



European Maritime Safety Agency



Action Plan For Oil Pollution Preparedness and Response

This report is accompanied by
an Inventory of Member States Oil
Pollution Response Capacity



This Action Plan was adopted by EMSA's Administrative Board at its 9th Meeting held in Lisbon on 21st and 22nd October 2004.*

** Italy could not accept this Action Plan.
Germany could accept the Action Plan but was not in a position to accept its financial implication.*

Executive Summary

As of May 19th 2004, with the entering into force of Regulation 724/2004, the European Maritime Safety Agency (EMSA) has a legal obligation in the field of response to ship-sourced pollution within the Community. For the implementation of this legal obligation, the Executive Director of EMSA, following consultation with the relevant Commission services must submit to the Administrative Board a detailed plan regarding the Agency's pollution preparedness and response activities. This Action Plan, presented here, provides the required detailed proposal for a plan as stipulated by the above mentioned regulation.

For various reasons, it is difficult to be prepared for a large oil spill in European waters. Incident statistics show that a large scale oil spill may occur every 2 to 3 years but the location of such an event cannot be predicted. Nevertheless, both the ERIKA (1999) and PRESTIGE (2002) accidents took place in the region of the Bay of Biscay. EMSA is required, if requested, to assist coastal states when such large-scale incidents occur. As always the primary responsibility to react to an incident remains with the Member State concerned.

For this Action Plan, EMSA based itself to a great extent on the risk assessment undertaken by ITOPF (International Tanker Owners Pollution Federation) at

the request of the Commission (DG TREN). This risk assessment has been supplemented with additional information from a range of sources including Member States, particularly contributions made at the "Oil Pollution Response in the European Union" Workshop in June 2004. Against a background of increased seaborne traffic, the growing exports of heavy oil from the Former Soviet Union (FSU), particularly through the Baltic and the Black Seas, give rise for concern. Four priority areas have been identified in European waters which require additional action:

- The Baltic Sea
- The Western approaches to the Channel
- The Atlantic coast
- The Mediterranean Sea, particularly the area along the tanker trade route from the Black Sea

It is worth noting that whilst the North Sea area has a high level of tanker traffic and spill incidence, extensive resources are already in place to mount a response. Consequently, this area has not been considered as a priority for action at this stage.

Using experience acquired, and lessons learnt from previous major oil spills, particularly those involving heavy fuel oil, mechanical at-sea oil recovery is the optimum technique available to remove spilt oil of heavy grades

from the marine environment. In certain scenarios and under specific conditions, generally lighter oils in open sea, the application of chemical dispersants can also be effective in reducing shoreline impact by removing the oil from the sea surface into the water column. Adopting a shoreline clean-up and shoreline oil recovery approach is very costly in terms of damages to socio-economic activities and the environment in addition to the need to dispose of, in an environmentally acceptable manner, huge volumes of collected waste material. With this in mind, it is important to note that for every tonne of oil recovered at sea an estimated 10 tonnes of shoreline clean-up waste material is avoided. From a European perspective, there is still room for improvement in the response chain. On-board oil recovery equipment and vessel storage capacity can be upgraded, whilst the problems of more effective vessel guidance to oil slicks and the provision of sufficient facilities for discharging oil recovered at sea in a timely manner need further attention.

It should be acknowledged that EMSA is confronted with a situation where there are significant differences between Member States in terms of contingency planning, investments in and the availability of oil pollution response equipment. The Agency has made an inventory of at-sea response resources available in the EU-25 (which is kept separately, has already been distributed to Member States and remains publicly available). It should be clearly understood that EMSA does not have the (legal) competence to establish minimum standards for oil spill preparedness and response in the EU. Nevertheless, by promoting best practice EMSA will encourage an active approach by coastal states.

Indeed, a new investment trend is emerging with regard to national response equipment. Coastal states like Portugal, Spain and France have invested recently and/or have budgetary plans to invest in new at-sea oil recovery capacity. In Greece, modest investments are planned by industry.

It is unreasonable to expect an individual coastal state to be prepared to cope with a large scale oil spill without assistance from other coastal states. Some of the Regional Agreements in the EU, for example HELCOM and the Bonn Agreement, have been effective in co-ordinating national capabilities in responding to spills in their seas. Regular multinational exercises help maintain and improve operational experience and practice. For small to medium scale oil spills, these Agreements offer an effective framework for operational response activities. Nevertheless, even for those Member States that are contracting parties to one or more of these Regional Agreements, it would be very difficult to deal with an ERIKA or PRESTIGE scale incident. At the EU level there is an existing mechanism, established by the Council Decision of 23 October 2003, providing a structure which can be utilised by coastal states to 'hire-in' additional response equipment when faced with an oil spill. As the aforementioned incidents have illustrated, there is simply not enough appropriate response capacity available for a prompt and effective response to the larger spills.

According to the amended Regulation, EMSA is required to provide the Commission and Member States with technical and scientific assistance in the

field of oil pollution response. The proposed activities can be divided into three categories: information, co-ordination and operational assistance.

With respect to information and dissemination of best practices, it is the Agency's intention to further invest in its Oil Pollution Response Unit. Within this Unit, there will be capacity for the gathering, analysis and dissemination of best practices, techniques and innovation in the field of oil pollution response, in particular regarding at-sea oil recovery during large spills. In turn, EMSA will use this information to develop, in consultation with Member States, the European Commission and the Regional Agreements, a model to evaluate the effectiveness of existing measures. Actions will include:

- Developing a database to provide information regarding previous incidents, responses and impacts; exploring possibilities to promote common simulation models for oil spill behaviour;
- Developing European guidelines for the use of dispersants,
- Undertaking an assessment regarding hazardous and noxious substance spills and other toxic substances, like vegetable oils, in European waters and the related responses and equipment required,
- Stimulating innovation of oil pollution response equipment with the aim of improved performance in heavy weather conditions.

The European Community is contracting party to all the European regional agreements. EMSA will upon request provide the relevant Commission services with technical and scientific assistance, i.e. to

disseminate best practices among regional agreements and to set up a system to exchange observers from the various Regional Agreements and other parties concerned to be present at exercises taking place in each other region on a structured basis.

Regarding the operational role of EMSA, providing 'additional means' in the field of oil pollution response, the Agency would like to work closely with these agreements at a practical operational and technical level, such as participation in joint oil pollution response activities. EMSA attaches a great deal of importance to regular multinational exercises involving at-sea equipment. The regional bodies have expressed their interest in having close working relationships with EMSA in this particular field. In order to achieve this objective, working arrangements will be concluded with the relevant secretariats in close co-operation with the Commission.

EMSA will work closely with the services of the Commission within the existing co-operation mechanisms in an efficient way and to avoid any duplication of activities. EMSA is in the process of agreeing guidelines for working arrangements with the services of the Commission (DG Environment). These arrangements should reinforce synergies between the Commission services and EMSA within the existing mechanisms to provide Member States with assistance.

In addition, there is a need to establish common classification criteria for oil pollution response equipment in order to facilitate, through the Community mechanism, immediate and effective coastal state assistance

to a requesting state. The Agency intends to develop such common classification criteria in co-operation with the parties concerned.

Under the heading of 'operational assistance', as has been mentioned before, EMSA is required to supply additional means to requesting Member States in need of at-sea oil recovery equipment in the case of an emergency. The additional means available to EMSA will be mobilised through the Community mechanism and will be ready for interventions anywhere in the EU. In order to minimise the response time, it is important to station the response vessels in the aforementioned high priority areas (shown in the map) and to ensure an optimal geographic distribution. There is an immediate need to make available additional oil recovery vessels with large storage capacity to assist coastal states during a large-scale incident. To work as cost-efficiently as possible, EMSA would prefer to conclude stand-by contracts, for a minimum period of three years, with commercial ship operators who have vessels that can be adapted for oil pollution response activities (so-called multipurpose vessels) and which can be mobilised at short notice. This seems the best way to realise a substantial increase in European response capacity within a short period of time.

In parallel, research into innovative ship design and new response techniques should be stimulated to bring about a further strengthening of the response system in the medium and long term.

Priority Areas for Additional Response Capacity



The means offered by EMSA, via the existing European co-operation mechanisms, will, as is common procedure, always fall under the direction of the requesting coastal state leading the response operation. The authority of the coastal state in charge will have EMSA's equipment at its disposal under its own responsibility.

EMSA would like to see a strengthening of the response chain, including improving the guidance of vessels to suitable slicks, upgrading aerial and/or satellite surveillance and creating improved facilities for the discharge of recovered oil. EMSA would therefore want to assist Member States, the European Commission and Regional Agreements in addressing these issues.

Other related activities of the Agency such as liability and compensation and dealing with operational oil spills/unlawful discharges are addressed within the Work Programme 2005 of EMSA.

This Action Plan has been put forward with the intention of strengthening European response to oil pollution, as requested by the Commission, the Council of Ministers and the European

Parliament and, formally, through the Regulation amending the tasks of EMSA.

It is important to note that the extent to which this Action Plan for Pollution Preparedness and Response can be implemented depends fully on the financial means provided to EMSA by the Budgetary Authorities. With limited resources, EMSA will need a significant phasing-in period in order to build up its “reserve for disasters”.

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Introduction

Following the accident of the oil tanker ERIKA in December 1999 and the ensuing proposal by the Commission, the European Parliament and the Council adopted Regulation 1406/2002, which established the European Maritime Safety Agency (EMSA). In the aftermath of a new ecological catastrophe in European waters, caused in November 2002 by the accident of the oil tanker PRESTIGE, it became obvious that additional measures had to be taken on a European level with regard to the response to ship-sourced oil pollution. The newly established European Maritime Safety Agency provided the appropriate framework for developing concrete pollution response actions at Community level. Accordingly, the European institutions gave EMSA a new task in the field of oil pollution response with the adoption (31st March 2004) and publication of the amended Regulation (724/2004) on 29th April 2004. The amended Regulation details two particularly relevant points, namely:

- The Administrative Board shall adopt a plan for the Agency's pollution preparedness and response activities and
- The Executive Director shall present, after consultation with the Commission, such a plan to the Administrative Board.

This Action Plan for Oil Pollution Preparedness and

Response fulfils the obligation placed on the Executive Director and the Agency's Administrative Board.

I. POLLUTION ACTION PLAN

The Action Plan describes the present European situation with respect to the existing structures for oil pollution response in the Member States of the European Union against the background of risk and preparedness. Based on this evaluation, and the associated implications regarding appropriate spill response techniques, the Action Plan identifies activities for the Agency within the context of the amended Regulation.

In order to aid the evaluation of the present status of European response preparedness, the Commission (DG TREN) contracted MVV Consultants and Engineers (MVV C&E) in 2003 to undertake a study on the preparedness of Member States regarding pollution response to oil spills. As Framework Contractors, MVV Consultants and Engineers (MVV C&E) subcontracted the International Tanker Owners Pollution Federation (ITOPF) to carry out the study. Since 1974, ITOPF staff have responded to more than 500 ship-sourced spills in 85 countries mainly at the request of the shipowner and/or his insurer (P&I Club) or the International Oil Pollution Compensation Fund (IOPC Fund). On numerous occasions ITOPF has provided advice to governments and administrations

affected by ship-sourced oil pollution. ITOPF has observer status at both the International Maritime Organisation (IMO) and the IOPC Fund and regularly contributes to discussions on matters relating to oil pollution. ITOPF has extensive knowledge of the subject, at both a theoretical and practical level. The study's risk assessment findings have been used as important data in the drafting of the risk analysis of the Agency's Action Plan.

A first preliminary draft of the Action Plan was discussed at the Administrative Board meeting on 25th March 2004. At that time, members of the Board raised a number of issues that should be taken into account in finalising the Action Plan. Following that debate, and as part of the consultation process, EMSA organised the "Oil Pollution Response in the European Union" Workshop on 23rd and 24th June 2004 with pollution experts and Administrative Board members from the Member States. Issues addressed and extensively discussed at the workshop included:

- Member States Experience and Best Practice
- Oil Pollution Response Techniques and Innovation
- International and Regional Agreements
- Co-ordination of Oil Pollution Response
- Scope of EMSA's Oil Pollution Response Activities
- Cost-efficiency: Deploying Multipurpose Vessels

Preliminary conclusions drawn at the workshop can be found on the Agency's website (www.emsa.eu.int).

At the Administrative Board Meeting on 25th June 2004, under "Any Other Business", Board members had an exchange of views reflecting upon the Workshop and the evolving positions of Member States. At that same meeting, the Agency's Complementary Work Programme 2004 was approved. In the field of oil pollution response, it identifies the following actions: gathering of technical information, preparations regarding the establishment of a "centre of knowledge", streamlining co-ordination of response equipment and working on "terms of operation" for the operational activities of the Agency.

In summary, this updated Action Plan for Oil Pollution Preparedness and Response for 2005 builds upon:

- The risk assessment provided by ITOPF
- The approved Complementary Work Programme 2004
- The contribution from Member States and the Regional Agreements, particularly that provided during the "Oil Pollution Response in the European Union" Workshop
- Practical information provided by business federations and companies working in the field of maritime transport and oil pollution response

Existing Structures for Oil Pollution Response

I. MEMBER STATES ACTIVITIES & OPRC 1990

Since the TORREY CANYON incident in 1967, the historical regularity of large-scale spills has driven the development of various pollution response structures at the national, regional, international and European levels. These frameworks provide the context within which Member States policies and activities have evolved. This chapter describes the main existing structures as well as the legal framework, obligations and tasks of the Agency in the field of pollution preparedness and response.

The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990) is the international agreement on which many Member States' response policy is based. It has been available for signing since 30th November 1990 and entered into force on 13th May 1995.

It includes the following main elements:

- Parties to the Convention are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.
- Parties to the Convention are required to provide assistance to others in the event of a pollution emergency and provision is made for the reimbursement of any assistance provided.

- Ships are required to report incidents of pollution to coastal authorities and the convention details the actions that are then to be taken.
- The Convention calls for the development of detailed plans for dealing with pollution incidents, the establishment of stockpiles of oil spill combating equipment and the holding of oil spill combating exercises.

OPRC 1990 has been widely ratified by Member States although some Member States have not done so to date. Even amongst those who have ratified OPRC 1990, implementation has taken different forms. Some Member States have established strong bilateral and/or regional agreements, whilst others have been less pro-active. The next table indicates which Member States have ratified OPRC 90 as of 1st September 2004.

In parallel to spills of oil, a Protocol to the OPRC Convention addressing incidents involving hazardous and noxious substances (HNS) is also available for ratification. Unfortunately, an insufficient number of countries, including Member States, have taken this step for the Protocol to enter into force. This would happen twelve months after ratification by not less than fifteen countries which were already party to the OPRC Convention. When compared to spills of

oil, response techniques for these “chemical” spills are still in development and the complex nature of the subject matter covered by HNS is often put forward as an explanation for the delay in ratification. Nevertheless, recently a certain acceleration in this process can be observed. The table below indicates which Member States have ratified the Protocol as of 1st September 2004.

Ratification of OPRC 1990 Convention and OPRC - HNS Protocol 2000		
Country	OPRC 1990	OPRC-HNS 2000
Belgium		
Cyprus		
Denmark	●	
Estonia		
Finland	●	
France	●	
Germany	●	
Greece	●	●
Ireland	●	
Italy	●	
Latvia	●	
Lithuania	●	
Malta	●	●
Netherlands	●	●
Poland	●	●
Portugal		
Slovenia	●	
Spain	●	
Sweden	●	●
United-Kingdom	●	
Iceland (EFTA)	●	
Norway (EFTA)	●	

*(IMO, 1st Sept. 2004)
Note: Non-littoral States in the European Union and EFTA have not been listed.*

2. REGIONAL AGREEMENTS

Building on, and in parallel to OPRC 1990, a number of coastal states have concluded bilateral and regional agreements to render mutual assistance whenever a pollution incident threatens their coasts. Sometimes, because of their geographic position, coastal states are members of more than one co-operation agreement. The European Community is also a contracting party to the most relevant regional agreements which are described below:

- The Helsinki Convention
- The Barcelona Convention
- The Bonn Agreement
- The Lisbon Agreement

2.1 The Convention of 1974 and 1992 on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention)

The Helsinki Convention (HELCOM) was adopted in 1974 and entered into force in 1980. In light of political changes a new convention was signed by all the countries bordering the Baltic Sea, as well as the European Community, in 1992 and entered into force on 17th January 2000. The main goal of HELCOM is to protect the marine environment of the Baltic Sea from all sources of pollution, not only ship-sourced oil pollution. The Convention covers the whole of the Baltic Sea area, including the sea and inland waters as well as the sea-bed. Measures are also taken in the whole catchment area of the Baltic Sea, as illustrated in the figure below, to reduce land-based pollution. Contracting Parties to the Helsinki Convention are Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, Sweden and the European Community. Amongst those with observer status are Belarus, Ukraine and the Bonn Agreement.

Catchment Area of the Helsinki Convention



The working structure of HELCOM, supported by a secretariat, consists of the meetings of the Helsinki Commission (once a year), the Heads of Delegation, and six subsidiary bodies including the HELCOM Response Group, which usually meets twice a year. The Helsinki Commission adopts various recommendations as developed in these subsidiary bodies. There are 17 recommendations relating to the response field of which 6 have been identified as requiring detailed reports from the Contracting Parties as shown in the table below. Additional information is also shown with respect to their implementation based on data from “Compliance with the requirements of the Convention and HELCOM Recommendations” as adopted by HELCOM 24/2003.

Implementation of Key Spill Response HELCOM Recommendations		
Recommendation	Topic	Implementation
11/13 (and guidelines)	National ability to response to spillages of oil and harmful substances	Fully or largely implemented by 1/3 of Parties
24/7	Further development and use of drift forecasting for oils and other harmful substances in the Baltic	Fully implemented by all Parties
12/8 (and guidelines)	Airborne Surveillance, with remote sensing equipment, in the Baltic Sea Area	Fully or largely implemented by 1/2 of Parties
19/17	Measures in order to combat pollution from offshore units	Not relevant to the majority of Parties
20/5 (and guidelines)	Minimum ability to respond to oil spillages in oil terminals	Fully implemented by the majority of Parties
22/2	Restricted use of chemical agents and other non-mechanical means in oil combating operations in the Baltic Sea area	Fully implemented by all Parties

In addition, HELCOM Response Manuals have also been developed for spills of oil and chemicals and provide operational details as to response strategies and arrangements for assistance between contracting parties. They are updated on an ongoing basis.

Key to the success of the Convention is the commitment that each country has made to providing for its own response capabilities which it then maintains in constant readiness for oil spill response anywhere in the Baltic. In support of this, varied exercises ranging from “table-top” (BALTEX ALPHA) to “State of

the Art” (BALTEX ECHO) to regular operational exercises (BALTEX DELTA), involving the deployment of vessels from several Member States, are run to test the alarm procedure, the response capability and the response time of Contracting Parties. These joint response exercises facilitate the addressing of practical issues that inevitably arise from complex operations such as at-sea spill response. The table below indicates the scale of these BALTEX DELTA exercises which tend to last approximately three days with the financial costs borne on an individual basis by the participants.

Recent BALTEX DELTA Exercises				
Year	Host Country	No. of Participating Countries	No. of Participating Vessels	No. of Participating Aircraft
2000	Russia	5	12	1
2001	Denmark	7	11	2
2002	Latvia	6	18	2
2003	Finland	5	16	
2004	Germany	-	-	-

The value of such exercises has been demonstrated during the VOLGONEFT 263 (1990), BALTIC CARRIER (2001) and FU SHAN HAI (2003) incidents, where German, Danish and Swedish authorities were in rapid contact with each other following the incident and all responded with anti-pollution vessels within hours.

Improvements in collaboration are continually made, including, above all, harmonizing communications links and exchanging the details of national clean-up capabilities, ship casualty data and practical experience gained during response operations. R&D projects are

also pursued with one country often named to lead work on specific issues.

2.2 The Convention of 1976 for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention)

The Mediterranean Action Plan (MAP) was created under the United Nations Environment Programme (UNEP) “umbrella” in 1975 leading to the creation of the Barcelona Convention a year later which entered into force in 1978. In 1995 MAP Phase II was adopted, entitled “Marine Environment and the Sustainable

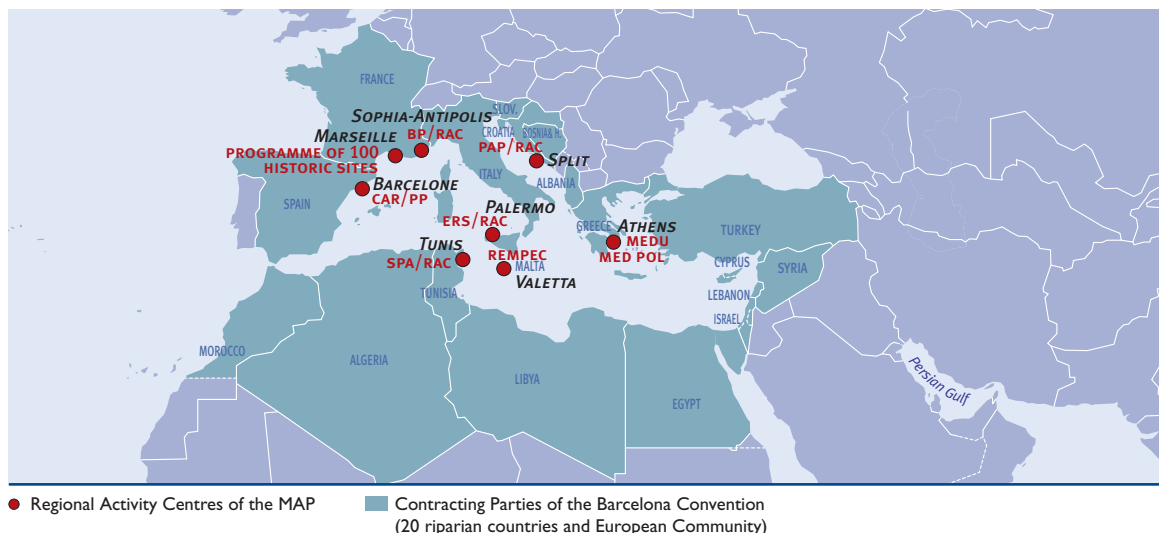
Development of Coastal Areas of the Mediterranean”. In the field of accidental pollution the focus is on prevention, preparedness and response. Contracting parties meet every two years at ministerial level to decide on policy, strategy and programme budget. The Convention’s Secretariat, the Co-ordination Unit (MEDU) has been based in Athens, Greece since 1982. In addition, six Regional Activity Centres (RACs) are responsible for the implementation of the different components of the MAP. The original 1976 Emergency Protocol provided the legal and institutional framework for regional co-operation in combating accidental marine pollution. As a result parties decided to set up the Regional Marine Pollution Emergency Response Centre for the Mediterranean (REMPEC) in Malta. The Centre is administered by IMO and UNEP to promote regional and sub-regional co-operation for emergency response and accident prevention and consequently is the main focal point of marine pollution activity. The figure below illustrates the Contracting Parties of the Barcelona Convention and the location of the RACs as well REMPEC.

The Barcelona Convention is composed of a series of protocols relating to different aspects of the marine environment which have been progressively adopted, albeit not all ratified. Those relating to spills of oil and hazardous material are:

- Protocol Concerning Co-operation in Combating Pollution of Mediterranean Sea by Oil and other Harmful Substances in Cases of Emergency (Emergency Protocol) which was adopted in 1976 and entered into force in 1978,
- Protocol Concerning Co-operation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution in the Mediterranean Sea (the New Emergency Protocol) which was adopted in 2000 and entered into force in 2004.

The first Protocol focused on co-operation for preparedness and response, whilst the second protocol expands its scope to prevention of pollution from ships. As a consequence new actions will be promoted, such as development of port reception facilities, surveillance strategies and emergency towing. The contracting parties are

Barcelona Convention Contracting Parties and Regional Activity Centres (RACs).



bound to take measures in terms of preparedness and response to accidental pollution by oil and other harmful substances. This includes training of personnel, developing contingency plans and arranging and participating in seminars and exercises related to this aspect. The table below shows the ratification status of the Protocols.

Ratification of the Barcelona Emergency Protocols (1 st October 2003)		
Country	Emergency Protocol	New Emergency Protocol
Albania	●	
Algeria	●	
Bosnia & Herzegovina		
Croatia		● ¹
Cyprus	●	
European Community	●	
Egypt	●	
France	●	●
Greece	●	
Israel	●	
Italy	●	
Lebanon	●	
Libya	●	
Malta	●	●
Monaco	●	●
Morocco	●	
Slovenia	●	
Spain	●	
Syria	●	
Tunisia	●	
Turkey	●	● ²
Yugoslavia	³	

¹ & ² Croatia and Turkey notified their ratification of the new Emergency Protocol to UNEP/IMAP pending notification from the depositary country.

³ FR of Yugoslavia notified on 16 July 2002 its succession to the Convention and the Protocols as above. The date of succession is 27.04.92. On 20 March 2003, UNEP Regional Office for Europe was notified that the newly reorganised State Union of Serbia and Montenegro had become party by succession to the Barcelona Convention.

As previously mentioned, REMPEC is the main centre of activity regarding oil pollution response in the Mediterranean. The main achievements of REMPEC are considered to be:

- Publication of a large number of technical information and training materials.
- Development of a wide range of recommendations and guidelines related to preparedness and response to accidental marine pollution.
- Development of the Regional Information System (RIS), the TRansport Of Chemical Substances (TROCS) database and a database on accidents.
- Training of more than 2000 spill responders able to deal with pollution incidents.
- Directly assisting 11 Mediterranean coastal states in the development of their national preparedness and response systems, and in the preparation and implementation of their national contingency plans.
- Conducting a number of communication and alert exercises.
- Organizing three major full-scale exercises involving personnel, equipment, vessels, aircraft and other means from several countries.
- Setting up the Mediterranean Assistance Unit (MAU). MAU is an “expert service” established by the Contracting Parties to the Protocol on Co-operation in Combating Pollution in Cases of Emergency. REMPEC is responsible for the organization and the activation of the Unit.
- Transferring the Mediterranean experience to other UNEP Regional Sea areas.

REMPEC disseminates information related to pollution and conducts training between governments'

administrators and decision-makers of different countries, assists member parties in the development of their national and sub-regional contingency plans and also promotes the creation of operational bilateral and multilateral agreements.

REMPEC also plays an important role in facilitating co-operation and mutual assistance through the organisation of joint training for responders, the organisation of major exercises, as well as the provision of historical and statistical data on past incidents.

The last complex regional Alert Exercise was organized by REMPEC in December 1999. However REMPEC regularly uses national oil spill response exercises organized by individual Mediterranean coastal states as Alert Exercises for testing the functioning of arrangements for mutual assistance in the region. The most recent examples of Alert Exercises are Algeria (May 2002), Morocco (June 2002) and Morocco (June 2004)

Three major full-scale exercises were organized in Cyprus, Egypt and Israel. These were held in Egypt (off Port Said) in October 1995, in Cyprus (off Larnaca) November 1998, and Israel (off Haifa) in November 1999. Each exercise lasted three days with three response vessels participating in exercises in Egypt and Cyprus respectively, in addition to a number of smaller units, surveillance aircraft and helicopters from the host countries. The Israeli exercise involved several local spraying vessels, spraying aircraft, surveillance aircraft, and shore clean-up units. Observers from the Palestinian Authority also attended the exercise in Israel.

REMPEC plans to organize a joint spill response exercise in 2005 involving Croatia, Italy and Slovenia, which would be the final activity related to the preparation of the sub-regional contingency plan for the Adriatic. This exercise has been postponed from 2004 and the intention remains to invite observers from all Mediterranean coastal states to attend the exercise.

2.3 The Agreement of 1983 for Co-operation in Dealing with Pollution of the North Sea by Oil and other Harmful Substances (Bonn Agreement)

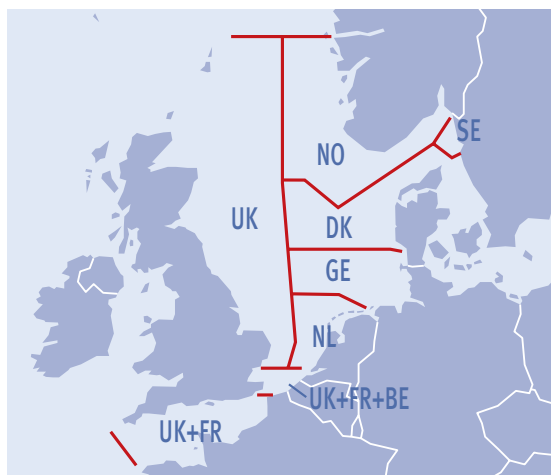
The first Bonn Agreement was established in 1969 following major oil spills including the TORREY CANYON. The current Bonn Agreement dates from 1983 and, unlike HELCOM, is focused on combating marine oil pollution by encouraging the North Sea states to jointly improve their basic capacity. The contracting parties to the Bonn Agreement are Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden, United-Kingdom and the European Community. Amongst those with observer status are Ireland (which it is foreseen will become a full member), Spain, HELCOM and REMPEC (see previous section for further information). The working structure of the Agreement, supported by a secretariat, consists of the Contracting Parties' "Heads of Delegation" meeting and a working group on Operational, Technical and Scientific questions concerning counter Pollution Activities (OTSOPA) which was established to promote the exchange of technical ideas. Both meetings occur once a year. The terms of the Bonn Agreement are to:

- Define procedures for notifying other Member States of an incident.

- Promote sharing of information and resources in response to a spill.
- Encourage sharing of surveillance resources as an aid to detecting and combating pollution and to prevent violations of anti-pollution regulations.
- Encourage Member States to come to the aid of others by providing response vessels and other resources as needed. Importantly, the Agreement states that those providing such resources are to be reimbursed by the Member State that requests the aid.

The geographical area covered by the Agreement, as shown below, extends from the North Sea south of 61° N, including Skagerrak and the English Channel and its approaches. For the purposes of oil spill monitoring and control, the sea area has been divided up into eight zones with supervisory responsibilities being assigned to each of the contracting states, as illustrated below. Within a particular zone, oil which is deemed a threat to national resources must be kept under observation by the supervisory party.

Bonn Agreement Zones of Responsibility for Surveillance and Incident Assessment



The Bonn Agreement Counter Pollution Manual, which is continually updated, provides guidelines for the provision of assistance from one country to another in the form of personnel, ships and equipment for containment, recovery and storage of 'harmful substances'. A more recent development has been the Bonn Agreement Oil Appearance Code (BAOAC). The Bonn Agreement has different types of exercises as shown in the table below:

Types of Bonn Agreement Exercise		
Exercise Name	Type	Aim
Bonnex Alpha	Synthetic Exercise	A "paper exercise" with the aim of creating discussion of issues relating to organisation, communication and logistics in joint combating actions involving two or more Contracting Parties.
Bonnex Bravo	Alarm Exercise	The aim is to test the agreed procedures and lines of communication for reporting, requesting and providing assistance, and to have an overview of the current response readiness of the Contracting Parties to calls for assistance.
Bonnex Charlie	Equipment Exercise	The purpose is to test the co-operation between combating units of the Contracting Parties with respect to both communication and equipment.
Bonnex Delta	Operational Exercise	The aim is partly to test the alarm procedure, the response capability and the response time of the Contracting Parties and partly to test and train the staff functions and the co-operation between combating units of the Contracting Parties.

Recent Bonn Agreement Exercises				
Exercise Type	Year	Host Country	No. of Participating Countries	Other Remarks
Bonnex Bravo	2000	Denmark	All Contracting Parties	Alarm (Paper) Exercise
Bonnex Bravo	2001	Netherlands	All Contracting Parties	Alarm (Paper) Exercise
Bonnex Bravo	2002	Sweden	All Contracting Parties	Alarm (Paper) Exercise
Bonnex Bravo	2003	Norway	All Contracting Parties except one	Alarm (Paper) Exercise
Bonnex Bravo	2004	Ireland	All Contracting Parties	Alarm (Paper) Exercise
	2004	Germany is planning an exercise in Heligoland by the end of the year. Denmark will probably also organise an exercise.		

Additional exercises are organised by individual countries or groups on a bilateral or multi-lateral basis, as opposed to being formally under the umbrella of the Bonn Agreement. Often all the Contracting Parties are invited to participate. These exercises cover a range of issues and involve the deployment of aircraft and vessels. Some examples of these exercises in 2003 include the Bonn Agreement Oil Appearance Code Validation exercise as organised by the Netherlands and NEBAJEX organised by Management Unit of the North Sea Mathematical Models (MUMM, Belgium), Centre de Documentation, de Recherche et d'Expérimentations sur les Pollutions Accidentelles des Eaux (CEDRE, France) and the Foundation for Scientific and Industrial Research (SINTEF, Norway). In September 2004, the United-Kingdom and France will hold Manchex 2004, simulating a collision in the Channel. In parallel, the Agreement has an annual programme for "Tour d'Horizon" activities as well as the Co-ordinated Extended Pollution Control Operations (CEPCO) programme to which all Contracting Parties are invited to participate. Both types of activity have been planned for the period 2004 – 2006. Procedures under the agreement have been success-

fully implemented in a number of incidents, the largest of which was the SEA EMPRESS (1996).

2.4 The Co-operation Agreement signed in 1990 for the Protection of the Coasts and Waters of the Northeast Atlantic against Pollution (Lisbon Agreement)

The Lisbon Agreement (1990) is aimed at promoting mutual assistance between France, Spain, Portugal and Morocco. This international framework for co-operation in combating accidental marine pollution follows the models of the Mediterranean Action Plan, the Bonn Agreement and the Helsinki Commission. Unfortunately, the Agreement has not yet entered into force. Despite this, some co-operation as outlined in the Agreement has been carried out in response to recent incidents in the region. The International Response Pollution Centre of the Northeast Atlantic (CILPAN) was created in 1991 in order to fulfil the objectives of the Lisbon Agreement. The functioning of this centre is assured by the Portuguese government, under the Ministry of the Environment and Planning. However, the actions of this centre are greatly limited by the non-ratification of the Agreement.

Prevention, monitoring, training and response to marine pollution by oil or other substances are the main remits of the agreement. Under the agreement the contracting states are to establish their own response organisations and national contingency plans, undertake to assess pollution incidents and inform other parties accordingly and develop joint training activities at regular intervals. The agreement also provides for the establishment of “zones of joint responsibility”. All contracting states are obliged to render assistance to other parties, if required.

3. EUROPEAN MECHANISMS

The two main Community level instruments which relate to marine pollution preparedness and response are:

- Decision No. 2850/2000/EC of the European Parliament and of the Council of 20th December 2000 which set up a Community framework for co-operation in the field of accidental or deliberate marine pollution for the period from 1st January 2000 to 31st December 2006.
- Council Decision 2001/792/EC, Euratom of 23rd October 2001 which established a Community mechanism to facilitate reinforced co-operation in civil protection assistance interventions.

This section describes the legal structure of the two instruments and how they complement each other:

3.1 The Framework for Co-operation in the Field of Marine Pollution

The European Parliament and the Council established a Community framework for co-operation in the field

of accidental or deliberate marine pollution through its Decision No. 2850 of 20th December 2000. This framework, established for the period 1st January 2000 to 31st December 2006, set a legal basis for the role of the European Community in the field of response to marine pollution. The budget is € 7 million up to 31st December 2006. The role of the Community framework is to:

- Support and supplement Member States' efforts at national, regional, and local levels for the protection of the marine environment;
- Contribute to improving the capabilities of the Member States for response in case of incidents involving spills;
- Strengthen the conditions for and facilitate efficient mutual assistance and co-operation between Member States in this field;
- Promote co-operation between Member States in order to provide for compensation for damage in accordance with the polluter-pay principle.

The Commission, with the assistance of a Management Committee on Marine Pollution (MCMP) consisting of delegates from Member States, implements the framework for co-operation via:

- The co-financing of projects which include actions such as training, exchange of experts, exercises, pilot projects and post-incident environmental impact surveys;
- A Community Information System (CIS) for the purpose of exchanging data on preparedness and response to marine pollution.

The MCMP delegates are high level government experts with the role of exchanging views on response to oil pollution, expressing their opinion regarding

actions to be taken and defining the current and future priorities.

The establishing legislation (in Annex II of the Decision 2850/2000/EC) defines the types of eligible actions and the level of Community financial contribution. The actions, which have to be implemented in close co-operation with the relevant national competent authorities, are selected according to their capacity to contribute to:

- Providing information and building capacity to deal with pollution incidents;
- Improving techniques for response and rehabilitation after incidents;
- Providing better public information to help clarify risks and relaying accidents information;
- Strengthening the co-operation of relevant local bodies and nature protection bodies as regards risk prevention and response;
- Providing operational support in emergency situations by mobilising experts, mainly belonging to the Community task force, to Member States and by disseminating experience from such situations among Member States.

The various types of actions are listed in Annex II of the Council Decision. These cover:

- Actions in training and information (courses, workshops and exercises);
- Actions for improving techniques and methods of response and rehabilitation (pilot projects);
- Support and information actions (environmental impact, conferences and events);
- Mobilisation of experts.

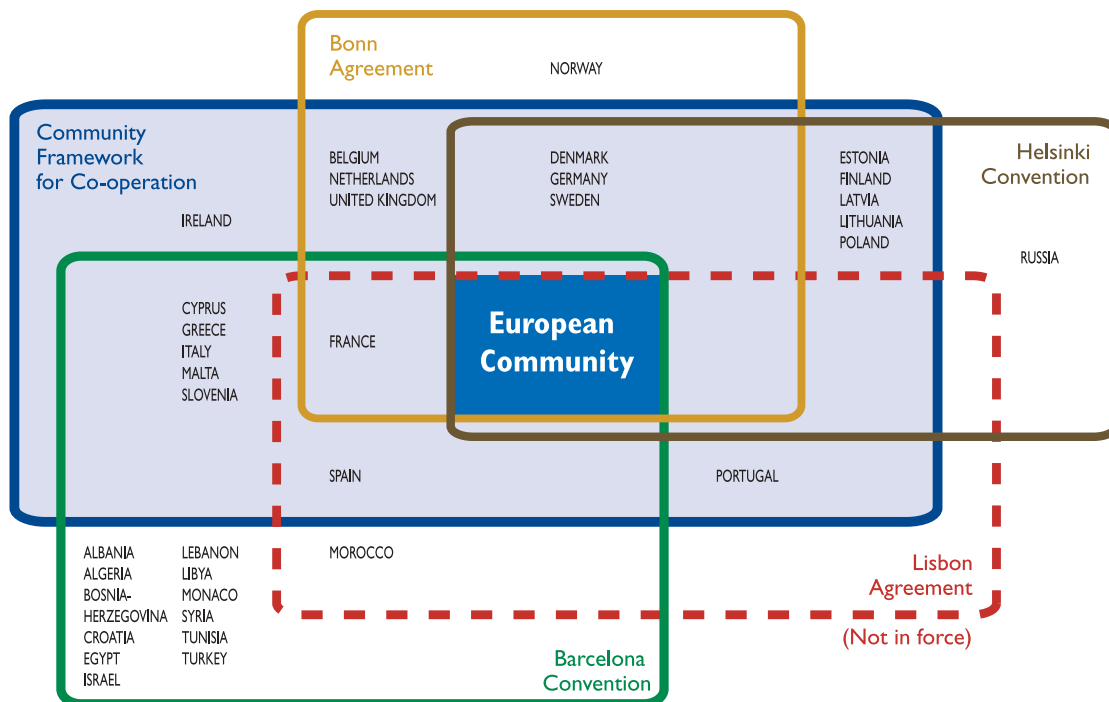
3.2 The Community Mechanism to Facilitate Reinforced Co-operation in Civil Protection Assistance Interventions

The Council Decision of 23rd October 2001 established a Community Mechanism to facilitate reinforced co-operation in civil protection assistance interventions. This new instrument covers both civil protection and marine pollution and provides for the following:

- The identification of intervention teams (and other intervention support), assessment teams and/or co-ordination teams in the event of emergencies;
- The setting up and implementation of a training programme for intervention teams, assessment experts, and/or co-ordination teams;
- Workshops, seminars and pilot projects on major aspects of interventions;
- The establishment and management of a Monitoring and Information Centre (operational on a continuous basis);
- The establishment and management of a common emergency communication and information system;
- Other support action such as measures to facilitate transport of resources

The next figure highlights the participation in the regional agreements of Member States, states not members of the European Union and the European Commission, showing that all major seas in the Community are covered by regional agreements. The figure also illustrates the importance of the Community's co-ordinating role.

International Framework for Co-operation in Combating Pollution



3.3 The Agency’s Oil Pollution Preparedness and Response Task

The amended EMSA Regulation details the new task of the Agency in the field of oil pollution response. The new objectives and tasks are described in the amended Regulation as follows:

Article I (Objectives); paragraph 1:

“1. This Regulation establishes a European Maritime Safety Agency (the “Agency”) for the purpose of ensuring a high, uniform and effective level of... prevention of pollution and response to pollution by ships within the Community.”

Article I (Objectives); paragraph 3:

“3. The Agency shall provide Member States and the Commission with technical and scientific assistance in the field of accidental or deliberate pollution by ships and support on request with additional means in a cost-efficient way the pollution response mechanisms of Member States, without prejudice to the responsibility of coastal States to have appropriate pollution response mechanisms in place and respecting existing co-operation between Member States in this field. It shall act in support of the Community framework for co-operation in the field of accidental or

deliberate marine pollution established by Decision 2850/2000/EC of the European Parliament and of the Council of 20 December 2000 setting up a Community framework for co-operation in the field of accidental or deliberate marine pollution and of the Community mechanism in the field of civil protection assistance interventions established by Council Decision 2001/792/EC, Euratom of 23 October 2001 establishing a Community mechanism to facilitate reinforced co-operation in civil protection assistance interventions.”

The new objectives as described in Article 1 are consequently translated into corresponding new tasks as set out in Article 2. The most noteworthy new elements in the task description are the following:

Article 2 (Tasks); paragraph (a):

“(a) It shall assist the Commission, where appropriate, in the preparatory work for updating and developing Community legislation in the fields of ... the prevention of pollution and **response to pollution caused by ships**, in particular in line with the development of international legislation in that field. That task shall include the analysis of research projects carried out in the field of ... the prevention of pollution and **response to pollution caused by ships**.”

Article 2 (Tasks); paragraph (b):

“(b) It shall assist the Commission in the effective implementation of Community legislation on... prevention of pollution and **response to pollution caused by ships** throughout the Community. In particular, the Agency shall:

- assist the Commission in the performance of any task assigned to it by existing and future Community legislation on...ship pollution prevention and **ship pollution response**...”

Article 2 (Tasks); paragraph (c) iii):

“(c) It shall work with the Member States to:

- **support with additional means in a cost-efficient way**, via the Community mechanism in the field of civil protection established by Council Decision 2001/792/EC, Euratom, **their pollution response actions in case of accidental or deliberate pollution caused by ships, when such a request has been presented**. In this respect, the Agency shall assist the affected Member State under which the cleaning operations are conducted;”

Article 2 (Tasks); paragraph (f):

“(f) It shall provide the Commission and the Member States with objective, reliable and comparable information and data on.....**pollution by ships** to enable them to take the necessary steps to improve their actions in these fields and to evaluate the effectiveness of existing measures. Such tasks shall include the collection, recording and evaluation of technical data...in the field of **marine pollution, both accidental and deliberate**, the systematic exploitation of existing databases, including their cross-fertilisation, and, where appropriate, the development of additional databases... The Agency will also assist the Commission and the Member States in their activities to improve the identification and pursuit of ships making unlawful discharges.

Article 2 (Tasks); paragraph (g):

“(g) In the course of negotiations with States applying for accession the Agency may provide technical assistance as regards the implementation of Community legislation in the field of ... prevention of pollution by ships....The Agency may also provide assistance in case of accidental or deliberate marine pollution affecting these States, via the Community mechanism in the field of civil protection established by Decision 2001/792/EC Euratom. These tasks shall be coordinated with the existing regional cooperation programs and shall include, where appropriate, the organisation of relevant training activities.”

The amended Regulation assigns an important role to the Administrative Board in defining the further modalities of EMSA’s action in the field of oil pollution response. In particular, Article 10.2 provides that:

Article 10; paragraph 2, point (k):

“The Administrative Board shall:

(k) **adopt, following the procedures set out in (d), a detailed plan for the Agency’s pollution preparedness and response activities, aiming at the optimum use of the financial means available to the Agency.”**

In order that the Administrative Board can adopt, by 30th November, a plan with respect to the Agency’s activities in the field of oil pollution preparedness and response, the amended Regulation requires the Agency’s Executive Director to present such a plan to the Administrative Board regarding this task (as detailed below). This Action Plan for Oil Pollution Preparedness and Response fulfils that requirement.

Article 15; paragraph 2, point (a):

“(a) he/she shall prepare the work programme and **the detailed plan for the Agency’s pollution preparedness and response activities**, and submit them to the Administrative Board after consultation of the Commission. He/she shall take the necessary steps for their implementation. He/she shall respond to any requests for assistance from the Commission or from a Member State in accordance with Article 10(2) (c). For information purposes, he/she shall transmit the plan to the Committee established by Article 4 of Decision No 2850/2000/EC as well as to the Committee referred to in Article 9 of Decision 2001/792/EC, Euratom;”

Having identified the existing oil pollution structures in the European Union and outlining the legal task of the Agency in this field, the subsequent chapters of the Action Plan concentrate on those additional elements that need to be evaluated in order to define the “added value” contribution that EMSA can make at the European level.

Primarily, it is necessary to understand the context within which spills occur and what intrinsic factors contribute to the risk of an incident at the European level. This is accomplished by a review of the current seaborne oil trade in European waters and the predicted future developments in this industry. In addition, the historical incidence of spills, particularly large-scale incidents, is also examined with an analysis of the factors that determine the socio-economic

and environmental impact of such incidents. These elements are used to identify the areas at high risk from a large-scale spill. A review then follows of the strengths and weaknesses of the various technical options that are available when responding to an oil spill in order to mitigate the potential impacts. Through an analysis of selected case studies specific lessons that can be learnt from previous incidents are discerned.

After reviewing the threat of an oil spill and the technical measures that can be employed to mitigate its impact, the operational aspects and capacities of the individual Member States are examined. This allows an assessment of the state of preparedness within these entities so assisting the identification of high priority areas. Finally, and within the context of the amended Regulation, conclusions are drawn as to how the Agency should, at the European level, bring “added value” to this field.

3 Marine Pollution Risk in European Waters

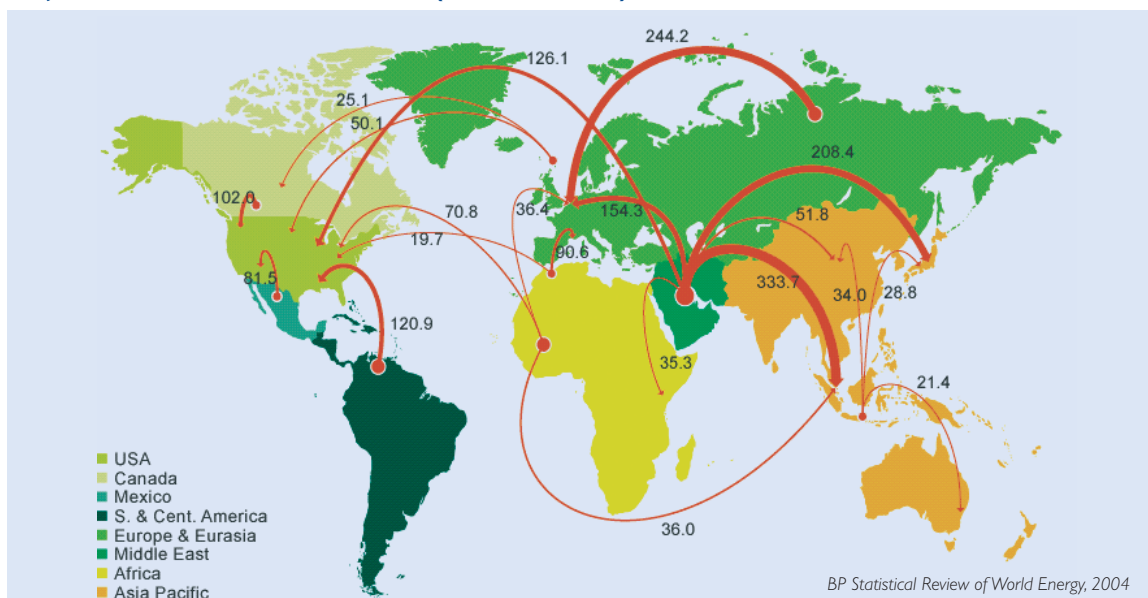
In order to determine the contribution at the European level that the Agency must make to fulfil its legal obligations, it is necessary to evaluate the nature and scale of the risk posed by oil spills in European waters. EMSA's initial action in the field of oil pollution combat should obviously be targeted at those areas where the risk of major pollution is highest. This chapter addresses this by reviewing present oil trade patterns, the associated tanker routes and the socio-economic and environmental impacts caused by large scale incidents. In addition the evolving crude and heavy oil trades are examined.

I. TRADE PATTERNS AND TANKER ROUTES

Although socio-economic and environmental damage resulting from tanker incidents can potentially occur anywhere, the likelihood of such an occurrence is clearly related to the density of tanker traffic, the prevailing weather and wave conditions in sea areas and the type of oil carried (heavy oil is significantly more polluting than light oil). These aspects are examined in the following paragraphs.

The trade in oil and associated products is a global activity. The figure below illustrates worldwide major oil movements by all means of transportation.

Major Oil Trade Movements: 2003 (million tonnes)



Traffic of hydrocarbons is very high in the maritime sector as it represents 43% of the world's seatriade in ton-miles (crude oil and oil products). Europe has traditionally been and remains a major importer of oil and associated products with 90% of all EU imports coming by sea. EU-25 imports have increased over the last thirty years and are expected to continue to do so. In addition, it is worth noting two important evolving aspects of this trade, namely:

- The increasing use of pipelines as a means of trans-

portation particularly from the Former Soviet Union (FSU) production fields to export terminals for transportation by sea,

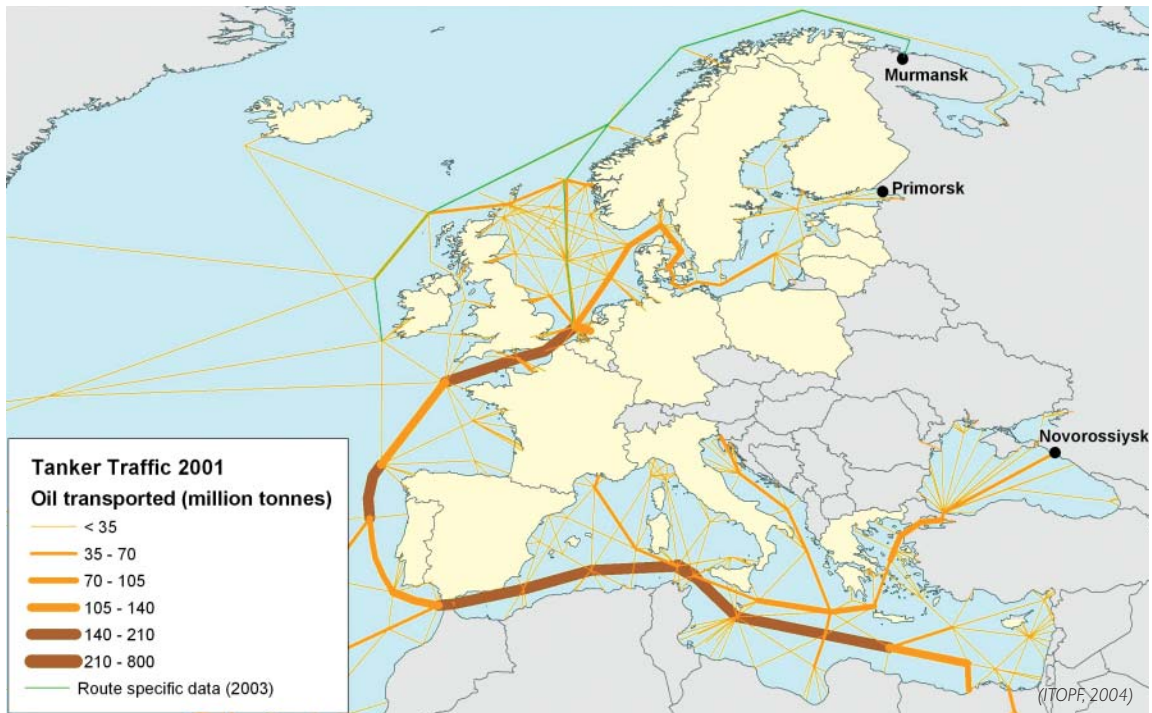
- The dramatic increase in oil flow from the FSU to Europe. In 2002, 181 million tonnes were exported rising to 244 million tonnes in 2003. This represents a 35% "year on year" increase.

The main individual ports for receiving oil into the EU are listed in the table below.

Major Oil Ports in Europe: 2003				
	Port	Country	Region	Quantity Imported (Million Tonnes/Year)
1	Rotterdam	Netherlands	North Sea	145
2	Marseille	France	Mediterranean	65
3	Le Havre	France	The Channel	45
4	Wilhemshaven	Germany	North Sea	40
5	Trieste	Italy	Mediterranean	37
6	Antwerp	Belgium	North Sea	34
7	Milford Haven	United-Kingdom	Irish Sea	32
8	Augusta	Italy	Mediterranean	31
9	Cagliary-Sarroch	Italy	Mediterranean	26
10	Immingham	United-Kingdom	North Sea	26
11	Southampton	United-Kingdom	The Channel	25
12	St. Nazaire	France	Atlantic Sea	20
13	Gothenburgh	Sweden	Baltic Sea	19

More specifically, **indicative** traditional tanker routes, in European waters are shown below.

Indicative Tanker Traffic and Volume of Oil Transported in 2001



From the above map, it is clear that particularly high tanker traffic occurs in the following main zones:

- The entrance to the Baltic Sea
- The North Sea
- The Channel
- The Atlantic coast, especially off the coast of Spain and Portugal and
- The Mediterranean Sea

It is also interesting to note that some of these high tanker traffic zones are in Particularly Sensitive Sea Areas (PSSAs) as designated by the International Maritime Organization (IMO). A PSSA is an area that needs special protection through action by IMO because of its significance for recognised ecological, socio-economic or scientific reasons and which may

be vulnerable to damage by international maritime activities. With respect to the high tanker traffic zones listed above, the following PSSAs have been approved in principle by the IMO:

- The Wadden Sea which is adjacent to the North Sea with responsibility for it shared between the Netherlands, Germany and Denmark.
- The Western European Waters which encompasses an area to the south of Portugal along the Atlantic Coast and as far north as the Shetlands Isles in the United-Kingdom. It also includes the Channel and its approaches.

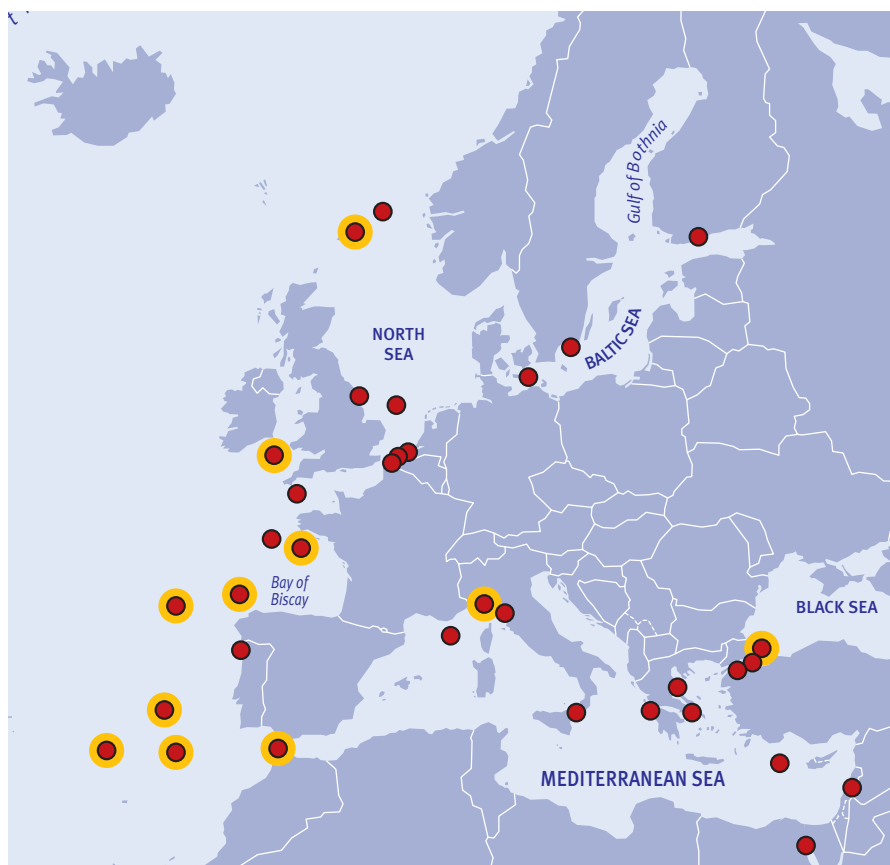
Not represented fully in the map above is the increasing volume of oil transported along the routes taken by tankers servicing the growing oil exports from

the Russian Federation. These exports, which include large quantities of heavy oil, use tanker routes that pass through sensitive areas and contribute to the inherent risk. This issue is addressed in more detail in the next section.

Aside from the identification of high tanker traffic zones, it is also necessary to review the historical incidence of spills and their locations around Europe. The figure below illustrates the location of tanker

spills greater than 700 tonnes in Europe over the last 20 years. Those incidents involving more than 10,000 tonnes are highlighted in yellow and listed in more detail in the subsequent table. It is noteworthy that a significant proportion of these spills are in Western Europe. Aside from the previously mentioned Western European Waters PSSA, the Canary Islands have also been approved as a PSSA by the IMO although no large tanker spills occurred in this area during the period under review.

Large Tanker Spills since 1984



● Spills > 700 tonnes ● Spills > 10,000 tonnes

N.B. The most affected area over the last 35 years has been the Galician coasts in Spain with 7 tanker spills of more than 10,000 tonnes (DG Tren: Maritime Sector: Vademecum No. 6, 2004).

Tanker Spills ≥ 10,000 Tonnes since 1989			
Date	Name	Tonnes	Country
18/12/1989	KHARK 5	80,000	Portugal/Morocco
29/12/1989	ARAGON	25,000	Portugal
06/08/1990	SEA SPIRIT	10,000	Spain/Morocco
11/04/1991	HAVEN	144,000	Italy
03/12/1992	AEGEAN SEA	73,500	Spain
05/01/1993	BRAER	84,000	United-Kingdom
13/03/1994	NASSIA	33,000	Turkey
21/12/1994	NEW WORLD	11,000	Portugal
15/02/1996	SEA EMPRESS	72,360	United-Kingdom
12/12/1999	ERIKA	19,800	France
13/11/2002	PRESTIGE	77,000	Spain

Therefore, although acknowledging that incidents can happen anywhere, it must be concluded that the probability of such tragic incidents occurring due to heavy weather conditions are the highest at the Atlantic Coast of Western Europe.

2. CHANGING TRADING PATTERNS IN CRUDE AND HEAVY FUEL OILS

A significant factor to be considered is the changing nature of the threat of oil spills. In the past the main risk, in terms of the movement of oil to Europe, has been the transport of oil to and from the European oil ports as previously mentioned. The development of Russian oil exports from the ports of Primorsk (in the Baltic Sea), Murmansk (in the Arctic region) and Novorossiysk (in the Black Sea) of both crude and heavy fuel oils has increased the use of existing routes through the Baltic whilst opening up new ones off the coasts of Norway, United-Kingdom, Ireland and in the Eastern Mediterranean/Black Sea area.

Tanker traffic passing through the Baltic Sea is expected to increase significantly from 11,256 tankers in 2002 to

14,472 in 2015. This equates to approximately a 30% growth in the number of tankers. Indeed, not only is the level of tanker traffic rising but the actual average size of the tankers is also increasing so adding to the overall spill risk and impact of an incident. Other vessel traffic is also projected to grow significantly with estimated percentage increases ranging from 35% to 102% depending on the particular part of the route. It is worth noting that these figures do not include passenger vessel traffic. Navigation conditions can be hazardous in winter-time in the Finnish Gulf (ice). The Danish Straits and the connected narrow fairway channels off the coast of Germany and Sweden also form an area where safety of navigation requires special attention (pilotage).

The Baltic Sea is almost totally enclosed by land, and only connected to the North Sea by narrow and shallow straits around Denmark and Sweden which limit the exchange of water with the open sea. It typically takes about 25-30 years for all of the water in the Baltic Sea to be replaced. As the world's largest brackish sea it is ecologically unique given that brackish bay water and

surface water force the marine and fresh water species to live on the edge of their survival limits. Due to its special geographical, climatological, and oceanographic characteristics, the Baltic Sea is highly sensitive to the environmental impacts of human activities in its catchment area. With this in mind, the whole of the Baltic Sea is classified as a PSSA by the IMO. In addition, the area is also classified as a "Special Area" under Annexes I and II of MARPOL 73/78. Annex I contains the regulations regarding the prevention of pollution by oil. That Annex defines certain sea areas as "Special Areas"⁴ in which, for technical reasons relating to their oceanographical and ecological condition and to their sea traffic, the adoption of special mandatory methods for the prevention of sea pollution is required. Under the Convention, these special areas are provided with a higher level of protection than other areas of the sea. Annex II contains the regulations for the prevention of pollution by noxious liquid substances and details strict controls on tank washing and residue procedures.

Projected scenarios regarding exports from North West Russia, using the Arctic tanker route, indicate that tanker traffic will increase from one 30,000 tonne tanker per day up to three 100,000 tonners per day, depending on the construction of a new pipeline from Siberia to Murmansk. With three days sailing along the Norwegian coast, 9 fully loaded tankers southbound and 9 tankers in ballast northbound will be transiting the Norwegian area of responsibility. It is expected that much of this exported oil will be destined for the United States and the Netherlands. In addition the North West European Waters are classified by the International Maritime Organization (IMO) as a "Special Area" under Annex I.

With respect to the Eastern Mediterranean/Black Sea area, various pipeline projects are underway e.g. the Baku-Tbilisi-Ceyhan (BTC) pipeline which is expected to carry 1 million barrels per day. These pipelines will generate crude and heavy fuel oil cargoes to be transported by tankers using routes through the East Mediterranean. Importantly the Mediterranean Sea is also classified as a Special Area under Annex I of MARPOL 73/78.

The changing trading pattern has increased, and is expected to continue to increase, oil pollution risks, particularly of heavy fuel oil, in areas that have inherent navigation hazards and environmental sensitivities.

In addition, the risk posed by non-tanker vessels is increasing in line with the quantity of bunkers carried on board. Some bulk carriers and container ships carry, as fuel for the ship itself, more heavy fuel oil than some tankers carry oil as cargo. Unfortunately, heavy fuel oils are more persistent in the marine environment and consequently cause more damage to Member States' environment and socio-economic resources. By way of demonstration, in recent years ITOPF has attended on site as many bunker spills from non-tankers as tanker cargo spills.

Consequently, it is clear that the increasing exports from the FSU, particularly those of heavy fuel oil pose an intrinsic risk to the following areas:

- The Mediterranean Sea and
- The Baltic Sea

⁴ The criteria for the identification of PSSAs and those for "Special Areas" are not mutually exclusive. In many cases a PSSA may be identified within a Special Area and vice versa.

3. FACTORS DETERMINING THE ENVIRONMENTAL AND FINANCIAL IMPACT OF SPILLS

The environmental and socio-economic damage caused by an oil spill is determined by a range of factors including type of oil; weather and sea conditions; effectiveness of clean-up operations; physical, biological and economic characteristics of the spill location; amount and rate of spillage; and time of year.

In general, light refined products (e.g. gasoline, diesel) and light crude oils do not persist on the surface of the sea for any considerable length of time due to rapid evaporation of the volatile components and they are more likely to disperse and dissipate naturally, especially in rough seas. Such oils tend to be more toxic than heavier oils which can result in mortalities of marine plants and animals if sufficient concentrations of oil enter the water column through wave action and are not rapidly diluted by natural sea movements. Correspondingly, these oils may taint edible fish, shellfish and other marine products. All such effects will, however, usually be localised and relatively short-lived since the toxic components are also the ones that evaporate most easily. Once clean water conditions return, fish and shellfish normally expel (“depurate”) the oil components that cause taint. Light oils can represent a fire and explosion hazard if spilled in confined conditions, leading to a wide variety of third party claims, due, for example, to temporary closure of port areas or nearby industry.

In contrast heavy crude oil, emulsified oil and heavy fuel oils, whilst generally lower in toxicity, are considerably more persistent in the marine environment due to the

lesser volatile compound content. Hence, they do not readily evaporate, disperse or dissipate naturally and rough sea conditions are more likely to accelerate the emulsification process. Consequently, these heavier oils will constitute a threat to seabirds and other wildlife (for example on shorelines) that become physically coated or smothered. Amenity areas, fishing gear, mariculture facilities and other structures will also be contaminated, sometimes over very extensive lengths of coastline due to the highly persistent nature of the oil. Further problems can arise if the already high density of the heavy oil increases further (e.g. through incorporation of sediment in coastal waters) to the extent that the residues sink. This is less likely to occur with light oils due to their lesser persistence in the marine environment. This can result in the prolonged contamination of the sea bed, forming a reservoir for the fouling of bottom fishing gear and repeated re-oiling of cleaned amenity areas as the sunken oil is remobilised after storms. All these problems can result in significant clean-up costs and major third party damage claims for economic loss, as illustrated by the NAKHODKA (1997), ERIKA (1999) and PRESTIGE (2002) incidents.

The amount of oil spill is evidently an important aspect in determining the environmental and financial impact of a spill, all other factors being equal. On the other hand, it is clear that the type of oil involved, and its associated fate and behaviour in the marine environment, has as much if not more influence than the quantity of oil spilled. The clean-up operations were, in many respects, just as difficult and costly with regard to the TANIO in France (14,500 tonnes of heavy fuel oil, 1980) as for the AMOCO CADIZ in France

(223,000 tonnes of crude oil 1978) both of which contaminated similar areas in France.

The table below shows spills greater than 10,000 tonnes since 1990, the type of oil spilled and where available, the “financial costs”. This cost data has been sourced from the International Oil Pollution Compensation Fund (IOPCF). The data represents the compensation value for all admissible claims under the CLC 92 and Fund 92 Conventions regardless of the actual compensation limits in place at the time of the incident. Various categories of claim are admissible under the terms of the Conventions

e.g. fisheries, tourism and clean-up operations. It is important to note that compensation for environmental damage (other than economic loss resulting from impairment of the environment) is restricted to costs for reasonable measures to reinstate the contaminated environment. Claims for damage to the ecosystem are not admissible.

It is important to highlight the fact that some of the cases are still “open” and consequently the figures shown are at the lower end of estimates. In addition, the costs have been inflated to 2002 monetary values to allow “like for like” comparison between incidents.

Tanker Spills ≥ 10,000 Tonnes since 1989					
Date	Name	Tonnes	Oil Type	Country	Cost (\$)
13/11/2002	PRESTIGE	77,000	Heavy Fuel Oil	Spain	700,000,000 ⁵
12/12/1999	ERIKA	19,800	Heavy Fuel Oil	France	600,000,000 ⁶
11/04/1991	HAVEN	144,000	Crude	Italy	300,600,371
05/01/1993	BRAER	84,000	Crude	United-Kingdom	175,893,597
03/12/1992	AEGEAN SEA	73,500	Crude	Spain	137,438,931
15/02/1996	SEA EMPRESS	72,360	Crude	United-Kingdom	89,579,514
18/12/1989	KHARK 5	80,000	Crude	Portugal/Morocco	N/A
13/03/1994	NASSIA	33,000	Crude	Turkey	N/A
29/12/1989	ARAGON	25,000	Crude	Portugal	N/A
21/12/1994	NEW WORLD	11,000	Crude	Portugal	N/A
06/08/1990	SEA SPIRIT	10,000	Heavy Fuel Oil	Spain/Morocco	N/A

⁵ & ⁶ Lower estimate

Clearly, the extent of the environmental and socio-economic damage caused by the spills varies widely. The most damaging spills have been the PRESTIGE (2002) and the ERIKA (1999). Both accidents were partly caused by the adverse weather conditions and sea conditions that occur frequently in wintertime off the North Atlantic coasts of Europe. This is also one of the areas with the highest tanker traffic density. Using the lower cost estimates, six incidents alone have a total financial

impact in excess of \$ 2 billion. It is also apparent that spills of heavy fuel oil are, all other factors being equal, significantly more expensive than those of crude oil.

In summary and based on worldwide experience of hundreds of spills, incidents involving large quantities of heavy crude oil, emulsified oil and, particularly, heavy fuel oils have the worst environmental and socio-economic impacts.

4 Spill Response Options and Case Studies

Having identified the main risks and impacts with regard to the occurrence of a large scale incident, it is necessary to describe what measures can be taken in responding and mitigating the impact of such events. This chapter provides an overview of the strengths and limitations of the recognised technical response strategies namely:

- Mechanical recovery at sea,
- Aerial application of dispersant chemicals,
- *In-situ* burning,
- Monitor and evaluate and
- Shoreline clean-up.

Also described are some of the issues regarding the disposal of oiled material collected from mechanical recovery at-sea operations or shoreline clean-up actions. Through the analysis of case studies, more specific factors are identified as enhancing the effectiveness of response operations as well as highlighting various deficiencies in the response chain as a whole.

1. MEASURING SUCCESS

When considering how to enhance the success of a spill response operation, different approaches to measuring success can be taken. The chosen approach will in turn directly influence the aims and nature of any response operations undertaken. It is worth noting that the specific circumstances of incidents,

particularly large scale spills, can vary widely, making it difficult to make direct comparisons between the success, or otherwise, of spill response operations. In addition, large scale incidents will inevitably result in stranded oil. The nature and scale of the associated impact will depend on a range of factors, as described earlier. Consequently, the use of simplistic “measures of success” often runs contrary to the complex nature of these events. Some of the parameters used regarding the effectiveness of actions taken include:

- The quantity of oil collected at sea,
- The percentage of the quantity of oil spilled that is collected at sea,
- The length of shoreline contaminated by oil,
- The extent to which the length of shoreline contaminated by oil has been reduced by at-sea response operations,

Each of these approaches has its advantages in trying to evaluate the effectiveness of measures taken however one weakness is that none of them addresses the socio-economic and environmental sensitivity of the coastline to oil pollution. Factors affecting the socio-economic coastline sensitivity include the presence, or absence, of mariculture facilities, fisheries, amenity beaches for recreational use and marinas. Contamination of any of these types of resources can

have a significant financial impact on the local markets and in turn that proportion of the population that depends on these activities for their livelihood. The extent of this socio-economic effect is not necessarily proportional to the length of shoreline oiled as these types of areas can be highly localised whilst the financial impact can be much wider:

Different shoreline types have different levels of environmental sensitivity to oil pollution. The degree of oil retention of a shore and the degree to which “mother nature” cleans, affects the scale of impact and duration of damage. These two aspects both depend upon the condition of the oil, for example “fresh” vs. “weather” oiled; the beach type, for example, rock, sand, shingle, mud flats; and the exposure to wave action and tidal scouring. More viscous oils tend to be retained in greater quantities as surface accumulations than do less viscous oils. Broken, uneven and gently sloping shorelines with a large tidal range can hold more oil than steep, smooth shores with a small tidal range. Where wave action and tidal scouring are strong, shores can be cleaned by “mother nature”. This type of information should also be cross-referenced with extent of wildlife, for example, birds and seals which are very sensitive to the smothering affect of being oiled.

A second weakness is that none of the approaches addresses the degree of oiling along a given length of coastline. Using the length of shoreline oiled implies that the shoreline is oiled to the same degree which ignores the fact that some areas might be heavily oiled whilst the majority might be lightly oiled. For any given coastline type, for example an amenity beach or rocky foreshore, the

thickness of the stranded oil, and the depth of shoreline oiled, is linked directly to the scale of shoreline clean-up required before the termination of such operations. Deciding on the point at which clean-up operations for a given area should be terminated depends on a range of factors and often is a source of debate and controversy.

In general terms, and in the majority of large scale incidents, it is clear that the removal of oil from the marine environment, or at a minimum from the sea surface, will directly and/or indirectly mitigate the impact of the oil on the coastline. This is particularly true of spills of very persistent oil, for example heavy fuel oils, where the fate and behaviour of the slicks is more difficult to model and consequently determine if oil slicks will contaminate the coastline. By way of an example, fate and trajectory models used during the PRESTIGE incident (Spain, 2002) did not predict initially the stranding of oil in the United-Kingdom.

Finally, and regardless of any technical measures of success, there remains the public perception of whether an incident was well handled or not and if the authorities concerned endeavoured “to do all that was possible”.

2. SPILL RESPONSE OPTIONS

The main techniques available for responding to a marine oil spill are described briefly below. Selecting the most appropriate techniques is dependent on the exact nature of the specific incident.

2.1 Mechanical Recovery At Sea

As previously mentioned, it is generally desirable to remove spilled oil from the marine environment. With

that aim in mind, the most appropriate technique is the use of mechanical recovery, namely booms, skimmers, grabs and “specialist” response vessels equipped with sweeping arm oil recovery systems.

Booms are capable of containing oil when the currents at right angles (perpendicular) are less than 0.75 of a knot (0.35 metres per second), effectively limiting the speed at which booms can be towed to less than 0.5 of a knot. They can be deployed in a U, V or J configuration, which usually involve two or even three vessels, allowing a wide sweeping width to encounter; contain and concentrate the oil sufficiently for recovery by skimmers. As a result, maintaining the correct formation and vessel speed is invariably challenging. Weather conditions also have a great influence on the ease of boom deployment, as handling wet slippery equipment whilst on board a vessel which is pitching and rolling is difficult and places personnel at risk. Booms are most effectively deployed in calm weather and flat seas conditions. The figure below shows a boom in deployment.



Vessel with Boom and Skimmer System Deployed



Vessel with Sweeping Arm System Deployed

Skimmers recover oil or oil/water mixtures from the sea surface and a range of designs are available depending on the viscosity of the target oil. Pumps are also needed to transfer the oil to storage and a suitable combination (skimmer and pump) is required if the target oil is to be successfully recovered. An alternative to ineffective skimmer/pump combinations is the use of mechanical grabs on very viscous slicks. As a result, boom and skimmer combinations can function with some success across a wide range of oils including heavy crudes, emulsified oils and heavy fuel oils. They work best when operated by trained teams in relatively calm sea conditions and where appropriate equipment has been installed.

In light of the challenges of operating towed boom systems involving multiple ships, “specialised” response

vessels have been developed, as shown above. These vessels incorporate sweeping arms, skimming devices and onboard oil storage. One of the main advantages of sweeping arm oil recovery systems is that they are a combined containment and recovery system so negating the need for separate deployment of lengths of boom and skimmer. In addition, they are also less likely to fail in heavier weather conditions and their better wave-following capability also enhances their performance. Due to the relatively narrow sweeping width, they are best suited to recovering oil in ribbons or windrows. Furthermore, they can operate with some success across a range of oils in more adverse weather conditions than towed boom systems.

2.2 Aerial Application of Dispersant Chemicals

Where the removal of oil from the marine environment cannot be achieved, an alternative approach is to remove the oil from the sea surface. The role of dispersant chemicals is to accelerate the natural dispersion process of oil into the sea (or water column). Dispersants can be sprayed from a range of platforms including boats, planes and helicopters and, with sufficient operational support, oil spread over a broad area can be dealt with rapidly and successfully as demonstrated during the SEA EMPRESS incident (UK, 1996).

As the objective of this type of response is to transfer the concentrated oil slicks on the sea surface to a diluted concentration in the water column, it is necessary to assess thoroughly the potential impact of the oil in the water column on environmental and socio-

economic sensitivities e.g. mariculture. In light of this, use of dispersant products is usually only undertaken with the approval of appropriate government authorities.

Unfortunately, chemical dispersants have little effect on oils with a viscosity of more than 2,000 centistokes (equivalent to Medium Fuel Oil at 10-20° C) as the dispersant is invariably washed into the surrounding water before taking effect. (Recent research indicates that the viscosity limit of the latest generation of dispersants might be higher; possibly 5,000 - 7,000 centistokes however further validation is required. These performance boundaries would not necessarily affect the general limitations as described.) Dispersants are unsuitable for dealing with viscous emulsions ("chocolate" mousse) or oils which have a pour point near to or above that of the ambient temperature. Even those oils, which initially could have been dispersed using chemicals, will increase in viscosity, due mainly to evaporation and emulsification, beyond the limit of the dispersant's effectiveness. A range of factors determines the length of time a particular oil slick might be dispersible, but it is unlikely to be more than a day or two. This type of response option is likely to be most successful for light crude oils.



Dispersant Application from an Airplane



Dispersant Application from a Helicopter

The use of dispersants as a response option is controversial in many European countries and is, at most, considered a secondary response. The United-Kingdom uses dispersants as a primary response whilst in Norway it is used to supplement physical removal of the oil. The general approach for Member States bordering the Baltic and Mediterranean Seas is either not to use dispersants or only under restricted circumstances. These policy positions reflect a range of considerations including historical experience of dispersants, the environmental sensitivity of the sea and coastline as well as the water exchange rate and its associated implications regarding the dilution of dispersed oil in the water column. The main potential disadvantage of dispersion of oil is the localized and temporary increase of oil in water concentration that could have an effect on the marine life within the immediate vicinity of the dispersant operation.

As regards the latest generation of dispersants, improvements have been made with respect to effectiveness and to environmental toxicity. These aspects when combined with the more frequent use of net environmental benefit analysis in spill response

indicate that, in certain situations, dispersants can play a more important role than might generally be assumed e.g. where mechanical recovery is unsuitable and where there is a threat to wildlife.

2.3 In-situ Burning

An alternative method of removing oil from the sea surface is through in-situ burning of the oil. This response option involves the containment of oil in special fireproof booms and deliberately igniting it. This approach is very unlikely to be suitable for ship-sourced pollution incidents due to a variety of factors including safety concerns, sea conditions and the availability of specialised equipment to contain sufficient oil to ignite/maintain combustion (contrary to initial perceptions, oil in the marine environment is difficult to burn). The generation of large quantities of smoke is also an issue as demonstrated by the accidental ignition of the cargo on board the AEGEAN SEA (Spain, 1992) which led to the temporary mass evacuation of the town of La Coruna. The formation, and probable sinking, of extremely viscous and dense residues also practically excludes this approach from environmentally sensitive areas. This type of response option has limited relevance to ship-sourced spills in European waters.

2.4 Monitor and Evaluate

Under certain circumstances (e.g. type of oil involved/its persistence in the marine environment, meteorological and oceanographic conditions) spilled oil will remain offshore, where it will disperse and dissipate naturally without contaminating coastlines and/or (heavily) impacting on wildlife. This “monitor and evaluate”/“do nothing” approach does not mean

“no action” whatsoever. There are various activities that should be carried out when implementing this approach.

In this type of scenario, monitoring and evaluating the condition of the vessel(s) involved in addition to the movement and fate of the oil slicks to confirm that coastline stranding will be avoided is a sufficient response. Aerial surveillance, satellite imagery and spill trajectory/ fate and behaviour modelling can all play a role at this stage. During the course of any incident, regular evaluations of the situation and potential outcomes need to be undertaken until such time as either a response becomes appropriate or until the authorities are entirely confident that the oil has behaved as predicted and that termination of the monitoring is appropriate. Consequently, the response strategy for any given incident can evolve away from a “monitor and evaluate” approach depending on the specific circumstances.

Actions of a “monitor and evaluate” approach will likely include aerial, and possibly sea, surveillance with similar daily costs to those incurred when a clean-up response is required. It should be noted that the individual circumstances of a spill will influence what areas need to be covered and over what period of time. In addition, the mobilisation of response resources, or placing them on standby until it is determined that they will not be required, will also incur costs. If the coastal state does not have pre-incident arrangements in place then the scale of these costs will be dependent on contracts established during the incident.



Aerial Surveillance

This type of response option is most likely to be appropriate for small offshore spills of light refined products (e.g. gasoline and diesel). On the other hand, if the spilled oil is likely to impact coastlines then a different response approach will be required.

2.5 Shoreline Clean-up

With respect to large scale incidents, there is invariably a shoreline clean-up aspect to the response strategy. There are a range of techniques which are usually used in combination to mitigate the impact of the oil on the coastline resources. These techniques all have their advantages and limitations but include manual and mechanical removal, flushing or washing with water at high or low temperatures and pressures, and even wiping with rags and sorbent materials.



Shoreline Clean-up

Selection of the appropriate technique must be done with reference to the shoreline type and the level of pollution present. This is necessary as the use of an inappropriate technique can actually result in elevated levels of damage. For example, in the case of an oiled rocky shoreline exposed to rough sea (i.e. high level wave action) an aggressive approach such as high pressure-hot water washing might be suitable. In contrast this type of technique would be completely unsuitable for more environmentally “delicate” habitats. Within this framework, there are complex discussions as to the appropriate point to terminate the clean-up operations. It is for this reason that in some cases the least damaging strategy will be to allow natural clean-up and recovery to take its course however unsatisfactory this might seem.

Once oil has reached coastlines, response efforts should first focus on areas which have the heaviest concentrations of mobile oil, which could otherwise lead to further pollution of surrounding areas. Experience around the world has shown, for example, that sensitive areas such as marshes and mangroves often recover more quickly and completely if invasive clean-up techniques and physical disturbance are avoided. Natural cleaning can also be very effective on rocky shores that are exposed to strong wave action.

2.6 Waste Separation and Disposal of Waste Materials

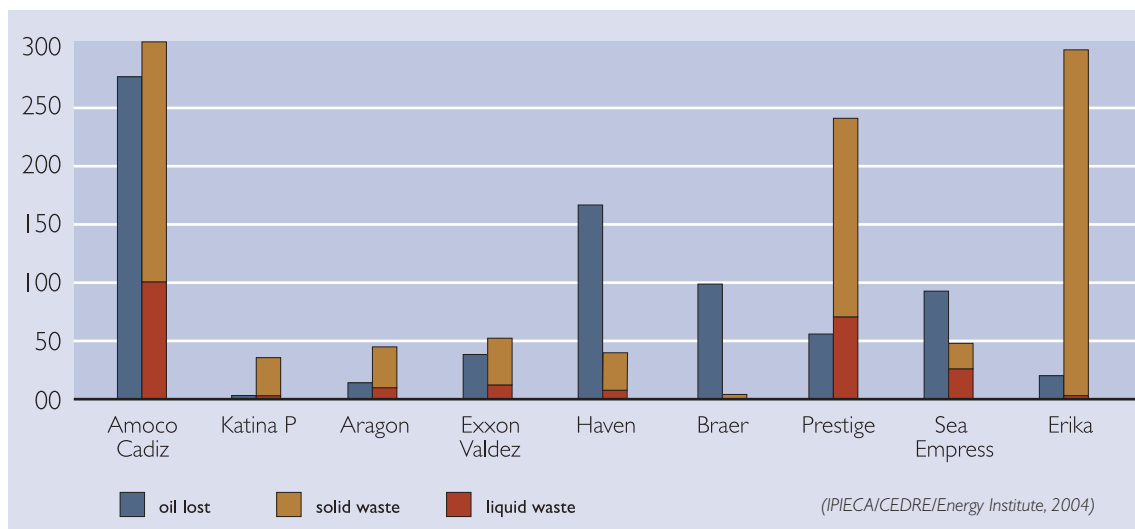
Both at-sea oil recovery and particularly shoreline clean-up generate substantial amounts of oil and oily waste. In this regard the oil/oil water emulsion recovered at sea, apart from limiting the coastline impact, is “purer” than waste material collected during shoreline clean-up operations. Consequently, it is significantly easier and less costly to dispose of this oil, often through reprocessing at refin-

eries which are frequently located near ports hence facilitating disposal and in turn reducing the associated costs.

With respect to materials recovered during shoreline clean-up operations, the lack of waste segregation is often a major issue. Preferably waste material should be separated into various waste streams to facilitate disposal. Unfortunately, this is often not the case and consequently shoreline waste material can be a mix of a wide range of substances including sand, beach debris, Personal Protective Equipment (PPE) and other oiled material. This type of waste needs to be transported, stored temporarily and ultimately disposed of in an environmentally acceptable manner. More traditional disposal routes include incineration and landfill however recent EU Directives have strengthened the conditions under which these techniques can be utilised. In part due to the lack of waste segregation, waste disposal operations often continue long after the clean-up phase is over. The figure below illustrates the amount of liquid waste collected during at-sea operations compared to the solid waste collected from shoreline clean-up operations from selected large scale incidents.

With this in mind, it is worth noting that for every tonne of oil recovered at sea it is estimated that at least 10 tonnes of shoreline clean-up waste material is avoided. In extreme cases, up to 30 times more waste than the volume of oil originally spilt can be generated. Although there may be different reasons for the amount of waste generated, it is also evident from the next figure that a significant number of smaller spills have created large amounts of waste. The management of all waste in any spill should be regarded as a high priority.

Waste Generated during Selected Oil Spill Incidents ('000 tonnes)



In summary, for any given spill, the response strategy should be based within the framework of mitigating shoreline impact with due weight given to the type of oil involved. With respect to light oils, the choice of options includes monitoring and evaluating (“do nothing”), the application of chemical dispersants and mechanical recovery. As regards heavy oils, only mechanical recovery is appropriate. When operating in calm waters boom, skimmer and sweeping arm systems are all suitable, however in rough seas only sweeping arm systems are feasible.

3. CASE STUDIES

Analysis of case histories enables potential improvements in response to be identified. A number of such points can be derived from analysis of the PRESTIGE incident.

3.1 Prestige

On 13th November 2002, while some 30 nautical miles off Cabo Finisterra (Galicia, Spain), the

Bahamas registered tanker PRESTIGE (81,564 DWT) began listing in bad weather and leaking oil. The ship was carrying 76,972 tonnes of IFO 650 heavy fuel oil and it was estimated that up to 1,000 tonnes of oil was lost initially, while drifting powerless towards the Spanish coast.

In the early hours of 15th November, while the PRESTIGE was being towed away from the Spanish coast, a section of shell plating in the vicinity of No. 3 starboard ballast tank was lost and the rate of oil spillage increased. On 19th November, the vessel finally broke in two and sank some 140 nautical miles west of Vigo (Spain), the bow section at a depth of 3,500 metres and the stern section at a depth of 3,830 metres. The break-up and sinking released additional cargo, and over the following weeks, oil continued to leak from the wreck at a slowly declining rate. The final amount of oil that leaked from the vessel has yet to be determined, but it is currently estimated by Spanish sources that 14,000 tonnes remained in

the wreck (before operations to remove the oil from the wreck began). Consequently, an estimated 63,000 tonnes of heavy fuel was spilt.

The initial response to the damage sustained by the PRESTIGE was by Spanish vessels contracted to provide a search, rescue and towage capability to Sociedad de Salvamento y Seguridad Maritima (SASEMAR). Spanish vessels were dispatched to the casualty to assist. It is understood that none of the Spanish vessels was directly involved in the recovery of oil from the sea surface. Furthermore, it is understood that the Spanish vessels did not carry containment and recovery equipment during the period of the response.

An analysis of the oil recovery performance of the vessels involved in the response has been undertaken using figures from SASEMAR and from AZTI, a non-profit making organisation based in Pais Vasco. Figures provided by AZTI, state that the fleet of response vessels deployed recovered 17,445 tonnes of oil/water emulsion. AZTI estimates this equates to between 7,850 and 9,595 tonnes of pure oil. This can be broken down using figures from SASEMAR and vessel operators as shown in the table below. (The small disparity between the total of these individual figures and the AZTI figure is likely to stem from anomalies in reporting recovered and discharged volumes from the various organisations involved.)

It is known that the large fishing fleet was mobilised promptly, arrived on scene early, benefited

from significant financial and logistical support from the Spanish authorities and that a considerable volume of oil was recovered. This was a result of their sheer number; their ability to manoeuvre very close to the shore to recover oil and to recover plates of oil too small and too spread out for the larger “specialised” vessels. The low vessel freeboard and the generally calmer waters near shore allowed manual collection of oil by long-handled scoops, the use of nets and by mechanical grabs attached to vessel cranes.

What is also clear is that the “specialised” vessels recovered a significant volume of oil, and of the twelve recovery vessels mobilised, four recovered some 90% of this volume and one single vessel recovered 41% of the total.

The next table shows an analysis of the performance of the vessels activated during the incident. The oil/water emulsion recovery rate has been calculated with reference to the actual period that the vessel was available to search and recover oil and does not include time spent on other activities such as discharging recovered oil.

It is worth noting that the initial spill of a limited quantity of oil occurred on 13th November whilst on 19th November the vessel broke in two and sank releasing a larger quantity of cargo, estimated to be at least 25,000 tonnes.

Analysis of Vessel Oil Recovery Performance						
Vessels	On Site Arrival (Days after incident)	Recovery Period (Days)	Sweeping Arms	Vessel Storage Capacity (m ³)	Recovered Oil/Water Emulsion (m ³)	Oil/Water Recovery Rate (m ³ /Day)
RIJNDELTA	6	~24	●	3,548	7,032	285.7
ARCA	10	~31	●	1,060	5,498	174.5
NEUWERK	9	~27	●	1,000	1,600	58
FAR SCOUT / BOA SIW*	17	42		1,000	1,228	29.2
GUNNAR SEIDEN-FADEN	21	~38		310	500	13
NORMAN DRAUPNE / BAMSE*	40	~25		798	285	11.2
UNION BEAVER	13	19		300	102	5.4
BRITISH SHIELD** & SEFTON SUPPORTER	20	~31		3,835	99	3.1
AQUA CHIARA	22	38		1,084	48	1.3
TITO	22	38		290	48	1.3
AILETTE	3	45		500	600	?
ALCYON	15	44		500	150	?
Fishing Vessels***	-	-		-	35,523	-

* Each pair of Norwegian vessels is considered as one unit since only one recovery device was deployed between each pair.

** The BRITISH SHIELD was chartered to act as a transshipment and storage facility and was not directly involved in the recovery of oil from the sea surface.

*** The role of the fleet of fishing boats is not as clear as that of the response vessels for numerous reasons. AZTI reports a total of 35,523 tonnes oil/water emulsion collected by Spanish and French fishing boats and estimated to contain between 12,433 and 15,885 tonnes of pure oil. Unfortunately, key information in comparing their performance with the response vessels is not available at present. It is difficult to determine exactly how many fishing vessels were involved and for how long a period, but several Spanish and French ports provided vessels. One port alone provided 296 fishing vessels, so it is safe to say that hundreds of fishing vessels were active, as opposed to the limited number of "specialised" vessels. The difficulty in assessing the number of vessels involved also indicates that there are similar issues with regard to the volume of pure oil recovered.

It is evident that the "specialised" response vessels (ARCA, RIJNDELTA and NEUWERK) achieved the best performance in the recovery of oil at sea despite not being on site during the initial phase or approximately the first week of the second phase of the incident.

Notable points regarding the response operations are described below:

- Vessels that were mobilised promptly and arrived on-scene early in the response were, in principle, able to recover significant volumes of oil. The viscosity of the

oil at the time, as opposed to the even higher viscosities of the “weathered” oil encountered later; together with the coherent nature of the slicks meant the oil was readily observed and was encountered in large volumes. High daily recovery rates were achieved.

- Gradual emulsification, fragmentation and spreading of the oil over time led to reduced recovery efficiencies of vessels. The decreasing ability of vessels to encounter oil and increasing problems with pumping (associated with the higher viscosity of the emulsified oil) resulted in lower daily recovery rates.
- The supply type vessel provided a suitable platform from which to deploy boom and skimmers into the oil. The large free deck area allowed for storage of equipment and for maintenance and cleaning. However, the exposed nature of this deck made conditions uncomfortable and hazardous for the crew in heavy sea conditions. Use of boom requires assistance from an additional vessel with consequent problems of co-ordination between the two vessels. The boom and skimmer system operations appear to be less effective in combating this type of oil.
- Many of the vessels involved were not designed to recover heavy fuel oil in Atlantic winter conditions. They are more suited to incidents involving less viscous oil in a calmer operating setting.
- Overall, vessels employing sweeping arm skimmers achieved significantly higher recovery rates and volumes than other skimmers employed. Reasons for this include the relative ease of deployment of the sweeping arm in comparison to the resources needed to deploy boom and the better operational window. The simpler design of the sweeping arm compared to adapted skimmers was also an advantage.
- Vessels with a large storage capacity were able to remain at sea recovering oil for longer periods before discharge was required.
- Vessels with heating coils and pumps of sufficient capacity were able to discharge oil from their tanks more readily, so minimising time in port.
- The total capacity of the “specialised” recovery vessels deployed was insufficient to deal with a disaster of this scale. Minimisation of coastal damage calls for a high percentage of the spilled oil to be recovered at sea.
- The performance of those vessels that were in principle suitable for this type of operation (recovering heavy fuel oil in Atlantic winter conditions) was severely hampered by the following factors:
 - The vessels arrived on site after a significant delay. Mindful that the initial spill occurred on the 13th November; the RIJNDELTA was on site 6 days later; NEUWERK 12 days and the ARCA 13 days.
 - By the time of arrival of these vessels, the oil had become scattered and spread over a very large area. Consequently locating the oil was difficult. Nevertheless the “specialised” vessels would have been more effective if communication from the aerial surveillance support had been more efficient and timely.

- Although the most effective vessels had a substantial storage capacity on board and were equipped with oil water separators, they had to spend a significant period unloading in port due to the lack of suitable ship to shore transfer systems. It is worth noting that the NEUWERK spent at least 3 days discharging, RIJNDELTA 6 days and the ARCA 7 days. More oil would have been recovered if these delays had been minimised.
- In order to be effective in these sea areas, dedicated pollution response vessels should be capable of continued recovery operations in wave heights of 3 metres or more.

In conclusion, if these issues can be remedied then “specialised” response vessels will be a powerful tool in combating heavy fuel oil pollution at sea, even in rough weather conditions.

3.2 Erika

M.T. ERIKA, carrying about 30,000 tonnes of heavy fuel oil as cargo, broke in two in a severe storm on 11th December 1999, about 60 nautical miles off the coast of Brittany in Northwest France. The bow sank on 12th December; followed by the stern on 13th December. An estimated 20,000 tonnes of cargo was lost to the sea.

The French Navy initiated aerial surveillance on 12th December, using their aircraft and a French Customs Service aircraft. For a period of about two weeks after the sinking, the weather and sea state were poor, with periods of strong westerly winds and heavy seas interspersed with the odd calmer day. These are typical weather conditions for northern Biscay in winter. Computer modelling and

forecasting of oil movement were also begun. Three separate models were used, all of which suffered limitations because of the very viscous nature of the oil and the weather conditions. The oil spent much of its time at sea being swamped by waves, and therefore did not move as rapidly as predicted by the models.

On 14th December the decision was taken by the French authorities to send their response vessels to the site of the oil slicks and to call in outside resources from various European countries under the Bonn Agreement. The poor weather conditions caused delays to the arrival of the vessels on site, where they joined ALCYON and AILETTE. On 25th December and the following days, severe south-westerly storm winds drove most of the oil ashore on the Brittany and Vendee coasts and operations at sea were called off.

A summary of response vessel performance was published in the reports of the French Senate, which showed that five of the response vessels recovered oil during 3 or 4 days of response at sea as shown in the table below.

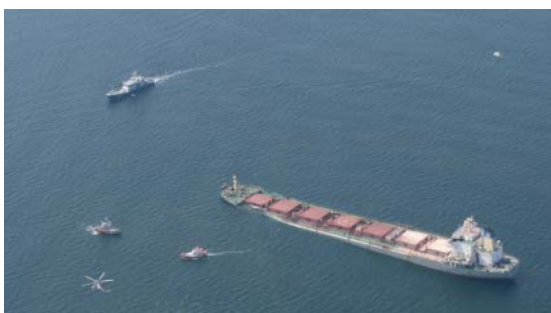
Response Vessel Performance during the ERIKA		
Country	Vessel (Country)	Recovered Oil/Water Emulsion (m ³)
Netherlands	ARCA	630
United-Kingdom	BRITISH SHIELD	140
France	AILETTE	120
Germany	NEUWERK	110
France	ALCYON	100
Total	5	1,100

The best performance in these difficult conditions was achieved by ARCA, which had pumps which were just capable of pumping this viscous oil. In addition its sweeping arms proved possible to deploy, even in the poor sea conditions. Although NEUWERK also had sweeping arms, it is understood that the pumps were not able to cope with the viscous oil. The remaining vessels, BRITISH SHIELD, AILETTE and ALCYON all had difficulty deploying containment boom and skimmers in the rough seas.

In conclusion, the limited success of boom and skimmer systems during the ERIKA incident confirms the PRES-TIGE experience as described in the previous section.

3.3 Fu Shan Hai

While passing between the south coast of Sweden and the Danish Island of Bornholm on 31st May, 2003, the Chinese bulk cargo carrier FU SHAN HAI (69,973 DWT) suffered a collision with the Cyprus container vessel GDYNIA (3,930 GT). GDYNIA was only lightly damaged in the collision and was later able to return to port, whereas the FU SHAN HAI sank in 60 metres of water some eight hours later. She went down with 1,800 tonnes of heavy fuel oil, 110 tonnes of diesel/lubes and 66,000 tonnes of potash (potassium chloride) as cargo. There were no crew injuries on either vessel.



Fu Shan Hai

The rapid assessment of the risk posed by the bulk cargo made by the authorities determined that the most important problem was that fuel oil was continually rising from the wreck and being blown in a continuous slick towards the Swedish Coast, some 18 nautical miles to the west.

The physical response by the authorities to the situation was rapid. One of the Swedish Coast Guard's (SCG) most modern multi-role vessels was the first to arrive on site and began the attempt to save the distressed vessel. Two facts related to this first response vessel are particularly noteworthy. The first is that being a multi-role vessel that regularly patrols the coast while carrying the full set of anti-pollution equipment and trained crew, there were oil spill response capabilities on site from the start. The second is that although the incident occurred in some of the most distant Danish waters vis-à-vis the station positions of the Danish emergency response fleet (e.g. Copenhagen), the location was reached relatively easily by the SCG who responded immediately.

While the initial response was underway, the alarm went out to other vessels in the region. Additional SCG spill response vessels arrived from the southern SCG stations. The Danish oil spill response vessels arrived from Copenhagen and Korsør. These included the two largest vessels of its fleet, the GUNNAR SEIDENFADEN and GUNNAR THORSEN as well as its two "sea-truck" response vessels, METTE MILJØ and MARIE MILJØ. German responders arrived from Rostock with the VILM, a 48 m sweep-arm oil recovery vessel.

During overflights, it could be easily observed in the first days of the at-sea response that all recovery vessels on site

near the Swedish coast were operating in heavy oil, using sweep arms and integral skimming pumps or external skimmers. The recovery fleet also included two V-sweep boom deployments (with three small vessels each). The weather and sea conditions were favourable for at-sea work; relatively calm seas, light winds, comfortable temperatures. It was reported in Sweden that 250 tonnes of oil/water mix were collected at sea on each of days two and three. By day five the collectable oil at sea was diminished and vessel operations began to be reduced. Some vessels remained in port on standby (mostly those stationed locally) and others (generally those stationed further away) began to be demobilised. Operations continued with some six sweep-arm vessels active a week into the response, though the daily quantity of oil collected decreased significantly.

Observations made during overflights in the first few days showed all the at-sea recovery vessels operating near the Swedish coast to be located in heavy oil, using sweep arms and integral skimming pumps or external skimmers. The recovery fleet also included two V-shaped boom deployments (with three small vessels each). The weather and sea conditions were favourable for work at sea, with relatively calm seas, light winds and comfortable temperatures.

By day 11, it was reported that the total quantity of oil collected at sea and discharged on land in Sweden was some 1,200 m³. Initial visual observation and later lab tests verified that the recovered oil/water mix was quite high on oil content. Accordingly, at least 50% of the bunker fuel, diesel and lubes on board at the time of incident was recovered at sea. This value does not include the quantity collected by the Danish vessels which later discharged in Denmark.

In summary, the important role of fully equipped multi-purpose vessels in providing an immediate response is clear. In addition, long-standing close co-operation between Member States reduced the time required for other response vessels to arrive. Finally, well-organised and suitably equipped at-sea recovery operations in relatively calm weather and sea conditions proved successful.

3.4 Braer

The BRAER grounded during one of the worst storms on record in the United-Kingdom on Garth's Ness, Shetland, United-Kingdom on 5th January, 1993. Over the next 12 days the entire cargo of 84,000 tonnes of Norwegian Gullfaks crude oil, a relatively "light" crude, leaked from the vessel as it broke apart in the continuing storm. In addition, up to 1,500 tonnes of heavy bunker oil were lost.

On account of the extreme weather conditions, the response options available were particularly limited. In the first instance, mechanical at-sea oil recovery techniques were rendered ineffective. Whilst approximately 130 tonnes of chemical dispersant were applied from aerial platforms, these operations were also limited to those restricted periods where both the wind had lightened and oil was on the sea surface.



Braer aground

The BRAER incident was unusual in many respects notably the fact that whilst the weather conditions contributed directly to the consequences of the vessel's engine failure, they also played an important role in mitigating the extent of shoreline contamination. Specifically, the strong wave and wind energy dispersed naturally the light oil into the water column so reducing the presence of a sea surface slick. The weather conditions also agitated sediment particles in the water column and seabed that in turn adsorbed the oil droplets. These heavier particles were, to a large extent, scattered by sub-surface currents over an extensive area. It should be noted that a significant proportion of the oil particles eventually coalesced in two sediment "sinks". These "sinks" continue to pose a pollution threat through re-oiling of the shoreline. As a result, there was limited conventional shoreline clean-up especially given the amount of oil involved. The main impacts resulted from contamination of fish and shellfish.

In summary, the BRAER incident illustrates that the specific circumstances of an incident greatly determine the response options that can be effected. In this particular incident, the role of the extreme weather conditions combined with "light" crude oil resulted in a less proactive approach than might have been expected. Despite these advantages, the incident still resulted in extensive socio-economic impacts with compensation for the incident costing in the region of \$ 175 million (when inflated to 2002 values).

4. "LESSONS LEARNT"

In light of the issues discussed in this chapter, the most suitable, if not the only, response option for spills of

heavy oil at sea is mechanical recovery. To maximise the efficiency of the recovery operations, "specialised" response vessels should be deployed. These vessels should have a range of specifications including:

- Sweeping arm equipment in order to have the ability to operate in difficult weather and sea conditions;
- Sufficient pump arrangements to transfer the recovered oil onboard and heated storage tanks to assist discharging to shore or to a lightering vessel;
- Oil/water separation systems to minimise the quantity of water taken up and stored onboard;
- Sufficient onboard storage capacity to take full advantage of the available opportunity to recover oil;
- Aerial, and where possible satellite support, with direct communication between ship and aircraft, to assist in locating the thicker concentrations of oil at sea;
- Vessel design to ease cargo discharge and vessel cleaning including removal of sediments.

Accordingly, there is a clear need for innovation in the development of combating techniques for these types of oils as well as for more resources.

In summary, the analysis of previous incidents clearly demonstrates the important role of fully equipped multi-purpose vessels in providing an immediate response. In addition, long-standing close co-operation between Member States reduced the time required for other response vessels to arrive. Finally, well-organised and suitably equipped at-sea recovery operations in relatively calm weather and sea conditions will be most successful.

Operational Developments in Member States

I. ACTIVITIES OF MEMBER STATES AND OPRC 1990

As mentioned earlier, OPRC 1990 is the international agreement on which many Member States' response policy is established. The Convention calls for the development of detailed plans for dealing with pollution incidents. A major oil spill will inevitably present those in charge with numerous complex problems, some of which will be non-technical in nature. It is recognised that prompt and effective response decisions are more likely to be made if considerable effort has been devoted in advance of any spill to the preparation of a comprehensive, realistic and integrated national contingency plan (NCP). In particular, those issues that are difficult to resolve prior to an incident, e.g. command and control arrangements or prioritisation of coastline sensitivities, can be the source of serious conflicts in the highly charged atmosphere following a major spill. In contrast, this is a time when all the concerned parties should be collaborating with the common purpose of responding to the incident as effectively as possible in order to minimise damage to the environment and to socio-economic resources. A realistic NCP is the foundation on which to achieve effective spill response.

A NCP essentially delineates an entire preparedness and response system, including both public and private resources, for responses to emergencies which could result

in the spillage of oil into the marine environment. Ideally, response preparedness is based on the incorporation and development of "best practice" guidelines and technical information to develop innovative techniques in this field.

In addition to identifying the response resources required, based on a risk assessment of potential incidents, an NCP also defines the responsibilities of all the different parties likely to be involved in a spill and the organisational structure for effective command and control. Consequently, provisions for co-operation between the authority, ship and cargo owners and salvor to clarify responsibilities and to resolve any conflicts are often included. This is especially relevant with respect to co-operation and assistance arrangements between different countries.

As identified in OPRC 1990, regular training of personnel (at all levels), testing (and maintenance) of equipment and relevant contingency plans are vital activities to enhance the response to an actual incident. In this respect, it is important to note that in some countries there is an existing policy of rotating personnel throughout the different departments within organisations e.g. national coastguards. The result of this is a "built-in" turnover of the specific personnel tasked with spill response. In this regard, spill drills and exercises are valuable, as long as they are practical (not overly

ambitious) and with all the “players” being willing to address the problem issues that will, inevitably, arise.

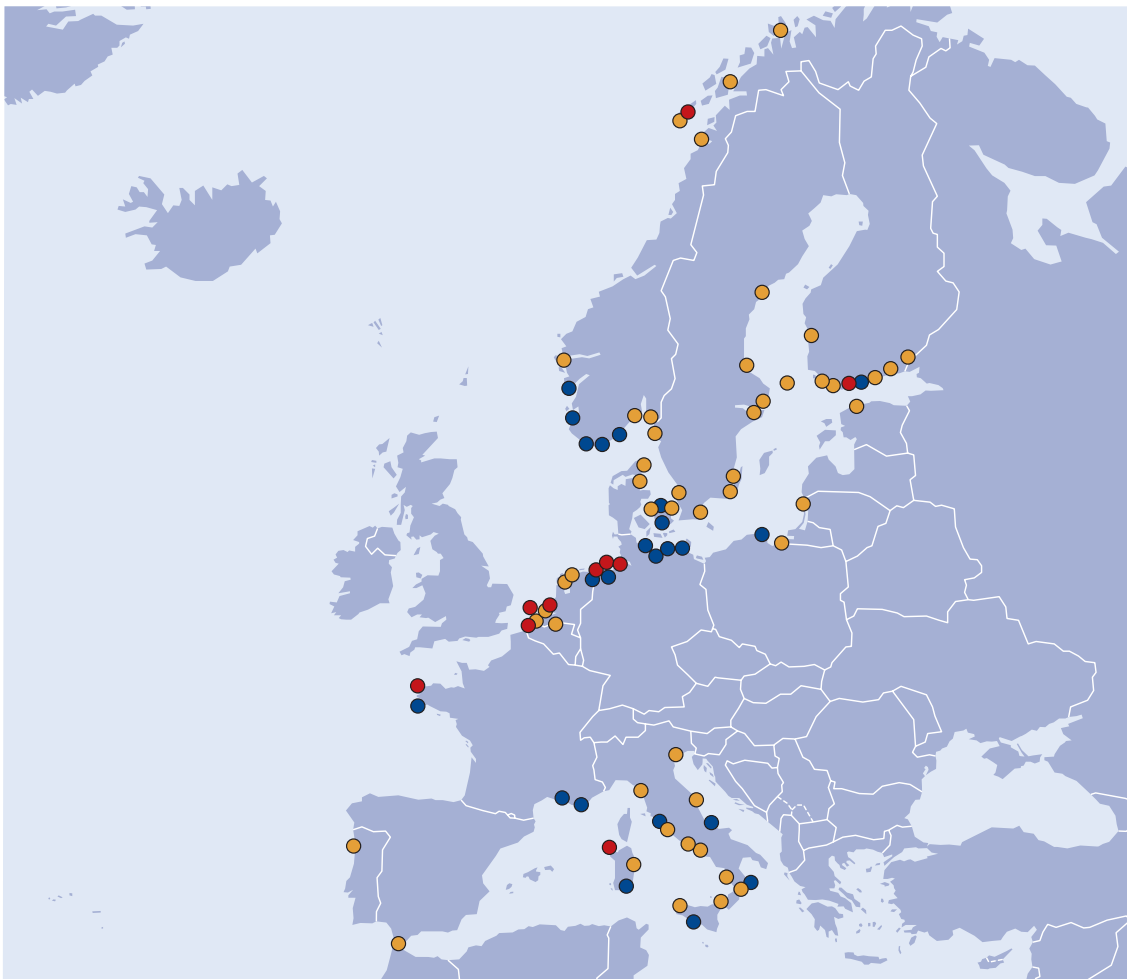
Despite the ratification of OPRC 1990 by many Member States, the reality of the European situation is that there is diversity with respect to contingency planning, response approaches, investments, availability of resources, exercising of capacity and approach to implementing bilateral and multilateral co-operation and assistance agreements among the Member States.

1.1 Current Distribution of At-Sea Response Vessels

In order to identify priority areas for EMSA “top-up” additional capacity, it is necessary to review the cur-

rent operational capacities of Member States as well as future plans. The subsequent figure indicates the distribution of response vessels operated by EU and EFTA Member States. The vessels have been categorised according to on-board storage capacity and shown by dots in their homeports. More detailed information can be found in the accompanying document “An Inventory of Member States Oil Pollution Response Capacity”. The data for this has been gathered from various sources including the Community Information System (CIS) and, importantly, a Member State Questionnaire. As far as the Agency is aware, the current distribution and future plans for additional response capacity, as presented, is up-to-date.

Indicative Distribution of At-Sea Response Vessels in Member States



Key: The symbols represent the number of vessel according to on-board oil storage capacity.

● 50 - 299 m³ ● 300 - 999 m³ ● 1,000 - 3,500 m³

The following specific points are worth noting when examining the figure above:

- Norwegian Authorities maintain government owned or chartered vessels located in different areas, e.g. West Norway, North Norway, South Norway, South-East Norway etc
- From the map, Greece appears to have no vessels above 50 m³ however there are a significant number of vessels available albeit with storage capacity less than 50 m³.
- In Belgium, the *Union Beaver*, a multi-purpose salvage vessel with ~ 300 m³ on-board storage capacity is available. The *Union Beaver* is currently engaged as a first-line oil combating vessel in the oil pollution contingency arrangements on the site of the *TRICOLOR* wreck-removal operation off Dunkirk.
- As stated before, the United-Kingdom relies on the aerial application of dispersants as its front line defence against oil pollution.

The indicative map clearly shows the availability of vessels of all categories of storage capacity in the North Sea area as well as the presence of a large number of vessels in the small category in the Baltic Sea region. The map also illustrates the gaps in the availability of vessels along the Atlantic coast. Although there appears to be no shortage of vessels in Italy, an examination of the characteristics of these vessels shows that these are relatively small with low storage capacities and recovery systems unsuitable for heavy oils. There are no response vessels of high capacity available in the Mediterranean.

1.2 Recent or Future Planned Developments in Response Capacity

With respect to those Member States that have invested recently or have budgetary plans to invest in new response capacity the following points should be noted:

Finland

- An icebreaker with substantial response capacity (storage capacity not yet defined) is planned to be operational in 2007.

(Government Authorities have decided to take this action however the precise financial commitment has not been determined to date.)

France

- A multipurpose vessel with 1,500 m³ storage capacity became operational in 2004.

Germany

- An additional vessel with 400 m³ storage capacity will be operational in September 2004.

- In addition, a private industry tugboat with approximately 800 m³ storage capacity is expected to be operational by end of 2004.

Greece

- Nine additional vessels are planned, each with approximately 25 m³ storage capacity. Four of these vessels are to be delivered between December 2004 and the end of 2006. Delivery of the remaining five will start in 2005 and be completed in 2008.
- In addition private industry has future plans to acquire a tugboat with ~800 m³ storage capacity.

Malta

- Three vessels of small-scale storage capacity are under construction.

Poland

- Two Search and Rescue (SAR) vessels (with unknown storage capacity) are to be adapted for an anti-pollution role and delivery is expected by 2007.

Portugal

- Two patrol vessels with 200 m³ storage capacity are planned for construction and expected to be delivered in 2007.

Spain

- Two vessels for emergency towing with 300 m³ storage capacity are planned for delivery in 2005/6.
- In addition, a call for tender has been launched for two multi-purpose vessels, each with a minimum of 1,000 m³ storage capacity.

Norway is in the process of taking steps in the field of pollution prevention and response due to the rapidly growing export of oil from the Russian Federation and increasing local oil and gas exploration. The activities of particular interest include:

- Three ocean-going tugs/anti-pollution vessels (offshore supply vessels) have been chartered to patrol the northern part of the coast. This is the first time such vessels have been permanently based in the north.
- Existing oil pollution equipment depots distributed along the coast are now being upgraded and new “intermediate” depots are being established.

The increasing Russian oil exports via the Baltic represent an inherent risk to this environment. Oil transportation in the Gulf of Finland is expected to increase from 77 million tonnes in 2003 to 190 million in 2010. In addition, navigation conditions, particularly in the Gulf of Finland, can be difficult in wintertime due to the extensive formation of ice. At this point it is worth noting that the co-operation between Baltic States on pollution response is well developed. Nevertheless, the absence of at-sea response vessels with a large oil storage capacity appears to be a weakness. Russian and Finnish authorities are clearly aware of this situation and have agreed, at a ministerial level, to set up a co-operation framework to better safeguard tanker traffic through the Gulf of Finland. The initial findings of the combined project group indicate that there will be a need for two additional state-of-the-art heavy icebreakers with substantial oil pollution response capabilities. These vessels should also have the capability to combat oil spills even in ice conditions. EMSA will monitor closely progress made under this project and would be interested in being associated with it.

Whilst no individual Member State has the identical exposure to oil pollution, some general themes can be identified among the EU-25 including:

- In the main, those Member States that have experienced the detrimental effects of large scale incidents have undertaken some type of review of their national contingency plans.
- Reviewing contingency plans has often been followed by further investment and development of co-operation and assistance arrangements.
- Historically, those coastal states bordering the Baltic and North seas have made significant investments over a long period in their at-sea response capacity.
- The new Member States have a lesser degree of response capacity than, in general, the EU-15 Member States.
- The coastal states bordering the Baltic and North seas have developed and implemented a policy of regular testing and exercising of these arrangements.
- Whilst there are notable exceptions, coastal states bordering the Mediterranean Sea are not well-resourced. This is particularly true with regards to large on-board recovered oil storage capacity.

This chapter concludes the review of the various issues that need to be examined in order to identify the needs for and the “added value” of the contribution that EMSA can make in strengthening oil pollution response and preparedness in the European Union. The next chapter describes how and within what framework the Agency will be active.



EMSA's Oil Pollution Response Activities

This chapter defines the overall framework, the subsequent implications and associated proposed activities that the Agency should take in the field of oil pollution response.

I. OVERALL FRAMEWORK

Before determining the precise activities that the Agency should undertake to fulfil its legal obligations, it is necessary to outline, based on the findings drawn from the first chapters of this Action Plan, the framework and its implications.

The overall context for EMSA's activities consists of the following elements:

Existing Framework

- Having reviewed the approaches of Member States to response preparedness, it is clear that EMSA should also provide its support in the same spirit of co-operation and of supplementing resources and structures that are already in place.
- The OPRC 1990 Convention is the backbone of this attitude through its underlying tiered approach to spill response. Whilst it has been ratified by most Member States, there are distinct variations in the degree of implementation.
- A similar pattern can also be observed with respect to approaches and investment in the national

contingency plans of Member States.

- All Member States are contracting parties to one or more of the Regional Agreements and, as a group, these structures have made a significant contribution to improving preparedness and response to spills in Member States through the development of joint procedures and technical understanding of the issues.
- There is a wide disparity in level of activity and effectiveness of these agreements, highlighted by the fact one is not actually in force. Regarding those that are in force, there are variations in types, frequency and scale of activities implemented, particularly exercises.

“Top-up” Philosophy

- As underlined by its Administrative Board, EMSA's operational task should be a 'logical part' of the oil pollution response mechanism of coastal states requesting support and should “top-up” the efforts of coastal states by primarily focussing on spills beyond the national response capacity of individual Member States.
- EMSA should not undermine the prime responsibility of Member States for operational control of pollution incidents. The Agency should not replace existing capacities of coastal states.

The Agency feels strongly that Member States have their own responsibilities regarding response to incidents.

- EMSA's equipment should be channelled to requesting states through the existing Community mechanism in the field of civil protection established by Decision 2001/792/EC, Euratom.
- The requesting state will have the equipment at its disposal and under its command and control.
- EMSA's operational role should be conducted in a cost-efficient way.
- EMSA's activities should respect and build upon existing co-operation frameworks and regional agreements. In addition, EMSA should strengthen existing arrangements and should create coherence within the European Union.

Technical considerations

Within the context of responding to large scale incidents involving heavy oils, the following technical points should be taken into account:

- The most appropriate response strategy at the EU level for spills of heavy oil, or "weathered" oil, is by way of at-sea containment and recovery,
- Analysis of case studies indicate specific technical aspects that enhance at-sea recovery by vessels e.g. sweeping arm systems are more effective at recovering heavy oil than boom and skimmer systems,
- More development is required to improve the performance of at-sea oil recovery systems operating in difficult weather and sea conditions,
- There are various additional deficiencies in the response chain which should be addressed by all the parties concerned. These include the availability

of aerial, and where appropriate satellite support, to assist the efficient deployment of anti-pollution vessels in the thicker concentrations of oil at sea and for establishing sufficient facilities for discharging oil recovered at sea in a timely manner.

- The Agency believes that realistic exercises are extremely important in testing and maintaining the capacity to provide technical and operational assistance to a requesting coastal state in the event of an incident. Equipment under contract of EMSA should participate in the exercises organised by the Regional Agreements.

Financial restraints

- It is already clear from the ongoing discussions in the framework of the annual Budgetary Procedure, that only limited resources will be available to EMSA to carry out its Action Plan⁷. With this in mind, EMSA's should try to offer at least a minimum viable system of additional means (see next section). In order to achieve this, a phasing-in period of some years might be needed.

Areas of priority for operational assistance

- To determine the scope of its operational assistance in the starting-up phase, EMSA has combined various findings with regard to historical spill incidence, current and future risk of spills, the type of oil transported, the environmental sensitivity of an area and the existing national preparedness arrangements, in order to identify the following as priority

⁷ There has been no decision yet regarding the budget for 2005 as the Budgetary procedure is still ongoing. The European Parliament proposes € 17.8 million for 2005, which is supported by the European Commission. Unfortunately, a multi-annual commitment is missing for the time being.

areas (for reasons explained earlier in Chapter 3) with respect to the Agency's stationing of vessels to support with additional means the response capacities of Member States:

- The Baltic Sea,
- The Western approaches to the Channel,
- The Atlantic coast,
- The Mediterranean, particularly the area along the tanker trade route from the Black Sea.

However, it must be stressed that the resources of EMSA are at the disposal of every requesting coastal state to assist in cases of a large oil spill anywhere in European waters, the assistance provided for by EMSA is not restricted to the four indicated areas.

It should be noted that whilst the North Sea area has a high level of tanker traffic and spill incidence, extensive national resources are already in place to mount a response action. Consequently, this area has not been determined as a priority area for action at this stage.

2. EMSA ACTIVITIES

During this initial stage EMSA's activities in the field of combating marine pollution are focused on ship-sourced oil pollution, as considered in OPRC 1990. Taking into account the framework as described and the Agency's legal task in the amended Regulation, EMSA would like to develop its role in 2005 along three distinct lines:

- Operational assistance
- Co-operation and Co-ordination
- Information

2.1 Operational Assistance

EMSA should provide coastal states additional means in a cost-efficient way to support their pollution response mechanisms, when requested, in the field of accidental or deliberate pollution by ships.

The analysis of the situation today in the European Union, taking into account lessons learnt from previous large oil spills, shows that there remains a lack of oil recovery vessels with large recovered oil storage capacity and with suitable equipment to deal with large spills of heavy oils. At-sea recovery has the highest priority, as the socio-economic and environmental costs of shoreline oil recovery are significantly higher than at-sea recovery. Due to the limited availability of resources, EMSA would like to focus on the immediate needs of coastal states. If the recent trend of national investments in multipurpose oil recovery vessels continues, EMSA might, in the future, change its focus to other additional means, depending on the availability of different types of equipment in individual regions and the available budget for this purpose.

For the time being it should be acknowledged that EMSA is confronted with a situation where there are significant differences between Member States in terms of contingency planning, investments and availability of oil pollution response equipment. The Agency has made an inventory of at-sea response resources available in the EU-25; however it should be clearly understood that EMSA does not have the (legal) competence to establish minimum standards for oil spill preparedness and response in the EU. EMSA will continue to monitor national developments regarding oil pollution response equipment and would like to maintain an up-to-date overview of existing and

planned capacity of coastal states. It should be mentioned that there is an encouraging development of national investment going on in at-sea response equipment in a group of coastal states.

In order to fulfil its legal obligations, EMSA will seek to develop a system adding oil recovery capacity, which will be as cost-efficient as feasible, but will only provide in 2005 the bare minimum in terms of assistance to Member States due to budgetary constraints⁸. At the very least, EMSA must be able to meet three requirements, as listed below, in order to implement its oil pollution response task in a credible manner. This means creating real added value at the EU level in order to offer assistance to coastal states having to cope with a large oil spill going beyond national capabilities through the availability of a "reserve for disasters".

These general requirements are:

- If EMSA assumes that multipurpose vessels can be made available, with limited investment, by the private sector then it should be able to restrict the amount per ship needed to conclude a stand-by contract at a reasonable level. Using existing contracts of some Member States as a benchmark, EMSA should be able to conclude these contracts for a maximum of 5 MEURO per region. In the context of a multi-annual contract, the total amount required will vary (up and downwards) depending on the type of vessel, the set of equipment needed and the required length of the contract to cover investment costs.
- EMSA should try to conclude stand-by contracts with commercial shipowners for a minimum period of three years with economically operated vessels

that can be adapted for oil pollution response activities (so-called multipurpose vessels). EMSA is conducting an ongoing consultation with industry, but has not received any firm confirmation yet that industry would like to participate under these contractual conditions. Such a minimum period is required to cover the financial investments in on-board oil pollution response equipment (sweeping arms, skimmers, heating installations, pumps). In budgetary terms it means that the budget 2005 should allow for a multi-annual commitment of 3 years. EMSA would like to set up contractual conditions in advance for the provision of equipment. Pre-agreed contractual conditions will remove any delay caused by the need to negotiate "on the spot" contractual arrangements at a time when the equipment is urgently needed to assist at-sea oil recovery operations.

- The biggest risk to the environment and socio-economic resources in European waters is the transit transport of Russian crude oil via the Baltic Sea, the Black Sea and via the East Mediterranean. Studies have indicated four (4) areas with high risk: Baltic Sea, the Western approaches to the Channel, the Atlantic coast and the Mediterranean Sea. Again, if EMSA is to be credible in executing this task, it has to supplement efforts of Member States, thereby enlarging existing capacity of oil pollution response vessels, in these four regions. This means having at least stand-by contracts for each of the identified regions. These contracts must lead to tailor-made solutions for each region. A specific solution will have to be found for each

⁸ Going beyond the question of whether it is desirable or not, for a budget of € 17.8 million or less EMSA is not able to opt for investments in new build specialised (oil pollution response) ships. Such a ship would require an investment of € 50 – 100 million.

region taking into account regional conditions, as well as the availability in the region, or its vicinity, of vessels that can be adapted for oil recovery activities.

Priority Areas for Additional Response Capacity



It should be stressed that the field of operation of such additional at-sea response capacity shall not be restricted to the areas indicated. Firstly, the equipment can be mobilised, upon request, by any Member State needing assistance. Secondly, the decision to base these vessels in certain areas will be subject to periodic review by the Administrative Board. The EMSA management will continue to monitor the situation regarding risk of spills and response preparedness and report to the Board accordingly.

Process leading to stand-by contracts

As soon as the Budgetary Procedure is finalised and the amount available for the Agency's

antipollution measures for 2005 is known, the Agency, after having consulted national and regional experts, will publish a pre-information notice in the Official Journal informing industry about its intentions as described in this Action Plan. EMSA would like to tender out the stand-by contracts using a two step approach. First of all, a "call for expressions of interest" will be published asking industry to come forward with proposals for stand-by arrangements for each of the four areas of high priority. The outcome of which will be reviewed by the Administrative Board before moving to the stage of entering into contractual and financial commitments. After having evaluated the responses, an "invitation to tender" will be sent to a list of the most suitable companies being selected.

The aim is to put in place the required stand-by contracts covering the four areas of high priority in 2005. At this early stage it is not known with certainty whether the industry will be able to provide the required services fully within the limits of the means available to EMSA in 2005. If the "call for expressions of interest" shows that it is not feasible to cover all areas in the first round, the Executive Director will submit to the Administrative Board a further analysis of the situation together with a proposal for the next steps to be taken. This might entail a phasing-in approach.

Technical requirements for oil pollution recovery vessels

There will be generic criteria and region-specific requirements for the oil recovery vessels operating under contract of EMSA.

General criteria

The oil recovery vessels need to:

- Have sufficient speed and power to arrive “on-site” as rapidly as possible. Furthermore, the vessel should have a certain degree of manoeuvrability in order to position it efficiently with respect to the nature of the oil slicks during the at-sea oil recovery operations.
- Have a large storage capacity to effectively supplement existing capacity of coastal states in the event of a large scale incident. Larger vessels are needed, to be effective in rough weather and wave conditions. Large storage capacity is needed, preferably within the 1,500 – 3,000 m³ range, to maximise the opportunity for oil recovery operations before returning to port, and out of the field of operations, to discharge the recovered oil. The purpose is to recover as much oil as possible at sea so mitigating the socio-economic and environmental impacts of stranding oil.
- Be equipped with all necessary means for mechanical oil recovery at sea particularly during adverse weather conditions. This includes, sweeping arms, pumps able to handle heavy oil, skimmers, oil/water separation installation, cargo heating installations, safety and cleaning facilities.
- Be available within a short period of time. Mobilisation time of a commercially operated vessel normally includes two phases. Phase one is needed to unload a vessel of its cargo, crew the vessel and/or install the equipment required to convert a vessel

into an oil recovery vessel (in certain cases this step is not needed at all, which of course significantly improves mobilisation time). Phase two is the time needed to reach the area of operations.

- Vessels will have to comply with all relevant international and EU legislation regarding construction (if applicable: double hull), manning and procedures (ISPS, ISM).

The type of vessel will depend on the economic possibilities (area of economic operation) of each individual region in order to guarantee the presence of the vessel in the region with high risk. Suitable vessels may be: dredgers/dredge hoppers, seagoing tugboats, bunker oil tankers, ice breakers, supply vessels, sand extraction vessels, et cetera.

Industry might be asked to present, in addition, plans for rapid discharging of oil recovered at sea.

EMSA's equipment will be channelled to requesting states through the existing Community mechanism. Liability provisions for vessels under contract to EMSA will be identical to other vessels offered (and have been offered) to requesting states through the same mechanism.

Region-specific requirements

Atlantic coast (Western approaches to the Channel and the Bay of Biscay)

As previously indicated, the rough seas of the Atlantic area are in need of supplementary at-sea pollution response resources. Vessels with sizeable storage

capacity need to be based in these areas to allow rapid arrival on site in the event of a large spill.

It can be observed that along the busy tanker routes in the area off the coast of Ireland, southern United Kingdom and west Brittany (the Western approaches to the Channel), insufficient equipment is available that is suitable for dealing with a major spill of a heavy grade of oil. Accordingly, at least a medium capacity vessel (1,000-1,500 m³) should be located in this region. It should be noted that substantial response capacity is in place beyond the Eastern entrance to the Channel and, in view of the relatively short sailing time (~2-3 days), additional assistance should be possible.

Equipment used off the Atlantic coast will have to be suitable to cope with adverse weather conditions and high waves. Storage capacity should be as close as possible to 3,000 m³ or above. The vessel must have a construction, an engine and oil recovery equipment that are sufficiently robust to perform well under heavy conditions.

Western approaches to the Channel:

The area of economic operations should be in the Irish Sea, Celtic Sea and/or English Channel

Atlantic Coast (area with Bay of Biscay):

The area of economic operations should be between Cadiz (Gulf of Cadiz) and Brest.

Mediterranean Sea

Given the extensive and increasing shipping activities in the Mediterranean/Black Sea area and the absence

of recovery vessels capable of dealing with a large spill of a heavy grade of oil, the response capacity should be strengthened. In view of the different nature of the climatic and geographical conditions (when compared to the Atlantic area), the requirements for equipment may be different.

Due to the increased oil exports from Russia via the Black Sea, EMSA would like to focus firstly on the Eastern Mediterranean area. A second contract may focus on the Western part. It should be noted that weather conditions are less severe than at the Atlantic coast. Storage capacity will have to be within the 1,500 – 3,000 m³ range. The Eastern Mediterranean Sea is a large sea area with a large numbers of islands. Vessels must be able to have a high average speed whilst special attention is needed regarding manoeuvrability. As recovered oil discharging facilities are not available everywhere, special arrangements might be needed. The area of economic operations should be Greece, Sicily, southern Italy, Cyprus and/or Malta in order to cover the East Mediterranean.

Baltic Sea

Increased oil exports from Russia pose a threat to the Baltic Sea. EMSA would like to provide additional oil recovery equipment within the 1,500 to 3,000 m³ range in the region. The area of economic operation should be between St. Petersburg and Gothenburg. Operating in winter conditions should be part of the plans provided to EMSA. Whilst prevailing wave height is less than at the Atlantic coast, the low water temperature and ice conditions are challenges that have to be met.

Improving the response chain

In addition to this immediate assistance, other activities are needed to improve the response chain. Experiences with recent accidents (PRESTIGE, ERIKA, FU SHAN HAI) shows that a close look is needed at the whole chain of activities required to be successful. In particular, two elements need further work: discharging of recovered oil and aerial surveillance.

The issues of on-board oil storage and discharging recovered oil must be given special consideration. For large spills like the PRESTIGE (~63,000 tonnes spilled), the storage capacity on board recovery vessels will never be sufficient to prevent any oil stranding. The largest vessel of this type currently in operation has a storage capacity of ~3,500 tonnes and, in previous incidents, has spent a significant number of days in port discharging while it was needed at sea. Acceleration of this unloading phase is required.

Accordingly, transfer of cargo at sea to a lightering vessel should be studied in more detail drawing on the concepts and techniques used by Navy vessel fuelling operations and, where conditions allow, the use of barges.

The importance of aerial surveillance in providing accurate and timely information on the location of oil slick has been clearly demonstrated. Agreements regarding the provision of direct aerial support will be explored, preferably with the local coastguard. Training and testing of the system will be required to maximise its effectiveness. As regards the major incident scenario, the option of stationing a helicopter on deck will be explored.

Satellite imagery provides excellent area coverage but has specific operational limits including availability over the area of interest, image interpretation and, very importantly,

timeliness of delivery of the image to spill responders. Facilitating its integration into the response to both accidental and deliberate discharges will be addressed.

It follows that, while organisation of spill response is a key issue, the other important area for improvement is the identification and remedy of any weak links in the response chain. It is essential that all the components required to conduct at-sea recovery be in place as the operation commences.

To make at-sea recovery operations as efficient as possible, EMSA would welcome any improvement of the overall performance of the response chain. EMSA is willing to assist parties concerned to address in particular two issues. Firstly, the need for timely discharging of recovered oil either through ensuring the availability of on-shore installations or lightering tankers at sea and secondly to work on improving the effectiveness of slick surveillance using data acquired from either aerial and/or satellite platforms. These two side conditions are important for conducting effective operations, as the analysis of the PRESTIGE incident has demonstrated (see Chapter 4), but do touch upon competences of coastal states directly. For that reason, EMSA would like to facilitate discussions on how to improve these elements together with Member States and their regional agreements.

2.2 Co-operation and Co-ordination

The European Community is contracting party to all the above-mentioned regional agreements. EMSA will upon request provide relevant Commission services with technical and scientific assistance, i.e. to disseminate best

practices among regional agreements and to set up a system to exchange observers from the various Regional Agreements and other parties concerned to be present at exercises taking place in the regions on a structured basis.

Regarding the operational role of EMSA, providing 'additional means' in the field of oil pollution response, the Agency would like to work closely with these agreements at a practical operational and technical level, such as participation in joint oil pollution response activities. EMSA attaches a great deal of importance to regular multinational exercises involving at-sea equipment. The regional bodies have, at the Workshop of June 2004, expressed their interest in having close working relationships with EMSA in this particular field. In order to achieve this objective, working arrangements will be concluded with the relevant secretariats in close cooperation with the Commission.

Discrepancies exist in the capacities offered by regional agreements, for example multinational exercises with equipment at-sea. EMSA would welcome the development of effective regional agreements in the European Union, where they have been absent until now.

In addition to the links with regional agreements, EMSA will work closely with the services of the European Commission within the existing co-operation mechanisms in an efficient way and to avoid any duplication of activities. EMSA is in the process of agreeing guidelines with the services of the Commission. This arrangement should reinforce synergies between the services of the

European Commission and EMSA within the existing mechanisms to provide Member States with assistance.

As mentioned in Chapter 5, there seems to be a need to establish common criteria for the classification of oil pollution response equipment to facilitate immediate and effective coastal state assistance as experiences with previous incidents has shown. To further explore the classification of equipment, different activities will be deployed as of the autumn of 2004 (including studies and a seminar with experts from Member States).

2.3 Information

EMSA is in the process of establishing a "centre of knowledge". As stated in the Complementary Work Programme 2004, EMSA will need to provide the Commission and Member States with technical and scientific assistance. It is the Agency's intention to further invest in its Oil Pollution Response Unit. Within this Unit there will capacity for the gathering, analysis and dissemination of best practices, techniques and innovation in the field of oil pollution response, in particular for at-sea oil recovery during large spills. In turn, EMSA will use this information to develop, in consultation with Member States and the Regional Agreements, a model to evaluate the effectiveness of existing measures.

Actions approved in the framework of the Complementary Work Programme of 2004 will continue into 2005. EMSA will focus on the following:

a) A database is urgently needed which will provide information regarding previous incidents, responses and the impacts. This will be an important information

tool for several activities in this field. This database is of use for the Agency but should be available for consultation by Member States. EMSA will, in addition, explore possibilities to promote common simulation models for oil spill behaviour.

b) At short notice, EMSA will have to organise consultations with Member States in order to facilitate a common understanding of the existing means to combat pollution and in particular the use of chemical dispersants and their implications. At least a seminar will have to be organised to discuss the outcome of the study and a correspondence group is needed to continue work on this subject.

c) EMSA should not only concentrate on the possibility of taking action in the event of an oil spill. Preparedness is an integral element in mounting an effective response operation. The IMO estimates that more than half of packaged goods and bulk cargoes transported by sea today can be regarded as dangerous, hazardous or harmful to the environment. Many of these materials are also dangerous or hazardous from a human health and safety perspective.

For a variety of reasons, including structural changes in the refining industry and evolving demand from the manufacturing sector; the seaborne trade in these substances is increasing in scope and volume, which in turn gives rise to an increasing number of accidents involving such products.

It is important to note that whilst oil spills have a certain generic nature, hazardous and noxious substances (HNS) cover an exceptionally broad range of materials and in turn their behaviour in the marine environment.

Vegetable oils need to be considered as well. Consequently, a prioritisation is needed which would form a useful base for determining whether additional action is needed and what that might entail. This prioritisation would take existing and ongoing studies into account with the aim of identifying operational recommendations that would be relevant to the Member States and the Regional Agreements. With this in mind, an assessment is needed to evaluate the level of seaborne trade and the potential risk posed by accidents involving hazardous and noxious substances. This issue was highlighted [by several of the participants] at the "Oil Pollution Response in the European Union" Workshop (23rd and 24th June 2004) organised by EMSA.

d) In addition to the Complementary Work Programme 2004, the Agency would like to explore how it can stimulate improving oil pollution response equipment, logistics and concepts. This was one of the ideas raised at the Oil Pollution Response workshop in June. More innovation may improve the efficiency of oil pollution recovery operations by enabling a larger percentage of spilled oil to be recovered at sea before it reaches shore. For example, equipment that will continue to perform in heavy weather conditions should be fostered.

3 CLOSING REMARK

This Action Plan has been put forward with the intention of strengthening European response to oil pollution as requested by the Commission, the Council of Ministers and the European Parliament and, formally, through the regulation amending the tasks of EMSA.

It is important to note that the extent to which this Action Plan for Pollution Preparedness and Response can be implemented depends fully on the financial means provided to EMSA by the Budgetary Authorities. With limited resources EMSA might need a significant phasing-in period in order to build-up its "reserve for disasters" in the different European seas.

As previously noted the spill risk/response preparedness situation in Europe is, in reality, a "moving target". With this in mind, continued monitoring of the situation is needed in order to remain up-to-date. The Administrative Board will be consulted and advised accordingly.

4 BUDGETARY OVERVIEW OF PROPOSED ACTIVITIES

06020203: European Maritime Safety Agency Anti-pollution measures		
Activity:	Title III Expenditures	2005
Information:		
	Database incidents, responses, impacts	50.000
	Workshop Dispersants	25.000
	Study and Workshop on threat of Hazardous and Noxious Substances	75.000
	Study and Workshop on Innovation of equipment, procedures and contingencies	50.000
Co-ordination:		
	Missions	25.000
	Study and Seminar on Classification of Oil Response equipment	75.000
Operational assistance: Stand-by Contracts for Oil Recovery Vessels		
	Arrangement for the Baltic Sea	4.500.000
	Arrangement for the Western approaches to the Channel	2.500.000
	Arrangement for the Atlantic coastal area	6.000.000
	Arrangement for the East Mediterranean Sea	4.500.000
Total:		17.800.000

The Agency would like to thank all organisations for their contributions, particularly with respect to photographic images, including; the International Tanker Owners Pollution Federation, the United-Kingdom's Maritime and Coastguard Agency, the Netherlands's Coastguard, the Centre de Documentation, de Recherche et d'Expérimentations sur les Pollutions Accidentelles des Eaux (Cedre) and the Swedish Coastguard. It should be noted that the copyright for these images remains with organisations concerned.



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