EMSA

European Maritime Safety Agency

Action Plan for Response to Marine Pollution from Oil and Gas Installations

As adopted by EMSA´s Administrative Board at its 37th Meeting
held in Lisbon, Portugal, on 13-14 November 2013

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List of Acronyms and Abbreviations

AIS	Automatic Identification System
BBL	Barrel (1 bbl=159 litres)
BOP	Blowout Preventer
BTEX	Benzene, Toluene, Ethyl-benzene and Xylene
CILPAN	International Centre for Pollution Response in the North East Atlantic
CLEE	Convention on Civil Liability for Oil Pollution Damage resulting from Exploration for and Exploitation of Seabed Mineral Resources
CTG MPR	Consultative Technical Group Marine Pollution Preparedness and Response
DG ECHO	European Commission Directorate General - Humanitarian Aid and Civil Protection
EEA	European Economic Area
EEZ	Exclusive Economic Zones
EFTA	European Free Trade Association
EIA	Environmental Impact Assessment
EMSA	European Maritime Safety Agency
ESAS	Environmental Safety Aspects of Shipping
EU	European Union
FPS	Floating Production Systems
FPSO	Floating Production, Storage, and Offloading Systems
FSO	Floating Storage and Offloading Systems
GBS	Gravity-based structure
GIRG	Global Intervention and Response Group
GMES	Global Monitoring for Environment and Security
GUI	Graphic User Interface
HELCOM	Helsinki Commission
HNS	Hazardous and Noxious Substances
IMO	International Maritime Organization
IOOA	Irish Offshore Operators Association
IPC	International Policy Centre
IPIECA	Global Oil and Gas Industry Association for Environmental and Social Issues
LRIT	Long Range Identification and Tracking
MARPOL	International Convention for the Prevention of Pollution from Ships
MODU	Mobile Offshore Drilling Unit
MEPC	Marine Environment Protection Committee
NCA	Norwegian Coastal Administration
NCP	National Contingency Plan
NEBA	Net Environmental Benefit Analysis
NUI	Normally Unmanned Installations
OCES	Operators Cooperative Emergency Services Joint Declaration and Emergency Assistance Code
OIC	Offshore Industry Committee
OGP	International Oil and Gas Producers Association
OJEU	Official Journal of the European Union
OPEC	Organization of the Petroleum Exporting Countries
OPOL	Offshore Pollution Liability Agreement
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation

OSPAR	Convention for the protection of the marine environment of the North Atlantic
OSR-JIP	Oil Spill Response Joint Industry Project
OSWG	Oil Spill Working Group
OTSOPA	Bonn Agreement's Working Group on Operational, Technical and Scientific Questions concerning Counter Pollution Activities
REMPEC	The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
SAR	Synthetic Aperture Radar
THETIS	EMSA's information system that supports the new Port State Control inspection regime
TLP	Tension-leg platform
UK	United Kingdom of Great Britain and Northern Ireland
UNCLOS	United Nations Convention on Law of the Sea
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

As of 1 March 2013, with the entry into force of Regulation (EU) No.100/2013, EMSA has a new mandate[1] to respond to marine pollution caused by oil and gas installations. On this basis, the Agency:

- Provides Member States and the European Commission with technical and scientific assistance in the field of marine pollution caused by oil and gas installations;
- Supports, upon request, with additional means, and in a cost-efficient way pollution response actions in case of marine pollution caused by oil and gas installations;
- Uses the CleanSeaNet service to monitor the extent and environmental impact of such pollution; and
- May provide assistance in case of marine pollution caused by ships and oil and gas installations affecting third countries sharing a regional sea basin with the Union.

In Europe there are over 1,000 offshore oil and gas installations, the majority of which are concentrated in the North Sea. Given the size and dynamics of the offshore sector, a number of international and regional public regulatory and industry cooperation structures have been established to address the issue of marine pollution from these installations.

Oil spills originating from oil and gas installations, especially well blowouts, can differ substantially from ship-sourced oil pollution. One of the reasons is the potentially larger quantity and prolonged release of spilled oil, if the leakage proves difficult to stop. Environmental impacts as well as safety hazards associated with oil spills originating from oil and gas installations could be more severe than with ship-sourced oil spills due to the potential continuous release of fresh oil with its usually high content of flammable and toxic volatile organic compounds (VOC) in the event that the well control is lost.

Since offshore oil and gas activities in European waters began, a number of oil spills originating from oil and gas installations have been recorded. With the increase and expansion of offshore oil and gas activities, as more regions are considered for exploratory drilling and extraction, the map of the European oil and gas industry is changing and the number of oil and gas installations is increasing, which may increase the probability of incidents that could lead to oil spills. As a consequence, existing public and private pollution response capabilities and contingency plans at regional and national level are being developed and continually updated and reviewed to be ready to respond to the challenges posed by the nature of spills from offshore operations.

Industry has an important role to play in the prevention of, and preparedness for and response to, oil spills caused by oil and gas installations, usually as part of the license conditions of the shelf state, by undertaking initiatives to improve the safety and environmental standards of oil activities and to limit the extent of incidents that can affect human life and the environment.

[1] See Regulation (EU) No 100/2013, article 1 amending EMSA's Founding Regulation (EC) No 1406/2002.

The new mandate of the Agency to assist the Member States should be considered within this broader context. The scope of the Action Plan is to present the framework for the implementation of EMSA's activities with regard to its new task.[2] These activities cover both response and monitoring of pollution incidents. With regard to response, the Action Plan covers the response to oil pollution caused by oil/mixed oil and gas installations (hereinafter called offshore installations). The response to pollution caused by gas installations is not addressed due to the particularities of such incidents.[3] EMSA's expertise and response capabilities are primarily focused on oil pollution in the marine environment. Gas emissions may include liquid condensates, which evaporate into the atmosphere, with limited residues persisting on the water surface, meaning that on-site recovery is not feasible. However, gas plumes from gas installation incidents can pose a significant hazard to responders and EMSA will therefore explore monitoring options for oil and gas incidents, taking into consideration recent technological advances in this area.

Since 2004 the Agency has been tasked to assist Member States with marine pollution response. The Agency developed a 'top-up' philosophy for its 'Anti-Pollution Measures', which was endorsed by its Administrative Board. These principles will be extended to the new task.

- EMSA's operational task should be a 'logical part' of the oil pollution response mechanism of coastal states requesting support and should 'top-up' their efforts by focussing primarily on spills beyond the national response capacity of individual Member States. Based on its 'top-up' philosophy, and in accordance with the tiered response approach,[4] EMSA can be considered as a 'European tier' to provide assistance to Member States.
- EMSA should not undermine the prime responsibility of Member States for operational control during response to pollution incidents. The Agency should not replace, subsidise or substitute existing capabilities of coastal states, also taking into consideration that Member States have their own responsibilities regarding response to incidents.
- EMSA's vessels and equipment should be channelled to requesting states through the Emergency Response Coordination Centre in the European Commission.
- The requesting state will have assets provided by the Agency at its disposal and under its command and control. The choice if and which assets to use rests with the requesting state.
- EMSA's operational role should be conducted in a cost-efficient way.

The delivery of tasks by the Agency will have to be undertaken within the limits of the current Financial Perspectives without prejudice to the negotiations and decisions on the future multi-annual financial framework and of the Agency's annual budget. It is likely that the Agency will have more tasks to accomplish than in the past and limited financial resources to do so. It is therefore, essential to identify the options that bring the most added-value and that are expected to be cost-efficient.

[2] The Action Plan does also not include any activities or actions with regard to the Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35/EC.

[3] See Elgin case study in Chapter 4.

[4] See Chapter 5.

EXECUTIVE SUMMARY (CONT.)

Given the current budgetary constraints, the Agency is not planning to enlarge its fleet of contracted oil pollution response vessels; instead the adaptation of the existing network to cover areas with offshore installations will be considered. Furthermore, EMSA intends to expand its toolbox of available options to be used by Member States by providing new pollution response capabilities especially suited for combatting pollution caused by offshore installations. EMSA's activities will respect and build upon existing cooperation frameworks and regional agreements. In line with its mandate to 'top-up' Member States' capabilities, and also taking into account the industry resources, EMSA will only focus on those activities that will bring an added-value and are expected to be cost-efficient. Possible actions for the Agency have been identified as indicated below.

- Adaptation of the network of Stand-by Oil Spill Response Vessels:
  Revision, where necessary, of the geographic distribution of vessels, contract amendments and equipment suited for response to oil spills from offshore installations.
- Monitoring and evaluation tools, including adaptation of the CleanSeaNet service:
  Adaptation of the satellite monitoring service used also for offshore installations within the currently available number of images; additional images shall be provided only during emergencies.
  Explore suitable tools for the monitoring and evaluation of spill hazards (primarily atmospheric gas plumes), taking into account the particularities of the spill and the environmental conditions.
- Use of oil dispersants:
  Provision of limited dispersant supplies and application systems (aircraft and vessel mounted) to cope with spills involving the release of oil from offshore installations.
- Provision of specialised equipment:
  Development of contractual arrangements to provide existing oil pollution response equipment for use on suitable vessels of opportunity, and possibly procurement of additional stand-alone equipment (for mechanical recovery, dispersant application or in-situ burning), depending on the availability of funds.

These activities represent EMSA's principal tools to fulfil its new task of supporting Member States in responding to pollution caused by offshore installations. Member States have the primary responsibility for pollution response in their waters and will take the decision on which response option to use. The preferred EMSA option continues to be the mechanical recovery of oil, but considering the particularities of spills originating from offshore installations, additional options will be made available, providing Member States with a wider range of tools for pollution response.
The Action Plan provides:

- An overview of international and regional regulatory and cooperation structures for pollution response, addressing offshore installations in particular;
- Information regarding particularities and challenges of pollution caused by offshore installations and response measures to marine pollution caused by such installations, including some case studies;
- A brief overview of both Member States' and oil industry's preparedness and response activities regarding oil pollution caused by offshore installations; and
- An array of proposed activities by the Agency in the fields of operational assistance, cooperation and information.

The activities proposed in the Action Plan shall be implemented on a step-by-step basis through the Agency's Annual Work Programmes, following the approval by the Administrative Board in November 2013. The actual timing and extent of its implementation are dependent on the available financial resources as well as the levels of support and participation from both Member States and the oil industry. Nonetheless, EMSA intends to build up an appropriate 'reserve for disasters' by adapting its current capabilities and developing new ones.

1. INTRODUCTION

Offshore installations are the means by which the oil and gas industry is able to explore, extract and transport oil and gas reserves from the geologic layers situated under the seabed.

In Europe, offshore oil and gas activities have been developed since the mid-1960s, when hydrocarbon discoveries were made first in the UK, soon followed by discoveries in Norway in 1969.

Currently there are more than 1,000 oil and gas installations in European waters and shared sea basins (Figure 1). The majority are located in the North Sea (UK, Norway, Netherlands), while others are located in the Adriatic Sea, around the Iberian Peninsula, off Libya and Egypt, and the Black Sea. Most of these offshore installations operate in shallow waters of less than 300 metres in depth.

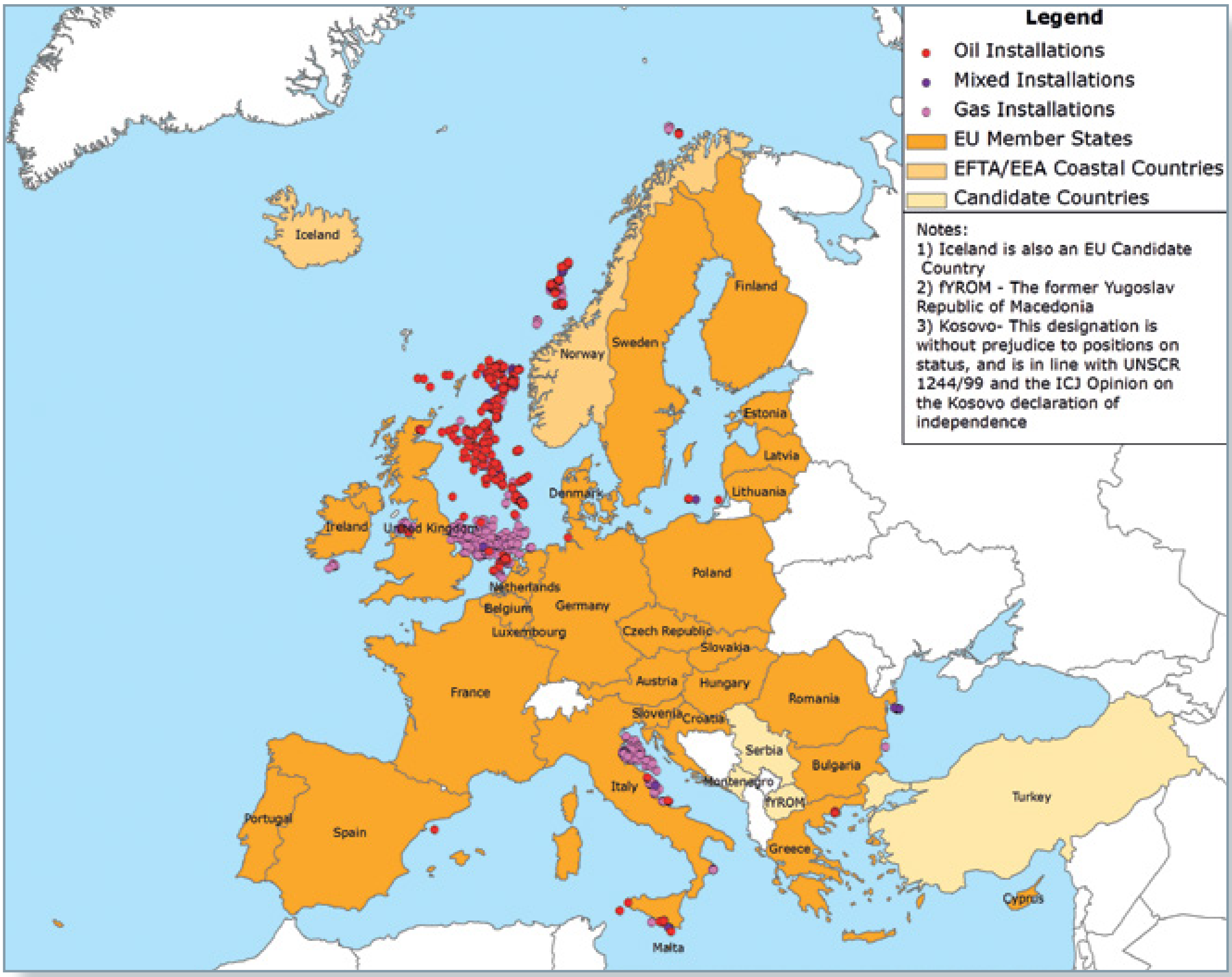


Figure 1 - Map of offshore installations across Europe

A brief overview of relevant offshore oil and gas activities by geographical area is presented below:

- The North Sea is the most mature area in Europe, with more than 40 years of offshore oil and gas activities and the largest number of known oil fields and offshore installations. Due to the shallowness of this area, the majority of these installations are in waters of less than 300 metres depth. Deepwater oil installations can be found east and west of the Shetland Islands and west of Norway.

- The Baltic Sea is an area with very limited offshore oil and gas activities. There are only a few offshore installations in the Baltic Sea, all of them located in the south-east, in Poland and Russia.
- In the Mediterranean Sea, Italy operates approximately 100 offshore installations, mainly for gas extraction and exploration. These facilities are located in the Adriatic Sea, in the Ionian Sea and in the Sicily Channel. Spain also has two installations in the Mediterranean Sea. No active offshore installations are reported in the Cypriot, French, Maltese and Slovenian sectors, but some of these countries have had drilling activities in the past (France, Cyprus) and/or plan to start drilling activities in the near future (Cyprus and Malta). Croatia also has some offshore installations, as does Greece, which is also planning more.
- Offshore oil and gas activities also take place in the waters of North African states and non- EU Member States around the Mediterranean Sea, such as Algeria, Egypt, Israel, Libya and Tunisia. Production in the territorial waters of these countries is modest, but there is significant exploration activity, particularly in Egypt and Libya. A number of European companies are active in the region.
- In the Black Sea, exploration and production activities have been conducted for over 30 years. Romania is the only sizable producer of oil, with several offshore installations already in place. Some offshore installations are also located in Bulgarian and in Turkish waters, and exploration is being carried out in all areas of the Black Sea.
- In the Arctic region, oil is currently produced in the shallow waters of the Barents and Norwegian Seas. The Barents Sea is one of the widest shelf areas in the world and has a mean depth of 230 metres. Both Russia and Norway are exploiting the area, which, from an ecological point of view, is considered to be highly sensitive.

In addition to established fields such as the North Sea, other European sea basins are currently being considered for future exploration and extraction of oil. The number of offshore installations is increasing across a range of geographical locations, which ultimately leads to a higher likelihood that oil spills will occur. Though most of these will probably be minor, Europe needs to be prepared to address all types of spills, whether small or large. Further information on the history of offshore installations, and a description of key characteristics, is presented in Annex 1.

To supplement the information regarding offshore oil and gas activities in Europe, some figures on the quantities of oil and gas produced in the OSPAR regions[5] (containing the majority of the active oil and gas production areas) are presented in Annex 2.

The continuous and still increasing demand for energy is driving the oil and gas industry towards more challenging and potentially hazardous environments (deeper waters, higher-pressure and higher-temperature horizons, and more diverse locations) requiring state-of-the-art technology and allocation of significant financial resources.

The recent blowout on the Deepwater Horizon drilling rig, also known as the Macondo incident, attracted considerable public attention and raised awareness of the threats of offshore exploration activities, and the need for better prevention and response mechanisms was explicitly shown. This was the largest ever well blowout and offshore spill. It began with an explosion and fire on 20 April 2010, resulting in the death of 11 persons. The well released at least 7,900 tonnes (50,000 barrels) of oil per day for three months, with an estimated total release of 780,000 tonnes (4.9 million barrels). The disaster clearly exceeded the limits of existing technologies to contain a well blowout and of the current strategies to corral and clean-up marine oil spills.

Following this event, global concern has grown among all states where offshore oil and gas activities are present. Concerns have also been raised by the European community regarding whether Member States' administrations and industry are operating, maintaining, monitoring and regulating these activities in such a way that the probability of incidents is minimised and accidental spills are prevented. The capacity of European states to respond to a major oil spill caused by an explosion, well blowout, pipeline rupture or the sinking of offshore installations was questioned; it was therefore necessary to find out whether appropriate steps were being taken to prevent and, ultimately, to successfully respond to such events in European waters. This was done through the analysis performed by the European Commission on the current status of preparedness in the Member States.

[5] The OSPAR Convention, otherwise known as the Convention For The Protection Of The Marine Environment Of The North-East Atlantic, refers to Artic Waters, Greater North Sea, Celtic Sea, Bay of Biscay and Iberian Coast, and the Wider Atlantic.

Consequently, it became clear that additional measures should be taken on a European level with regard to preparedness and response to oil pollution caused by offshore installations. This has led, for example, to the introduction of new legislation regarding the safety of offshore oil and gas activities[6]. It also led to the recognition that more operational measures should be developed. Based on its expertise in the field of marine pollution, EMSA was therefore given new tasks in the field of responding to marine pollution caused by oil and gas installations, with the entry into force of Regulation (EU) No 100/2013, amending the Founding Regulation (EC) No 1406/2002.

In order to effectively carry out the new tasks, the Agency has prepared this Action Plan, which establishes the framework for its pollution response activities in the context of the amended regulation and in line with its technical and operational capabilities, as well as the new financial envelope.

The implementation of this Action Plan is dependent on the Member States' policies and strategies for pollution response and on available pollution response capabilities of the Member States and the oil and gas industry. The document has therefore been developed in consultation with these two groups. This approach aims at building upon a common understanding of the threats of offshore oil and gas activities and identifying pooled resources for pollution response. In addition, it enables the Agency to develop only those pollution response activities that bring an added-value, in line with its 'top-up' mandate and the need for cost efficiency.

It is acknowledged that the industry has an obligation with regard to pollution response and that relevant capabilities are already in place, with additional ones being further developed on a global scale. These response tools are primarily available to the industry partners, but under certain conditions they can also be requested by Member States. Nonetheless, without the intention of duplicating industry resources and capabilities, the Agency will provide a direct 'government-to-government' resource, with guaranteed availability of pollution response capabilities to authorities in Europe.

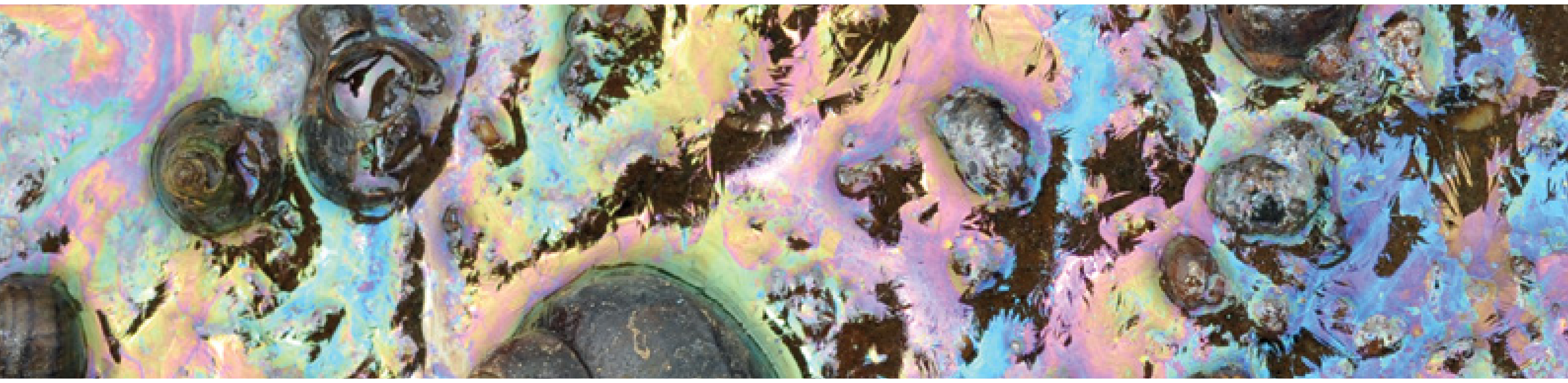
2. INTERNATIONAL AND REGIONAL STRUCTURES FOR POLLUTION RESPONSE

2.1 INTERNATIONAL LEGAL FRAMEWORK

An analysis of the current international legal framework for offshore oil activities highlights its fragmented and incomplete nature. At a global level, the United Nations Convention on the Law on the Sea (UNCLOS) provides the legal basis to create an international regime pertaining to offshore oil activities, but no such regime has yet been established.

Moreover, regional initiatives, such as those developed in the North-East Atlantic, have limited coverage. There are still regions where there is no regional regulation of offshore oil exploration and exploitation.
However, a number of international and multilateral instruments are applicable to offshore installations and are introduced hereafter.

[6] Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35/EC.



2.1.1 INTERNATIONAL CONVENTIONS GOVERNING OIL POLLUTION FROM OFFSHORE INSTALLATIONS

The United Nations Convention on Law of the Sea (UNCLOS, 1982) is an umbrella Convention, which sets out the exclusive rights of coastal states with regard to exploration and exploitation in their Exclusive Economic Zones (EEZ) (article 56 and 60) and on their continental shelves (article 81). UNCLOS defines the continental shelf in article 76.[7] Under this definition, if the continental margin (geophysical configuration) extends beyond 200 nautical miles, UNCLOS provides for an extension of the continental shelf of up to 350 nautical miles.[8]

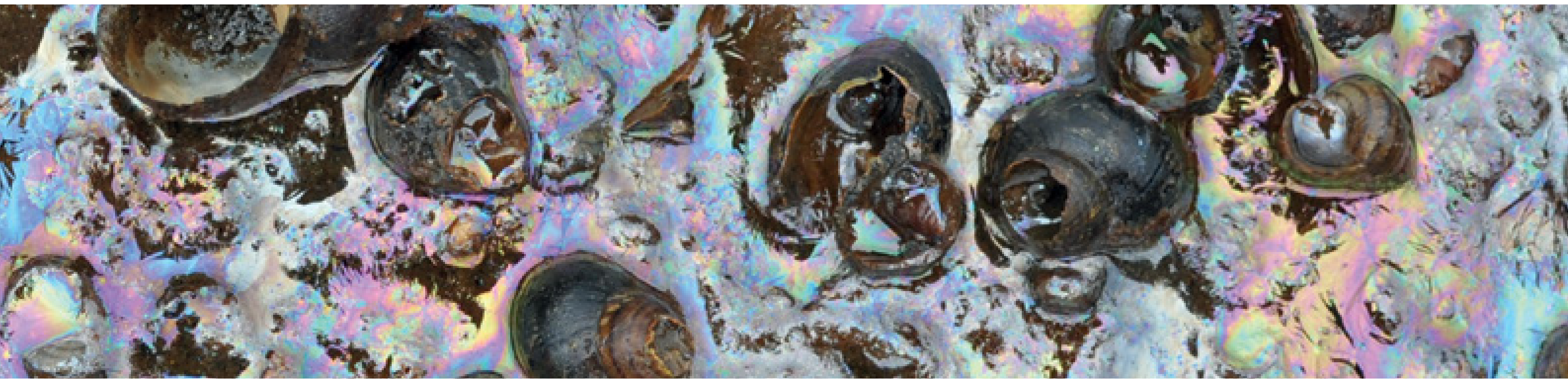
With regard to the protection of the marine environment, Part XII of the Convention is relevant. More specifically, with regard the coastal states' obligations regarding the protection of the marine environment against pollution from offshore installations, the following provisions are applicable:

- Article 80 referring to article 60 enables states to establish drilling installations with safety zones;
- Article 194 paragraph 1 calls on states to 'take jointly or individually all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment'. These include the necessary measures to minimise 'pollution from installations and devices used for the exploitation or exploration of the natural resources of the seabed and its subsoil, in particular measures for preventing accidents and dealing with emergencies (…)';
- Article 208 paragraph 5 invites coastal states 'to adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with seabed activities subject to their jurisdiction' as well as to act 'through competent international organizations or diplomatic conference to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment' from seabed activities.

The International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC, 1990) establishes measures for Contracting Parties to prepare and respond to oil pollution incidents involving ships, offshore units, sea ports and oil handling facilities, both nationally and in cooperation with other countries. The Convention was adopted on 30 November 1990 following the 1989 Exxon Valdez disaster, when the International Maritime Organization (IMO) was called upon to develop further measures to prevent pollution from ships, and entered into force on 13 May 1995. The scope of the Convention was extended in 2000 when the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol) was adopted.

[7] The continental shelf of a coastal state comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

[8] Coastal states may extend their claim to a distance not to exceed 350 nautical miles from the baseline or 100 nautical miles from the 2,500-metre isobaths.



The Convention and its Protocol apply to offshore units, which are defined as 'any fixed or floating offshore installation or structure engaged in gas or oil exploration, exploitation or production activities, or loading or unloading of oil.'
All Parties to the Convention shall require that operators of offshore installations under their jurisdictions have oil pollution emergency plans or similar arrangements, which are coordinated with the national systems and approved in accordance with procedures established by the competent national authority.

They also require that persons in charge of offshore installations under their jurisdictions shall report without delay any event on their offshore unit as well as any event at sea involving a discharge, probable discharge, or presence of oil.

Contracting Parties should establish national systems to promptly and effectively respond to oil pollution incidents, including as a minimum:

- The designation of competent national authorities with responsibilities for pollution response, national operational contact points and authorities to act on behalf of the state requesting assistance; and
- National contingency plans for preparedness and response, taking into account guidelines developed by IMO.

In addition, all Parties, using their own capabilities or through bilateral or multilateral cooperation and in cooperation with the oil industry, port authorities and other relevant entities, shall establish:

- Minimum levels of pre-positioned oil spill combating equipment and programmes for its use;
- Programmes of exercises for oil pollution response organisations and training of relevant personnel;
- Detailed plans and communication capabilities for responding to an oil pollution incident; and
- Mechanisms or arrangements to coordinate the response to an oil pollution incident with the capabilities to mobilise the necessary resources.

All Parties should ensure that all current information is provided to the IMO.

In accordance with the Convention, all Parties agree, based on their capabilities and availability of resources, to cooperate and provide advisory services, technical support and equipment for the purpose of responding to an oil pollution incident when requested by any party affected or likely to be affected by such incident.

All Parties also agree to cooperate directly or through IMO or relevant regional organisations/arrangements in promoting and exchanging results of research and development programmes with regard to the enhancement of oil pollution preparedness and response, including technologies and techniques for surveillance, containment, recovery, dispersion, clean-up and otherwise minimising or mitigating the effects of oil pollution, and for restoration.

The European Union is not a signatory to this Convention but most of the EU Member States and coastal EFTA/EEA contracting parties are.

Country	OPRC 1990
Belgium	
Bulgaria	•
Croatia	•
Cyprus	
Denmark	•
Estonia	•
Finland	•
France	•
Germany	•
Greece	•
Iceland (EFTA/EEA)*	•
Ireland	•
Italy	•
Latvia	•
Lithuania	•
Malta	•
Netherlands	•
Norway (EFTA/EEA)	•
Poland	•
Portugal	•
Romania	•
Slovenia	•
Spain	•
Sweden	•
UK	•

(IMO, 31 January 2013)
Note: Non-coastal EU/EFTA/EEA Member States have not been listed.
*Iceland is also an EU Candidate Country

Table 1 - List of coastal EU Member States, EFTA/EEA Countries and EU Candidate Country party to OPRC

International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties, 1969[9] The Convention affirms the right of a coastal state to take such measures on the high seas and in the EEZ as may be necessary to prevent, mitigate or eliminate danger to its coastline or related interests from pollution by oil or the threat thereof, following a maritime casualty.

[9] Adoption: 29 November 1969; entry into force: 6 May 1975.

Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991) - the 'Espoo (EIA) Convention'

The 1991 Espoo Convention was signed by the European Community on 26 February 1991 and ratified in June 1997.[10] Its main provisions are implemented by Directive 97/11/EC,[11] which had to be transposed into national legislation by March 1999.

The Espoo Convention as amended and its Protocol establish the obligations of Parties to assess the environmental impact at project level for proposed activities, likely to cause significant adverse transboundary impacts. Each Party is also obligated to notify and consult any other Parties with respect to proposed activities that are likely to cause significant adverse transboundary impact.

The Convention requires parties to 'take all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impact from proposed activities' as well as to 'take the necessary legal, administrative or other measures to implement the provisions of this Convention, including, with respect to proposed activities listed in Appendix I (…)'.

Appendix I to the Convention, as amended, lists the 'Offshore hydrocarbon production' - defined as 'Extraction of petroleum and natural gas for commercial purposes where the amount extracted exceeds 500 metric tonnes/day in the case of petroleum and 500,000 cubic metres/day in the case of gas' - as one of the activities with potential to cause significant adverse impacts.

2.1.2 LIABILITY AND COMPENSATION FOR OIL POLLUTION DAMAGE FROM OFFSHORE INSTALLATIONS

Given the absence of an international instrument for compensation for oil pollution damage from offshore installations, states bordering the North Sea[12] elaborated a regional Convention on Civil Liability for Oil Pollution Damage resulting from Exploration for and Exploitation of Seabed Mineral Resources in 1977 (the 'CLEE' Convention). The CLEE has never actually entered into force.

As an interim measure until the ratification of the CLEE, the Offshore Pollution Liability Agreement (OPOL) was applied in the UK. As the CLEE was never ratified, OPOL continued to apply and was further extended. OPOL is an association formed by the offshore installations operators which administers a voluntary strict liability compensation scheme. Currently, the compensation ceiling per incident for pollution damage and the cost of remedial measures is up to US $250 million[13] (€188 million) per incident. This is made up of US $125 million (€94 million) to cover pollution damage claims and US $125 million for remedial measures.

OPOL applied initially to offshore facilities within the jurisdiction of the United Kingdom of Great Britain and Northern Ireland, but has subsequently been extended to offshore facilities within the jurisdictions of Denmark, Germany, France, the Republic of Ireland, the Netherlands, Norway, the Isle of Man, the Faroe Islands and Greenland. It currently excludes offshore facilities located in the Baltic and Mediterranean Seas. It can be extended to apply to offshore facilities within the jurisdiction of any other European state, should they wish.

The issue of liability and compensation for oil pollution damage resulting from offshore oil exploration and exploitation was brought to the attention of the IMO in March 2010 at the 60th session of the Marine Environment Protection Committee (MEPC). The Indonesian delegation made a general statement regarding the accident with the Montara offshore oil platform located in Australian waters, which resulted in a significant release of oil into the Timor Sea. The MEPC concluded that this matter should be discussed at the Legal Committee rather than MEPC.

[10] Council Decision of 27 June 1997 on the conclusion, on behalf of the Community, of the Convention on environmental impact assessment in a transboundary context (ESPOO Convention). Proposal OJEU C 104, 24.4.1992, p. 5 (decision not published).

[11] Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, OJEU L 73, 14.3.1997, p. 5. Directive 97/11/EC was repealed by Directive 2011/92/EU which lists oil and gas developments as projects for which environmental assessment is mandatory.

[12] The United Kingdom, Germany, Ireland, the Netherlands, Norway and Sweden.

[13] $ 1=€ 0.75 on 23 August 2013.

The Indonesian delegation submitted a proposal to the 97th session of the Legal Committee in November 2010. The concern of Indonesia was that, although companies generally do carry insurance, this is usually determined in accordance with the regulatory limits set by national bodies which regulate offshore drilling in the country where the company is operating, in accordance with national or regional rules. The amount of such insurance may be insufficient.

The Indonesian delegation proposed that a uniform international standard be applied. Indonesia therefore invited the Legal Committee to include this item on its work agenda and to consider the possibility of establishing an international regime for liability and compensation for oil pollution damage resulting from offshore oil exploration and exploitation activities. The Indonesian proposal was considered at three successive sessions of the Legal Committee.

During the 99th Session held in April 2012, the IMO Legal Committee agreed to inform the Council that it wished to analyse further the liability and compensation issues connected with trans-boundary pollution damage resulting from offshore oil exploration and exploitation activities, with the aim of developing guidance to assist states interested in pursuing bilateral or regional arrangements. The Committee recognised that bilateral and regional arrangements were the most appropriate way to address this matter and that there was no compelling need to develop an international convention on this subject.[14]

2.2 REGIONAL AGREEMENTS

The grounding of the oil tanker Torrey Canyon in 1967, and subsequent release of 117,000 tonnes of oil with serious consequences for the environment, proved to be a pivotal point for international cooperation in combating marine pollution. In 1969, the first European Regional Agreement for cooperation in dealing with marine pollution (the 'Bonn Agreement') was signed. A number of additional international agreements/conventions have followed.

The Agreement of 1983 for cooperation in dealing with pollution of the North Sea by oil and other substances (Bonn Agreement)

The Bonn Agreement was adopted on 13 September 1983 and entered into force on 1 September 1989.

This Agreement shall apply 'whenever the presence or the prospective presence of oil or other harmful substances polluting or threatening to pollute the sea within the North Sea area (…) presents a grave and imminent danger to the coast or related interests of one or more Contracting Parties'.[15]

The Bonn Agreement is focused on responding to marine pollution of the North Sea, by encouraging the bordering states together with the European Union to:

- Offer mutual assistance and cooperation in responding to pollution;
- Execute surveillance as an aid to detecting and combating pollution and to prevent violations of anti-pollution regulations.

Contracting Parties to the Bonn Agreement are: Belgium, Denmark, France, Germany, Ireland, the Netherlands, Norway, Sweden, the United Kingdom and the European Union. Spain, the Helsinki Commission (HELCOM), the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), IMO and the Organisation for Economic Co-operation and Development (OECD) have observer status. The international cooperation between the Contracting Parties to the Bonn Agreement to respond to maritime pollution in the North Sea will apply independently of the source of the pollution, whether from offshore installations or vessels.

[14] Extract from Rochette, J. (2012), 'Towards an international regulation of offshore oil exploitation' - Report of the experts workshop held at the Paris Oceanographic Institute on 30 March 2012, Working Papers N°15/12, IDDRI, Paris, France, 18 p.

[15] Article 1 (1) of the Agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances, 1983, as amended by the Decision of 21 September 2001 by the Contracting Parties to enable the Accession of Ireland to the Agreement.

The Bonn Agreement has developed a Counter Pollution Manual, which is continually updated, with the aim of providing guidelines and practical information for the provision of assistance from one contracting party to another, in the form of vessels, personnel, recovery and storage equipment, during a multinational marine pollution combating operation.

The Agreement about Cooperation concerning Pollution Control of the Sea after Contamination by Oil or other Harmful Substances (Copenhagen Agreement)

The initial agreement was signed between Denmark, Finland, Iceland, Norway and Sweden on 16 September 1971, with the latest revision being endorsed on 29 March 1993.

The Parties agreed to cooperate for monitoring, investigating and reporting of any contamination of the sea by oil or other harmful substances. The Parties are also required to establish appropriate national preparedness for pollution control within their waters, while also providing assistance at the request of another Party that needs support.

Under the Agreement, all Parties have agreed to conduct regional exercises with the purpose of testing alarm procedures, communication and the compatibility of equipment.

The Parties share experiences regarding response measures, results of monitoring activities and technological research and development through plenary meetings, working groups and exercises.

The Convention on the protection of the marine environment of the Baltic Sea area (1992 Helsinki Convention)

The Helsinki Convention applies to those countries bordering the Baltic Sea[16] and entered into force in 2000.

The Convention aims at facilitating the cooperation between the State Parties with the purpose of preventing and eliminating pollution of the Baltic Sea. The Convention applies to 'fixed or floating platforms'.[17]

The Convention contains provisions related to the prevention and response to offshore activities, particularly in Annex VI. Key to the success of the Convention is the commitment that each country has made to provide its own response capabilities, which it then maintains in constant readiness for oil spill response anywhere in the Baltic. In support of this process, exercises (table-top and operational) are performed to test the emergency procedures, the response capability and response time of Contracting Parties.

Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention)

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean entered into force in 2004 and has 22 Contracting Parties.[18]

The Convention identifies in article 7 the exploration and exploitation of the continental shelf and the seabed and its subsoil as one of the potential sources of pollution of the Mediterranean Sea for which the Contracting Parties are required to take the appropriate prevention and response measures.

Under the Barcelona Convention (article 16), Contracting Parties shall determine liability and compensation from pollution damage, caused by activities covered by the Convention, in line with the 'polluter pays' principle.

[16] Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden and the European Community

[17] As per the definition of 'ship', article 2 (3) of the Convention, which includes 'fixed and floating platforms'.

[18] Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, European Union, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey.

The Barcelona Convention has given rise to seven Protocols addressing different aspects of the Mediterranean marine environment and its conservation. The Protocol for the Protection of the Mediterranean Sea against pollution resulting from exploration and exploitation of the continental shelf and the seabed and its subsoil (the Offshore Protocol) was adopted in 1994 and entered into force on 24 March 2011.[19]

The Protocol establishes the system of authorisation for exploration or exploitation and establishment of an installation in the Mediterranean Sea. It determines the minimum requirements for granting authorisation, monitoring and liability in case of damage, with a view to limit the impact of pollution from offshore activities.

With regard to contingency planning, under article 16, the Parties shall require the operators to have in place a contingency plan as one of the minimum requirements for authorising the siting of an installation.

In addition, in case of emergency caused by an offshore installation, the Contracting Parties shall implement 'mutatis mutandis' the provisions of the Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea (Prevention and Emergency Protocol).

The Protocol also stipulates operational measures which the Parties must take in the event of pollution caused by ships, as well as emergency measures which must be taken on board ships and on offshore installations (article 11 (5)).

In order to assist the Mediterranean coastal states to implement the provisions of the Prevention and Emergency Protocol, including building up their national prevention and response capabilities to be prepared for major marine pollution incidents, REMPEC was originally established in Malta in 1976.

The Cooperation Agreement signed in 1990 for the protection of the coasts and waters of the North-East Atlantic against pollution (Lisbon Agreement)

The Lisbon Agreement (1990) is an international framework for cooperation in responding to accidental marine pollution, aimed at promoting mutual assistance between France, Portugal, Spain and Morocco. This agreement is in force since 1 February 2014. The European Union is also contracting party to the Lisbon Agreement.

For the purposes of this Agreement 'pollution incident' means 'an event or series of events having the same origin and resulting in a discharge or a danger of a discharge of hydrocarbons or other harmful substances, which has occasioned or may occasion damage to the marine environment, the coast or the related interests of one or more of the Parties, and requiring emergency action or an immediate reaction of some other kind'. Although pollution originating from offshore installation is not mentioned specifically, from the broad definition of 'pollution incident' it entails that oil pollution caused by offshore installations is included in the scope of the agreement.

The International Centre for Pollution Response in the Northeast Atlantic (CILPAN) has been established in Lisbon as part of the Lisbon Agreement, in order to coordinate response between the Agreement's Member States during a marine pollution incident.

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 Parties are to establish their own response organisations and national contingency plans, to undertake the assessment of 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 Parties are obliged to render assistance to other Parties, if required.

[19] End of 2012, the EU acceded to the Barcelona Offshore Protocol by Council Decision of the Council of 17 December 2012 on the accession of the European Union to the Protocol for the Protection of the Mediterranean Sea against pollution resulting from exploration and exploitation of the continental shelf and the seabed and its subsoil, OJEU L 4, 9.1.2013, p. 13–14.

Convention for the protection of the marine environment of the North-East Atlantic 1992 (OSPAR Convention 1992)

The European Community is a Contracting Party to the Convention for the protection of the marine environment of the North-East Atlantic (OSPAR Convention) pursuant to Council Decision 98/249/EC of 7 October 1997.[20]

The aim of the Convention is to prevent and eliminate pollution and to protect the maritime area against the harmful effects of human activities. The Convention entered into force on 25 March 1998. The OSPAR Convention applies in the North-East Atlantic.

The sixteen Contracting Parties[21] are obliged to 'take all possible steps to prevent and eliminate marine pollution'. Pollution from oil rigs, including fixed and floating offshore platforms is expressly addressed (article 5 and Annex III). The OSPAR Convention applies the precautionary principle and 'polluter pays' principle (article 2) but does not provide for clean-up or liability for oil spill from offshore installations, or for insurance or financial guarantee in relation to incidents caused by offshore installations.

The Convention defines offshore activities as 'activities carried out in the maritime area for the purpose of the exploration appraisal or exploitation of liquid and gaseous hydrocarbons'.

The main objective of OSPAR's 'Offshore Oil and Gas Industry Strategy' is: 'to prevent and eliminate pollution and take the necessary measures to protect the OSPAR maritime area against the adverse effects of offshore activities by setting environmental goals and improving management mechanisms, so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected'.

The Offshore Oil and Gas Industry Strategy sets out the development and implementation of programmes and measures in respect of all phases of offshore activities.[22] It requires the OSPAR Commission to collect information about threats to the marine environment; establish priorities for taking action; and develop and periodically review environmental goals. The oil industry related work is implemented by OSPAR's Offshore Industry Committee (OIC).

The OSPAR Commission also cooperates with other international organisations in developing measures to prevent and eliminate pollution from offshore sources including the efforts by the European Union, the most relevant being developments under the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation[23] (for Offshore Chemicals).

Convention on the protection of the Black Sea against pollution, 1992 (Bucharest Convention)

The 'Convention on the Protection of the Black Sea against Pollution' (also known as the Bucharest Convention) was adopted in 1992 and entered into force in 1994. The Contracting Parties to the Convention are Bulgaria, Romania, the Russian Federation, Georgia, Turkey and Ukraine. The European Union is not yet party to the Bucharest Convention, but has been granted observer status.

[20] Council Decision 98/249/EC of 7 October 1997 on the conclusion of the Convention for the protection of the marine environment of the north-east Atlantic, OJEU L 104, 3.4.1998, p. 1.

[21] Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the European Union.

[22] It seeks to: 'promote the development and implementation by the offshore industry of environmental management mechanism, including elements for auditing and reporting, which are designed to achieve both continuous improvement in environmental performance and the environmental goals' and to 'promote the joint development of environmental best practice guidelines for offshore activities for the purpose of giving effect to the principle of sustainable development'.

[23] European Parliament and Council Regulation (EC) No 1907/2006 and Directive 2006/121/EC, OJEU, L 136 of 29 May 2007, p. 3 and 281.

Amongst others, the objectives of this Convention are to:

- Prevent pollution by hazardous substances;
- Prevent, reduce and control pollution of the marine environment from vessels;
- Prevent, reduce and control the pollution of the marine environment resulting from emergency situations;
- Provide the framework for scientific and technical cooperation and monitoring activities.

For the purposes of the Convention 'vessel' means seaborne craft of any type. This expression includes hydrofoil boats, aircushion vehicles, submersibles, floating craft whether self-propelled or not, platforms and other man-made structures at sea.

The Contracting Parties are obliged by this Convention to prevent, reduce and control the pollution, including from offshore installations, in the Black Sea in order to protect and preserve the marine environment. The Convention provides the legal framework for cooperation and concerted actions to fulfil this obligation. A protocol has been adopted for joint action in the case of accidents (such as oil spills). Both the Bucharest Convention and its Emergency Protocol provide the legal institutional framework for actions concerning regional cooperation in responding to marine pollution incidents.

The implementation of the Bucharest Convention is managed by the Commission for the Protection of the Black Sea Against Pollution (referred to as the Istanbul Commission or 'Black Sea Commission') with its Permanent Secretariat in Istanbul, Turkey. Advisory Groups, comprising experts from all Black Sea states, have also been created to provide expertise, information and support.

The Advisory Group on the Environmental Safety Aspects of Shipping (ESAS): 'coordinates the regional approach to emergency response, particularly the international response to accidents involving the extraction, maritime transport, handling and storage of oil and, where relevant hazardous chemicals.'

One of the major achievements of the Black Sea Commission has been to develop the Black Sea Contingency Plan (BSCP) for responding promptly and effectively to marine pollution incidents affecting or likely to affect the Black Sea environment, which is in accordance with the Emergency Protocol to the Bucharest Convention.

Operator's Co-operative Emergency Services (OCES) Joint Declaration and Emergency Assistance Code

OCES is the organisational framework under which oil and gas companies operating in the waters of the North Sea and adjacent waters of the North West European Continental Shelf cooperate and share resources in the event of an emergency.

In 1979, the National Oil Industry Associations of the UK, Norway, Denmark and the Netherlands issued a Joint Declaration committing the associations to the principle of mutual aid in an emergency situation, regardless of national boundaries, and established the Emergency Assistance Code to govern the provision of this assistance. Subsequently, the National Oil Industry Associations of Ireland and Germany endorsed the Joint Declaration. The Joint Declaration and Emergency Assistance Code was revised in December 2011.

Under national law, the oil or gas installation operator is required to have in place effective contingency plans for emergency situations.[24] In order to promote and facilitate the sharing of resources, the National Oil Industry Associations have declared policy of mutual support between members and have put in place the arrangements to ensure that support can be provided effectively.

The Emergency Assistance Code lays down the operational principles under which emergency assistance may be requested and provided. It also sets out the management and administrative procedures to follow.

[24] The OCES Emergency Assistance Code defines an 'emergency situation' as 'a situation in which people, property or the environment are at risk of (or have already suffered) serious harm due to an event on or near a fixed or mobile offshore installation or pipeline such as leak, loss or well control, blowout, explosion or fire'.

2.3 EUROPEAN FRAMEWORK

2.3.1 EUROPEAN LEGISLATION

With regard to offshore installations, the European legislation presented below is relevant.

- Directive 85/337/EEC,[25] as amended by Directives 97/11/EC,[26] 2003/35/EC[27] and 2009/31/EC,[28] on the assessment of the effects of certain public and private projects on the environment, has harmonised the principles of the environmental impact assessment of projects by introducing general minimum requirements. This directive as amended applies to exploration and exploitation of oil activities likely to have significant effects on the environment due to, inter alia, their nature, size and/or location.
- Health and safety of workers at work: Directive 92/91/EEC[29] (complementing the Framework Directive 89/391/EC)[30] is the principal piece of Union legislation relevant for protection of offshore workers.
- Directive 94/22/EC[31] is a principal legal framework for granting licences for hydrocarbon prospection, exploration and production.
- Directive 2008/98/EC on waste (Waste Framework Directive). This directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste. The directive applies to oil spills including those from offshore installations,[32] as upheld by the Court of Justice of the European Union. It also introduces the polluter pays principle.
- Environmental Liability Directive 2004/35/EC.[33] The directive establishes an administrative system to prevent and/or remediate environmental damage caused by operators carrying out dangerous activities. The directive sets out two liability regimes: 1) operators carrying out operational activities not listed in an Annex III are liable for fault based damage to protected species or natural habitats, and 2) operators of hazardous activities listed in Annex III are strictly liable. The extraction of crude oil is one of the dangerous activities listed in Annex III to the directive[34] therefore the operator of the installation would be subject to strict liability rules if it causes significant adverse effects to the biodiversity. Initially the geographical scope of 'water damage' under the directive was limited to areas at very small distance from the coast as covered by the EU Water Framework Directive.[35] In addition, the directive did not provide for compulsory insurance. These limitations were recently lifted with the entry into force of Directive 2013/30/EU on safety of offshore oil and gas operations amending Directive 2004/35/EC.

[25] Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, OJEU L 175, 5.7.1985, p. 40–48.
[26] OJEU L 73, 14.3.1997.
[27] OJEU L 156, 25.6.2003, p. 17–25.
[28] OJEU L 140, 5.6.2009, p. 114–135.
[29] Council Directive 92/91/EEC of 3 November 1992 concerning the minimum requirements for improving the safety and health protection of workers in the mineral- extracting industries through drilling, OJ L 348, 28.11.1992, p. 9–24.
[30] Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, p. 1–8.
[31] Directive 94/22/EC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons, OJ EU L 164, 30.6.1994, p. 3–8.
[32] In its judgment C-188/07 of 24 June 2008 (Commune de Mesquer), the Court of Justice of the European Union found that hydrocarbons accidentally spilled at sea following a shipwreck, mixed with water and sediment and drifting along the coast of a Member State until they are washed up on that coast constitute waste within the meaning of the WFD, where they are no longer capable of being exploited or marketed without prior processing. In interpreting this judgment it appears that any accidentally spilled hydrocarbons at sea, under circumstances where they are no longer capable of being exploited or marketed without prior processing, would have to be considered as waste. This would also apply to any oil spills from offshore drilling. Accordingly, their further treatment, storage or processing would have to satisfy the requirements of the waste legislation. Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste, Directorate-General for Environment, June 2012.
[33] Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (OJEU L 143, 30.4.2004, p. 56) as amended by Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC (OJEU L 102, 11.4.2006, p. 15) and Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJEU L 140, 5.6.2009, p. 114).
[34] See point 7 of Annex III: '7.Manufacture, use, storage, processing, filling, release into the environment and onsite transport of:
(a) dangerous substances as defined in article 2(2) of Council Directive 67/548/EEC (…).'
Directive 67/548/EEC was replaced by Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. OJEU L 353, 31.12.2008, p. 1–1355.
[35] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327, 22.12.2000, p. 1–73.

- Regulation (EC) No 1406/2002 of the European Parliament and of the Council for the establishment of the European Maritime Safety Agency (EMSA), which has recently been amended as to include new tasks for EMSA in the field of responding to spills originating from offshore installations.

Finally, Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35 EC, published in the OJEU L 178/66 on 28 June 2013, entered into force on 18 July 2013 and should be transposed by Member States by 19 July 2015.

This new legislation aims at reducing the risk of a major accident in the EU offshore oil and gas sector and at limiting the consequences should such an accident nonetheless occur.

The objectives of the directive are to:

- Ensure a consistent use of best practices for major hazards control by oil industry offshore operations potentially affecting EU waters or shores;
- Implement best regulatory practices in all Member States with offshore oil and gas activities;
- Strengthen the preparedness and response capacities for pollution originating from offshore activities;
- Improve and clarify existing liability and compensation provisions.

A common EU framework for offshore activities has the potential to raise standards in this area.

With regard to existing legislation, the directive expands the scope of the following texts:

- The geographical scope of the Environmental Liability Directive is extended to cover all marine waters under the jurisdiction of the Member States. The definition of 'water damage' is broadened as reference is made to, not only the EU Water Framework Directive, but also to the 'environmental status of the marine waters concerned as defined in Directive 2008/56/EC'[36] (Marine Strategy Framework Directive). Article 3 of the Marine Strategy Framework Directive defines 'marine waters' as waters, the seabed and subsoil on the seaward side of the baseline from which the extent of territorial waters is measured extending to the outmost reach of the area where a Member State has and/or exercises jurisdictional rights, in accordance with the UNCLOS.

  Accordingly, the holder of the licence for offshore oil and gas operations may be liable to compensate for damage to the marine environment occurring in the following maritime jurisdictional zones: the territorial sea, the EEZ and the continental shelf including those areas of the shelf extending beyond the 200 nautical mile EEZ as described under Section 2.1.1 above.

- The regime established by Directive 92/91/EC on health and safety at work is reinforced to include, inter alia, environmental impact assessment, to require the risk assessment to be submitted to the regulator for consent, to establish a notification scheme for well operations and to require independent verification of critical risk control elements.

- The national competent authorities' existing obligations under Directive 94/22/EC on the conditions for granting and using authorisations for the prospection, exploration and production of hydrocarbon are strengthened during the licensing process in order to improve assessment of technical and financial capacity of the applicants.

[36] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy, OJEU, L 164, 25.6.2008, p. 19–40.

Directive 2013/30/EU further details the type of assistance that EMSA shall furnish to the Commission and the Member States within the framework of its mandate as defined by Regulation (EC) No 1406/2002 as amended. Accordingly, EMSA shall:

- Assist the Commission and the affected Member State, on its request, in detecting and monitoring the extent of an oil or gas spill;
- Assist Member States, at their request, with the preparation and execution of external emergency response plans, especially when there are transboundary impacts within and beyond offshore waters of Member States;
- On the basis of the Member States' external and internal emergency response plans, develop with Member States and operators a catalogue of emergency equipment and services available.

The Agency may, if requested:

- Assist the Commission in assessing the external emergency response plans of Member States to check whether the plans are in conformity with the directive;
- Review exercises that focus on testing transboundary and European Union emergency mechanisms.

2.3.2. COOPERATION IN THE FIELD OF ACCIDENTAL OR DELIBERATE MARINE POLLUTION

The Consultative Technical Group Marine Pollution Preparedness and Response (CTG MPPR), composed of experts from Member States, provides a forum at European level in support of pollution preparedness and response activities. EMSA hosts and chairs the annual CTG MPPR meetings, workshops on specific subjects, facilitates the rolling Work Programme and provides the group's secretariat.

2.3.3. CIVIL PROTECTION COOPERATION AT EU LEVEL

Two legal instruments govern civil protection cooperation at the EU level:

- Council Decision 2007/779/EC, Euratom of 8 November 2007 establishing a Community Civil Protection Mechanism (recast),[37] and
- Council Decision 2007/162/EC, Euratom of 5 March 2007 establishing a Civil Protection Financial Instrument.[38]

The Civil Protection Mechanism aims at facilitating reinforced cooperation in civil protection assistance interventions, including emergency response to marine pollution incidents inside and outside the Union.

More specifically, it provides for the following:

- The establishment and management of the Emergency Response Coordination Centre (ERCC) (formerly Monitoring and Information Centre, MIC), responsible for the coordination of the European response to disaster inside or outside the EU. The ERCC works in close cooperation with national crisis centres in 32 Participating States (EU 28, the former Yugoslav Republic of Macedonia, Iceland, Liechtenstein and Norway) and provides a central platform to exchange requests and offers of assistance facilitating informed decisions at national level;
- Dissemination of early warning alerts to both specialists and the general public and circulation of the latest updates on ongoing emergencies and Mechanism interventions;

[37] Council Decision 2007/779/EC, Euratom of 8 November 2007 establishing a Community Civil Protection Mechanism (recast), OJEU L 314, 1.12.2007, p. 9.

[38] Council Decision 2007/162/EC, Euratom of 5 March 2007 establishing a Civil Protection Financial Instrument, OJEU L 71, 10.3.2007, p. 9.

- Facilitation of the provision of European assistance at headquarters level and on the site of the disaster through the deployment of EU civil protection experts for assessment and coordination, when required;
- The setting up and implementation of a training programme, which involves training courses, organisation of joint exercises and a system of exchange of experts of the Participating States;
- The establishment and management of a secure Common Emergency Communication and Information System (CECIS);
- Other support actions such as measures to facilitate transportation of resources for assistance intervention.

In December 2011, the European Commission proposed a decision on a new Union Civil Protection Mechanism.[39] The new decision merges into a single text the provisions relating to the functioning of the Mechanism and those relating to the financing of its actions. It strengthens the cooperation among Participating States in the field of disaster prevention through the sharing of risk assessment information and assessments of risk management capabilities and improves the planning and pre-commitment of response capacities through the creation of a voluntary pool of Member State response assets which stay under national command and control. The new Mechanism will also introduce a process to identify gaps in the European disaster response system and simplifies the existing procedures for the pooling and co-financing of the transport of assistance, thereby reducing the administrative burden on the Commission and Member States. Finally, it also establishes the possibility of prevention or preparedness missions in third countries.

2.3.4. THE AGENCY'S ACTIVITIES IN THE FIELD OF OIL POLLUTION ORIGINATING FROM OFFSHORE INSTALLATIONS

In 2004, with the adoption of Regulation (EC) No 724/2004,[40] the Agency was assigned the following tasks in the field of marine pollution by ships:

- To provide the Member States and the Commission with technical and scientific assistance in the field of ship sourced accidental and deliberate pollution;
- To support, on request, with additional means and in a cost-efficient way, the Member States' pollution response mechanisms.

In order to further determine the framework for its pollution response activities, EMSA developed its Action Plan for Oil Pollution Preparedness and Response (Oil Action Plan) regarding ship-sourced pollution, which was approved and adopted by the Agency's Administrative Board at its 9th meeting in Lisbon on 21-22 October 2004. This Action Plan is being implemented and updated accordingly by the Agency's annual Work Programmes.

As of 2005, the Agency gradually built-up a network of at-sea oil recovery vessels for pollution response operations covering priority areas.

In addition, in line with Directive 2005/35/EC as amended,[41] the Agency has been tasked to support Member States activities in the field of monitoring ship-sourced pollution. Consequently, the Agency has developed the CleanSeaNet service, a satellite based monitoring system for marine oil spill detection and surveillance in European waters. Since April 2007 the service provides a range of detailed information including oil spill alerts to Member States, rapid delivery of available satellite images, and oil slick position interpretation.

[39] Proposal for a decision of the European Parliament and of the Council on a Union Civil Protection Mechanism, COM/2011/0934.

[40] Regulation (EC) No 724/2004 of the European Parliament and of the Council of 31 March 2004 amending Regulation (EC) No 1406/2002 establishing a European Maritime Safety Agency (Text with EEA relevance), OJEU L 129, 29.4.2004, p. 1–5.

[41] Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties, including criminal penalties, for infringements, as amended by Directive 2009/123/EC.

Furthermore, based on the recognition, in the Oil Pollution Action Plan, of necessary actions with regard to Hazardous and Noxious Substances (HNS), the Agency broadened its scope of activities to cover the provision of operational information related to HNS pollution. In 2007, the Agency developed an Action Plan for HNS Pollution Preparedness and Response (HNS Action Plan), which was approved and adopted by the Agency's Administrative Board at its 18th meeting in Lisbon on 12-13 June 2007. As with the Oil Action Plan, this plan is being implemented and further defined by the Agency's annual Work Programmes.

The main focus of the HNS Action Plan is to ensure that the Agency will provide specialised information and assistance to Member States, in order to build upon their existing knowledge and response capacities in the field of HNS pollution response.

With the entry into force of the amendment to the EMSA Founding Regulation [Regulation (EU) No 100/2013 amending Regulation (EC) No 1406/2002], the Agency's mandate was extended to cover response to oil pollution caused by offshore installations.

In 2012, the Agency began preparatory actions, such as gathering and reviewing information related to offshore installations in sea basins bordering European states, including information on the extent and type of offshore activity, as well as preparedness and response options in Europe regarding offshore installations incidents.

The Agency aims to offer operational assistance for response to oil pollution originating from offshore installations, and to this effect it has developed this Action Plan.

Chapter 6 of the Action Plan details EMSA's framework actions in this field.

3. SPECIFIC RESPONSE MEASURES FOR SPILLS FROM OFFSHORE INSTALLATIONS

Spills originating from offshore installations have different characteristics to ship-sourced spills. Although the response measures are generally the same as those taken to combat ship-sourced spills, they need to be adapted to the particular challenges presented by the spills from offshore installations.

3.1.PARTICULARITIES OF POLLUTION CAUSED BY OFFSHORE INSTALLATIONS

The production of oil from offshore installations requires the exploration, extraction, storage and transport of oil, and, subsequently, entails the possibility that a spill may occur. The accidental occurrence of major oil spills has stimulated cooperation between different countries, and between governments and industry, in the area of both prevention and response. Cooperation and sharing of resources contribute to an integrated approach, extending from contingency planning to spill response as well as post-spill actions (e.g. liability and compensation).

Potential sources for oil pollution caused by offshore installations include well blowouts, acute or slow releases from sub-sea equipment and pipelines, structural failure or damage of production or pumping platforms, platform-tanker loading activities and other accidental releases.

3.1.1 WELL BLOWOUTS[42]

A well blowout may occur at the surface of the water or sub-sea. Surface blowouts deposit oil on the surface of the water, installation or other adjacent features. A sub-sea well blowout on the other hand involves an underwater release in which oil travels upwards through the water column before reaching the water surface.

Most well blowouts are relatively minor, but if the control of the well is lost and oil reservoir pressure is high enough to force the oil to flow to the surface, an uncontrolled well blowout is potentially the largest type of oil spill event. A well blowout can, depending upon the particularities of the oil reservoir and the time until it is contained, release a much higher volume of oil than a spill from a tanker or pipeline. During exploratory operations the particularities of oil reservoirs (pressure, temperature, geological formations, etc.) and drilling requirements may be different than initially estimated, making them a particularly sensitive type of operation. The Macondo incident occurred during exploration drilling, as did the 2009 Montara well blowout in Australia's East Timor Sea.

A review of accidents worldwide over the past 50 years has shown that most well blowouts to date have occurred in shallow water at depths of less than 150 metres, and relatively few have occurred in deepwater. Blowouts have only rarely occurred during routine oil production operations; the majority of blowouts have occurred during exploratory drilling operations. As shown in Table 2, there have been six times as many well blowouts during exploratory drilling as during production operations. This can be explained by the fact that exploratory activities are undertaken with the scope of accessing new reservoirs, or enhancing production in reservoirs that are already being exploited, where unknown parameters might be encountered, hence these operations are more susceptible to an uncontrolled blowout.

Activity Type	Number of blowouts
Routine Oil Production Activities	8
Exploratory Drilling Activities	48
Total Number	56

Table 2 – Number of blowouts per type of activities (1956-2012)

The potential volume of oil released from a blowout is dependent on the size and pressure of the reservoir. They may last for days, weeks or months if they cannot be contained, potentially releasing large quantities of oil. It should be noted however that major blowouts are rare, and smaller blowouts can be contained more rapidly, although they also require dedicated response measures. Oil reservoirs will continue to spill into the environment until one of the following conditions is met:

- The well is controlled by human or mechanical intervention (e.g. capping the well, igniting the well, drilling a relief well);
- The subsurface reservoir pressure finally drops to such a level that the oil stops flowing out;
- The well naturally bridges on its own (plugs with sand or debris).

[42] Extract adapted from Nuka Research and Planning Group, LLC – Oil spill prevention and response in the U.S. Arctic Ocean, November 2010.

3.1.2 OTHER SPILLS FROM OFFSHORE OIL ACTIVITIES[43]

In addition to well blowouts, there are several other potential causes of oil spills, such as human error, equipment failure/breakdown, loss of structural integrity of the offshore installation, errors during fuel transfer operations, etc. With regard to production operations, as oil reservoirs age the balance of fluids extracted may change to a higher ratio of produced water to produced oil, a combination that is typically more corrosive to valves and piping. Saltwater can also corrode pipelines and oil production equipment from the outside. Routine maintenance, inspection, repair and replacement programmes help to reduce the likelihood of oil spills from production and other drilling operations, but will not eliminate it entirely.

In the process of transporting extracted oil, sub-sea pipelines[44] or flowlines[45] used to transfer oil from production installations to onshore facilities can breach, resulting in the rapid release of the pipeline contents. In addition to spillage from pipelines or flowlines, oil may be spilled from storage tanks, facility piping or manifold valve systems. The potential maximum oil spill volume would be the volume of the tank(s) or the volume of oil in the piping. The amount of oil released into the water would depend on how much oil escaped secondary containment systems around the tanks and piping, and how quickly the leak is controlled at source. Spills from tanks associated with offshore installations may flow directly to the water surface because these tanks typically have no additional containment equipment around them. Prevention systems for offshore storage tanks and piping may include double-walled piping, double-walled storage tanks and improved containment structures to capture and pump recovered fluids.

3.2. CHALLENGES OF RESPONDING TO POLLUTION CAUSED BY OFFSHORE INSTALLATIONS

Offshore oil activities pose a number of specific challenges due to the environment in which they are operating and the technology that is necessary to perform them. When an oil spill originating from an offshore installation occurs, factors such as spill source control, environmental conditions, spill size and duration, oil properties and oil well particularities have to be taken into account to ensure that the most appropriate response strategy is adopted.

3.2.1 SPILL SOURCE CONTROL

The most challenging scenario, with regard to spill source control, is characterised by blowout incidents. Generally, shutting-in the well is the main strategy to stop the flow of oil in such cases. However, due to specific considerations such as well particularities, environmental conditions and available technologies, this is not always a quick and easy operation; it can require a lot of time and in the meantime it can result in the release of considerable quantities of oil.

[43] Extract adapted from Nuka Research and Planning Group, LLC – Oil spill prevention and response in the U.S. Arctic Ocean, November 2010.

[44] Pipelines are pipes transporting hydrocarbons from the production / storage facilities situated in the offshore production area to other facilities either offshore or onshore.

[45] Flowlines are pipes connecting the well with the production / storage facility in the offshore production area.

The control of a blowout can be addressed in several stages depending on the time of intervention. The easiest way to prevent a blowout is by addressing the 'kick,'[46] which usually precedes it. This can be achieved by altering the composition of drilling fluids (e.g. increasing the weight of the drilling fluids to overcome the pressure of the formation oil) in order to prevent oil from entering the well and coming up through the casing string. However, if the kick was not addressed or the intervention was insufficient, then a blowout might occur. Once a blowout has started, and if no other well intervention operations can be performed to control the well, then the available BOP (Blowout Preventer) system is used in the first sequences of a blowout in order to shut-in and secure the well, thus stopping the blowout.

Due to well stability and integrity reasons the time frame for reacting to such incidents can be limited and these steps may not always be taken on time as planned, which can lead to loss of well control with the potential for creating chain reactions and causing series of fires and explosions that ultimately may reduce and limit the crew's response capability. This can lead to structural integrity failure and impair the capacity of well shutting-in by means of the BOP system. If the BOP system is impaired by various factors or if its use is not effective, then the control of the well is lost and the blowout becomes uncontrolled. At this stage, the uncontrolled blowout may cause a significant oil spill and therefore, pollution response measures, such as well capping and containment and drilling of relief wells (as presented in Section 3.3), are performed in order to control and stop the flow of oil. Such actions require additional time, and oil may continue to be released in the interim.

3.2.2 ENVIRONMENTAL CONDITIONS

Environmental conditions (water composition, currents, temperature, wind, etc.) have the potential to significantly influence the way an oil spill behaves by altering its characteristics (dispersion, weathering or emulsifying). Some offshore installations, particularly those located further from the coast, may be subject to more severe weather conditions, which may have an impact on the subsequent behaviour of the oil, should a spill occur in such areas. However, impact on the environment is likely to be higher in areas with lower temperatures or shallow waters.

Local biodiversity is a major factor contributing to the way response options are selected and used. Wildlife, in particular seabirds, mammals and juvenile fish, are much more susceptible to the threat of oiling in coastal areas. For some ecosystems - for instance in coastal sites for breeding marine birds, marine mammals or nesting sea turtles - it is important that oil is prevented from reaching shore. If a spill occurs in important spawning sites for fish, where benthic associations of plants and animals are also present and where there is high biological production within the water column, measures which have least impact on these ecosystems should be used. Such factors should be considered in the early stages of a response strategy, as inadequate response measures could have significant effects on the environment.

The Baltic Sea, western European waters, the Wadden Sea between Germany, Denmark and the Netherlands, the Canary Islands and the Strait of Bonifacio, have been designated as Particularly Sensitive Sea Areas (PSSA) under IMO regulations. In these areas, an oil spill would greatly impact the environment, and pollution response options have to be carefully assessed for ensuring that the most appropriate options are chosen, based on a Net Environmental Benefit Analysis (NEBA)[47] approach.

[46] A kick is represented by a flow of formation fluids into the wellbore during drilling operations, caused by the pressure in the wellbore being lower than that of the formation fluids, thus causing flow.

[47] The Net Environmental Benefit Analysis (NEBA) is a methodology that provides a sustainability framework for measuring changes in a given ecosystem and for evaluating and classifying the environmental benefits. When used during oil spill response planning, NEBA is a methodology of weighing up both the advantages and disadvantages of the available spill response measures for selecting only those measures bearing the lowest environmental impact.

3.2.3 SPILL SIZE AND DURATION

One of the main challenges regarding spills from offshore installations, particularly in the unlikely case of loss of well control, is the fact that the spill size and duration are often unknown factors; but the quantity is potentially large and the spill duration longer than other types of spills, whether from vessels or pipelines. The volume of oil released during a spill originating from offshore installations cannot be accurately estimated in advance (although the flow volume is generally known) since it depends on the stopping/closing of the leakage. The average window of opportunity for the seaborne recovery operation of a tanker spill, based on previous accidents, is just two to four weeks, whereas for a spill originating from offshore installations it could potentially be several months.

3.2.4 PARTICULARITIES OF THE WELL AND OIL PROPERTIES

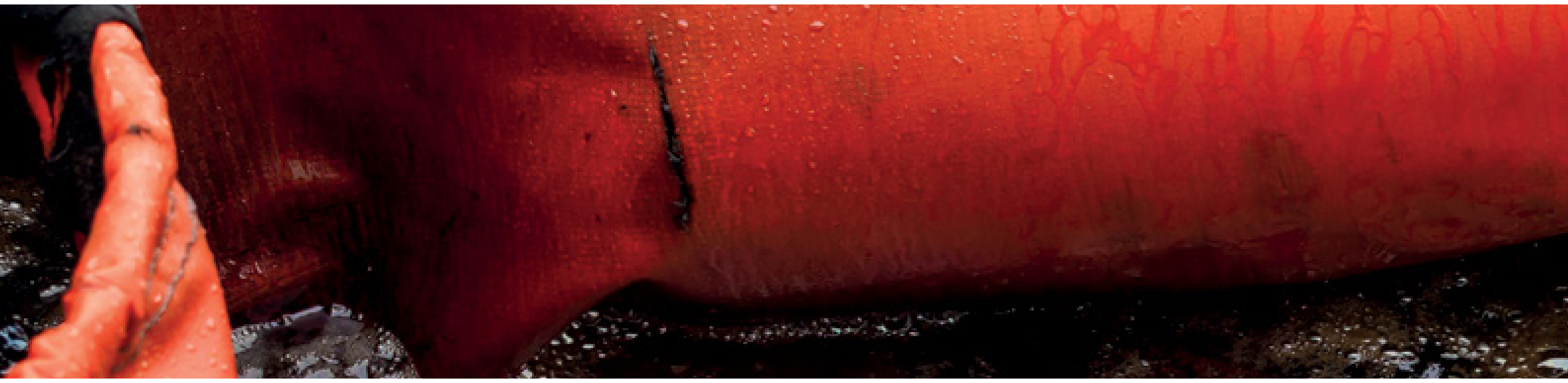
An oil well is drilled in order to access the underground oil reservoir, for the purpose of extracting the oil. It poses different challenges depending on the type of well in question, its depth, geological formations, as well as pressure and temperature conditions.

Dependent on the depth of the water, the operations are conducted either as shallow-water or deepwater oil exploration and production. As the availability of oil and gas reservoirs becomes more of an issue and most of the major reservoirs available in shallow waters are already exploited, there is a shift towards deepwater operations. These pose more challenges and require more advanced technology, since spills from deepwater operations are more difficult to tackle and to contain.

Other features of the oil wells that pose a specific challenge are the high pore pressures (up to 0.8 psi/feet) and high bottom hole temperatures (up to 149°C). High pressure (HP)/high temperature (HT) wells are expensive to exploit, as the challenging conditions restrict the range of appropriate materials, which can be used and affect equipment performance. These conditions also pose additional hazards to drilling, completion and workover[48] operations.

Developing and producing from HP/HT wells is a relatively new departure for the oil and gas industry, as HP/HT wells were not considered economically viable until the mid- to late-1990s. HP/HT wells are usually found offshore in areas such as the North Sea, the Gulf of Mexico, and China, where a small number of such wells are drilled and completed every year. However, the number of HP/HT wells being drilled is increasing.

[48] Workover operations are intended to restore the productivity of a producing well by cleaning the build-ups of sand, silt or other substances obstructing the well.



Also associated with the well particularities are the properties of the oil. During an oil spill incident, the properties of the spilled oil, including the oil phase composition and the oil compositional changes due to weathering, if known, can be used as input data for models to predict the environmental impact of the spill, and for various treatment alternatives that could be used. There are a number of oil properties, already known by the operators that on-scene coordinators need to know in the event of an oil spill, such as:

- To what extent or at what rate the oil will evaporate;
- The detailed chemical composition of the oil;
- Oil behaviour and fate in the environment;
- The viscosity of the oil at ambient temperature as it evaporates;
- If the oil is likely to sink or submerge;
- If the use of chemical dispersants can enhance its dispersion;
- If emulsions will form;
- The hazard to on-site personnel during clean-up operations;
- The oil toxicity to marine or aquatic organisms.[49]

Based on the oil properties, the most appropriate response measures can then be selected. For example, light crude oil, with low to medium viscosity (below 5,000 mPa•s),[50] is more suitable for dispersant spraying, while higher viscosity crude oil, with a pouring point above the sea temperature or with high wax content is more suitable to other measures, such as mechanical recovery.

Furthermore, offshore installations often produce mixtures of oil and gas. The properties of these highly flammable or explosive mixtures, such as flash point and toxicity, also need to be considered. Highly toxic components such as BTEX (the collective name given to benzene, toluene, ethyl benzene and the xylene isomers) may not dissolve completely in water, and freshly spilled crude oil may therefore be more hazardous than older weathered oil as the quantity of BTEX is likely to be substantially higher. Higher safety standards of the vessel and equipment, as well as the protection of response personnel, must be considered in the case of spills where the presence of highly toxic BTEX is an issue.

[49] Extract adapted from 'A catalogue of crude oil and oil product properties' - P. Jokuty, S. Whiticar, Z. Wang, M. Fingas, P. Lambert, B. Fieldhouse and J. Mullin.

[50] Pascal-second (Pa•s) is a measurement unit for the dynamic viscosity of fluids [1 mPa•s = 1 cP (centipoise)].

3.3. RESPONSE MEASURES

The main pollution response measures for accidental releases originating from offshore installations are the following:

1. Well capping and containment – the well is capped with the assistance of specialised equipment for the purpose of controlling the flow of oil and a containment system is used to direct the released oil toward storage or disposal facilities;
2. Mechanical recovery – oil is collected and removed from the water surface and disposed of onshore;
3. Dispersant application – oil is chemically treated and dispersed in the water column;
4. In-situ burning – oil is burned on the water surface, with most of the carbon released into the atmosphere, while minimum residues remain in the water;
5. Monitor and evaluate – this option involves close monitoring and constant evaluation of the spill, taking into account the particularities of the spill and the environmental conditions.

3.3.1 WELL CAPPING AND CONTAINMENT

This option is used in the event of a well blowout. The primary focus during response operations is to shut-in the well, i.e. stopping the uncontrolled flow of oil. Before the control of the well is lost, measures such as intervention inside the well (downhole) and use of the BOP (Blowout Preventer) are intended to secure the well and prevent a blowout. If these measures have failed and the well control is lost, then direct intervention measures for containing the spill and closing the well are used. These measures include well capping and drilling of relief wells.

Well capping is a method of installing specialised equipment on top of a well with an uncontrolled flow of oil for the purpose of closing off the flow from the wellbore. This equipment has the capacity to close off the well if the cap itself and the equipment downhole have the capacity to withstand the resulting shut-in pressures.

In case the flow of oil cannot be stopped by capping alone, the use of containment systems could reduce the flow of oil to the environment until a relief well or other measure stops the flow. For this reason, the capping device could also have the ability to connect with or include equipment that would enable containment of oil, and deliver the released oil from a sub-sea wellhead, in a controlled manner, to the surface for storage and disposal.[51]

The drilling of relief wells is a standard response procedure when dealing with uncontrolled blowouts. It is conducted for the purpose of injecting high-density mud and cement in order to plug the well, thereby stopping the release of oil.

The oil and gas industry has recently developed well capping systems that can be used and deployed in the event of a sub-sea well incident. More details about industry initiatives with regard to pollution prevention and response are provided in Section 5.2.

[51] The International Association of Oil & Gas Producers – Capping & Containment Report No 464, May 2011.

3.3.2 MECHANICAL RECOVERY

This pollution response measure commonly involves the use of specialised equipment such as towed oil booms or sweeping arms to contain and concentrate the spilled oil, skimming systems to recover the oil, as well as temporary storage systems. These technologies require the support of vessels, which can be either pre-fitted and pre-equipped oil spill response vessels, or vessels of opportunity equipped at the time of the incident. Personnel must be properly trained in order to deploy and operate the vessels and equipment.

Towed boom systems are capable of containing oil in low current conditions and can be deployed in a U, V or J configuration through the use of two or even three vessels. This strategy allows a large sweeping width for containing and concentrating the oil. However, maintaining the correct formation and vessel speed is challenging and weather conditions have a significant influence on the success of the operation. It is for these reasons that booms are most effectively deployed and towed in calm weather and flat sea conditions. Configurations of towed booms and skimmers can successfully perform across a wide range of oils including heavy crudes, emulsified oils and heavy fuel oils.

In order to address and overcome the challenges of operating towed boom systems (e.g. the use of multiple ships, influence of weather conditions, etc.), specialised response vessels have been developed. Such vessels are fitted with sweeping arms, skimming devices and onboard oil storage. One of the main advantages of this configuration is that it represents a combined containment and recovery system fitted on the same vessel, thus excluding the need for separate deployment of towed booms and skimmers and the need for additional vessels. The sweeping arms are also less likely to be limited in operation by difficult weather conditions. As the sweeping arms have a relatively narrow sweeping width, they are best suited to recover oil in ribbons or windrows.

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. Based on their design, meant to ensure they float on the water surface, skimmers might encounter some operational difficulties when exposed to wind, waves and currents. For example, moderate waves may reduce the effectiveness of the skimmers. Therefore skimmers can only be used in relatively calm waters if reasonable performance is to be achieved.

The success of mechanical recovery operations is dependent on a number of factors such as weather conditions, currents and waves, as well as oil viscosity. These factors will directly influence the oil recovery rates.[52]

Also in the field of mechanical recovery, an option for the recovery of weathered and sub-surface oil and tar balls is the use of oil nets. Oil net systems are based on a filtration system especially designed to recover very heavy, high viscosity and/or weathered oil from the sea surface. Their working principle is that of fishing nets, and such systems usually have a total capacity of 5 to 8 tonnes. They can operate offshore and in coastal waters towed at low speed (up to 5 knots), pulled by either two small or one larger vessel(s). There are different options with various possibilities regarding ancillary equipment to spread the net and to increase the sweeping surface (i.e. inflatable chambers, frames). This system is usually intended to be used on small vessels of opportunity (i.e. fishing vessels).

[52] ITOPF Handbook 2011-2012.

3.3.3 DISPERSANTS APPLICATION[53]

The main purpose of the dispersant application is to break up the spilled oil into small droplets. This greatly enhances the rate and extent of the natural dispersion process, during which the breaking waves lead to the dispersion of an oil slick into oil droplets. The resulting increased surface-to-volume ratio of these droplets accelerates biodegradation through naturally occurring micro-organisms.

The criteria that determine the appropriateness and effectiveness of dispersant application are the following:

- Weather conditions: in adverse weather conditions the application of dispersants may be the only effective response option;
- Type of oil: dispersants are generally considered efficient to treat light oil with low to medium viscosity, but not heavy oil with high viscosity and wax content;
- Geography and morphology of the area: the use of dispersants in shallow waters and areas with slow water replenishment rates is normally not recommended, due to the potential environmental impact of their use;
- Nature of the release: whether the spill is controlled and therefore mechanical means are considered sufficient, or there is a prolonged release of oil resulting in a large oil spill which may require additional means to cover the full scope of the spill.

Dispersants are applied both on the water surface and sub-sea, not only to disperse the oil more rapidly, but in order to ensure safety of operations related to oil containment and salvage. Based on the above, the application of dispersants is in principle considered as a valid response option in the following cases:

- When safety of the pollution response and salvage operations crew is at stake;
- In rough weather conditions;
- If the product is light oil with low to medium viscosity;
- In deep sea areas and/or areas with relatively fast water replenishment rates;
- If the release of oil is continuous.

Environmental considerations linked to the use of dispersants are the subject of ongoing research in the field. Although the concentration of the dispersed oil rapidly decreases with time, the type of organisms exposed and the duration of their exposure need to be taken into account. Benthic organisms, marine mammals, sea birds and fish are among those that are likely to be affected by the use of dispersants. Nevertheless, in light of the lack of conclusive evidence to date as to their long-term fate and potential impacts on the various species, the use of dispersants is gradually gaining ground as a response measure that could be employed under specific conditions.

[53] More detailed information on dispersants is available on EMSA's Manual on the Applicability of Oil Spill Dispersants, available on EMSA's website: www.emsa.europa.eu

The decision on whether to use dispersants is usually based on the NEBA approach, especially in ecologically sensitive areas. However, in principle a NEBA is not conducted when dispersants are used to address and ensure the safety of the pollution response operations, as safety of personnel always has priority.

There are two main options for using dispersants. The primary dispersant application option consists of spraying dispersants over oil on the sea surface, by means of vessels or aircraft, while the second option consists of applying dispersants sub-sea.

The surface application of oil dispersants, as stated above, can be performed by either vessels or aircraft fitted with dispersant spraying equipment.

Vessel dispersant application

This response measure entails the fitting of spraying equipment on vessels identified as suitable for this operation. Vessels can be either specifically designed for this purpose or vessels of opportunity that meet the required technical characteristics to guarantee the safe and efficient dispersant application. Vessel dispersant application equipment is available in the form of either portable or permanently installed systems, the operational flexibility of which varies greatly. The main types of dispersant application devices are spray arms, spray hoses with floating buoys, and single nozzle devices.

Spray arms remain the most accurate and controlled measure for applying dispersants. However, they have many operational disadvantages, such as higher capital, freight and storage costs, high requirements for vessel modifications and pre-fitting works, and limited manoeuvrability.

Spray hoses with floating buoys have the advantage of enabling a large swath width, of up to 50 metres, by suspending a hose with a series of nozzles on a cable between the vessel and a floating buoy towed by the same vessel. The system offers an alternative to traditional spray arm systems; however, it requires a relatively complex construction and its performance can be affected by weather conditions.

The single nozzle devices were developed to overcome disadvantages such as additional vessel modifications and difficult rig-up and rig-down. They provide a compact, highly portable and easy to install solution, and are capable of reproducing the swath and particle dispersion of spray arms, but may be more affected by strong winds.

Aircraft dispersant application

An aircraft dispersant application strategy requires both aircraft and equipment for dispersant application.
With regard to the selection of a suitable aircraft for aerial dispersant use, a number of factors, such as those presented below, must be taken into consideration:

- Availability: the timeframe for the aircraft to be made available is essential for effective dispersant use. In addition, access to some types of aircraft (particularly military aircraft) can be complicated, and has to be considered.
- Speed: in connection with availability it ensures quick response.
- Range: it is important as it establishes the aircraft's operational limits.
- Payload: for ensuring that proper dispersant quantities are available without the need for refilling too often.
- Cargo access: this directly influences the time needed to prepare the aircraft for dispersant use.
- Adaptability: the aircraft's capacity to host the dispersant spraying equipment without the need for conversion/modification.
- Experience: the pilot's experience in similar operations can contribute to a smooth and successful operation.
- Manoeuvrability: although this not a crucial factor, it can directly influence the dispersing capabilities in some cases.

Sub-sea dispersant application

More recently, the sub-sea injection of dispersants has been used following sub-sea blowouts. Sub-sea application of dispersants can reduce the amount of VOC in the vicinity of the blowout, thereby enhancing the safety conditions for the response personnel and the integrity of the equipment used for containment and response operations, as well as minimising the quantity of oil reaching the surface. This second option, which requires very specific expertise and tools, enables containment operations and the drilling of relief wells to be safely undertaken.

3.3.4 IN-SITU BURNING[54]

The fourth oil spill response measure, in-situ burning, is an alternative option that requires the concentration of oil with the use of fire-resistant booms and setting fire to the oil. In EU waters in the relatively recent past, in-situ burning has only been used in response to the Torrey Canyon incident in 1967.

In-situ burning of thick, fresh oil can be initiated very quickly by igniting the oil with ignition devices. In-situ burning can remove oil from the water surface very efficiently and at very high rates. Removal efficiencies for thick slicks can easily exceed 90%. Removal rates of 2,000 m^3/hour can be achieved with a fire area of only about 10,000 m^2 or a circle of about 100 metres in diameter.

The use of towed fire containment booms to capture, thicken and isolate a portion of a spill, followed by ignition, is far less complex than the operations involved in mechanical recovery, transfer, storage, treatment and disposal. If the small quantities of residue from an efficient burn require collection, the viscous, tar-like material can be collected and stored for further treatment and disposal. There is a limited window of opportunity for using in-situ burning, defined by the time it takes the oil slick to emulsify; once water contents of stable emulsions exceed about 25%, most slicks are not ignitable. The benefit of this measure lies in the lack of pumping and offloading needs, which alleviates the challenge of locating suitable reception facilities. Travel and offloading time do not apply.

Despite the strong incentives for using in-situ burning as a primary response option, considerable reluctance still persists on the basis of two major concerns. The first concern relates to the fear of causing secondary fires that threaten human life, property and natural resources. More specifically, in-situ burning might cause flashback and secondary fires, especially when the oil on water is at a temperature near or above its flash point, and where ignition of the oil will result in very rapid spreading of the flame. In cases where a large amount of volatile oil is spilled, a cloud of vapours can build-up near the source in calm wind conditions and may represent a fire hazard. In such cases, care must be taken to isolate the portion of the slick to be burned from other areas of the slick. The fire and heat pose threats that are real, acute and potentially life-threatening, even in situations that are under control. The threat to responders can be mitigated through the implementation of an exclusion zone around the fire itself that protects responders from radiated heat.

[54] Information extracted from: In-situ burning - Ian Buist, James McCourt, Steve Potter, Sy Ross and Ken Trudel, 1999 IUPAC, Pure Appl. Chem. 71, 43–65.

The second complication of the use of in-situ burning are the potential environmental and human-health effects of the by-products of burning, primarily the smoke. In-situ burning of oil slicks on water can be described as 'starved combustion' in which not enough air (oxygen) is drawn into the fire to burn the fuel completely to carbon dioxide and water vapour. As a result, in-situ burning produces a large, dense, black plume of smoke rising from the fire. Smoke and burn emissions can be a threat both in the immediate vicinity of the fire and at a distance. Emissions may include a variety of toxic substances, while the smoke particles are of concern for at least two reasons: disruption to visibility and threat to human health.

The need for specialised equipment such as fire-resistant booms, which are not readily available, is also a restrictive element for using this strategy. Furthermore, the success of in-situ burning is also dependent on whether the oil can be concentrated into layers of a sufficient thickness to burn, as well as on the sea conditions and other weather and environmental factors. For instance, low water temperatures, often found in the North Sea and North Atlantic Ocean, might pose some challenges to keep the corralled oil burning, but recent studies and developments in this field are exploring how to overcome this limitation.

3.3.5 MONITOR AND EVALUATE

This option, although it does not involve any active response for containment, recovery or other treatment of the spilled oil, does require the availability and use of dedicated resources for close monitoring and constant evaluation of the spill. Surveillance capabilities, usually from aircraft or satellite, together with dedicated software, are necessary in order to identify the extent of the spill and estimate its fate.

The response strategy employed in this case does not involve intervening directly, but rather constantly monitoring and evaluating the situation; on the basis of this continuous evaluation, the decision not to recover or treat the spilled oil may be reconsidered, taking into account the particularities of the spill and the environmental conditions. In rough weather conditions the oil naturally disperses and thus monitoring and evaluation of the spill would usually be the first approach to follow. In addition, monitoring and evaluation can be used in parallel with other response options in order to assess their effectiveness.

4. CASE STUDIES

During the period 1956-2012 over 200 incidents involving offshore installations occurred worldwide, with 11 incidents involving significant oil releases, totalling almost two million tonnes of oil. An overview is presented in Annex 3. Details regarding the quantities of spilled oil are not always available; some incidents which are known to have involved significant release of oil are listed in Annex 4.

The largest accidental oil spills recorded from offshore installations are Ixtoc 1 (over 500,000 tonnes) in 1979 and Macondo (approx. 780,000 tonnes) in 2010. While it is not clear exactly how much oil was spilled, these spills, both in the Gulf of Mexico, are probably the largest to ever have occurred.

In Europe, a number of oil spills originating from offshore installations have been recorded since the start of the offshore oil operations more than 40 years ago.

Analysis of case studies enables lessons to be learned regarding the most appropriate response measures in a range of different situations. The following case studies are considered relevant as they represent the most significant oil and gas incidents in European waters or shared sea basins, with the exception of the Macondo incident, which did not occur in Europe. The Macondo incident has been included as it triggered a series of changes (legislation, licensing and response), not only in the region, but around the world, one of which is EMSA's updated mandate. These case studies can be used to improve the planning of actions required to respond to future spills.

Ekofisk Bravo Oil Spill (1977)

Figure 2 - Picture showing the Ekofisk Bravo platform following the blowout[55]

The Ekofisk Bravo blowout occurred during a workover on the B-14 production well, when about 3,000 metres of production tubing was being pulled out. The production 'christmas tree' valve stack had been removed prior to the works and the blowout preventer had not yet been installed. The main factor leading to the spill taking place was human error. The well experienced a kick and due to the failure of a safety valve, a blowout occurred, leading to uncontrolled release of oil. However, the ignition of the oil was avoided. The personnel were evacuated and no injuries were reported. This blowout was the first major oil spill in the Norwegian continental shelf.

The initial flow was estimated at 4,500 tonnes (28,000 barrels) per day with a calculated total release of 32,000 tonnes (202,380 barrels). Up to 40% of the oil was thought to have evaporated after its initial release and the Norwegian Petroleum Directorate reported a total spill estimate between 13,000 tonnes (80,000 barrels) and 20,000 tonnes (126,000 barrels).

[55] Photo source: Norwegian Petroleum Directorate Diary No 01/2002.

The well was capped after seven days on 30 April 1977. The severe sea conditions, combined with a high atmospheric temperature contributed to the natural dispersion of the oil. Further investigation and monitoring showed no significant damage and no shoreline pollution. There was also no significant damage reported to the platform.

The Norwegian State Pollution Control Board declared that no major ecological damage resulted from the spill, so no response measures for oil collection were involved. Weather and wave action during the following days were predicted to eliminate any visible slick.

As observed in this case study, depending on the quantities of spilled oil and the weather conditions, it may be the case that no response measures are required, other than careful monitoring.

Production well D-103 Oil Spill (1980)

Although there is almost no detailed information regarding this spill, it is known that it occurred on August 1980, following a well blowout, with the release of approximately 140,000 tonnes of oil (1,000,000 barrels).[56] The production well was located approximately 800 kilometres southeast of Tripoli, Libya. This is a relevant case study as it represents, to date, the largest oil spill originating from offshore installations in the Mediterranean Sea, and it shows that pollution from offshore installations may occur in EU neighbouring countries, which could potentially impact the entire region.

Statfjord A Oil Spill[57] (2007)

Figure 3 - Damaged hose that caused the oil spill photographed by a ROV[58]

On 12 December 2007, during the loading of a tanker off Norway, approximately 3,000 tonnes of oil was spilled into the North Sea. The accident occurred at the Statfjord oilfield and was the country's second largest after the Ekofisk spill in 1977. Examination of the transfer hose on 14 December revealed a break in the hose between the seabed and the tanker connection.

After a few hours, the slick was estimated to be eight kilometres long and one kilometre wide and by late afternoon on 12 December its surface area covered an estimated 23 km². The following day, the slick was around ten kilometres long and five kilometres wide, with an average thickness of less than 100 microns. The pollution was moving north-east and thought to be dissolving.

Difficult weather conditions (winds of about 45 knots and waves up to seven metres high) meant that the rescue and recovery vessels and tug boats sent on site had to be put on standby until the weather improved.

[56] Etkin, D.S. 1999. Marine Oil Spills Worldwide: Offshore Exploration and Production. Oil Spill Intelligence Report Statistical Series. Cutter Information Corp., Arlington, Massachusetts, USA.

[57] Extract adapted from Cedre website (www.cedre.fr).

[58] Photo Source. StatoilHydro.

The initial strategy employed by StatoilHydro was to monitor the evolution of the pollution and to be ready to begin recovery operations as soon as conditions allowed. On 14 December, the waves had decreased to less than three metres high, allowing two containment and recovery systems to be used. The operations however soon came to a halt as the slicks were not thick enough to be recovered. Nevertheless, the vessels remained on site over the weekend to continue to monitor the slick, which was also under surveillance by satellite and aircraft.

Extensive flights by surveillance aircraft, made available by the Norwegian Coastal Administration did not detect any remaining oil, thus confirming predictions of natural dispersion.

As in the case of the Ekofisk oil spill, this is an example where, due to the weather and sea state particularities of the North Sea, as well as the limited quantity of oil, no response operations were required, since the waves and weather contributed to the natural dispersion of the spilled oil. Continuous monitoring and evaluation was performed. The EMSA CleanSeaNet service provided monitoring support during the accident on the Statfjord A platform, showing that, eight days after the accident, the oil spill could not be detected on a satellite image.

Macondo Oil Spill (2010)

The Macondo incident was an oil spill in the Gulf of Mexico, which flowed unabated for three months in 2010. Recognised as the largest accidental marine oil spill in the history of the petroleum industry, its source was a sea-floor oil gusher resulting from the 20 April 2010 Deepwater Horizon blowout and explosion which claimed eleven lives. The Deepwater Horizon rig was drilling on the Macondo Prospect, block 252. The well was capped after 87 days, on 15 July 2010, by using a newly designed capping device. The total released oil was estimated at 780,000 tonnes (4.9 million barrels).

The spill was notable for the extensive lengths of containment booms that were deployed, the vast number of specialised equipment provided from all over the world, the thousands of vessels of opportunity involved in the recovery and burning of oil, and the volume of oil dispersants used (estimated at 7,600 tonnes).

Table 3 presents estimates of what happened to the oil, based on the release of the above-mentioned volume of oil.[59]

Category	Estimate
Direct recovery from wellhead	17%
Burned at the surface	5%
Skimmed from the surface	3%
Chemically dispersed[60]	8%
Naturally dispersed	16%
Evaporated or dissolved	25%
Residual remaining	26%

Table 3 - Percentage of oil treated by use of different strategies

[59] 'Deep Water - The Gulf Oil Disaster and the Future of Offshore Drilling', National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, January 2011.

[60] The category 'chemically dispersed' includes dispersal at the surface and at the wellhead; 'naturally dispersed' was mostly at the wellhead; 'residual' is the oil remaining as surface sheen, floating tar balls, and oil washed ashore or buried in sediment.

The Macondo incident is one of the largest accidental marine spills in the world and has been a trigger for significant changes worldwide, highlighting the necessity of more effective prevention and response measures. On a European level it has led to the revision of EMSA's Founding Regulation[61] and the new Directive 2013/30/EU on the safety of offshore oil and gas activities.

Figure 4 - Deepwater Horizon sinking as a consequence of blowout and explosion[62]

Elgin Platform Incident (2012)

Although a gas rather than oil spill incident, the Elgin platform case represents the most recent offshore installation incident in Europe. The incident demonstrates the particularities of gas incidents, which, due to the nature of the gas, are not expected to significantly pollute the water; most liquid condensate evaporates quickly.

On 25 March 2012, a gas leak occurred at the Elgin platform in the North Sea during operations to plug and decommission the well. Methane gas was released into the environment together with a quantity of between two and twenty-three tonnes of gas condensate.

According to the platform operator, the origin of the gas leak was an unexploited chalk reservoir layer located at a depth of 4,500 metres, above the main reservoir.

In April 2012 a diverter assembly was installed around the well head. This diverted the leaking gas (estimated then at 200,000 m^3 per day) away from the platform in a controlled manner, thus enabling well control operations to begin. A semi-submersible rig was working on the 'top kill' operation, which involved pumping weighted drilling mud into the well via the wellhead assembly. A relief well was drilled to 'bottom kill' the well. Flights performed by a surveillance aircraft from an industry cooperative were made in order to monitor the pollution status in the area.

[61] See Regulation (EU) No 100/2013.

[62] Photo source: The New York Times.

Once it reached atmospheric pressure at the base of the rig where the leak occurred, part of the product expanded in the form of gas into the atmosphere, while some liquefied to form a liquid condensate comparable to gasoline. This liquid condensate spread out at the water surface forming a very extensive and very thin slick (a few microns thick), with sheen-like appearance, the majority of which evaporated within a few hours. The liquid condensate had very low solubility and did not form an emulsion. Due to these considerations, no pollution response measures were needed.

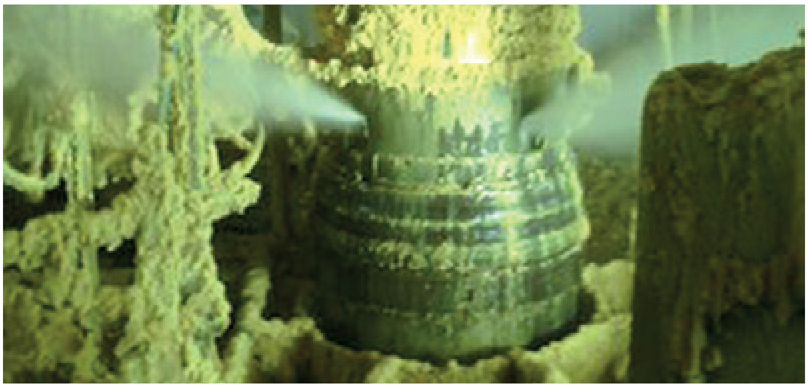


Figure 5 - Photo taken by the Wild Well Control/Total reconnaissance team reveals four leaks releasing 200,000 cubic metres of natural gas a day.[63]

A routine CleanSeaNet image acquired on 27 March 2012 showed condensate oil spreading from the Elgin platform, providing valuable information on the extent of the spill and the direction of spread (Figure 6). On 1 April another image taken over the same area showed that there was no longer a sheen coming from the platform; the condensate oil had evaporated and/or dispersed and no more condensate was being released.

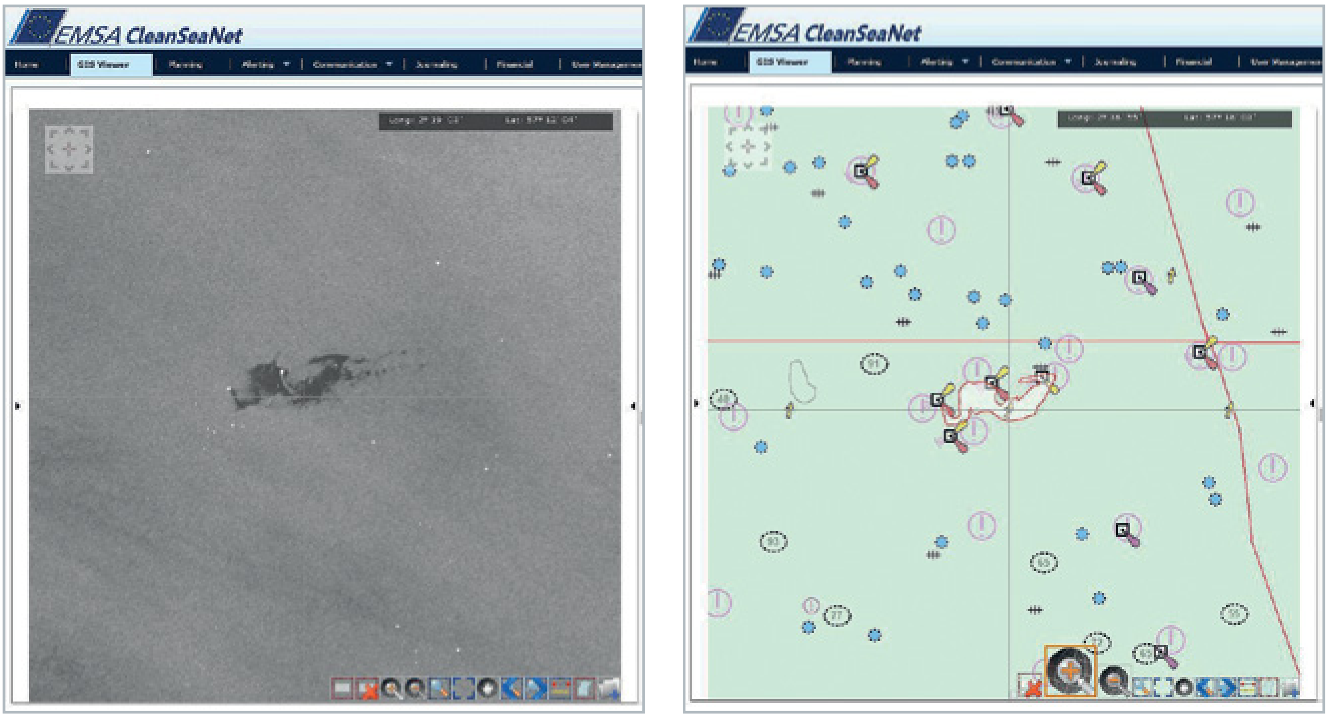


Figure 6 - CleanSeaNet images showing the Elgin platform spill

[63] Photo source: Wild Well Control reconnaissance team / Total.

5. STAKEHOLDER ACTIVITIES REGARDING POLLUTION FROM OFFSHORE INSTALLATIONS

This chapter presents the activities being undertaken both by stakeholders such as the Member States and by the oil and gas industry, which, although not under EMSA's mandate, are relevant for its framework with regard to pollution caused by offshore installations.

5.1.MEMBER STATES

Although most EU Member States have ratified the OPRC 1990 Convention, there is still significant diversity in the approaches adopted with respect to contingency planning, response options, investments, availability of resources, exercising of capacity and implementation of bilateral and multilateral cooperation and assistance agreements.

For ensuring availability of appropriate pollution response measures to efficiently deal with oil spills, many governmental authorities and industry parties use a 'tiered' response approach founded on cooperation and mutual support. This approach reflects the spirit of the OPRC Convention. It establishes different tier levels that are defined based on the volume of spilled oil, and the location of the incident. The three tier levels are defined as follows:

- Tier 1 – small volumes of spilled oil, affecting a small, local area and for which onsite pollution response equipment only is required. This type of spill is usually managed and dealt with by the operator alone, without the need for external intervention;
- Tier 2 – spills with larger volumes of spilled oil, affecting a regional area, for which a more complex range of pollution responses is needed, involving, in addition to the operator, governmental and port authorities, industry cooperatives or regional agreements;
- Tier 3 – large scale spills, with a potential to cause major impacts, affecting large areas and requiring a significant number of pollution response equipment and expertise from a variety of national and international sources.

Most Member States currently have operational capacity,[64,65] (specialised equipment, trained and experienced personnel and specialised vessels) to respond to smaller ship-sourced releases and spills from offshore installations, but only a few have sufficient means to respond to very large spills. In addition, the strategies to respond to marine oil incidents vary between the individual countries. However, the operational responsibility rests to a large extent with the offshore installation operators, which need to ensure appropriate means for responding to pollution incidents caused by offshore installations, under the supervision of the affected Member States.

Member States participate in national or international exercises and training activities focused specifically on pollution response from offshore installations. The national authorities, when participating in these exercises, have the opportunity to coordinate with industry for the deployment of available resources and to test the suitability and efficiency of national contingency plans or regional agreements and commitments.

Existing public and private pollution response capabilities and contingency plans at regional and national levels are continually being reviewed to improve response to such oil spills and to properly address the challenges posed by the offshore oil and gas activities.

[64] EMSA Inventory of EU Member States Oil Pollution Response Vessels 2012, available on EMSA's website: www.emsa.europa.eu

[65] EMSA Inventory of National Policies Regarding the use of Oil Spill Dispersants in the EU Member States 2010, available on EMSA's website: www.emsa europa.eu

Mechanical Recovery

With regard to mechanical recovery, all Member States have oil pollution response vessels, specialised or non-specialised, and equipment for anti-pollution response. The policy regarding the use of mechanical recovery varies among Member States, but the majority have defined it in their contingency plan as the primary response option. Especially in sensitive areas and closed marine environments (e.g. Baltic Sea, Black Sea), mechanical recovery is to be considered the main option to respond to oil spills due to particularities such as sensitive ecological conditions and slow water replenishment rates.

The resources available in each Member State may be state-owned or contracted from the private sector. The available oil spill response vessels are very diverse in terms of class, storage capacity, speed and capability to accommodate the various types of anti-pollution equipment. However, as mechanical recovery requires proper storage capacities for the collected oil, the Member States' oil spill response vessels considered capable to address potentially large spills originating from offshore installations are those with an oil storage capacity greater than 1,000 m^3. The availability and distribution of such vessels can be seen in Figure 7.

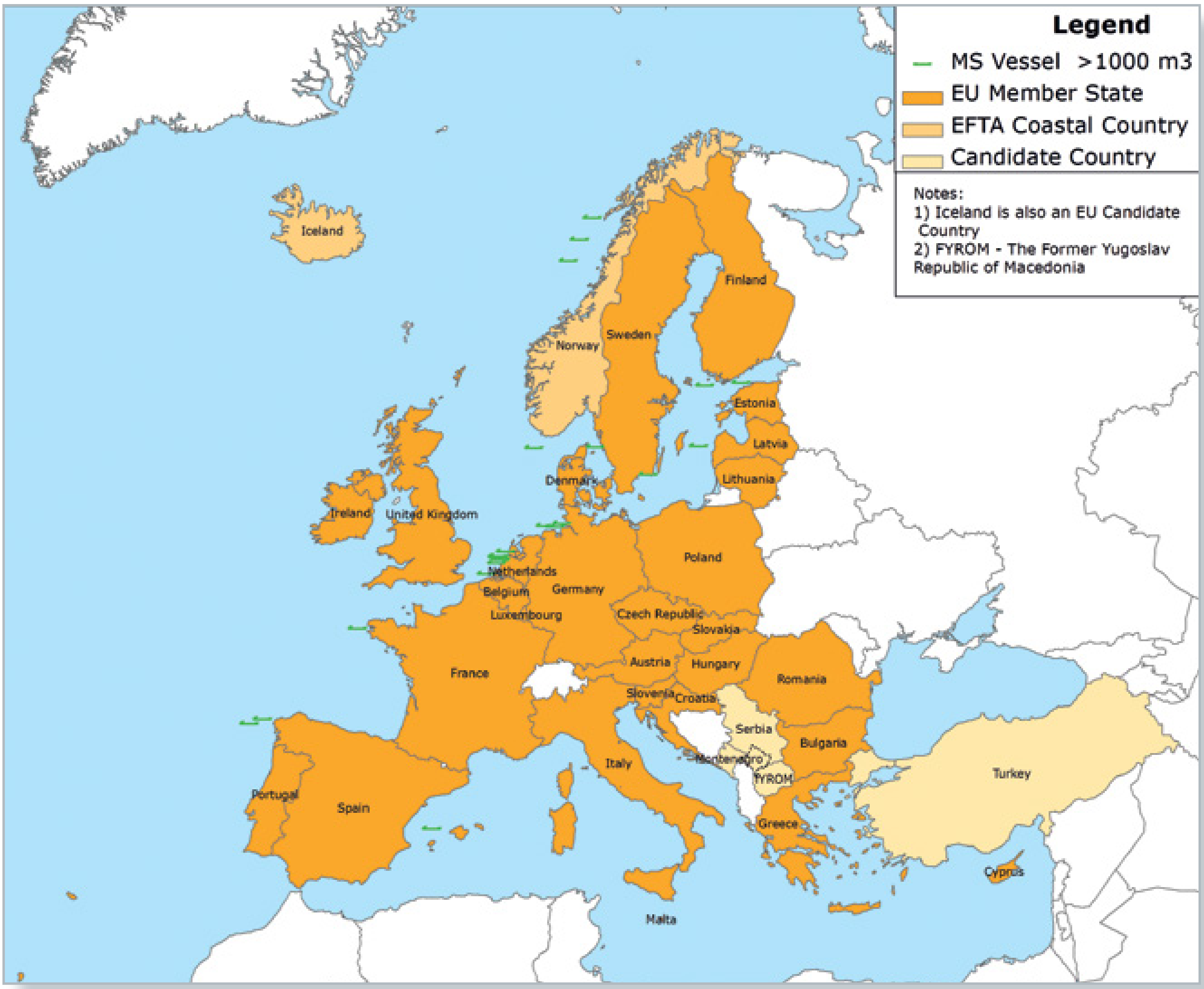


Figure 7 - Distribution of the EU Member States' oil pollution response vessels

It is worth noting that most pollution response vessels with considerable storage capacity are located in the Northern parts of Europe. This results in higher overall storage capacity in the region, with limited to no storage capacities in other regions, as presented in Table 4.

Sea Basin	Member States´overall storage capacity (m^3)	Total number of vessels (storage capacity > 1,000 m^3)
Mediterranean Sea	5,094	1
Atlantic Coast	7,574	2
Baltic Sea	9,327	4
North Sea	54,208	7
Black Sea	278	0

Table 4 - Member States' overall oil storage capacities by sea basin

This discrepancy is also a result of the fact that the majority of offshore oil and gas activities are concentrated in Northern Europe, where the Member States have access to a number of private resources. In Norway, for example, the private industry association possesses more than 28 oil recovery vessels with storage capacities of above 1,000 m^3, which can be provided to the government for pollution response operations in addition to the national assets.

As other parts of Europe do not have such extensive offshore oil and gas activities, the level of preparedness is also lower, with more limited access to resources for mechanical recovery of oil.

General background on dispersants usage in the EU

Within the EU, the decision to use dispersants during an oil spill response operation lies entirely with the affected coastal Member State(s), and policies vary between Member States.

EMSA has collected, and disseminates at regular intervals relevant information regarding the EU Member States dispersant usage policies and operational capacities. In addition, the Agency has reviewed the dispersant testing and approval procedures in those countries most likely to consider dispersant usage, e.g. the United Kingdom, France, and Norway.[66]

National dispersants testing and authorisation framework

Dispersant testing and approval procedures have been developed in seven EU/EFTA/EEA Member States, with one other Member State currently in the process of developing such procedures. Of the countries that do not have testing and approval procedures, seven would allow the use of dispersants approved in a neighbouring country or by the Bonn Agreement. Currently there are over 60 different types of dispersants, which have been approved in Europe by at least one EU/EFTA/EEA Member State.

The licensing of specific dispersants as a response option for marine oil spills typically requires prior approval by the responsible national authority. Approval procedures usually include tests for the effectiveness of the dispersants and their toxicity prior to approval for use in oil spill response operations. Additional tests may include biodegradation, bioaccumulation, and similar toxicological tests, and in some cases other criteria (e.g. physical criteria such as maximum viscosity) may be set as well.

[66] EMSA Inventory of National Policies Regarding the use of Oil Spill Dispersants in the EU Member States.

These tests are conducted before granting the principal license to introduce the substance into territorial waters of the authorising state. Approved dispersants are typically published in national lists of licensed products for spill response applications. These laboratory tests are distinct from and do not interfere with the requirement for authorisation to apply dispersants during the response in an actual oil spill.

Before approved products are authorised for use in a particular response situation, the request is usually scientifically reviewed by relevant authorities before permission is given. The criteria for response options for relevant spill scenarios must be reflected in contingency plans in order to support rapid decision-making during the specific spill situation.

Dispersant use policies in the EU Member States and EFTA/EEA Countries

With regard to the use of oil dispersants, the Member States have different approaches. The main conclusions to be drawn, based on data from the 2013 EMSA 'Inventory of National Policies Regarding the Use of Oil Spill Dispersants in the EU Member States', are presented below.

- The United Kingdom is the only country that uses dispersants as a primary response option (prior authorisation is required if dispersants are to be used in sea depths of less than 20 metres or within one nautical mile of such depths);
- Dispersant use is prohibited in Slovenia due to shallow waters (below 25 metres);
- HELCOM (Baltic Sea) countries currently would probably not use dispersants in an actual spill, but are exploring the option to use dispersants in brackish waters and may change their regional dispersant use policy in the future;
- All other countries permit the use of dispersants as a secondary or last response option;
- There have been changes in recent years regarding dispersant use policies. Countries are now more willing to consider the use of dispersants and to plan for it in advance at national level;
- Almost all EU countries are interested in and follow up on developments regarding dispersant use, in particular following the more recent incidents.

Table 5 presents the EU/EFTA/EEA Member States policies for dispersant use:

Dispersant Use						
Member State*	First response option	Secondary response option	Last response option	Not allowed	Included in NCP**	Not included in NCP**
Belgium		•			•	
Bulgaria			•		•	
Croatia		•			•	
Cyprus		•			•	
Denmark			•		•	
Estonia			•			•
Finland			•		•	
France		•			•	
Germany			•			•
Greece		•			•	
Iceland			•			•
Ireland		•			•	
Italy			•		•	
Latvia			•		•	
Lithuania			•		•	
Malta		•			•	
Netherlands		•			•	
Norway		•			•	
Poland			•		•	
Portugal		•				•
Romania			•			•
Slovenia				•		•
Spain			•			•
Sweden			•			•
UK	•				•	

Table 5 - Dispersant use policies among EU/EFTA/EEA Member States[67]

*Only coastal Member States
**NCP – National Contingency Plan

[67] Based on information available on 30 August 2013.

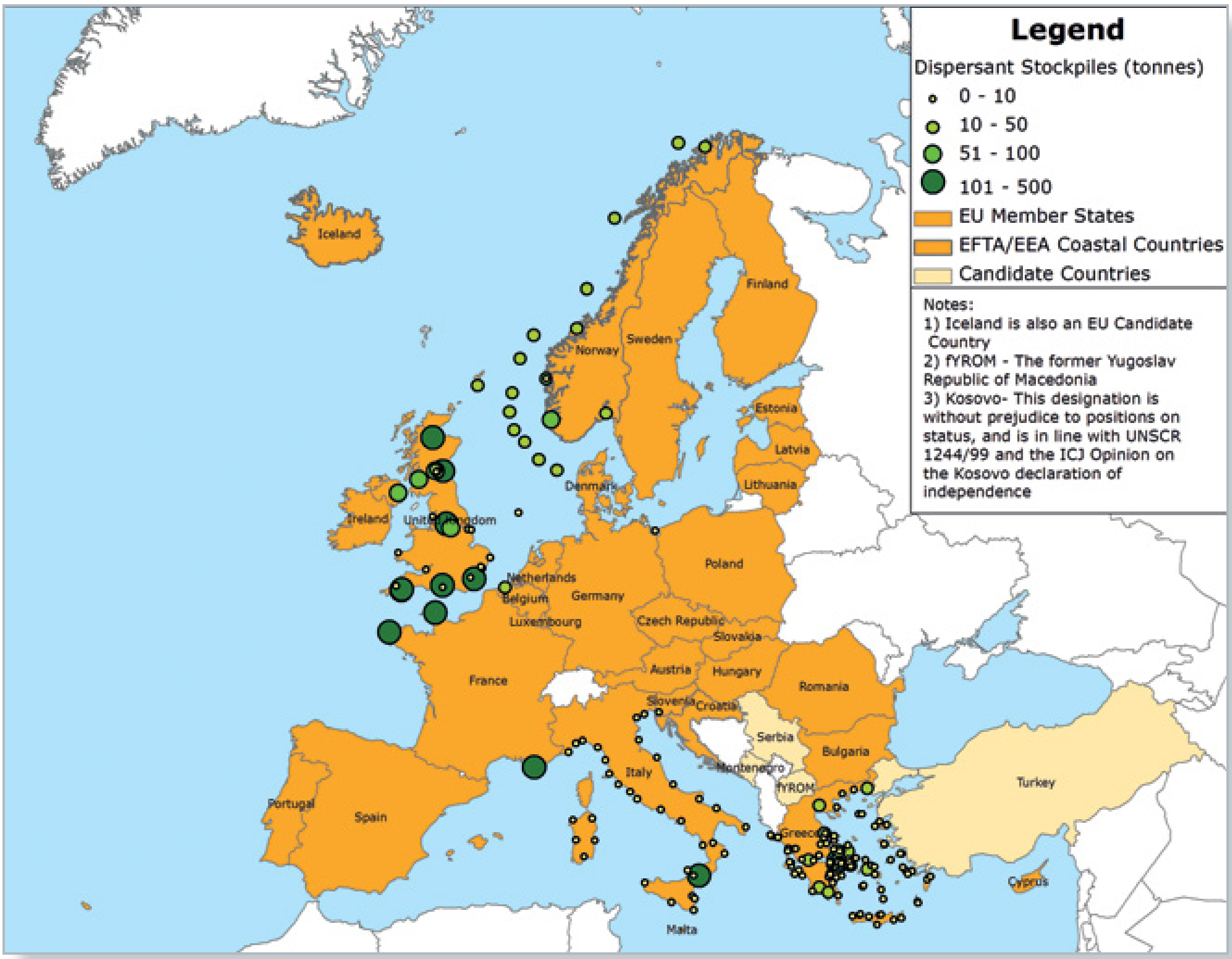


Figure 8 - The current dispersant supplies in EU/EFTA/EEA Member States

As seen in Figure 8, dispersant supplies are unevenly distributed amongst Member States. A few countries (France, Greece, Norway and UK) possess dispersant supplies which are, in total, greater than 500 tonnes (Table 6).

The approximate dispersant supplies of EU Member States and EFTA/EEA countries are shown in Table 6. The information regarding dispersant supplies and their locations across Europe is based on the updated information in EMSA's 'Inventory of National Policies Regarding the Use of Oil Spill Dispersants in the EU Member States', 2013 edition (in publication).

Country	Dispersant Supplies (tonnes)
United Kingdom	1,274
France	1,118
Greece	645
Norway	630
Italy	127
Malta	25
Belgium	11
Poland	0.2

Table 6 - Dispersant supplies in EU Member States and EFTA/EEA countries[68]

[68] Based on information available on 30 April 2013.

Vessels with dispersant spraying systems, and stand-alone spraying equipment, are available in Member States, with the exception of countries where authorities do not favour the use of oil dispersants. However, the majority of existing dispersant spraying equipment is for small, local harbour spills, as the application rates of most systems are below 100 litres per minute. Higher capacity spraying systems are typically required and used for large spill response operations.

Aircraft dispersant spraying capacities, by contrast, are extremely limited in distribution and number (Figure 9), with a high dependence on a few providers.

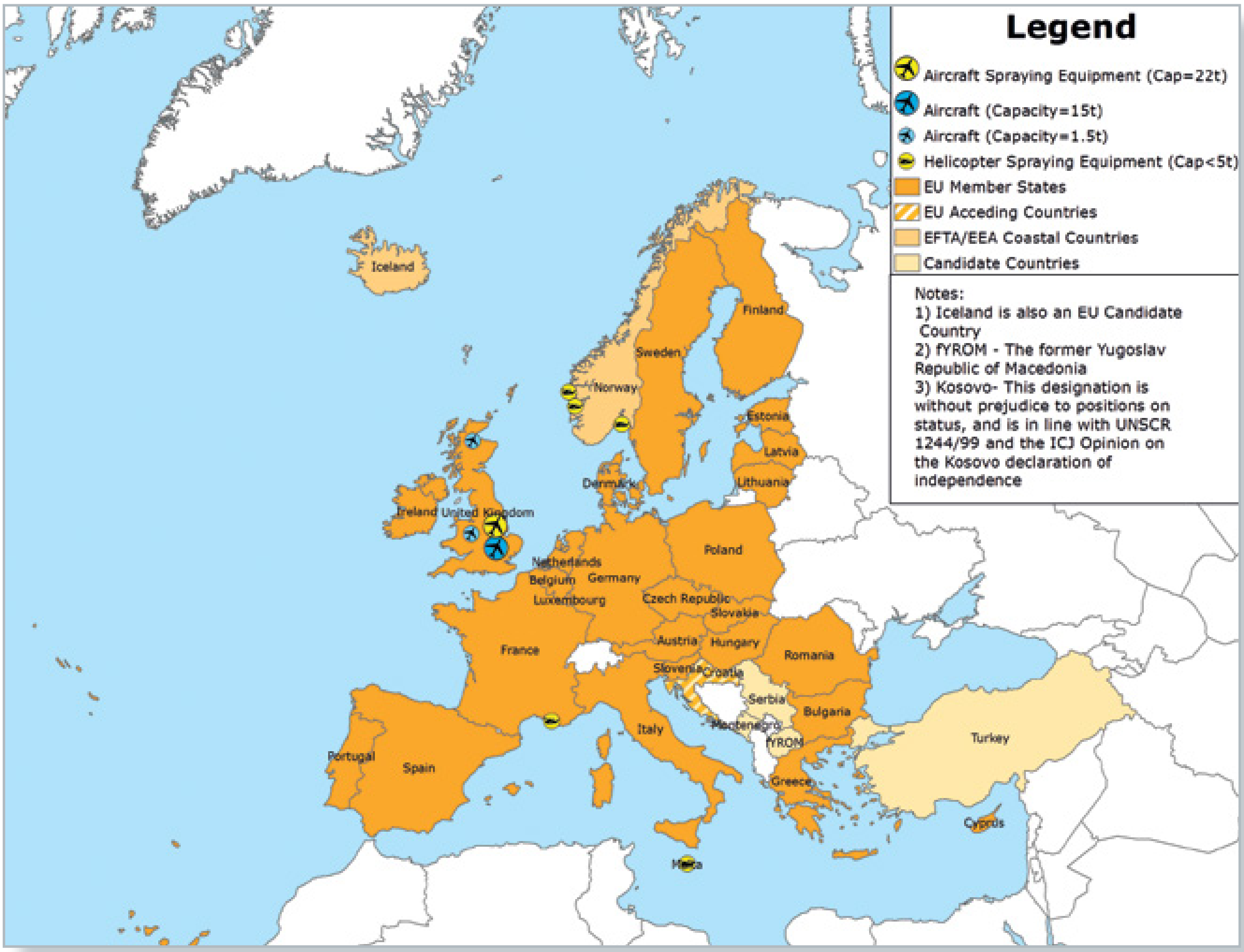


Figure 9 - EU/EFTA/EEA Member States aerial dispersant spraying capacities

As presented in Figure 9, aircraft dispersant application equipment is present in only a few countries, some of which only have dispersing equipment in the form of helicopter buckets with a very limited carrying capacity, of less than five tonnes each (Norway, France, Malta). Italy has three fire-fighting airplanes, with a payload of approximately five tonnes each, which can be converted for dispersant spraying operations. The United Kingdom, the only country to use dispersants as a primary response option, has the most significant aircraft dispersant application capability, in the form of governmental owned and contracted private aircraft (over 30 tonnes of total payload capacity).

5.2. OIL INDUSTRY

Oil industry operators are required by the national authorities to have contingency plans in place and appropriate means available for promptly responding to pollution incidents caused by their operations. This is typically accomplished through contracts with private response organisations, which have the specialised equipment and trained personnel to provide spill response in accordance with the approved contingency plans. The distribution of response capabilities is therefore determined to a large extent by industry, though with oversight from national administrations. This distribution has an influence on contingency planning by national administrations as well as industry.
The oil industry is actively involved in the prevention of spills caused by offshore installations, through undertaking initiatives to improve safety and environmental standards of oil extraction activities and to limit the extent of incidents that can affect human life and the environment.

Globally, oil companies, both private and state-owned, have established international cooperation structures, some of which focus on improving environmental performance. Examples of such organisations are the International Association of Oil and Gas Producers (OGP) and the Global Oil and Gas Industry Association for Environmental and Social Issues (IPIECA).

OGP was formed in 1974 and is a global forum in which members identify and share best practice to achieve improvements in every aspect of health, safety, the environment, security, social responsibility, engineering and operations. In July 2010, OGP formed the Global Intervention and Response Group (GIRG) to ensure that the lessons learnt from incidents are globally applied. GIRG activities cover prevention, intervention and response to oil spills with the help of three teams of technical experts, one of which is the Pollution Response Team, tasked with addressing issues arising from recent spill events and response efforts. Following the evaluation of oil spill performance information associated with recent incidents, the Pollution Response Team made a number of recommendations and concluded that the recommendations should be addressed through a series of activities initiated under the umbrella of a Joint Industry Project.[69]

Subsequently, the Oil Spill Response Joint Industry Project (OSR-JIP) was formed in December 2011. The OSR-JIP work program is intended to execute the recommendations of the GIRG Oil Spill Response report over a period of three years and is being managed by IPIECA on behalf of OGP.

IPIECA was formed in 1974 following the launch of the United Nations Environment Programme (UNEP) and is currently the only global association involving both upstream[70] and downstream[71] oil industry partners on environmental and social issues.

IPIECA develops, shares, and promotes good practice and knowledge to help industry improve its environmental and social performance. Its work is supported by a number of specialist working groups, one of which deals with oil spill preparedness.

The Oil Spill Working Group (OSWG) was established in 1987 and serves as a key international industry forum to help improve oil spill contingency planning and response around the world. One of the most important initiatives of IPIECA's OSWG is the Global Initiative (GI), an umbrella programme launched in 1996. Under this programme governments, through the International Maritime Organization (IMO), and oil industry, through IPIECA, are working together to assist countries in developing national structures/ capability for oil spill preparedness and response. The programme aims to enhance global preparedness and capacity to respond to oil spills.[72]

[69] Oil Spill Response - Global Industry Response Group recommendations, OGP, May 2011.

[70] The upstream oil industry refers to the exploration and production sector.

[71] The downstream oil industry refers to oil refining as well as marketing/distribution of products derived from crude oil.

[72] Extract adapted from IPIECA website (www.ipieca.org).

In the aftermath of the latest incidents, the oil industry has reacted promptly and different initiatives have been undertaken in countries with significant oil and gas activities (e.g. UK, Norway). One of the most significant initiatives was conducted in the UK, where the Oil Spill Prevention and Response Advisory Group (OSPRAG) was established to secure an unprecedented level of cooperation and collaboration across the UK offshore oil and gas industry, its regulators and trade unions, with the task of carrying out a thorough review of drilling practices on the UK continental shelf.

The industry coordinated its response to the issues arising from the Macondo incident by structuring OSPRAG's work according to four priorities:

- Preventing the possibility of an escape of hydrocarbons from a well;
- Minimising the length of time and volume of any escape of well hydrocarbons;
- Ensuring effective spill response measures;
- Ensuring sufficient financial arrangements to cover the response to any spill.[73]

As a result of OSPRAG's work, the availability of both pollution response equipment and expertise was enhanced, culminating in the development of a well capping device, designed to seal off a sub-sea well in the unlikely event of a blowout, purpose built for the North Sea environment and sub-sea wells present in this area.
Furthermore, the industry stakeholders, over recent years and in cooperation with the relevant authorities, have developed new technological capabilities, such as new modelling software to calculate the volume of spilled oil more accurately.

Another joint effort of the oil industry is focused on the establishment of strategic tier 3 pollution response capabilities, through the industry-owned cooperatives that are offering assistance primarily to oil and gas companies but also to some Member States. Such cooperatives provide pollution preparedness services, equipment and specialised personnel for responding to oil spills caused by offshore installations. For responding to sub-sea well control incidents, well capping equipment stored in Norway, South Africa, Brazil and Singapore is available.

Industry has already invested significant financial funds and expertise into the research and development of additional pollution response capabilities (i.e. capping devices and sub-sea application of dispersants) in order to ensure appropriate preparedness for accidental releases of oil and continues to drive such initiatives forward.

6. EMSA ACTIVITIES REGARDING POLLUTION FROM OFFSHORE INSTALLATIONS

This chapter describes the proposed activities to be implemented by the Agency in responding to oil pollution caused by offshore installations.

6.1. OVERALL FRAMEWORK

In defining the activities that the Agency will assume in line with its extended mandate, it is necessary to describe, based on information provided in the previous chapters of this Action Plan, the overall framework and its implications.

As of 1 March 2013, with the entry into force of Regulation (EU) No.100/2013, the European Maritime Safety Agency (EMSA) has a legal obligation to support the Member States, on request, to respond to marine pollution caused by oil and gas installations. The Agency was tasked to provide a framework for developing pollution response actions at European level, and more specifically:

- 'Provide Member States and the Commission with technical and scientific assistance in the field of marine pollution caused by oil and gas installations';

[73] Strengthening UK Prevention and Response (Final Report) – Oil Spill Prevention and Response Advisory Group (OSPRAG), September 2011.

- 'Support with additional means in a cost-efficient way pollution response actions in case of marine pollution[74] caused by oil and gas installations';
- 'Regarding marine oil pollution caused by oil and gas installations, by using its CleanSeaNet service to monitor the extent and environmental impact of such pollution';
- 'Provide assistance in case of pollution caused by ships as well as marine pollution caused by oil and gas installations affecting those third countries sharing a regional sea basin with the Union'.

Since 2004, the Agency has been tasked to assist Member States with marine pollution response. The Agency developed a 'top-up' philosophy for its 'Anti-Pollution Measures', which was endorsed by its Administrative Board. These principles will be extended to the new task, as presented below.

- EMSA's operational task should be a 'logical part' of the oil pollution response mechanism of coastal states requesting support and should 'top-up' their efforts by primarily focussing on spills beyond the national response capacity of individual Member States. Based on its 'top-up' philosophy, and in accordance with the tiered response approach, EMSA can be considered as a 'European tier' to provide assistance to Member States.

EMSA should not undermine the primary responsibility of Member States for operational control of pollution incidents. The Agency should not replace, subsidise or substitute existing capabilities of coastal states, also taking into consideration that Member States have their own responsibilities regarding response to incidents.

- EMSA's vessels and equipment should be channelled to requesting states through the Emergency Response Coordination Centre of the European Commission;
- The requesting state will have assets provided by the Agency at its disposal and under its command and control. The choice if and which assets to use rests with the requesting state;
- EMSA's operational role should be conducted in a cost-efficient way.

Furthermore, EMSA's activities should respect and build upon existing cooperation frameworks and Regional Agreements. In line with its mandate to 'top-up' Member States' capabilities, and taking into consideration industry resources, EMSA will focus on those activities that will bring an added-value and that are expected to be cost-efficient.

EMSA's current capabilities and arrangements for mechanical recovery are represented by a network of contracted Stand-by Oil Spill Response Vessels for pollution response and the CleanSeaNet system for monitoring purposes.

6.2. ACTIVITIES

Prior to the revision of the Agency's Founding Regulation, EMSA's pollution response tasks were focused on ship-sourced pollution involving the release or threat of release of oil and, to a lesser degree, hazardous and noxious substances. With the extension of its mandate to oil and gas installations in March 2013 and within the current framework, EMSA will develop activities in this area according to three distinct approaches, in line with the working pillars that were established in the previous Action Plans (Oil Action Plan and HNS Action Plan):

- Operational assistance;
- Cooperation;
- Information.

[74] Marine pollution caused by oil and gas installations should be understood as pollution by oil or any substance other than oil which, if introduced into the marine environment, is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

This section describes those of EMSA's activities considered necessary for addressing its enlarged mandate, according to which EMSA has to provide coastal states with 'additional means' for supporting their pollution response mechanisms, when requested, in case of oil pollution caused by offshore installations.

6.2.1.OPERATIONAL ASSISTANCE

The activities proposed under the operational assistance theme are focused on EMSA's existing capabilities and their adaptation, as well as the establishment of new response tools by the Agency, in order to provide an appropriate 'reserve for disasters'.

The Agency will not develop any capabilities in the field of well-capping, in light of the high level of expertise required and of the limited financial resources available for this new task, also taking into consideration the 'added-value' requirement for the activities that EMSA should undertake.

Similarly, EMSA will not consider the procurement of oil nets in the context of enhancing its mechanical recovery capabilities, due to their limited operational range and as a result of the numerous logistical challenges linked to their use.

6.2.1.1 EMSA'S NETWORK OF CONTRACTED STAND-BY OIL SPILL RESPONSE VESSELS

The Agency has established a network of contracted Stand-by Oil Spill Response Vessels around the European coastline, providing a European tier of operational resources to support, on request, the pollution response mechanisms of the coastal states. The most cost-efficient system for providing such a service is to use commercial vessels adapted for response operations; the vessel continues to undertake its normal commercial activities, and on request can be mobilised at short notice and fitted with oil spill response equipment in order to provide at-sea recovery services.

The network of contracted Oil Spill Response Vessels comprises seventeen[75] fully equipped vessels for mechanical recovery of oil, with one further vessel in the preparatory phase. The equipment available on board the vessels consist of two systems: (1) rigid sweeping arms, and (2) oil boom and skimmer configurations.[76] EMSA's vessels all have adequate storage, heating and pumping capacities for responding to large spills.

Figure 10 - Kontio, icebreaker, one of EMSA's Stand-by Oil Spill Response Vessels

[75] As of November 2013.

[76] Detailed information regarding the vessels and their equipment for mechanical recovery are presented in EMSA's Handbook 'Network of Stand-by Oil Spill Response Vessels and Equipment' available for download on EMSA's website: www.emsa.europa.eu

Figure 11 - Ria de Vigo, offshore supply vessel, one of EMSA's Stand-by Oil Spill Response Vessels

Figure 12 - Aktea OSRV, oil tanker, one of EMSA's Stand-by Oil Spill Response Vessels

The current overall storage capacity for recovered oil of EMSA's contracted vessels is approximately 63,000 m^3. The regional capacities by sea basin and distribution of EMSA vessels within different regions are shown in Table 7. The geographic distribution of EMSA's contracted vessels is shown in Figure 13.

Sea Basin	EMSA´s overall storage capacity (m^3)	EMSA´s total number of vessels
Mediterranean Sea	26,836	7
Atlantic Coast	21,669	5
Baltic Sea	6,483	2
North Sea	4,630	2
Black Sea	2,708	2

Table 7 - EMSA's overall oil storage capacities by sea basin (volumes and vessels)

The network of Stand-by Oil Spill Response Vessels is designed in such a manner that the vessels can be sent to provide assistance in any European location if deemed necessary, based on the scale of the spill and the requested assistance. However, although the majority of the vessels contracted by the Agency are certified for unrestricted navigation, factors such as safety of the operations, the location of the spill, and geographical conditions have to be taken into consideration prior to the decision on which vessel(s) to mobilise.

EMSA's response services are at the disposal of any coastal state requesting assistance in responding to oil spills in European waters.

Adaptation of EMSA's network of contracted Stand-by Oil Spill Response Vessels

EMSA's pollution response strategy for spills from offshore installations will be based on 'topping-up' the Member States' response capacities, taking into account the various national policies for pollution response, industry resources, as well as EMSA's existing pollution response capabilities.

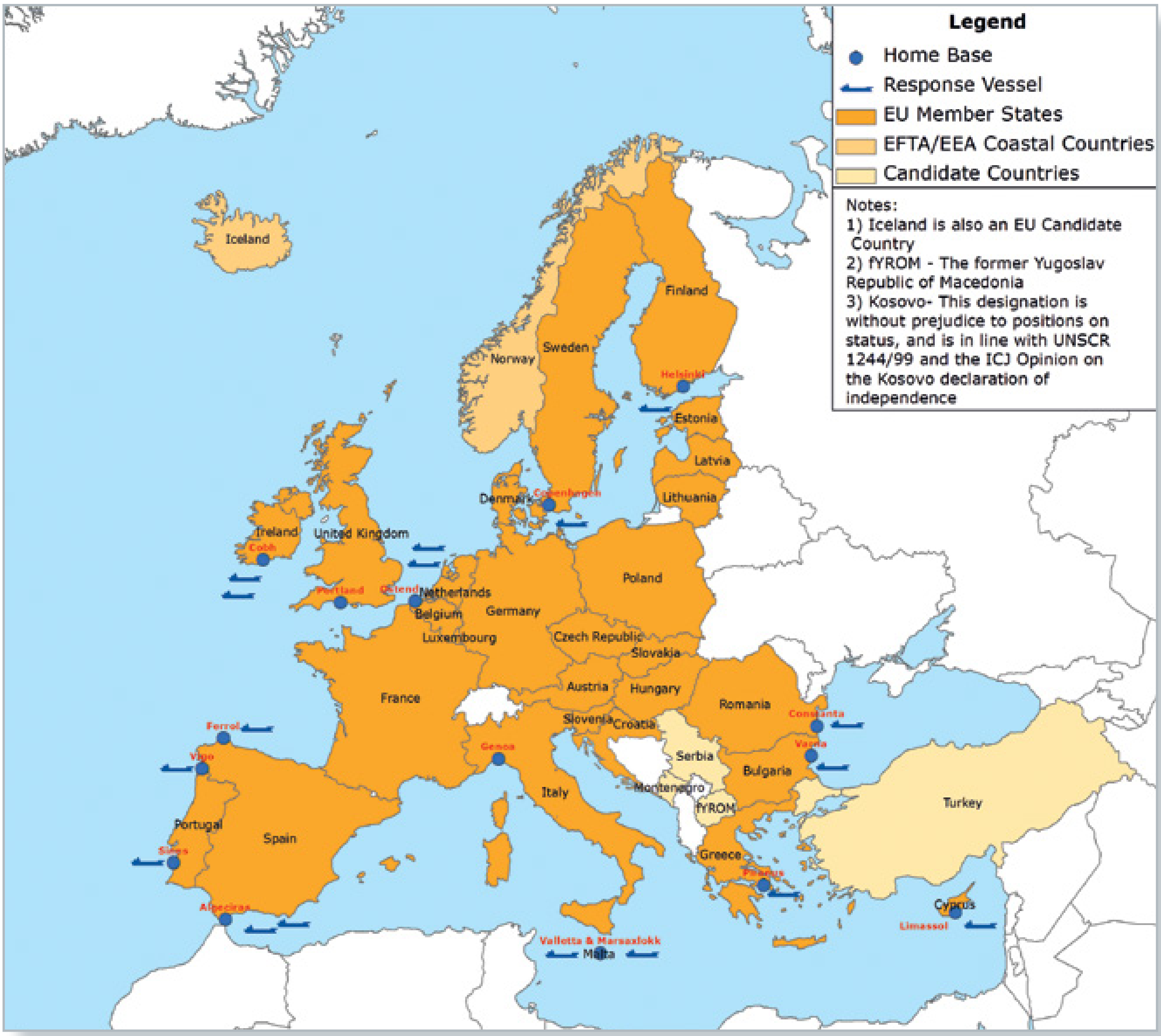


Figure 13 - Distribution of EMSA's network of Stand-by Oil Spill Response Vessels (November 2013)

Given the technical characteristics of the EMSA contracted vessels, their oil pollution response equipment, the existing contractual arrangements and the new legal basis, the service provided by EMSA can be expanded to include second line response to oil pollution caused by offshore installations. However, some technical, geographic and contractual adaptations will have to be considered in order to ensure that EMSA has the capacity to efficiently complement the

Member States' resources in this field, also taking into consideration industry resources, where such information is available and where such resources are accessible by governments.

Technical adaptation

EMSA's fleet of contracted Stand-by Oil Spill Response Vessels is designed as a 'European tier' to provide additional 'top-up' support to Member State response mechanisms. Consequently, the vessels are not intended to be the first on site following a spill and thus are not expected to operate in hazardous atmospheres, which could be the case in spills originating from offshore installations.

Oil containment and recovery operations are often undertaken in the presence of hazardous atmospheres. The flash point of the oil to be recovered is a key parameter in the regulations to determine safe recovery as well as transport, handling and storage of oil on board vessels. For flash points of 60°C or below, the safety regulations for oil recovery vessels are very stringent. Vessels that meet the requirements under these regulations are called 'first line oil recovery vessels,'[77] whilst those not complying with these regulations are 'second line oil recovery vessels'.[78] The EMSA contracted oil recovery vessels are mainly second line oil recovery vessels, regardless of their capabilities to handle oil/products with a flashpoint below 60°C.

The flash point is largely dependent on the type of oil, its composition and its weathering patterns. In case of accidental releases from offshore installations, the type of spilled oil is crude, which increases the hazards linked to the flash point, as this type of oil is highly flammable, with a very low initial flash point, often below -20ºC. The relatively fast evaporation of the lighter compounds (up to C_{10}) results in the rapid increase of the flash point, which quickly exceeds 60ºC, thus reducing the probability of explosion and fire. However, although the VOC from the crude oil tend to evaporate quite rapidly, spills from offshore installations can continue to release fresh and highly volatile crude oil, sometimes also mixed with gas components, for extended periods of time. As a result, the flash point of the oil or of the pollutant (mixture of oil and gas) may be less than 60°C for a relatively long time following the initial release.

This situation poses restrictions and/or limitations on the oil recovery vessels contracted by the Agency. The EMSA contracted vessels will not be technically adapted to accommodate the above-mentioned safety issues, as this both falls out of the Agency's scope to provide second line response and also presents major technical challenges, mostly linked to the design of the vessels.

With regard to the oil recovery equipment to be used on board the EMSA contracted vessels; the Agency is continually monitoring new developments in the field of mechanical recovery. EMSA will consider providing additional means for the purpose of improving the efficiency of its mechanical recovery equipment, for instance by enhancing the oil encounter rate. However, only equipment with a well-proven record of efficiency will be contracted. In addition, the Agency will look into the procurement of additional explosion-proof equipment that can operate in hazardous atmospheres. This equipment can be used in conjunction with the EMSA vessels, or on request as stand-alone equipment to be used on vessels of opportunity (see Section 6.2.1.4).

[77] The terms 'first line recovery vessel' and 'second line recovery vessels' represent the notations used by Bureau Veritas (BV).

[78] 'Safety precautions second line oil recovery vessels', Report ASCC/2009/007, Dr. W. Koops, 2010.

Geographic adaptation

The current distribution of the contracted vessels is a result of the evaluation of oil trade patterns of the shipping industry, past oil pollution incidents, as well as the availability of Member States' pollution response capabilities across Europe. The offshore oil and gas industry was not taken into consideration when planning was undertaken, as response to pollution caused by offshore installations was not within the Agency's mandate. Following the revision of its Founding Regulation, EMSA will take into account the particularities of the offshore oil and gas sector and the location of offshore installations in European waters in order to be able to adapt its network of vessels to combat oil spills from offshore installations. Figure 14 shows the distribution of EMSA's network of vessels, and the location of offshore installations in European waters.

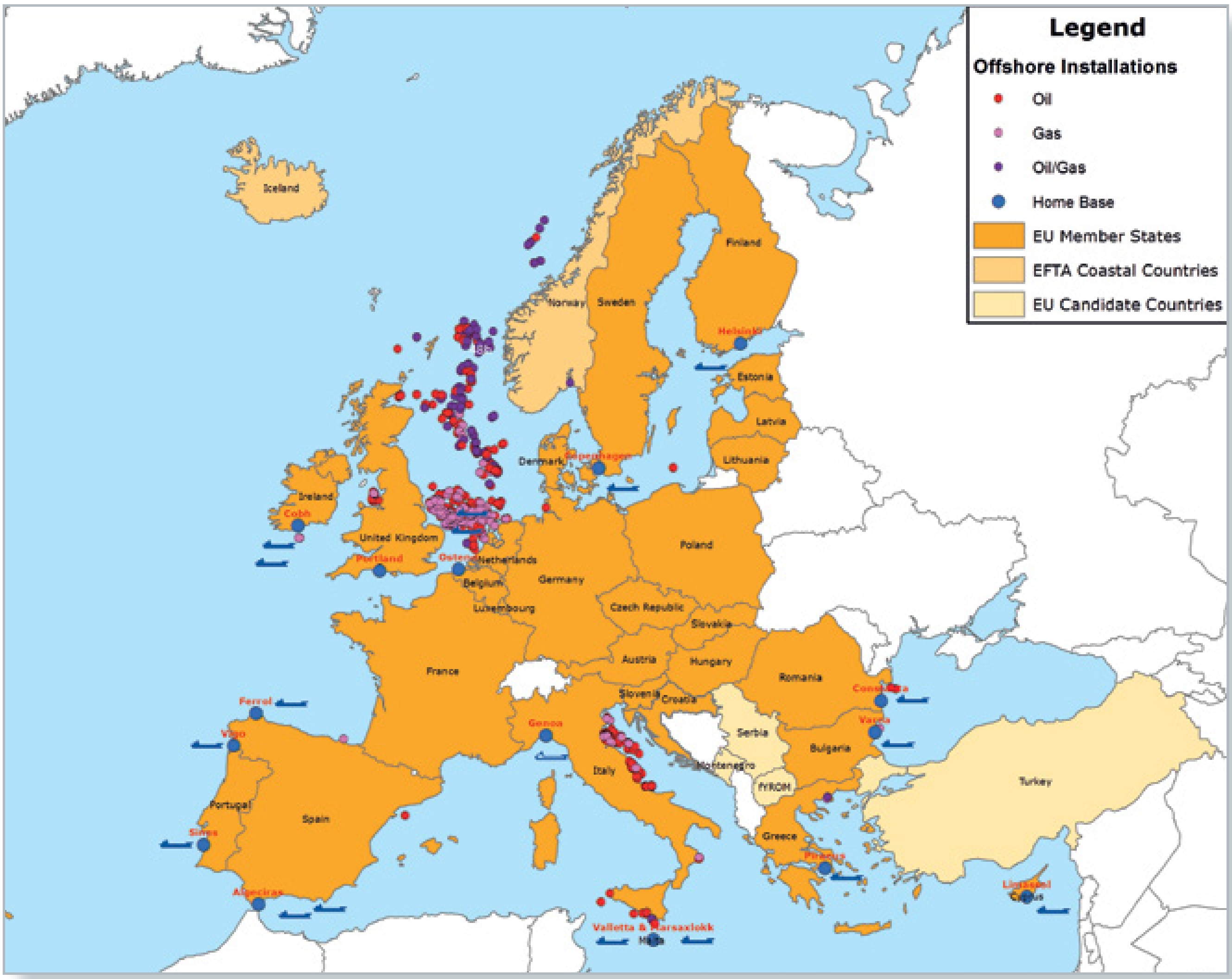


Figure 14 - Distribution of EMSA's network of Stand-by Oil Spill Response Vessels in relation with the location of offshore installations (as of November 2013)

In order to determine the geographical areas of priority for operational assistance, a number of factors have been taken into consideration. Firstly, the locations of such installations present in European waters have been mapped. Secondly, the current Member States' preparedness and response arrangements have been identified. Finally, the specific risk factors linked to offshore operations were taken into consideration. This analysis of the geographic distribution of offshore installations in conjunction with existing response capacities and risk factors has enabled the identification of priority areas. Past incidents (see Annex 3) and the fact that well blowouts are the main incidents causing large spills (see Annex 4) have also been taken into account in defining priority areas for operational assistance. A review of accidents

worldwide has shown that the majority of blowouts have occurred during exploratory drilling operations; well blowouts have only rarely occurred during routine oil production operations. As a result, and for the purpose of this Action Plan, priority for response capacity is given to those areas where offshore exploratory drilling is continuing or anticipated, and to a lesser degree driven by the presence of offshore installations.When the EMSA stand-by vessels contracts expire, the Agency will reconsider the distribution of the contracted vessels and will propose adaptations if needed.

Contractual adaptation

EMSA's network of stand-by oil recovery vessels is based upon contractual arrangements with vessels that undertake normal commercial activities, and on request can be mobilised at short notice (within a maximum of 24 hours) and fitted with oil spill response equipment in order to be able to provide at-sea recovery services. This arrangement is reflected by a dual contract structure.

- A Vessel Availability Contract:
  This contract is concluded between the Agency and the ship operator and it ensures the availability of the vessels at any time. In particular, under this contract, the ship operator is obliged to respond positively to a request for assistance transmitted by EMSA. Failure to do so would result in financial penalties.
  In addition, it addresses technical modifications made to the vessels with respect to pumping, heating and any oil recovery equipment as well as organising drills and participating in exercises.
- An Incident Response Contract:
  This contract is to be concluded between the ship operator and the affected State. This pre-established model contract addresses the actual oil recovery operations. It covers the terms and conditions of the service and includes the associated daily hire rates.
  It should be highlighted that, following a request for assistance, EMSA will activate or even pre-mobilise the vessel to facilitate the operation. The command and control during an incident rests with the coastal state using the vessel.

Spills originating from offshore installations have often required extended response operations. Under the current terms and conditions of the Incident Response Contract, the EMSA vessels are required to provide services for a period of 21 days, although this period may be extended if both parties, the affected Member State and the ship operator, agree. However, this is a possibility that cannot be guaranteed under the current contracts.

Consequently, EMSA will review the possibilities to adapt and amend contracts to ensure that the contracted response vessels will respond to pollution incidents for the duration of the response, when needed. Such additional requirements could be implemented at the time of the renewal or the conclusion of a new Vessel Availability Contract.

6.2.1.2 MONITORING AND EVALUATION TOOLS

The Agency's current capabilities with regard to monitoring and evaluation of oil spills are represented by the CleanSeaNet satellite service. The Agency will consider options for adapting this service, as well as additional options for monitoring and evaluation.

The CleanSeaNet Service

With regard to the CleanSeaNet service, Directive 2005/35/EC as amended[79] gives EMSA the task of providing assistance to the EU Member States and the European Commission in case of ship-sourced marine pollution. In particular, article 10.2 (a), which states that EMSA shall 'work with the Member States in developing technical solutions and providing technical assistance in relation to the implementation of this Directive, in actions such as tracing discharges by satellite monitoring and surveillance' provides the legal basis for the service.

Accordingly, since April 2007, EMSA operates the CleanSeaNet satellite-based oil spill and vessel detection service, for (1) routine monitoring for ship-sourced discharges of oil, including unlawful discharges, and (2) to provide an emergency monitoring service for large-scale accidental oil spills. The service is available to all coastal EU/EFTA/EEA Member States and EU Candidate Countries.

The CleanSeaNet service is based on radar satellite images, covering all European sea areas, which are analysed in order to detect possible oil spills on the sea surface. When a possible oil spill is detected in national waters, an alert message is delivered to the relevant country. Analysed images and alert reports are available to national contact points within 30 minutes of the satellite overpass (Figure 16). This allows users to react immediately. Approximately 2,000 images are ordered and analysed per year. Coastal states define their service coverage requirements by specifying which areas they want monitored by CleanSeaNet. In cooperation with the coastal state users, EMSA plans and orders satellite images to meet these requirements.

The service is technically based on Synthetic Aperture Radar (SAR) images, presently mainly provided by the Canadian Space Agency's RADARSAT-2 satellite, and by the Italian Space Agency's CosmoSkyMed satellite constellation. The RADARSAT-2 satellite provides up to 500 kilometres wide swath, however other SAR satellites with a higher resolution and therefore a narrower swath (e.g. CosmoSkyMed) are integrated in the service for monitoring special situations such as pollution emergencies. Following the planned launch in 2014, the Sentinel-1 satellite, as part of the series of GMES/Copernicus satellites from the European Space Agency, will provide EMSA with sustainable access to SAR images over coming years. Each coastal state has access to the CleanSeaNet service through a dedicated graphical user interface (GUI), which enables them to view ordered images. Users can also access a wide range of supplementary information through the interface, such as oil drift modelling (forecasting and backtracking), optical images, and oceanographic and meteorological information (Figure 15).

Adaptation of EMSA's CleanSeaNet service

As the Agency has been tasked to respond to spills caused by offshore installations, monitoring services have to be updated in line with this new task. As with ship-sourced pollution, monitoring of offshore installations can comprise of both routine monitoring for operational spills, and emergency monitoring for large-scale pollution incidents.

The map in Figure 16 shows the coverage of the CleanSeaNet service and the locations of the European offshore installations.

[79] Directive 2005/35/EC of the European Parliament and of the council of 7th September 2005 on ship-source pollution and on the introduction of penalties for infringement, OJ L 255 of 30.9.2005, p. 11 as amended by Directive 2009/123/EC of the European Parliament and of the Council of 21 October 2009, OJ L 280, 27.10.2009, p. 52.

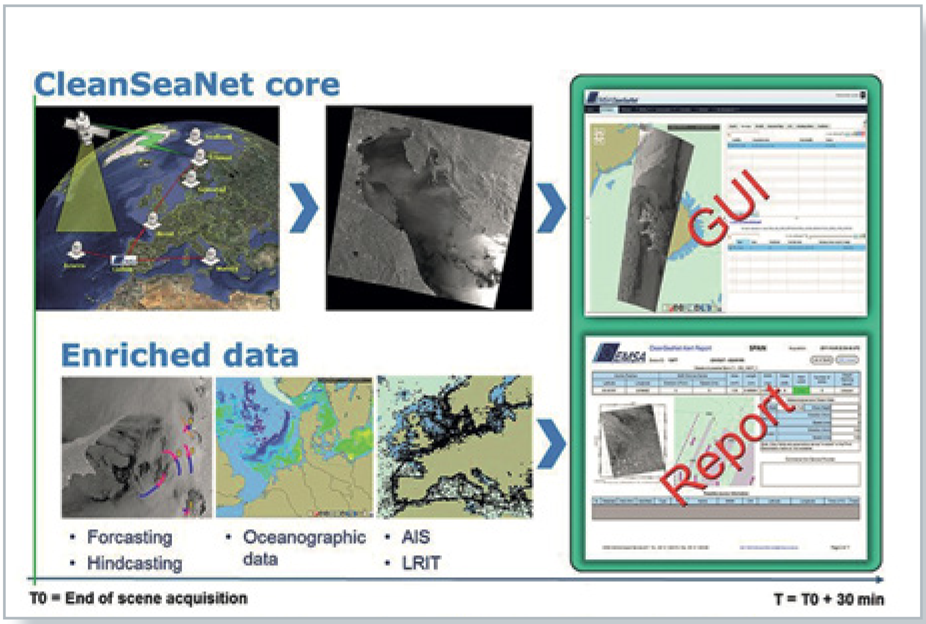


Figure 15 - CleanSeaNet service chain within 30 minutes of satellite overpass

Upper part: satellite acquisition and downlink, radar image

Lower part: auxiliary information enriching the information content

Right side: visualisation and reporting to the user

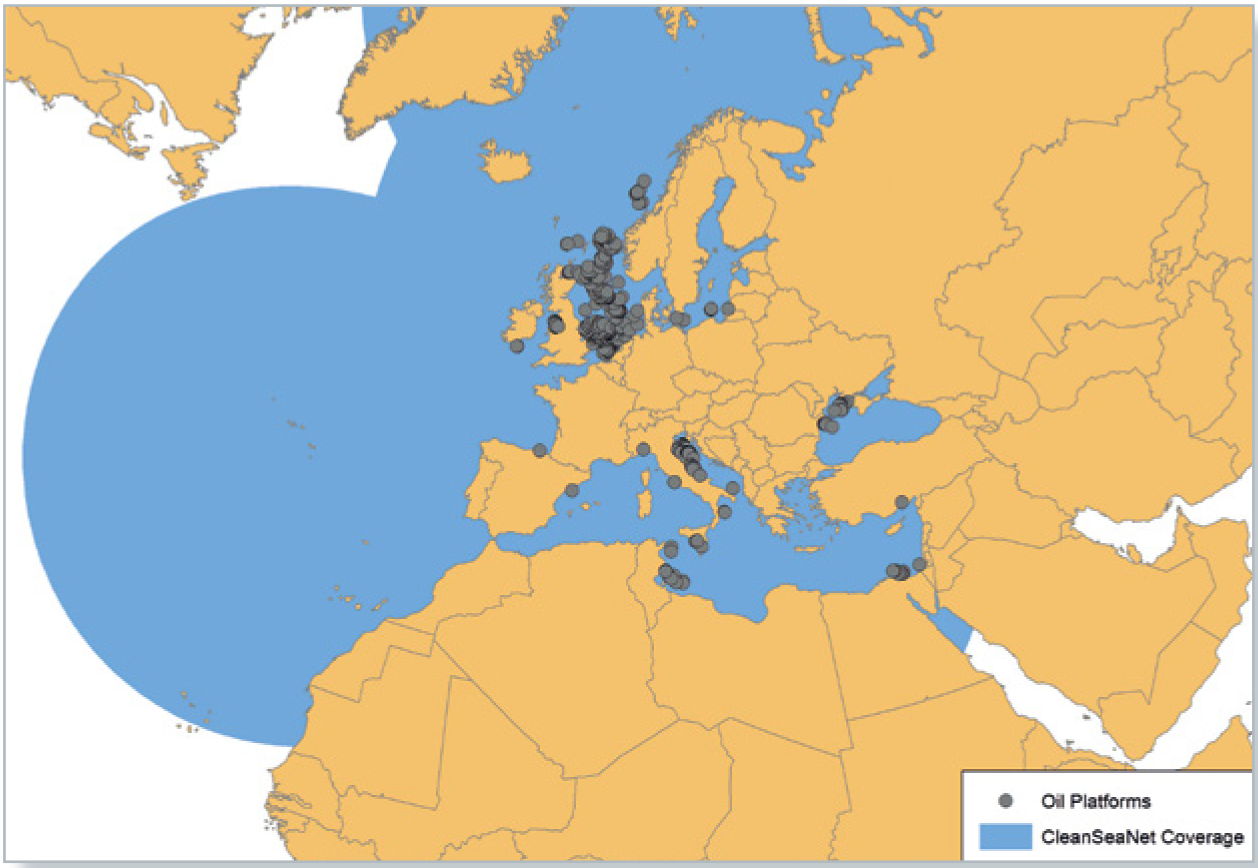


Figure 16 - CleanSeaNet default operational monitoring area and offshore oil/gas installations around Europe

Source: Int. Assoc. of Oil and Gas Producers, EEA Environment Report Assessment Report No. 10 (2003), CMAP Electronic Nautical Charts, Petroleum Economist Ltd. Oil and Gas Map

The largest proportion of the total amount of oil spilled at sea originates from the frequent small operational pollutions from ships or offshore installations, and not from big accidents. Oil pollution from ships, which is of a thickness that can be observed by satellite can constitute a MARPOL violation; this is not the case with discharges (mostly production water) from offshore installations, as the permitted concentration levels are above the detection level.

Oil and gas industry operators are obliged to permanently monitor the discharge of oil immediately around the installations, but satellite images have the unique advantage of monitoring the larger area around the installation at reasonable costs, and can detect oil spills which only appear on the surface far away from the installation. The CleanSeaNet service can provide this information 30 minutes after satellite overpass. Regular monitoring can also have a deterrence effect on potential polluters, by increasing the probability that violations will be detected.

In case of a major accidental spill from an offshore installation causing significant pollution, the CleanSeaNet service can provide intensive longer term monitoring with a suite of satellite images (radar and optical) in the vicinity of the platform and over an extended surrounding area. CleanSeaNet has the capacity to integrate local modelling results that provide forecasting products indicating where the spill may drift.

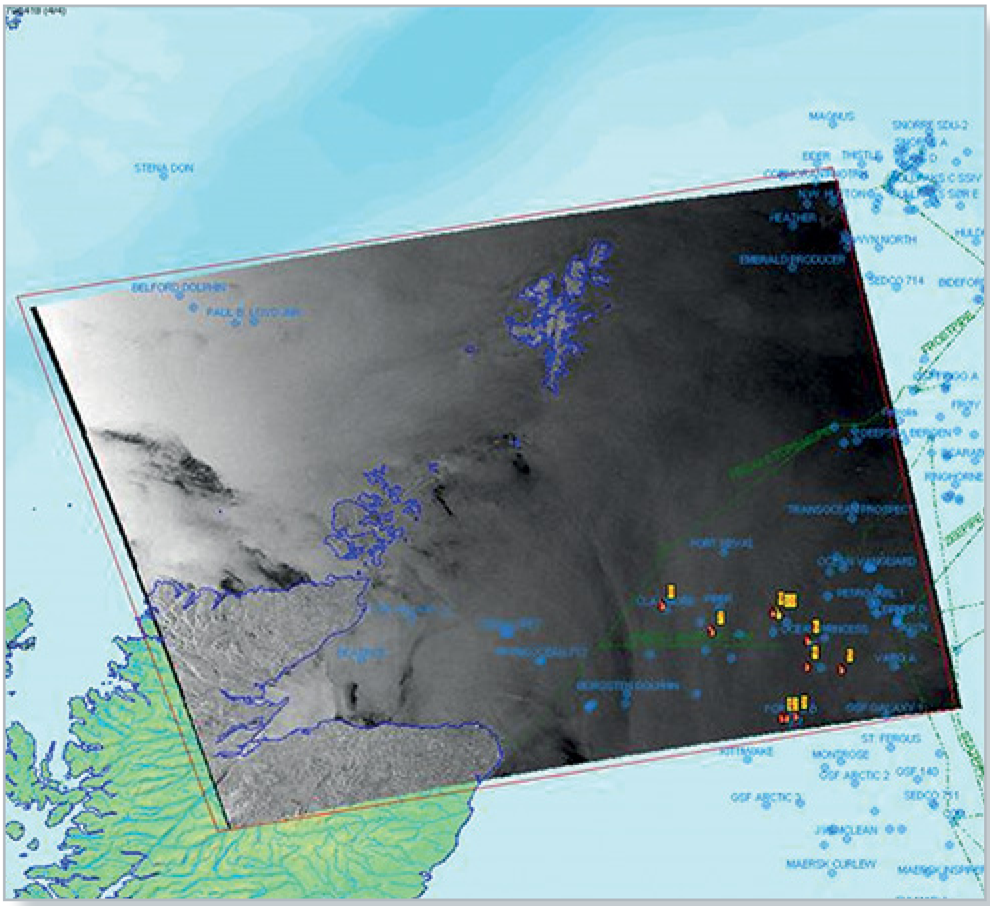


Figure 17 - CleanSeaNet result of 2010-05-29 21:37:57 UTC

As presented in Figure 17, the CleanSeaNet service is already capable of identifying oil pollution from offshore installations. The satellite image (Figure 17) shows five spills originating from different oil installations in the northern part of the North Sea. In the detailed images below (Figure 18), which are zoomed areas of the above, the installations (white dots) and the spills (black patches) can be clearly identified.

Some Member States (for instance UK and Norway) already use the CleanSeaNet service for routine monitoring of offshore installations in order to detect discharges.

Emergency satellite support can be triggered via direct tasking of the EMSA CleanSeaNet emergency procedures or, for major oil spills in European waters, via the Emergency Response Coordination Centre in the European Commission and the 'International Charter on Space and Major Disasters' for which EMSA acts as project manager.

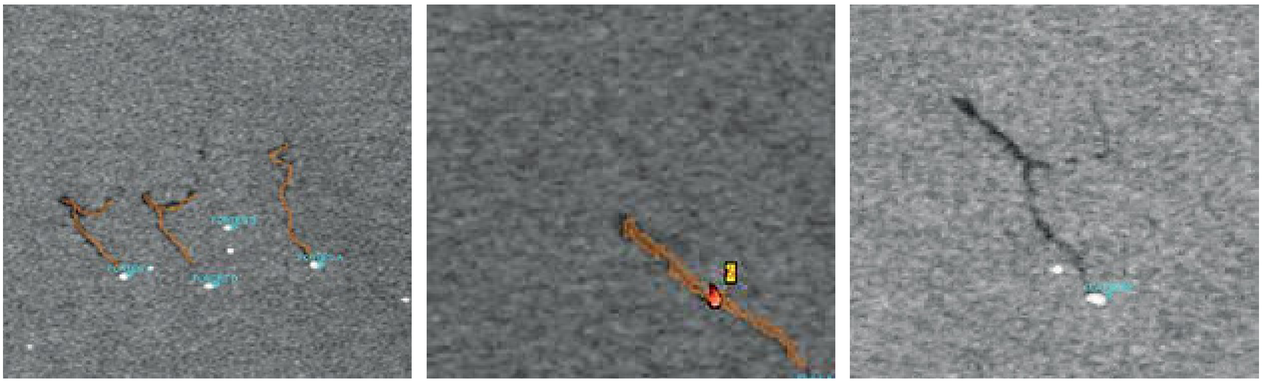


Figure 18 - Zoomed areas around platforms where spills could be identified

Satellite capacity to cover wide areas provides decision-makers with a valuable tool for assessing the evolution of the spill situation. Even in cases where no pollution is visible on the satellite image, this information can be useful, as decision-makers are able to re-prioritise aerial surveillance to target other areas, thereby reducing the need for unnecessary verification flights.

The assistance provided by CleanSeaNet will be specifically adapted to offshore requirements, and a number of limited adaptations to the existing service will be made. The following actions will be undertaken for establishing a service for offshore installations:

- Collection of user requirements:
  - Identification of the coastal states' relevant authorities to establish a user community; and
  - Consolidation of the requirements.

- Operational and technical analysis:
  - Identification of the best suite of satellites and their operational modes based on existing CleanSeaNet capabilities; and
  - Development of a coverage scenario, to be confirmed by the users.

The outcome will provide the basis for the implementation of the enhanced CleanSeaNet operational service chain adapted to monitor offshore installations.

As no additional financial resources for the operation of CleanSeaNet are foreseen within the financial envelope for the period 2014–2020, additional monitoring of offshore installations will require re-alignment of the existing CleanSeaNet coverage scenario to meet both demands: the regular CleanSeaNet monitoring of European seas for oil spills from vessels, and monitoring of offshore installations. Unless additional funding is made available, for example from sources such as the Copernicus (formerly GMES) programme of the European Commission, routine platform monitoring can only be provided in fully shared mode with existing CleanSeaNet monitoring. Due to the similar nature of the products, strong synergy effects between the classical CleanSeaNet service for illegal pollution by ships and the new service addressing offshore installations are expected, meaning that selected images allocated for standard routine CleanSeaNet operation should be re-used for oil platform monitoring. As this would also affect the CleanSeaNet standard operational coverage, a trade-off between the two monitoring scenarios should be found. This will be done in consultation with Member States.

For accidental and emergency monitoring, EMSA has agreements with satellite owners and the European Commission for receiving additional satellite imagery. Therefore, in these cases, EMSA can provide additional services in order to fully support response operations with additional image acquisitions.

Notwithstanding the abovementioned budgetary constraints, it is expected that an operational service can be established in a relatively short time. A first analysis, as displayed in Figure 19, shows that in order to obtain snapshots covering all offshore installations in Europe, twenty-seven radar images are necessary. However, for regular monitoring a frequent coverage is necessary, therefore this number would need to be multiplied depending on the frequency requested by the user. A precise estimate of the monitoring needs of the offshore installations is not currently available, and the impact on the requirements for coverage and satellite resources can only be given at a later stage.

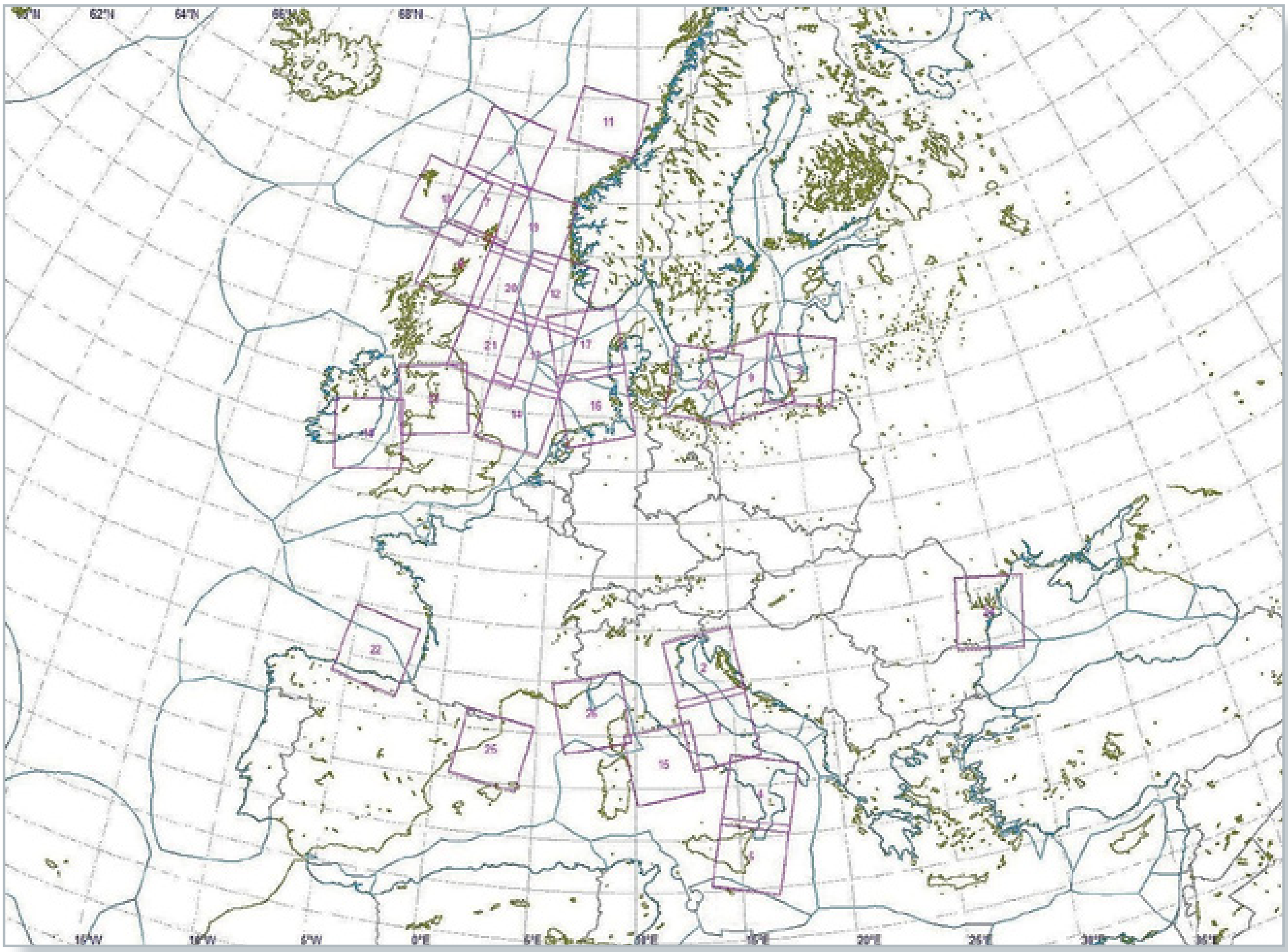


Figure 19 - Coverage of the main European offshore installations by Radarsat-2 imagery (27 images required)

Other monitoring and evaluation tools

In addition to the adaptation of its current monitoring tools, the Agency will look into the option of employing additional tools for monitoring purposes. Oil spills caused by offshore installations, due to the potential presence of hazardous atmospheres and gas plumes, can pose a series of concerns for the safety of the pollution response operations and the responding personnel. Therefore, based on these concerns, and especially for incidents involving offshore gas installations or emissions of explosive vapours during major oil spills, specialised equipment, for example unmanned aerial vehicles, could be added to the Agency's toolbox to safely monitor the heat of the installation and the evolution of the hazardous atmosphere or to trace discharges. Within budgetary constraints, synergies with regular monitoring of discharges using the CleanSeaNet service will be explored.

6.2.1.3 DISPERSANT APPLICATION

The aim of dispersant application is to remove the oil from the sea surface and disperse it in the water column. In the case of oil spills originating from offshore installations, especially well blowouts, use of dispersants may be beneficial as they are capable of combatting the oil spills for prolonged periods and may prevent the oil from spreading to sensitive areas. Furthermore, the remote location of some offshore installations and associated weather and sea conditions will influence the choice of response measures. The type of spilled oil and potentially large quantities are factors that make dispersant application an appropriate response option in some circumstances.

By adding dispersant application to the Agency's current capabilities, an enhanced set of tools will be available to requesting Member States. Such an enhanced toolbox is expected to better address the response to oil spills originating from offshore installations, as it will provide greater adaptability to the particularities of such spills. The decision to use dispersants will always be made by the affected Member State (and not by the Agency).
As the development of sub-sea dispersant capabilities requires extensive financial efforts and specific expertise that the Agency does not currently possess, the Agency will develop its capabilities for surface dispersant application, rather than sub-sea injection of dispersants.

The Agency will assist the Member States by providing limited dispersant quantities in areas where the use of dispersants is permitted, but no or limited quantities of dispersants are currently available. These dispersant quantities will be provided in conjunction with dispersant application equipment, thus offering tools for responding to larger spills. Storage could be established in the depots currently used for the oil pollution response equipment used on board EMSA's vessels. These selected locations should be able to meet requirements such as safety and environmental restrictions, storage capability, ease of access to ports and airports and maximum mobilisation time required for deployment on vessels and aircraft. The Agency will consider providing limited supplies of dispersant for use by selected contracted vessels and by airplane, together with dedicated portable spraying equipment in areas where such means are absent or sparse. These supplies, considering that large dispersant quantities can be made available by manufacturers within a timeframe of seven to ten days, do not need to be very large to initially top-up the Member State supplies, if already in place. Appropriate spraying systems (on selected EMSA vessels or possibly available airplane) are required in order to supplement the currently available dispersant spraying equipment of the Member States.

Vessel dispersant application

In order to provide vessel dispersant application capabilities, EMSA intends to use the available network of Stand-by Oil Spill Response Vessels or vessels of opportunity. This approach only requires that vessel dispersant application equipment is purchased and stored in selected depot(s) onshore.

Dispersant application equipment could be fitted on a select number of EMSA contracted vessels that are on stand-by in areas where offshore installations are present or likely to be developed, and where similar equipment is not already available, thereby providing Member States with enhanced means of pollution response to better address large spills. For EMSA's network of contracted vessels, the most portable and adaptable dispersant spraying solution would be the preferred option, as this requires no additional vessel pre-fitting works, allows a quick and easy installation, and eliminates the need to store the equipment on board at all times. In addition, the fact that the spraying equipment is portable means that it can also be used independently on vessels of opportunity as part of the stand-alone equipment approach detailed in Section 6.2.1.4.

The Mediterranean Sea is an area with offshore oil activities where extensive future developments are anticipated. Vessels fitted with dispersant application equipment could be considered for this area, in line with the relevant national policies regarding the use of dispersants.

The North Sea, although it is an area with extensive offshore oil activities, might not be a suitable area for additional vessel dispersant application, as it already has proper response measures in place.

The Baltic Sea is an area with very limited offshore oil and gas activities and where a regional policy (Helsinki Convention) does not favour the use of dispersants. Therefore, deploying vessel dispersant equipment is not currently recommended in this area.

The Black Sea does not possess any dispersing capabilities, although offshore oil activities have been present for more than 30 years and the area is under continuous development. This is mainly due to the fact that dispersant use was prohibited in the past. Still, in light of recent changes regarding dispersant application, which might be allowed based on prior approval from relevant authorities, this region could be considered for the deployment of vessel dispersant capability.

Based on the abovementioned considerations, some of EMSA's vessels could be fitted with portable dispersant application equipment, and dispersant supplies could be provided. This would increase the options available to Member States responding to spills originating from offshore installations, as well as balancing the availability of dispersant spraying capabilities at a European level.

Aircraft dispersant application

Aircraft dispersant application is an efficient method for dispersant spraying as aircraft can easily and quickly reach offshore areas, covering and spraying over large areas in a short period of time and carrying relatively large quantities of dispersant. In case of a release of fresh oil over a prolonged period of time due to loss of well control, the window of opportunity for aerial dispersant application could also be much wider and extend beyond the first 24 hours following a spill.

Based on the benefits of this option as well as considering the fact that the availability of aerial dispersant capabilities in Europe is very limited and the few appropriate resources are mainly privately owned by an industry cooperative, the Agency intends to develop aerial dispersant capability. This will be achieved by using the same contractual structure as is applied to the network of contracted Stand-by Oil Spill Response Vessels, consisting of an Availability Contract to ensure an aircraft will be available for dispersant application, and of an Incident Response Contract which is activated during emergencies. The basic day-to-day costs of the aircraft are covered by its normal activities. The availability contract established with the aircraft service provider ensures the availability and readiness of the aircraft and associated preparations for oil spill response activities. This contract will be managed by EMSA and will not involve the Member States, nor will it incur any direct financial obligations upon them.

For the response during an actual pollution incident, an Incident Response Contract shall be established for the provision of the response services. Such a contract will represent the agreement between the requesting state and the aircraft provider and it will stipulate the conditions for the provision of oil recovery services, including fees.

For the purposes of having aircraft arrangements similar to those in place for the Stand-by Oil Spill Response Vessels, it is preferred if no or minimal aircraft modification or conversion is required, thus ensuring that the aircraft can continue with its normal operations, and can be made available to the Agency within a specific timeframe, upon agreed chartering terms.

By developing dispersing capabilities, the Agency will be able to provide Member States with a more comprehensive and flexible network of pollution response equipment that is capable of addressing larger oil spills and will reduce the dependency on industry arrangements by providing a 'government-to-government' service, with a guaranteed availability of pollution response capabilities for Europe. However, it should be reiterated that the choice of whether or how to use this new tool will be entirely a decision of the Member State requesting assistance.

6.2.1.4 PROVISION OF SPECIALISED EQUIPMENT

The general rule with regard to the network of contracted Stand-by Oil Spill Response Vessels and the specialised equipment for use on board these vessels is to offer them together. In the future, provision of specialised equipment only – whether currently available equipment which was previously procured for EMSA's vessels, or new equipment to be procured specifically for this purpose and which can also be used by vessels of opportunity - will be considered by the Agency.

Using specialised stand-alone equipment provides flexibility as it ensures the availability of pollution response equipment across Europe. Based on the available options, there are two different approaches that could be envisaged.

The first approach entails the use of equipment available within the framework of the EMSA's network of Stand-by Oil Spill Response Vessels. The equipment could be sent as stand-alone equipment to the requesting party for supporting operational activities, and to be used on vessels of opportunity. Examples of such specialised equipment already available to be utilised in this manner include oil skimmers and containment booms.

The second approach, subject to available funds, entails the provision of new pollution response equipment for supporting the Agency's activities, bearing in mind latest innovations in this field. As a result, the Agency could acquire additional specialised equipment for enhancing its toolbox. Such additional specialised equipment could include equipment for enhanced mechanical recovery, spraying equipment for developing dispersant application capabilities, as well as fire-retardant booms, as the Agency is also taking into consideration the possibility to provide in-situ burning capabilities as an additional tool to Member States upon request.

Since a large number of offshore supply vessels are usually present in the areas of offshore oil extraction activities in order to cope with the various technical, operational and logistical requirements that emerge, they could serve as vessels of opportunity depending on their capability to operate and respond to such spills. The different approaches adopted in Member State national policies, and the differing industry standards with regard to requirements for oil recovery vessels will also be considered.

Nonetheless, the development of an equipment assistance service should be implemented in such a way that the heart of the Agency's at-sea oil recovery service, i.e. at-sea oil recovery by EMSA response vessels utilising their primary response system, remains fully operational. EMSA will further analyse the feasibility of having additional specialised equipment to be made available to vessels of opportunity.

The provision of additional equipment for responding to oil spills from offshore installations will be subject to feasibility studies in line with the Agency's new pollution response strategies and will be further discussed with experts from Member States, subject to available financial resources.

6.2.1.5 CONCLUSIONS

Each oil spill incident is unique and therefore the decision to use mechanical recovery, oil dispersants, in-situ burning, or to monitor and evaluate the oil spill will depend on the specific conditions that prevail. It is not possible to fully anticipate the unfolding of events connected to an oil spill, and so information will need to be assessed in relation to developments as they occur.

As a general conclusion, all of the abovementioned response measures have to be considered in conjunction with the challenges that an oil spill presents, such as environmental conditions, spill size and duration, type of oil and oil well particularities. Spills originating from offshore installations tend to be more difficult to address than ship-sourced spills, and require more complex and integrated approaches for efficient response.

Upon evaluating the available response options, the Agency should consider which bring the most added-value in relation to existing Member States capabilities, taking into consideration industry resources. Possible actions for the Agency have been identified as indicated below.

- Adaptation of the network of Stand-by Oil Spill Response Vessels:
  Revision, where necessary, of the geographic distribution of vessels, contract amendments and equipment suited for response to oil spills from offshore installations.

- Monitoring and evaluation tools, including adaptation of the CleanSeaNet service:
  Adaptation of the satellite monitoring service used also for offshore installations within the currently available number of images; additional images shall be provided only during emergencies.
  Explore suitable monitoring tools for the monitoring and evaluation of spill hazards (primarily atmospheric gas plumes), taking into account the particularities of the spill and the environmental conditions.

- Use of oil dispersants:
  Provision of limited dispersant supplies and application systems (aircraft and vessel mounted) to cope with spills involving the release of oil from offshore installations.

- Provision of specialised equipment:
  Development of contractual arrangements to provide currently available equipment to suitable vessels of opportunity; and possibly procurement of additional 'stand-alone' equipment (for mechanical recovery, dispersant application or in-situ burning), depending on the availability of funds.

6.2.2. COOPERATION

The Agency aims to work closely together with Member States, oil industry and other key international actors to ensure efficient response levels to pollution caused by offshore installations.

The Agency's activities under the cooperation theme aim to enhance already existing cooperation, and to stimulate new cooperation in the field of pollution caused by offshore installations.

Cooperation with Member States

Cooperation already takes place in the framework of the Consultative Technical Group for Marine Pollution Preparedness and Response (CTG MPPR). The CTG MPPR was established by EMSA in 2007 and provides a platform for Member States to improve preparedness and response to accidental and deliberate ship-sourced pollution. The CTG MPPR consists of marine pollution response experts from all 28 Member States, EFTA/EEA coastal states, coastal EU Candidate Countries, the Regional Agreements' Secretariats and the European Commission represented by the Humanitarian Aid and Civil Protection Mechanism. The purpose of the CTG MPPR is to enable and strengthen the exchange of information and best practice between national experts as well as define the current and future priority actions in this field. Initiatives take the form of workshops, training, technical studies, guidelines and reports.

Following the extension of EMSA's mandate in the field of pollution preparedness and response to pollution from offshore installations, an amendment to the current CTG MPPR Rules of Procedures will be proposed in order to extend the CTG MPPR's scope of work.

Under the framework of the CTG MPPR, the Technical Correspondence Group on Dispersants (TCG Dispersants) was established by EMSA in June 2012. The objective of the TCG Dispersants, which comprises Member States' experts in the field of dispersants, was to compile a list of and review documents related to the use of dispersants during the Macondo oil spill response, and to consider the existing scientific and operational aspects of dispersant testing procedures in the European Union. From the literature review on dispersants application was completed by the TCG Dispersants in 2013 and will be considered by the Agency in the implementation of this Action Plan as appropriate.

The Agency is also addressing the issue of the diverse dispersant testing and approval procedures in the EU with the aim to facilitate the mutual acceptance of dispersants tested and approved for use elsewhere in Europe and possibly harmonising dispersant approval procedures. This is important with regard to the creation of dispersant depots for use in European waters.

Cooperation with the IMO and Regional Agreements

EMSA is currently assisting the Commission with activities in the framework of the International Maritime Organization (IMO). The Agency participates and contributes to the MEPC OPRC/HNS Technical Group meetings, which represent the main technical IMO forum with regard to marine pollution preparedness and response. Through this cooperation, pollution caused by offshore installations is already addressed. Of particular interest in this regard is the recent work (2012) of a Correspondence Group for developing Guidelines for International Offers of Assistance in case of large oil spills, in which EMSA is actively involved. The necessity for such guidelines was identified following recent large scale oil spills caused by offshore installations, where the provision of international support was impeded by the lack of an appropriate framework, resulting in delays in response operations.

With respect to the Regional Agreements, the Agency has already established forms of cooperation, as part of the European Union delegation, and participates in relevant meetings. For example, EMSA participates in support of the Commission in HELCOM Response and OTSOPA meetings. In addition, EMSA is also a member of the HELCOM Informal Working Group on Aerial Surveillance, which meets once a year.

EMSA actively contributes to such meetings by submitting papers, taking part in discussions and by participating in a variety of operational exercises organised around Europe.

Representatives from the Regional Agreements, as well as the Chairpersons of the groups OTSOPA and HELCOM Response, along with the European Commission (DG ECHO) and EMSA representatives meet annually in Inter-Secretariat meetings. The purpose of these meetings is to exchange information on marine pollution preparedness and response activities and projects undertaken within the various Regional Agreements, while promoting the dissemination of best practices in this field. Areas of common interest include dispersant application, risk assessment methodologies, oiled wildlife response, places of refuge, and research and development. Pollution caused by offshore installations is already a topic of discussion within the context of these meetings, and the Agency will further enhance the exchange of information regarding this topic.

Cooperation with the oil industry

In the light of the new task of responding to spills originating from offshore installations, EMSA would like to establish cooperation with the oil industry, as this will facilitate access to relevant data such as the location of offshore installations in European waters, the industry's inventories of oil spill response capabilities, as well as expertise in responding to such spills.

By obtaining information on locations of offshore installations, EMSA can more precisely map the offshore installations around Europe. This can be used and included as a layer in CleanSeaNet, thus serving better monitoring of offshore installations for example during accidents and emergencies.

Through this cooperation, information included in the oil industry operators' inventories could be used to map capabilities in terms of responding to spills originating from offshore installations. Relevant data regarding the industry's inventories of pollution response capabilities will be superimposed with the Member State data, thus creating a comprehensive and accurate database that will form part of the revised EMSA inventories for pollution response capabilities. Another potential area of cooperation with the oil industry is emergency preparedness. Joint exercises, under the supervision and with the participation of the Member States, might be planned and performed, in order to enhance expertise and promote training, as well as promote a more integrated response approach.

With the extension of the Agency's mandate, a preliminary dialogue has started with the oil industry with the aim to establish cooperation leading to joint drills and exercises with the participation of the Member States, the oil and gas industry and the Agency, as well as to identify how to communicate and where to cooperate in complex response operations. EMSA is already regularly conducting exercises within the context of its network of contracted vessels addressing ship-sourced pollution, and a joint participation in operational exercises involving response to offshore installation incidents would be beneficial, as it would facilitate the adaptation of EMSA's resources to new requirements.

EMSA's cooperation with industry will not affect the Agency's relationship with the Member States and their primary responsibility for pollution preparedness and response, but is expected to provide a more comprehensive understanding of the currently available resources and thereby facilitate the design of an added-value pollution response service.

6.2.3. INFORMATION

The Agency will continue collecting and disseminating information in the field of marine pollution response with the support of the EU Member States, EFTA/EEA States, EU Candidate Countries, and the European Commission. Building further on existing activities, the Agency will facilitate the exchange of and disseminate relevant information, including inter alia past incidents, best available techniques and know-how with regard to pollution response from offshore incidents.

In 2012 for example, the 'Safe Platform Study',[80] contracted by EMSA to Det Norske Veritas, was published describing the vessel design requirements to enter and operate in dangerous atmospheres. This study is relevant for pollution response to offshore installations, as it addresses the issue of hazardous and explosive atmospheres and its implications on response operations. The safety zones concept developed therein is very useful especially in the case of a large spill with the release of fresh crude oil, and concerns both first line and second line response.

With regard to facilitating a better understanding of the usage of dispersants, EMSA has developed the Dispersant Usage Evaluation Tool (DUET), which was distributed to the EU and EFTA/EEA States in 2009, following training on the tool's functionalities. DUET includes a software programme to simulate oil spills and dispersant applications that allows a quantitative comparison of these response options including different levels of effectiveness of the dispersant and timing of its application. The model estimates the trajectory and fate of the oil, including water concentrations of naturally - and chemically - dispersed oil and dissolved hydrocarbons, as well as the surface area impacted by floating oil. These measures can be compared for scenarios with and without dispersant use, in order that informed guidance may be provided.

DUET is intended for use by pollution response experts and can provide support for decision-making regarding the use of dispersants in an oil spill. The model system as implemented in DUET is not designed to be a trajectory model for the purpose of forecasting the movements of oil and planning the placement of response measures during an actual incident. Instead, it is designed to gain an understanding of the fate and behaviour of dispersed oil, including concentration and duration of the dispersed oil plume, mainly for contingency planning purposes. It also includes relevant technical documentation.

The Agency also organises workshops/seminars on specific pollution response subjects with representatives of the Member States. These meetings are intended to share and distribute information on specific topics and to establish a common understanding and the sharing of best practices to respond to marine pollution.

With regard to its new developments and proposed measures, the Agency is looking into the possibility of organising such meetings to further discuss requirements with experts from Member States. An example of such an initiative is the workshop held in November 2012, where the use of oil spill dispersants was discussed.

[80] 'Technical Report - Safe Platform Study: Development of vessel design requirements to enter and operate in dangerous atmospheres', available on EMSA's website: www.emsa.europa.eu

7. CONCLUSIONS

Member States have differing levels of experience with developing offshore oil and gas activities, and have also developed different approaches to contingency planning and pollution response. The availability of oil spill response capabilities also varies considerably between different regions across Europe, including the role which the oil industry plays in the provision of such capabilities.

The Agency understands the current situation as follows:

- There are more than 1,000 offshore oil and gas installations in European waters;
- Oil exploration is expanding into deeper waters and in geographically dispersed areas such as the northern North Sea, Barents Sea, south of Portugal, eastern and central Mediterranean Sea and Black Sea;
- Historically, a higher number of well blowouts have occurred during exploratory drilling than during other offshore operations, though they also occur to a lesser degree during routine production;
- The release of oil due to uncontrolled well blowouts can be of longer duration and might result in larger quantities of spilled oil when compared to tanker incidents;
- There is room to improve the capability of the Member States, taking into consideration also industry resources, to adequately respond to large-scale oil pollution from offshore installations in European waters.

The Agency was given an additional task in assisting Member States in case of oil pollution from offshore installations. This new task needs to be accomplished within the given funding envelope.

This Action Plan provides the implementation framework for the Agency and is intended to strengthen response levels in European areas where offshore installations are present or where exploration activities are expected to start, in line with the Agency's 'top-up' philosophy. This approach entails the selection of those options that bring the highest added value and which do not replace or subsidize existing capabilities of coastal states, but constitute 'additional means' to strengthen existing arrangements and where possible to create more coherence within the European Union.

Based on the above, the Agency will focus on the following activities:

- Adaptation of the network of Stand-by Oil Spill Response Vessels;
- Monitoring and evaluation tools (adaptation of the CleanSeaNet service and additional monitoring tools);
- Use of oil dispersants;
- Provision of specialised equipment.

These activities represent EMSA's tools to assist Member States in responding to oil pollution caused by offshore installations. The preferred option will continue to be the mechanical recovery of oil, but when mechanical recovery alone might not be sufficient, additional options will be at the disposal of requesting states.

It is important to stress that EMSA's role in strengthening the pollution response capacities on an EU level does not interfere with the Member States' national sovereignty regarding the pollution response measure(s) that shall be used. The decision of whether to opt for mechanical recovery, whether and how to use dispersants or in-situ burning, or whether to limit response to monitoring and evaluating the oil spill, lies with the Member States. EMSA will offer an array of tools that can be utilised at the discretion of the Member States.

The Action Plan was approved by EMSA Administrative Board at its 37th Meeting on November 2013 and shall be implemented on a step-by-step basis through the Agency's Annual Work Programmes, following the approval by the Administrative Board. However, the actual timing and the extent to which they can be implemented are dependent on the available financial resources as well as on the levels of support from and participation of both Member States and the oil industry.

ANNEX 1

OFFSHORE INSTALLATIONS – HISTORY, DESCRIPTION AND CHARACTERISTICS

First offshore exploration activities started in 1896 when the first submerged oil wells were drilled off the coast of Summerfield, California. The wells were drilled from piers extending from land out into the channel, resembling boardwalks in appearance.[81]

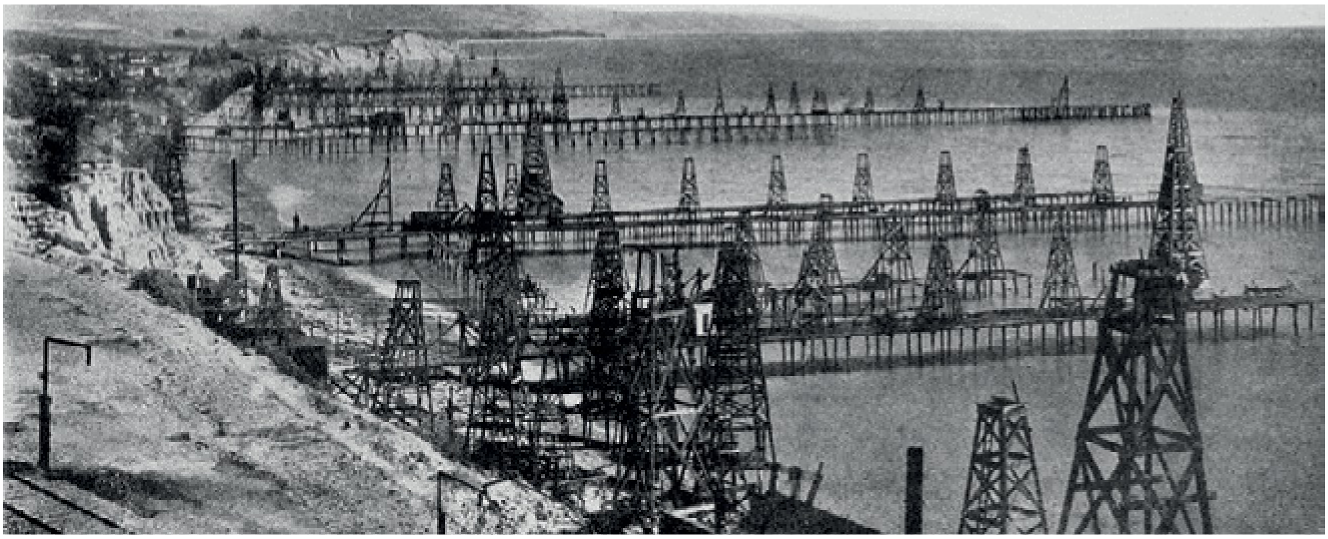


Figure 20 - Oil wells just offshore at Summerland, California, c.1915[82]

Offshore barges for exploration were first used in 1950, deepwater drillships in 1956, and semi-submersible rigs in 1962. When offshore oil and gas activities moved into deeper waters of up to 50 metres, fixed platforms were built. Demands for drilling equipment for greater depths of up to 150 metres increased, and the first jack-up rigs appeared.

Prompted by the much greater production capacity in deepwater fields, during the 1980s, development of technologies for building deepwater wells has intensified. This area has expanded considerably over recent decades; technology has now developed to such an extent that currently exploration between 500 to 2,000 metres is considered deepwater and over 2,000 metres ultra-deepwater.

On a global level, offshore oil production has grown from a modest 160,000 tonnes per day in the 1960s to nearly 4,000,000 tonnes per day in 2010, representing one third of world's crude oil production.[83]

Unlike onshore oil production, offshore production has never experienced sharp downward fluctuations and has grown consistently over the years. In fact, it has been the main source of growth for world crude oil production, as onshore production has essentially remained at plateau for over two decades.

In 2005, the Persian Gulf/Middle East topped the list of offshore producers, followed by the North Sea, West Africa, the Gulf of Mexico, Asia/Australasia, Brazil, China, Caspian, and Russia/Arctic. Of the total offshore crude, shallow water accounted for 33,200,000 tonnes per day and deepwater 550,000 tonnes per day.

[81] 'A Brief History of Offshore Oil Drilling', National Commission on BP Deepwater Horizon Oil Spill and Offshore Drilling.

[82] Photo by G.H. Eldridge. Published in Nature and Science on the Pacific Coast, Pacific Committee of the American Association for the Advancement of Science, 1915, p. 86.

[83] Extract adapted from 'Global offshore oil: geological setting of producing provinces, E&P trends, URR, and medium term supply outlook', Ivan Sandrea (OPEC) and Rafael Sandrea (IPC), (Oil and Gas Journal, March 5 and 12, 2007).

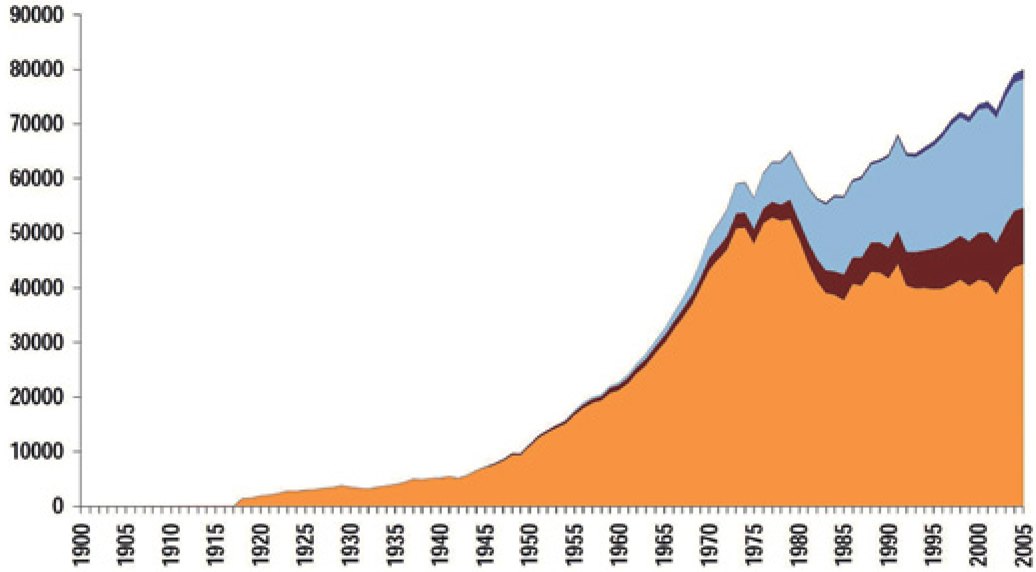


Figure 21 - Historical global oil production split by offshore and onshore (kb/d)

Source: Global offshore oil: geological setting of producing provinces, E&P trends, URR, and medium term supply outlook, Ivan Sandrea (OPEC) and Rafael Sandrea (IPC), (Oil and Gas Journal, March 5 and 12, 2007)

LARGEST OFFSHORE OIL PRODUCING REGIONS, 2005			
	Crude oil production		
	Start-up	Million bbl/day	Cumulative, billion bbl
Persian Gulf/Middle East[1]	1957	5.3	51
North Sea[2]	1975	4.7	45
West Africa[3]	1969	3.5	25
Mexico Gulf of Mexico	1960	2.6	20
Asia- Australasia[4]	1960	2.1	21
US Golf of Mexico	1947	1.6	24
Brazil	1973	1.5	6
China	1980	0.6	2
Caspian[5]	1950	0.4	1
Russia-Artic	1999	0.05	0
Others[6]		0.8	2
Total NGL7		1.6	7
Total		25	204

[1]Egypt, Iran, Iraq ,Neutral Zone, Kuwait, Qatar, Saudi Arabia, United Arab Emirates, [2]Denmark, Norway, UK, [3]Angola, Cameroon, Congo (Brazzaville), Equitorial Guinea, Gabon, Ivory Coast, Nigeria,[4]Australia, Brunei, Indonesia, Malaysia, Myanmar, New Zealand, Thailand, Vietnam, [5]Azerbaijan, Kazakhstan, bordering countries, [6]Mainly Argentine, Canada, Germany, India, Netherlands, Trinidad, Tunisia, Libya, [7]Mainly Australia, Egypt, Equatorial Guinea, Iran, Nigeria, Norway, Trinidad, United Arab Emirates, UK, US.

Table 8 - Largest offshore oil production regions, 2005

Source: Global offshore oil: geological setting of producing provinces, E&P trends, URR, and medium term supply outlook, Ivan Sandrea (OPEC) and Rafael Sandrea (IPC), (Oil and Gas Journal, March 5 and 12, 2007)

DESCRIPTION AND CHARACTERISTICS OF OFFSHORE INSTALLATIONS [84]

The offshore installations include any fixed or floating installation or structure engaged in oil exploration or production activities, as well as any structure for the purposes of loading or unloading of oil, all of which might be the source of an offshore oil spill.

Larger lake-and sea-based offshore platforms and drilling rigs are amongst the largest moveable man-made structures in the world. There are several types of offshore installations, listed below.

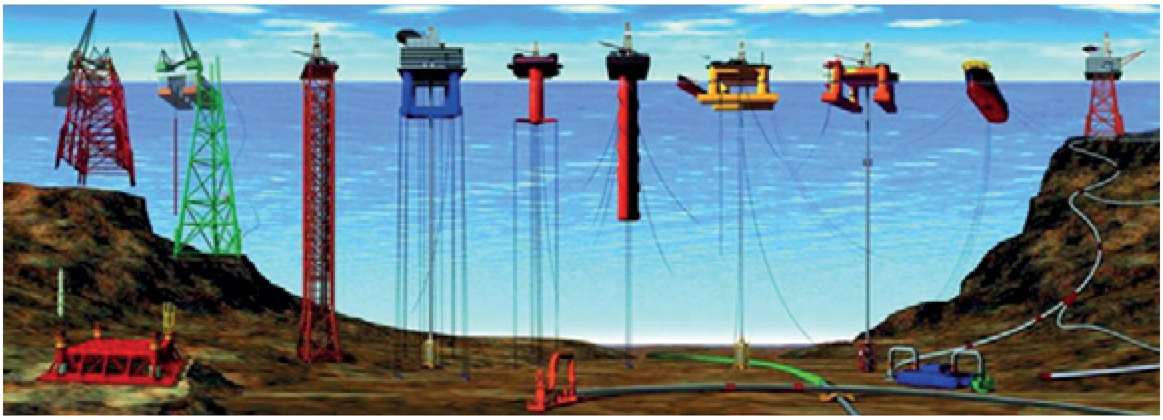


Figure 22 - Types of offshore installations
(From left to right): 1, 2) conventional fixed platforms; 3) compliant tower; 4, 5) vertically moored tension leg and mini-tension leg platform; 6) Spar ; 7,8) Semi-submersibles ; 9) Floating production, storage, and offloading facility; 10) sub-sea completion and tie-back to host facility.[85]

Fixed platforms

These platforms are installations built on concrete or steel legs, directly anchored into the seabed, and are designed for long-term use, therefore they are economically feasible for installation in water depths of up to about 500 metres. They have a top-side supported by fixed jackets and they are composed of decks with space for drilling rigs, production facilities and equipment as well as crew quarters. Fixed jackets consist of vertical sections made of tubular steel members, which are anchored into the seabed.

Compliant towers

These installations, similar to fixed platforms, are fixed structures composed of narrow and flexible towers and a pile foundation represented by a lower jacket secured to the seafloor that acts as a base for the upper jacket and surface facilities. The upper jacket supports a conventional top-side deck for drilling and/or production operations. Compliant towers are designed in such a manner so they are able to sustain significant lateral deflections and forces, and are typically used in water depths up to 900 metres. Unlike fixed platforms, compliant towers react to water and wind movements in a manner similar to floating installations.

Jack-up drilling rigs

Jack-up drilling rigs ('jack-ups') are rigs that self-elevate by jacking-up above the sea using legs that can be lowered. The legs are stationed on the ocean floor while the drilling equipment is jacked-up above the water's surface. When their legs are not deployed, jack-ups float, which makes them quite easy to transport from one drilling location to another. Jack-ups provide a very stable drilling environment in comparison to other types of offshore drilling rigs. They are typically used in water depths of up to 110 metres, although some designs can go to depths of 170 metres. Within these depth limits, they are the most popular type of mobile offshore drilling unit (MODU) for offshore exploration and development purposes.

[84] Extract information adapted from Rigzone website (www.rigzone.com).

[85] Office of Ocean Exploration and Research (15 December 2008). 'Types of Offshore Oil and Gas Structures' NOAA Ocean Explorer: Expedition to the Deep Slope. National Oceanic and Atmospheric Administration, 23 May 2010.

Semi-submersible platforms

These installations are mobile offshore drilling units designed with a platform-type deck containing drilling equipment, crew accommodations as well as other machinery and equipment, all of which are supported by pontoon-type columns that are submerged into the water. These columns provide sufficient buoyancy for the structure to float, but they have enough weight to keep the structure in an upright position. Semi-submersible platforms are mobile and can be moved in between different locations for drilling purposes. They can be ballasted up or down, and are moored during drilling or production operations. Semi-submersibles can be used in water depths of up to 3,000 metres.

Drillships

A drillship is a vessel that has been modified to drill oil and gas wells. Drilling equipment is connected to the well equipment below via riser pipe, a flexible pipe that extends from the top of the sub-sea well to the bottom of the drillship. Drillships have extensive mooring or positioning equipment. They are also used for exploratory drilling of new oil or gas wells in deep waters. Drillships are very mobile and can operate in depths ranging from 610 to 3,048 metres.

Floating production systems

Floating production systems are offshore production facilities that house both processing equipment and storage for produced hydrocarbons, and are commonly termed FPSOs (Floating Production, Storage, and Offloading systems). FPSOs consist of large mono-hull structures, equipped with processing facilities topside, aboard the deck, and with hydrocarbon storage below, in the double hull. FPSOs do not actually drill for oil or gas. FPSOs usually gather hydrocarbons from multiple sub-sea production wells through a series of in-field pipelines. Due to the fact that they can disconnect from their moorings, FPSOs are optimal in those areas that might experience adverse weather conditions. More limited systems include Floating Storage and Offloading systems (FSOs), Floating Production Systems (FPSs) and Floating Storage Units (FSUs).

Tension-leg platform (TLP)

Tension-leg platforms (TLP) are another type of floating production system, vertically moored to the seafloor in a manner that eliminates most of the structure's vertical movement. A buoyant hull structure supports the top-side, and a mooring system keeps the platform in place. TLPs are used in water depths up to about 2,000 metres. The 'conventional' TLP has a basic design with four air-filled columns forming a square, supported and connected by pontoons, similar to the design of a semi-submersible. Currently, there are three different types of TLPs: full-size TLPs, mini TLPs and wellhead TLPs. TLPs are the third most commonly used type of floating production facilities in the world.

Gravity-based structure (GBS)

These installations consist of structures that comprise steel or concrete caissons, usually anchored directly onto the seabed. GBSs store large volumes of oil, and support heavy topsides in deep water. GBS platforms are constructed to address constraints such as the lack of pipeline infrastructure or the limited capacity of heavy lift vessels. GBS platforms are transported from the construction site by either wet-tow or/and dry-tow and are installed by controlled ballasting of the cylinder compartments with seawater.

Spar platforms

These types of installation provide an alternative to floating platforms; they can support drilling, production and storage operations. Spar platforms consist of a large vertical cylinder that carries topside equipment. The cylinder hull is moored to the seafloor, but spar platforms do not require moorings to stay upright, as the centre of gravity is below the centre of buoyancy. The majority of spar platforms are located beneath the water's surface, and therefore providing more stability than, for example, TLPs. Spar platforms also have the capability to move horizontally and position themselves over wells at a distance from the main platform location.

Normally unmanned installations (NUI)

These installations are small fixed structures, designed to be operated remotely, and do not necessitate the constant presence of personnel. These installations usually only contain a well bay, a helipad, and an emergency shelter, offering the advantages of a surface well-head without the high costs associated with a full scale production platform. They are only visited occasionally for routine maintenance.

Conductor support systems

These installations, also called satellite platforms, are small unmanned installations. They usually contain only a well bay and a small process plant, and are intended to operate in conjunction with a production platform to which they are directly connected by flow lines, by an umbilical cable, or by a combination of both.

Sub-sea processing systems

These systems were developed to overcome the challenges of extremely deep water situations, and as a viable solution for fields located in harsh conditions where oil and gas processing equipment above the water level might be at risk. There are several types of sub-sea processing methods, such as sub-sea water removal, re-injection or disposal, boosting of well fluids, sand and solid separation, gas/liquid separation and boosting, and gas treatment and compression, which help save space on offshore production platforms.

Sub-sea processing systems are very efficient in increasing the recovery from the field and contribute to efficient flow management and assurance, while reducing expenses for equipment. They also help enhance production from mature or marginal fields, thus increasing recovery rates and further expanding the life of production fields.

Underwater transport pipelines

Pipelines are enclosed tubular structures used for the transport of oil produced on offshore installations to the shore in a quick and efficient manner, eliminating the need of employing additional transport vessels and/or storage capabilities.

Worldwide, there are currently around 790 offshore drilling rigs (jack-ups, semisubmersibles, drillships and barges), and 8,000 fixed or floating platforms. Of these, 116 rigs (14.7%) and more than 1,000 fixed or floating platforms (12.5%) are in European waters.

Many offshore installations are likely to be constructed in the near future as explorations in nearly all sea areas in and around Europe are either under development or already in progress. Some of the projects under development concern deepwater exploration activities, particularly in the Northern North Sea, the Black Sea and the Mediterranean Sea (the waters off Cyprus, Libya, Lebanon and Egypt). Oil fields have also been identified off Tunisia.

In addition, the broad shelf of the Barents Sea off Northern Norway and Russia is subject to intensive exploration. Opinions on the quantity of oil deposits vary considerably. Some estimates show that gas will be the primary source of extraction, whilst others indicate that oil reserves, of levels comparable to the Saudi Arabian deposits, will be the principal extraction target. A substantial increase in offshore activities related to offshore oil exploration is expected in this area.

ANNEX 2

QUANTIFICATION OF OIL AND GAS PRODUCTION

Quantification of oil and gas production by region:

OSPAR Regions	Oil production tonnes of oil equivalents (toeq)	Gas production tonnes of oil equivalents (toeq)
Region I: Arctic Waters	24,273,145	31,092,026
Region II: Greater North Sea	205,385,197	172,777,596
Region III: Celtic Seas	882,504	7,187,409
Region IV: Bay of Biscay and Iberian Coast	6,628	none
Region V: Wider Atlantic	none	none
TOTAL:	230,547,474	211,057,031

Table 9 - Source OSPAR

Currently, the majority of oil and gas produced in Europe is from the North Sea and the Norwegian Sea. Other significant production occurs in the Adriatic Sea and in the Black Sea. Future exploration and/or exploitation will increasingly include the Barents Sea in the Arctic.

Quantification of Oil and Gas production by year (1993-2007):

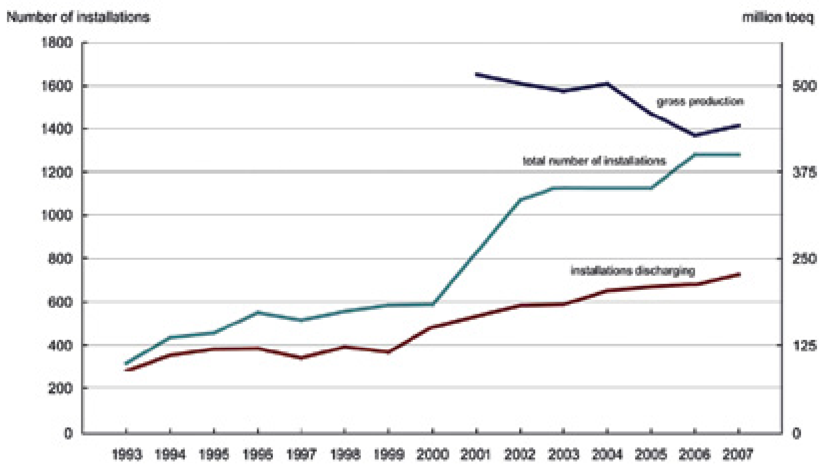


Figure 23 - Source OSPAR

The number of offshore installations for oil and gas production has continuously increased since the early 1990´s. This trend is expected to continue. Many new installations are expected to include more challenging environments such as the Arctic and deepwater.

ANNEX 3

OFFSHORE INSTALLATIONS INCIDENTS LIST (UP TO DATE)

Legend:
DS: Drillship
JU: Jack-up
P: Platform
SS: Semi-submersible

Incidents in European waters or shared sea basins are highligted in grey

Date	Ring/Well name	Location	Type	Incident	Remarks
2012-03-25	Elgin Platform	North Sea	P	Gas leak	Gas leak during operations to plug and decommission the well
2011-11-07	Frade Field	Campos Basin, Brazil	P	Seabed instability	A crack in the seabed has led to an oil spill
2011-08-10	Gannet Alpha	UK North Sea	P	Leakage	Flow line leakage
2010-06-16	Production Platform	Red Sea, Egypt	P	Leakage	Platform leakage in Jebel alZayt Field, worst in Egypt
2010-05-01	Qua Iboe	Niger Delta	P	Pipeline damage	Damaged pipeline spilled oil into the Atlantic
2010-04-21	Deepwater Hori-zon/Macondo	Gulf of Mexico (GOM)	SS	Blowout and sinking	Fire destroyed platform
2009-08-21	West Atlas	Montara Fied, Australia	P	Blowout	More than two months were needed to plug the well
2007-12-12	Statfjord A	North Sea	P	Oil splill	Spill during loading operations
2007-10-23	Usumacinta	GOM	JU	Blowout	Storm, major release
2006-04-23	Maersk Giant	Norway	JU	Blowout	Shallow gas
2005-09-28	Adriatic VII	GOM	JU	Hurricane	Major damage
2005-09-28	High Island III	GOM	JU	Hurricane	Major damage
2005-09-28	Rowan Fort Worth	GOM	JU	Hurricane	Rita - Beached, written off
2005-09-28	Rowan Halifax	GOM	JU	Hurricane	Rita - Beached, written off
2005-09-28	Rowan Louisiana	GOM	JU	Hurricane	Rita - Beached, written off
2005-09-28	Rowan Odessa	GOM	JU	Hurricane	Rita - Missing, sunk
2005-09-27	Chevron Typhoon	GOM	P	Hurricane	Major damage
2005-09-09	Noble Max Smith	GOM	JU	Hurricane	Major damage in Rita
2005-08-31	Ocean Warwick	GOM	JU	Hurricane	Major damage
2005-08-31	Rowan N. Orleans	GOM	JU	Hurricane	Katrina - capsized, sank
2005-08-29	Hercules 25	GOM	JU	Hurricane	Katrina - derrick fell on rig
2005-08-29	PSS Chemul	GOM	SS	Hurricane	Major damage
2005-08-29	Shell Mars	GOM	P	Hurricane	Major damage
2005-07-27	Mumbai High N	Indian Ocean	P	Fire	Boat impact
2005-07-10	Thunderhorse	GOM	SS	Hurricane	List after Dennis

Date	Ring/Well name	Location	Type	Incident	Remarks
2005	Gulfwind	-	JU	Sinking	Wrecked, Chiles Offshore
2005	Transocean 7	-	JU	Sinking	Wrecked
2004-11-28	Snorre A	Norway	P	Blowout	Seabed gas blowout
2004-09-15	Ensco 64	GOM	JU	Hurricane	Major damage
2004-09-15	Medusa Spar	GOM	P	Hurricane	Damaged
2004-08-20	Jim Cunningham	Egypt	SS	Blowout	Fire
2004-08-10	Adriatic IV	Med Sea, Egypt	JU	Blowout	Fire
2003-09-11	Parker 14-J	GOM	JU	Collapse	Jacking mechanism failure
2002-10-02	Nabors Dolphin 105	GOM	JU	Sinking	Collapse and capsize
2002-10-02	Rowan Houston	GOM	JU	Sinking	Collapse and capsize
2002-09-30	Arabdrill 19	Saudi Arabia	JU	Blowout	Fire
2002-08-09	Ocean King	GOM	JU	Blowout	Fire
2001-07-13	Marine IV	GOM	JU	Blowout	-
2001-06-19	Petrobas P7	Bicudo Field, Brazil	P	Blowout	Fire
2001-05-09	Glomar Baltic I	GOM	JU	Blowout	-
2001-03-20	Petrobas P36	Campos Basin, Brazil	P	Sinking	Explosion
2001-03-01	Ensco 51	GOM	JU	Blowout	Setting casing string, fire
2000-04-15	Al Mariyah	Persian Gulf	JU	Collapse	Jack failure when skidding derrick
1999-09-09	NXF Platform A	GOM	P	Blowout	Fire
1998-12-03	Petronius A	GOM	P	Sinking	Lift failure, dropped module
1998-07-17	Nabors Rig269	GOM	P	Collapse	-
1998-07	Glomar Artic IV	-	SS	Explosion	-
1998-06	Mr Bice	GOM	JU	Sinking	Sank in bad weather on tow
1998-01	Rigmar 151	West Atlantic	JU	Sinking	Formerly Neptune Gascogne
1997-04-01	Pride 1001E	GOM	P	Blowout	Fire
1997	(Pool) Ranger 4	GOM	JU	Sinking	Breakthru/slide into crater
1996-11-16	Maersk Victory	South Australia	JU	Collapse	Punch-through, leg failure
1996-04	Jalapa	GOM	JU	Sinking	Weather, struct. fail, flooding
1996-01-24	Sundowner 15	GOM	P	Blowout	Fire
1996-01	Offshore Bahram	Suez	JU	Sinking	Sank in bad weather on tow
1996	Ubit Platform	Nigeria	P	Fire	Explosion
1994-12-01	Rowan Odessa	GOM	JU	Fire	Leg struck pipe
1993-11	DM Saunders	Arabian Gulf	JU	Sinking	Flooded in bad weather on tow
1993-02	Actinia	Vietman	SS	Blowout	Major release
1992-09-29	Blake IV	GOM	JU	Blowout	Major release, fire
1992-08-27	Marlin 3	GOM	JU	Hurricane	Major damage, collapse
1991-08-23	Sleipner A	Norwegian CS	P	Sinking	-
1991-08	Fulmar A	UK SC	P	Explosion	Shell
1990-08-20	West Gamma	North Sea	JU	Sinking	Sank during tow (bad weather)

Date	Ring/Well name	Location	Type	Incident	Remarks
1990-05-30	Keyes Marine	GOM	JU	Blowout	-
1989-11-08	Interocean II	UK CS	JU	Sinking	Flooded on tow (bad weather)
1989-11-03	Seacrest	Gulf of Thailand	DS	Sinking	Typhoon Gay
1989-04-28	Al Baz	Nigeria	JU	Blowout	Burned & sank
1989-04-18	Cormorant A	UK CS	P	Explosion	Gas leak
1989-04	Five Sisters	GOM	JU	Sinking	Sank in bad weather on tow
1989-01-08	Teledyne Movible 16	GOM	JU	Blowout	Total loss
1989	Ekofisk P	Norwegian CS	P	Fire	-
1989	Sedco 252	Indian Coast	JU	Blowout	Fire
1988-12-15	Rowan Gorilla I	North Atlantic	JU	Sinking	Sank during tow (bad weather)
1988-09	Vicking Explorer	SE Borneo	DS	Blowout	Explosion and sinking
1988-09-22	Ocean Odyssey	UK CS	SS	Blowout	Fire
1988-07-06	Piper Alpha	UK CS	P	fire	Explosion after gas leak
1988-04-24	Enchova Central	Brazil	P	Blowout	Destroyed by fire
1988-02-22	Keyes Marine	GOM	JU	-	PT, legs bent total loss
1988	Glomar Labrador	-	JU	Collision	Merchant ship
1987-12-20	Steelhead Platform	Cook Inlet, Alaska	P	Blowout	Fire.Unocal, Penrod rig also lost
1987-11-04	Mississippi Cany 311A	GOM	P	Blowout	Platform tilted
1987-10-20	Bigfoot 2	GOM	JU	-	2 bow legs PT
1987-10-10	Yum II/Zapoteca	GOM	JU	Blowout	PEMEX
1986-11-20	Dixilyn Field 83	Indian Ocean	JU	Sinking	Stbd leg PT, capsized
1986-10	Zacateca	Mexico	JU	Blowout	Sank. Perforadora Co
1986	Bob Buschman	-	JU	Sinking	Field Co
1985-10-28	Penrod 61	GOM	JU	Sinking	Sank in H. Juan
1985-10-06	West Vanguard	Haltenbanken Norw. NS	SS	Blowout	-
1985-06	Dixilyn Field 82	Indian Ocean	JU	Sinking	Sank in bad weather on tow
1985-01	Glomar Artic II	UK CS	SS	Explosion	Pump room
1985	Zapata Enterprise	Javan Coast	JU	Blowout	Fire
1984-09-14	Zapata Lexington	GOM	JU	Blowout	Fire
1984-08-16	Enchova Central	Enchova Field, Brazil	P	Blowout	Fire, lifeboat fell to sea
1984-05-13	Getty Platform A	GOM	P	Explosion	-
1984-02-22	Vinland	Sable Island, N. Atlantic	SS	Blowout	Shell, Uniacke G-72
1984	Ali Baba	UK CS	SS	Grounding	Broke moorings
1983-11-05	Byford Dolphin	Norwegian CS	SS	Explosion	Diving accident
1983-10-25	Glomar Java Sea	S. China Sea	DS	Sinking	Capsized in tropical storm Lex
1983-09-09	60 Yrs of Azerbaijan	Caspian Sea	JU	Sinking	Seabed failure, volcanic action

Date	Ring/Well name	Location	Type	Incident	Remarks
1983-09-01	Key Biscayne	Australia	JU	Sinking	Sank in bad weather, Salvg 12-83
1983-07-20	Penrod 52	GOM	JU	Blowout	Collapsed during blowout
1983-05-15	Placid L10a	SNS, NL	P	Blowout	Corrosion
1983-03	Nowruz	Persian Gulf	P	Fire	Major release
1983-02-07	Glomar Grand Isle	Indonesia	DS	Blowout	Fire
1983	Neptune Gascogne	-	JU	Sinking	Lost legs Brazil. Later Rigmar 151
1983	Cerveza	-	P	Blowout	Abandon
1982-02-15	Ocen Ranger	N. Atlantic	SS	Sinking	Storm, Mobil
1982	Banzala	Cabinda, Angola	JU	Sinking	Lost, Shallow gas blowout
1981-08-27	Petromar V	S. China Sea	DS	Blowout	Sank after blowout
1981	Bohai 6	West Pacific	JU	-	Slipped on location
1980-12	Ocean Champion	Port Said	JU	Grounding	Grounded in bad weather
1980-11-21	Lake Peigneur	Louisiana	-	Sinking	Drilled into salt mine
1980-10-22	Dan Price	Alaska, North Pacific	JU	Sinking	Sank in bad weather on tow
1980-10-18	Maersk Endurer	Gulf of Suez	JU	Blowout	Derrick collapse, renamed EDC Setty
1980-10-02	Hasbah Platform	Persian Gulf	P	Blowout	Major release
1980-10-02	Ron Tappmeyer	Saudi Arabia	JU	Blowout	Hasbah Platform blowout
1980-08-09	Dixilyn Field 81	GOM	JU	Sinking	Hurricane Allen, on loc
1980-06-15	Bohai 3	-	JU	Blowout	Fire
1980-03-27	A.L.Kielland	Norwegian CS	SS	Collapse	Fatigue fracture caused capsize
1980-03-09	Ship Shoal 246b	GOM	P	Blowout	Killed after 1 day
1980-02-05	Nabors Workhorse IX	GOM	JU	Sinking	Sank in tow, salvaged
1980-01-17	Funiwa Platform	Nigeria	P	Blowout	Major release
1980-01-01	Sea Quest	Nigeria	SS	Blowout	Sedco 135C, fire, scuttled off Nigeria
1980	Harvey Ward	GOM	JU	Sinking	Mudslide, total loss
1980	Marlin 4	South America	JU	Collapse	Legs damaged, seabed slide
1980	Dixilyn 150	-	JU	Sinking	-
1979-11-25	Bohai 2	Bay of Bohai, China	JU	Sinking	Storm. Sank in tow
1979-06-03	IXTOC-1	Mexico	JU	Blowout	IXTOC 1 - Capped 1980 Mar 23
1979-05-10	Ranger 1	Ranger 1	GOM	JU	C
1978-02-01	Orion	Guersey, UK	JU	Grounding	Broke loose from barge
1977-09	Dolphin Titan 143	-	JU	Sinking	Sank in tow, salvaged , retired
1977-06	Ocean Master II	West Africa	JU	Sinking	Sank in bad weather on tow
1977-04-22	Ekofisk B	Norwegian CS	P	Blowout	Major release
1977-01-12	Scan Sea	West Pacific	JU	Sinking	Sank in bad weather during tow
1976-02	W.D. Kent	Off Dubai	JU	Sinking	Sank hit by a barge in storm
1976-03-01	Deep Sea Driller	Norwegian CS	SS	Grounding	Storm

Date	Ring/Well name	Location	Type	Incident	Remarks
1976-04-15	Ocean Express	GOM	JU	Sinking	Capsized on tow in bad weather
1976-01	Gatto Selvatico	-	JU	Sinking	AGIP
1976	Baku 2	Caspian Sea	JU	Sinking	Capsized, sank
1975-03	Zapata Topper	GOM	JU	Blowout	Sank off La.
1975-09	AMDP-1	Persian Gulf	JU	Sinking	Sank in tow, ArabAmOilCo
1975	Ekofisk A	Norwegian CS	P	Fire	-
1974-11	Liberation	South America	JU	Sinking	Weather, flooding, sunk
1974-10-09	Gemini	-	JU	-	Punch thru, leg failure
1974-01-01	Transocean 3	UK CS	SS	Collpase	Leg broke, capsize
1973-08-08	Trinimar Marine W327	Venezuela	P	Blowout	Major release
1970-12-01	South Timbalier 26	GOM	P	Blowout	Platform lost
1970-02-10	Main Block 41	GOM	P	Fire	Burned for 2 months
1969-11-25	Constellation	UK CS	JU	Sinking	Sank in bad weather on tow
1969-11-22	Zapata Scorpion	Canary Islands	JU	Sinking	Sank in tow
1969-03	Estrellita	GOM	JU	Sinking	Grounded in extreme weather
1969-01-28	Union Oil Platform A	Dos Cuadras US	P	Blowout	Major release
1969	Elefante	-	JU	Fire	Destroyed
1968-08	Little Bob	-	JU	Blowout	Fire off La. Coral Drilling
1968-04-28	Dresser 2	GOM	JU	Sinking	Overturned due to soil failure
1968-03-06	Ocean Prince	UK CS	SS	Collapse	Broke in storm
1966-02-09	Roger Buttin 3	West Africa	JU	Sinking	Leg penetration, sank
1965-12-27	Sea Gem	UK CS	JU	Collapse	BP, jack collapse, brittle fracture
1965-09-09	Penrod 52/Petrel	GOM	JU	Sinking	PT, capsized moving , H. Betsy
1965-09-09	Saipem Paguro	Ravena, Italy	JU	Blowout	Destroyed by fire
1965	Zapata Maverick	GOM	JU	Sinking	Punc thru, overturn H. B
1965	Pagura	-	JU	Fire	Saipem
1964-06-30	C.P. Baker	GOM	DS	Blowout	Explosion and fire
1963-05	Mr Louie	German CS	JU	Blowout	Crater
1959	Transgulf Rig 10	GOM	JU	Sinking	Punchthru, capsize b4 move
1957-03-31	Mr Gus 1	GOM	JU	Sinking	PT, tilt, capsized H. Audrey
1957	Deepwater II	GOM	JU	Sinking	Sank after hurricane
1956-08-10	SedcoNo8-Rig22	GOM	JU	Sinking	Under construction

Source: www.oilrigdisasters.co.uk

ANNEX 4

OFFSHORE INSTALLATIONS INCIDENTS WITH SIGNIFICANT OIL RELEASE*

Name	Date	Location	Spilled oil (tonnes)	Remarks
Deepwater Horizon/ Macondo	21 Apr 2010	Gulf of Mexico	780,000	A deepwater well blowout occurred during drilling, flowing until June 6, when a containment cap was installed. On July 15, a better containment cap was attached. Relief wells were drilled to permanently stop the flow.
West Atlas	21 Aug 2009	Montara oil field, Timor Sea, Australia	34,000	A well blowout occurred during drilling. More than two months were needed to plug the well.
Statford A	12 Dec 2007	Off Bergen, North Sea	4,000	Spill occurred during loading operations
Nowruz	24 Jan 1983	Persian Gulf	270,000	A collision between a supply ship and a production platform in the oil field. Around 8 months were needed to cap the well due to the Iran – Iraq war.
Hasbah Platform Well 6	2 Oct 1980	250km northwest of Qatar Persian Gulf	16,000	The rig Ron Tappmeyer jack-up, during exploratory drilling of well No. 6, experienced a blowout for 8 days and cost the lives of 19 men.
Funiwa No. 5 Well	17 Jan 1980	Niger Delta	27,000	Oil from the blowout, during drilling, polluted the Niger Delta for 2 weeks, followed by fire and the eventual bridging of the well.
Production well D-103	8 Jan 1980	800km southeast of Tripoli, Libya	142,860	The oil spill was caused by a wellhead blowout from a production platform.
Sedco 135F SemiSub (IXTOC-1)	3 Jun 1979	Bahia de Campeche, Mexico	500,000	The IXTOC-1 blowout occurred during drilling, and flowed uncontrollably until it was capped 9 months later.
Ekofisk B	22 Apr 1977	300km southwest of Ekofisk oil field, North Sea	32,000	Oil and gas blowout during a workover on a production platform. The leak was finally stopped seven days later.
Trinimar Marine Well 327	8 Aug 1973	Gulf of Paria, Venezuela	1,500	Oil spilled from the well for 5 days when the well sanded up, during production.
Unio Oil Platform Alpha Well A-21	29 Jan 1969	Santa Barbara Channel, California	16,000	The Union Oil Platform A blowout occurred during drilling and lasted 11 days but continued leaking oil for months afterwards. The depth was 1150 metres.

* Incidents in European waters or shared sea basins are highlighted in grey.

ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the EU's decentralised agencies.

Based in Lisbon, the Agency provides technical assistance and support to the European Commission and Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security.

It has also been given operational tasks in the field of oil pollution response, vessel monitoring and in long range identification and tracking of vessels.

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