addressed?
- Which human resources are available for operations?
- Which technical resources are in place?
- How is the plan maintained, trained, exercised and improved?

### 2. AIMS OF A WILDLIFE RESPONSE

The wildlife response should aim to:

- prevent, minimize and assess impacts on wildlife populations,
- prevent the continued suffering of individual oiled animals,

- where applicable ensure the coordinated involvement of responders from government, private sector, NGOs and/or volunteers from the general public with due attention to HSE procedures.

### 3. MINIMUM STANDARDS

A wildlife response plan should always be based on achieving at least the minimum standards of good practice. There are various issues that require attention in this respect, which are briefly discussed below:

1. Health, safety and environment standards
2. Animal welfare standards
3. Rehabilitation protocols
4. Requirements for equipment
5. Wildlife impact assessment and post release survival monitoring

#### 1. Health, safety and environment standards

Wildlife response should be carried out according to the same HSE standards that are applicable for oil spill response. This includes issues such as requirements for personal protection equipment, risk analysis, waste management. In addition, health and safety requirements must be put in place for working with wild animals. Various publications provide guidance on this topic (see References).

#### 2. Animal welfare standards

Animal welfare standards may differ between countries and different legal requirements for dealing with wild and injured animals may apply. A response plan should refer to national or sub-national/local legislation as appropriate and provide clear guidance as how wildlife responders should deal with animals and their welfare.

#### 3. Rehabilitation protocols

If the rehabilitation of oiled animals is attempted protocols must be used that are known to be successful. A wide range of protocols have been developed by organisations that deal with oiled animals on a regular basis. Organisations that have a record of responding to oiled wildlife incidents internationally and often together, have developed a joint methodology which reflects the crucial elements of the most successful protocols. This methodology must be used as it represents the minimum standards mentioned above as well as the present best practice.

Although rehabilitation protocols are kept by individual organizations and not easily available, increasingly training courses are being provided. A recent European initiative (EMPOWER – European Management Programme for Oiled Wildlife and other marine wildlife Emergency Responses, see [www.oiledwildlife.eu](http://www.oiledwildlife.eu)) aims to enhance the use and development of best practices and supports the development of expertise in the European coastal countries.

#### 4. Requirements for equipment

A set of basic equipment needs to be readily available as part of the response planning and preparedness. If equipment is not available from permanent response centers, the development of mobile equipment or mobile units should be considered. Alternatively such units may exist in neighbouring countries and could be made available in case of an emergency.

#### 5. Wildlife impact assessment and post release survival monitoring

Systematic scientific data gathering during and after a wildlife response is necessary to allow a reliable assessment of impact. Applying internationally agreed guidelines for wildlife impact assessment (Handbook Oil Spill Impact Assessment) will maximize the value of these scientific efforts in an international context,

where it is important to monitor the status of vulnerable populations and to explain significant changes in their development and survival.

Also of scientific importance is the systematic study of the survival of cleaned and rehabilitated animals after their release. This requires an intensified and concerted international effort to report on the presence, behaviour and breeding success of these animals on the breeding colonies. Such studies should be laid down in the wildlife response plan as an inextricable element of oiled wildlife rehabilitation and be designed and coordinated at an international level.

#### 4. RESPONSE OPTIONS

A number of response activities may be considered in order to achieve the aims of wildlife response (see table).

| Aim  | Actions that can be considered   | What is "best practice"?   | Handbooks and Guidelines that provide guidance  |
|--|--|--|---|
| Prevent and minimise impacts on wildlife populations                             | Oil combat at sea  | Oil spill response plan<br>Availability of vulnerability maps that include (seasonal) distribution of vulnerable wildlife at sea<br>Pre-identified biologists who could assist in aerial surveillance and the interpretation of real-time field data         | Handbook Wildlife Impact Assessment <sup>6</sup> ;<br>Guide to Oiled Wildlife Response Planning, IPIECA 2004 <sup>7</sup> |
|  | Protect sensitive areas (booming off)  | Availability of vulnerability maps that include (seasonal) distribution of vulnerable wildlife in coastal areas  | Handbook Wildlife Impact Assessment   |
|  | Deterrence and hazing  | Have predefined plans in place with reference to effective methods per species   | North American handbooks  |
|  | Pre-emptive capture  | Having predefined plans in place, which include directions for the treatment and fate of captured animals  | Case studies in literature  |
| Prevent the continued suffering of individual oiled animals                      | (Live animals) capture, clean, rehabilitate and release  | Systematically search beaches<br>Operate rehabilitation facilities<br>Operate internationally approved methodologies/protocols<br>Apply agreed triage criteria<br>Banding of animals that are ready to be released<br>Apply post release monitoring research | Handbook on good practice oiled wildlife rehabilitation <sup>8</sup> ;<br>Guide to oiled wildlife response planning       |
|  | (Live animals) capture, euthanise humanely   | Systematically search beaches<br>Operate euthanasia facilities<br>Have agreed euthanasia techniques  | Handbook on good practice oiled wildlife rehabilitation<br>Guide to oiled wildlife response planning                      |
| Assess impacts on wildlife populations   | (Dead animals) collect, administrate mortality per species   | Systematically search beaches  | Handbook Wildlife Impact Assessment   |
| Coordinated involvement of multiple stakeholders, including NGO's and volunteers | Operate a pre-spill defined plan<br>Have formal agreements in place<br>Provide for a clear, integrated command | Develop and agree an OWR plan before the incident, involving all responders<br>Have the plan trained and exercised regularly   | Guide to oiled wildlife response planning<br>Examples from various countries in Europe, incl. in HELCOM area              |

<sup>6</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

<sup>7</sup> [www.ipieca.org](http://www.ipieca.org)

<sup>8</sup> [www.oiledwildlife.eu](http://www.oiledwildlife.eu)

|                                |   |   |  |
|--------------------------------|---|---|--|
|                                | structure   |   |  |
| Health, Safety and Environment | Health and safety of responders at all times as a matter of highest priority<br>Minimize polluted waste and avoid secondary pollution | No wildlife response if health and safety of the responders cannot be guaranteed<br>Require a minimum level of training from all accredited responders<br>Volunteers being instructed and supervised<br>Provide protective clothing | Guide to oiled wildlife response planning<br>Examples from various countries in Europe, incl. in HELCOM area |

**5. STRATEGY**

The strategy of a plan specifies how the described aims will be achieved under various scenarios.

In certain cases the agreed aims and principles of a wildlife response plan may require a strategic area-specific and/or season-specific elaboration, in order to deal with the variable conditions and circumstances in different parts of the country, such as the delegated responsibilities of sub-national administrations, relative remoteness (lack of resources) of some parts of the country, area complexity, season-dependent distribution patterns of vulnerable wildlife or seasonal variations in sea and weather conditions.

**6. INTEGRATED PLANNING AND COMMAND STRUCTURE**

A wildlife response plan should be integrated with an existing appropriate oil spill response plan. The structure and contents of existing contingency plans may differ strongly from country to country or even within a single country and it needs to be considered how this integration is best structured. For example, in a standard oil industry set up, wildlife response comes in under “Operations” (see figure 1).

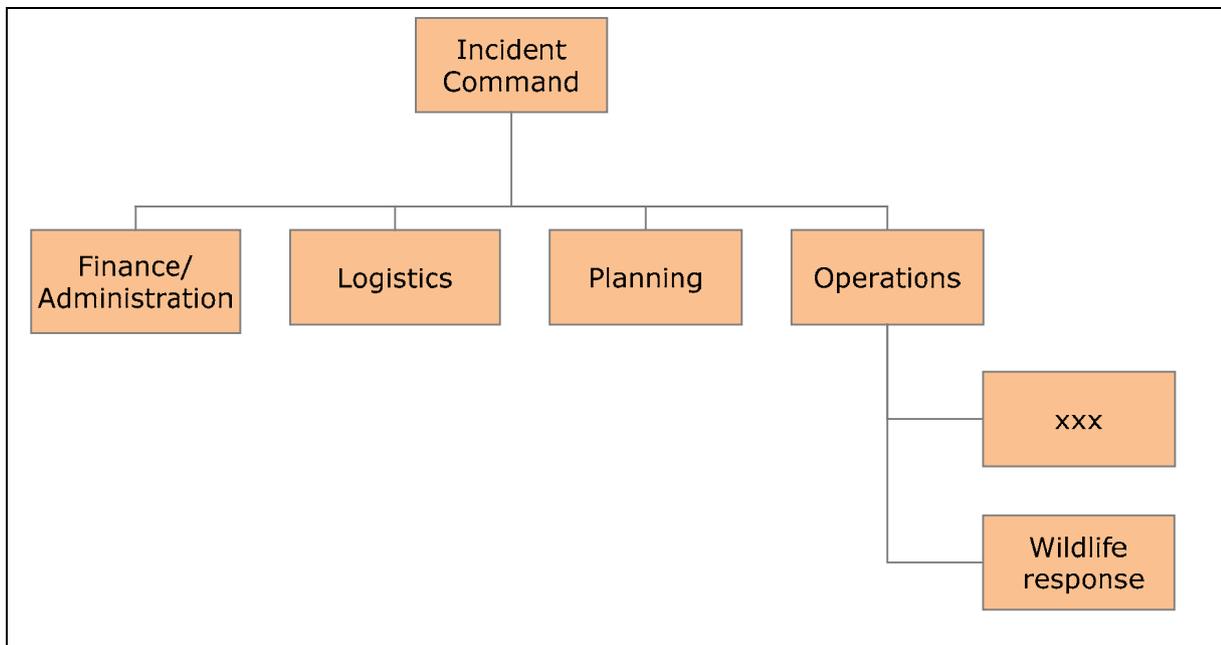


Figure 1: Wildlife response is often integrated into the overall incident command system as part of “Operations”, but the actual organisation structure will differ from country to country.

Also the wildlife response command chain can be structured in different ways. A useful approach that could be considered is to identify a wildlife coordinator who oversees all different aspects of the wildlife response, each of which could be coordinated by a separate officer (see figure 2) in case of a larger incident. In such a

case, the wildlife coordinator should work from, or be represented in the Incident Command Centre, where all real time information comes together and from where decisions are taken.

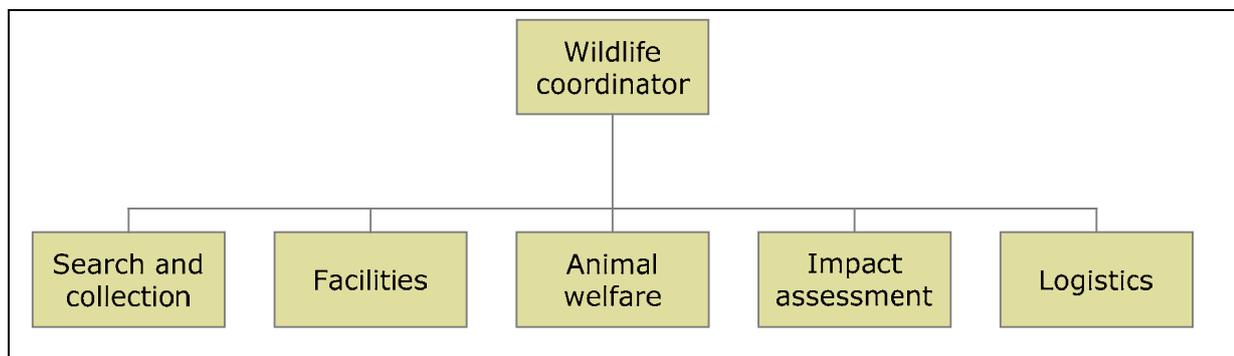


Figure 2: Example of a simple oiled wildlife response organisation chart. The contributions of foreign experts often include the set up and running of a rehabilitation facility, impact assessment, search and collection, and/or overall coaching. Groups or individual experts can be integrated into the organisation chart accordingly.

Although the function of the wildlife coordinator is best taken by an authority official, the roles of other coordinators could be taken by officers from groups and organisations that are formally part of the wildlife response plan. The roles and tasks of each coordinator are described in the operational section of the plan. The roles and responsibilities of organisations (governmental institutions, NGOs, industry bodies, private organisations and others) are best described in the strategy section of the plan, eventually following separate bilateral agreements.

One of the most important and difficult aspects of managing a wildlife response successfully is keeping oversight of day to day developments in relation to the set objectives of the response plan and plan and manage the activities accordingly. The individuals with key responsibilities should be trained to their job. Such training is available via international resources. In case of a worst case scenario developing, experienced individuals from international organisations can provide onsite management assistance.

## 7. TIERED RESPONSE

Relatively small incidents are easier to deal with at a national level than large and complicated incidents. Contracting States should make an assessment of the limits of national capacity in relation to different incident scenarios. The Tiered Response concept is suitable for this, where Tier 1 is local response, Tier 2 a national response eventually involving ad-hoc assistance from neighboring countries and Tier 3 an international response requiring involvement of resources that are available from abroad (see figure 3).

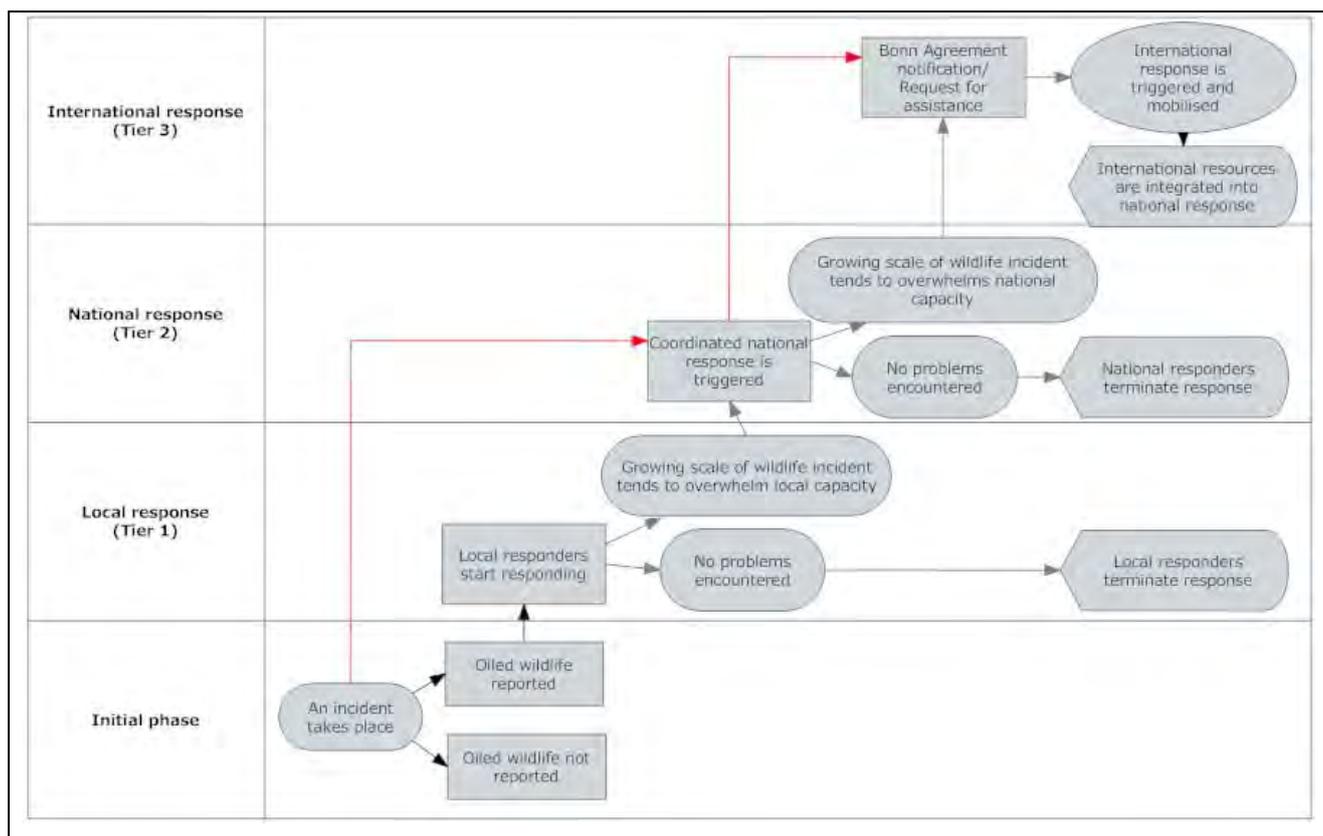


Figure 3: An illustration of the tiered response. In the response plan the capacity limits of each response tier should be clearly described, as well as the decision making process that facilitates the escalation into a next tier. The red arrows indicate that short-cuts should allow an immediate mobilisation of a Tier-2 or Tier-3 response, on the basis of a developing worst case scenario.

It is important for countries to evaluate at which incident scale the national capacity would be overwhelmed, e.g. by the number of involved wildlife or the complexity of the incident. As soon as these capacity limits are being approached in a real-time scenario, the response should escalate from a Tier-2 into Tier-3 scenario. Furthermore, Contracting States should list in advance which resources would be required from abroad in a Tier-3 response, and from where these resources can be invited. This would include e.g. response management assistance, animal care assistance, mobile response units and/or specialised equipment. They should be prepared to cover the costs of mobilised resources from abroad, according to the Bonn Agreement arrangements for international assistance. It should be borne in mind that international compensation regimes include wildlife response as one of the issues that can be included in a claim (see the Claims Manual published by the IOPC Fund in 2008<sup>9</sup>). Having operated according to a pre-spill defined plan strongly supports the justification of such a claim.

## 8. THE INVOLVEMENT OF VOLUNTEERS

The involvement of volunteers has been important in past wildlife responses, reducing the costs of the relatively labour intensive work that is involved. A volunteer can be defined as an individual who desires to assist with the response out of free will and therefore is involved as an unpaid work force and not as an employee.

Health, safety and liability issues must be considered very carefully before involving volunteers in wildlife response activities. The deployment of volunteers in national or state oil pollution response will not always be

<sup>9</sup> [www.iopcfund.org](http://www.iopcfund.org)

possible or desirable. If volunteers are to be used their activities must be well planned, coordinated, supervised and fully integrated into the overall oil pollution response. The person or authority responsible for the overall oil pollution response must determine if, where and when volunteers can be deployed and who will be responsible for their planning, coordination and supervision.

Different types of volunteers can be defined:

1. (Employees of) an NGO that offers its assistance as a voluntary body, ready to get involved and taking responsibilities without necessarily a formal contract or a demand for payment.
2. An individual who is affiliated with an NGO such as described under type 1 but having the status of an internal "volunteer". This type of volunteer is often well trained. Although perhaps not full time available, this type of volunteer will be well coordinated by the NGO in question and make an effective contribution to the response.
3. A member of the general public who offers his labour free of charge to the response organisation but is untrained and not affiliated to any organisation.

In the case of types 1 and 2, a considerable workforce can be mobilised if the right NGOs are identified and invited to play a role in the response plan by means of a formalised agreement. As part of this agreement the accredited NGO could be invited to participate in specific training programmes with regard to HSE and management aspects of an oil spill response. Also as part of the agreement, financial compensation may be addressed. In case a claim can be submitted to a compensation mechanism (P&I Club or IOPC Funds), the NGO could submit its own claim or make it part of the national claim. In the latter case the responsible authority may consider compensating the NGO's expenses in advance.

In case of a volunteer of type 3 (member of the general public), the health safety and liability issues are considerable and the involvement of these kinds of volunteers should therefore be considered very carefully. This type of volunteer must not be charged with key responsibilities, but if deployed given simple tasks under supervision after having received basic on-the-spot training. Health and safety risks should be avoided to the widest possible extent and appropriate insurances must be in place. There are examples of NGOs working in close relationship with the authorities using a professional infrastructure for the recruitment, training and supervision of this type of volunteer.

## 9. FINANCES

Most countries have in place an emergency budget for (marine pollution) emergencies. In the framework of the elaboration of an integrated wildlife response plan it should be considered whether also the costs of a wildlife response and all its possible aspects (see section 4) could be covered by this budget. Especially in large scale spills, these costs tend to be only a small fraction in relation to the total costs of the incident response.

International mechanisms are available that have been set up to compensate for the costs of oil spill response and oil spill damage (e.g. International Convention on Civil Liability for Oil Pollution Damage, IOPC Fund Conventions, Bunker Convention). Wildlife response is recognized by these mechanisms, and the main requirements for a justifiable claim in this respect are described in the 2008 edition of the Claims Manual of the IOPC Funds.

There are also other situations in which it is still unclear or unlikely that one or more of these international compensation mechanism are applicable to the case and in the end will be ready to receive claims. A wildlife response cannot be postponed until the issues around "who pays the bills?" have been resolved. It is recommended that the possibilities of financing large scale wildlife response during oil pollution events should be examined foreseeing future spills so that even in the more obscure pollution events, a smooth and coordinated wildlife response will be possible.

## 10. REFERENCES

The following international publications are worth consulting in the preparation of a wildlife response plan:

- Guide to oiled wildlife response planning. IPIECA (2004). Downloadable from [www.ipieca.org](http://www.ipieca.org)
- Handbook Oil Impact Assessment. Downloadable from [www.oiledwildlife.eu](http://www.oiledwildlife.eu)
- Handbook on good practice for the rehabilitation of oiled birds in the aftermath of an oil spill incident. Downloadable from [www.oiledwildlife.eu](http://www.oiledwildlife.eu).
- A European Oiled Wildlife Response Plan. Downloadable from [www.oiledwildlife.eu](http://www.oiledwildlife.eu).
- Claims Manual (IOPC Funds, 2008). Downloadable from [www.iopcfund.org](http://www.iopcfund.org)

Most of these documents are available via [www.oiledwildlife.eu](http://www.oiledwildlife.eu). This website also provides a myriad of relevant information with regard to wildlife response and preparedness. It also provides access to the activities of EMPOWER.