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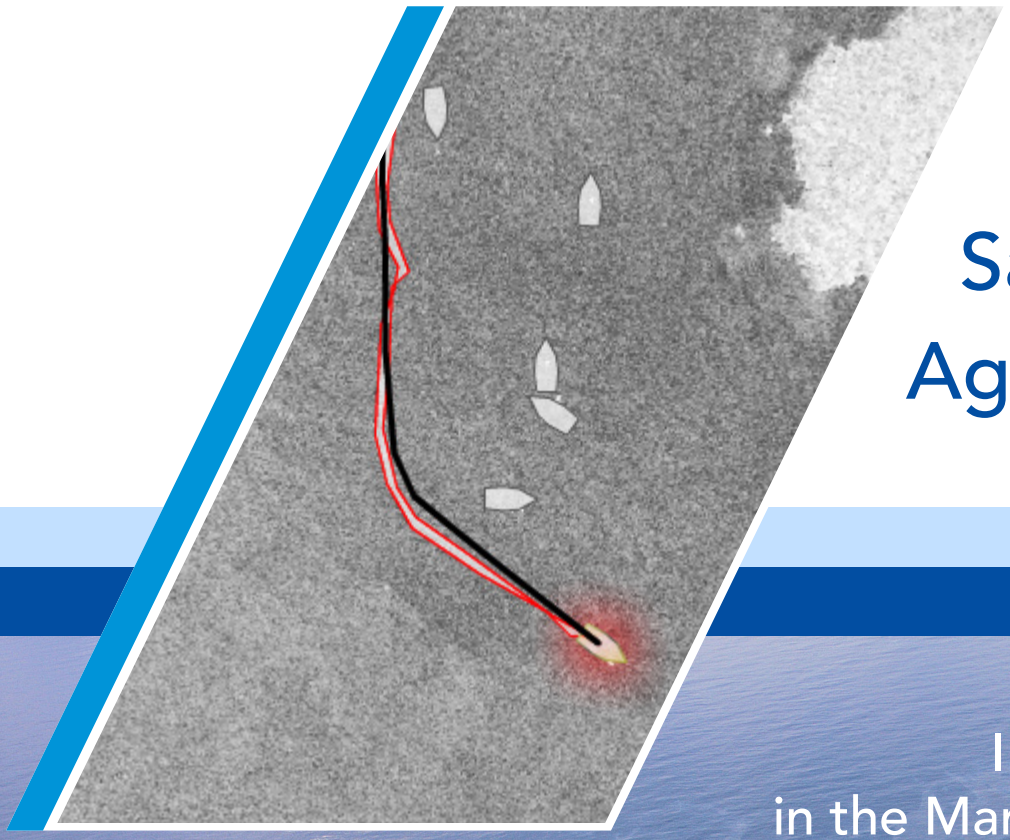

European Maritime Safety Agency

Addressing Illegal Discharges in the Marine Environment

EUROPEAN MARITIME SAFETY AGENCY

Foreword

Since Directive 2005/35/EC on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences[1] was adopted, progress has been made by Member States in addressing illegal discharges in the marine environment.

However, despite increased surveillance and enforcement efforts, illegal discharges of oil and other polluting substances still regularly occur in European waters, and the number of prosecutions remains low. Recognising this, EMSA has undertaken a number of activities together with the Member States, such as workshops and trainings.

One activity identified by stakeholders as useful was the drafting of a document to provide a common overview of the enforcement chain from beginning to end. It was felt that a document developed at the European level would build upon and complement tools and publications already existing at a regional level. The Agency facilitated a Working Group for that purpose. This document, *Addressing Illegal Discharges in the Marine Environment*, is the outcome.

This publication is intended to support authorities involved in the enforcement chain addressing illegal pollution (e.g. surveillance operators, inspectors and investigators, Port State Control Officers, law enforcement officials). It is recommended that readers familiarise themselves with the content of the document to obtain a sense of how the various steps in the enforcement chain are interdependent. However, the document has been developed so that each chapter can also be read in isolation, and readers can quickly identify the specific information they require.

Maritime transport is by nature transboundary, and successful prosecution of polluters relies on mutual understanding, exchange of information, and coordination between coastal, port and flag States. EMSA, as an European Agency, is pleased to contribute to the common effort to promote international cooperation in this field, with the ultimate goal of protecting the marine environment.

Markku Mylly
Executive Director

[1] As amended by Directive 2009/123/EC.

Acknowledgements

The European Maritime Safety Agency (EMSA) would like to thank the many individuals and organisations that contributed to the development of this document. In particular, the contribution of the members of Working Group convened to draft the document is gratefully acknowledged as follows:

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Disclaimer

This document is intended to provide useful information when addressing violations of MARPOL regulations in Europe. The Guidelines were developed in the framework of European Member State and EMSA activities in the field of improving the identification and pursuit of ships making unlawful discharges and are intended to provide a general overview of issues related to illegal discharges in the marine environment.

Under no circumstance does this document replace individual, legal or technical advice rendered considering the individual circumstances of each case and situation. Under no circumstances shall EMSA or any of the other contributors be liable for any loss, damage, liability or expense incurred or suffered that is claimed to have resulted from the interpretation and the use of the information presented herein.

Table of Contents

List of figures, images and tables

List of acronyms and abbreviations

AIS	Automatic Identification System
BA OAC	Bonn Agreement Oil Appearance Code
BSC	Black Sea Commission
CEPCO	Co-ordinated Extended Pollution Control Operations
CILPAN	International Centre for Pollution Response in the North East Atlantic
CIC	Concentrated Inspection Campaign
COW	crude oil washing
CTG MPPR	Consultative Technical Group for Marine Pollution Preparedness and Response
DG ECHO	European Commission Directorate General - Humanitarian Aid and Civil Protection
DG MOVE	European Commission's Directorate-General for Mobility and Transport
EC	European Commission
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EFTA	European Free Trade Association
EMSA	European Maritime Safety Agency
ENPRO	Network of Prosecutors on Environmental Crime in the Baltic Sea Region
EU	European Union
FSI	Flag State Implementation
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
Gt	Gross tonnes
HELCOM	Helsinki Commission, the governing body of the Helsinki Convention
HNS	Hazardous and Noxious Substances
IMO	International Maritime Organization
IOPP	International Oil Pollution Prevention
LRIT	Long Range Identification and Tracking
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee
MoU	Memorandum of Understanding on Port State Control
NCB	National Contact Bureaux (INTERPOL)
NIR	New Inspection Regime (PSC)
Nm	Nautical mile
NSN	The North Sea Network of Investigators and Prosecutors
OCM	Oil Content Meter
OECD	Organisation for Economic Co-operation and Development
OSPAR	Convention for the protection of the marine environment of the North Atlantic
OTSOPA	Bonn Agreement's Working Group on Operational, Technical and Scientific Questions concerning Counter Pollution Activities
OWS	Oil Water Separator
PRF	Port Reception Facility
PPM	Parts per million
PSC	Port State Control
PSSA	Particularly Sensitive Sea Area
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
SAR	Synthetic Aperture Radar
SLAR	Side Looking Airborne Radar
SRP	Ship Risk Profile
Thetis	The Hybrid European Targeting and Inspection System (Thetis), an EMSA managed information system in support of the new Port State Control inspection regime
UNCLOS	United Nations Convention on the Law of the Sea, 1982

Introduction

In order to prevent pollution of the marine environment by polluting substances, discharges at sea have been strictly regulated, mainly by the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78). However, some vessels continue to illegally discharge at sea in excess of the permitted limits or in areas where it is prohibited.

At European level, many of the measures to be implemented in order to address illegal discharges from vessels are outlined in Directive 2005/35/EC, as amended by Directive 2009/123/EC, on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences. As recognised in the Directive, '*The implementation of MARPOL 73/78 shows discrepancies among Member States and there is thus a need to harmonise its implementation at Community level*.'

Enforcement actions in Europe have had limited results in terms of the number of cases prosecuted and of the level of sanctions applied. Given the variety of legal systems and of operational practices in place in the Member States, a vigorous and homogeneous enforcement of pollution regulations across waters under the jurisdiction of EU Member States will require considerable effort. This will often involve cooperation between States both in the European Union and outside.

This document has been structured in two parts. Part 1 provides background information for developing a general understanding of ship-source pollution in the marine environment. It is assumed that readers will not necessarily have extensive experience in the maritime sector, and information is presented accordingly. In Part 2, a step-by-step overview is given from the initial indication of a possible pollution offence onwards, to support authorities in identifying the most effective actions depending on the particularities of the case and the national context.

The collection of evidence for proving violations requires access to various sources of information; throughout, the document indicates how existing organisations and systems can be used to request, receive, and exchange information. In order to avoid duplication of work and inconsistencies, and in relation to topics that are more appropriately addressed at national or regional level, extensive reference is made to relevant material produced by Regional Agreements, Networks of Prosecutors, and other bodies.

Most initial efforts by authorities in charge of enforcing pollution regulations have been concentrated on combatting pollution by oil. For this reason, the level of knowledge in this field is more developed and techniques and procedures in place to deal with it are more advanced. This document, which is built on existing bodies of knowledge, reflects this.

Much of the information contained herein is of general application and is not limited in terms of geographical scope. However, some information is related exclusively either to particular bodies (e.g. Regional Agreements; Paris Memorandum of Understanding) or to the EU context. In particular, legal measures taken at European level to harmonise the enforcement of international regulations addressing ship-source pollution apply only to European Union Member States. Information systems developed in application of EU legislation are usually only accessible by EU Member States.

Part 1 – General Information

This part provides general information on the various aspects related with ship-sourced pollution including the legal framework, the institutional context, pollution in the marine environment, and the production of oily waste. It is intended to provide a brief overview of pertinent topics to individuals who may not have had exposure to the full enforcement chain, for example, legal prosecutors with no maritime background, marine surveillance officials who are not aware of the range of cooperation channels at a European or global context.

Chapter 1: Legal framework

1.1 Legal background

At the international level there are two fundamental instruments that deal with certain aspects of ship-source pollution: the 1982 United Nations Convention on the Law of the Sea (UNCLOS Convention) and the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78).

At the European level the relevant provisions of MARPOL are implemented by Directive 2005/35/EC on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences, as amended by Directive 2009/123/EC.

Some other EU Directives may be of supportive value for the enforcement of the prohibition of illegal discharges, amongst others: Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 on reporting formalities for ships arriving in and/or departing from ports of the Member States, Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system amended by Directive 2009/17/EC and Directive 2009/16/EC of the European Parliament and of the Council of 23 April 2009 on Port State Control.

1.2 International level

1.2.1 MARPOL: the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)

The MARPOL Convention, adopted at the International Maritime Organization (IMO) in 1973 and modified by the Protocol of 1978, deals with the prevention of pollution from ships and the protection of the marine environment from discharges of harmful substances to the sea. It establishes criteria for discharges at sea and also an obligation for the ship master to report any pollution incident which is defined as ‘a discharge above the permitted level’. It also imposes a duty to cooperate between States parties to the Convention in the sanctioning of such violations. In particular, article 4 (4) of the Convention stipulates:

'The penalties specified under the law of a Party pursuant to the present article shall be adequate in severity to discourage violations of the present Convention and shall be equally severe irrespective of where the violations occur.'

MARPOL includes six annexes:

- Annex I containing Regulations for the Prevention of Pollution by Oil;
- Annex II containing Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk;
- Annex III containing Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form;
- Annex IV containing Regulations for the Prevention of Pollution by Sewage from Ships;
- Annex V containing Regulations for the Prevention of Pollution by Garbage from Ships;
- Annex VI containing Regulations for the Prevention of Air Pollution from Ships.

All annexes have been ratified by the requisite number of States (representing a gross tonnage of more than 50%), and have therefore all entered into force. Annexes I and II of MARPOL have been ratified by 152 states, representing 99.2 per cent of the world's shipping tonnage.[2]

For the purpose of this document and at its present stage the two first annexes are the most relevant (as they concern prevention of pollution by oil and liquid noxious substances in bulk).

1.2.1.1 Annex I – Regulations for the Prevention of Pollution by Oil

Annex I, Regulation 15 provides that 'any discharge into the sea of oil or oily mixtures from ships shall be prohibited'. To this prohibition there are exceptions, both for discharges outside and inside special areas. For example for a ship of above 400 tonnes, a discharge outside special areas is possible if all the following conditions are satisfied:

- the ship is proceeding en route;
- the oily mixture is processed through an oil filtering equipment meeting the requirements of regulation 14.7 of this annex;
- the oil content of the effluent without dilution does not exceed 15 parts per million;
- the oily mixture does not originate from cargo pump room bilges on oil tankers;
- the oily mixture, in case of oil tankers, is not mixed with oil cargo residues.

Regulation 34 provides, similarly to regulation 15, that oil discharges from cargo areas of tankers are prohibited, unless all the following conditions are satisfied:

- the tanker is not within a special area;
- the tanker is more than 50 nautical miles from the nearest land;
- the tanker is proceeding en route;
- the instantaneous rate of discharge of oil content does not exceed 30 liters per nautical mile;

[2] Updated information on which states have ratified which annexes is provided regularly by the IMO: http://www.imo.org/About/Conventions/StatusOfConventions/Documents/status-x.xls

- the total quantity of oil discharged into the sea does not exceed for tankers delivered on or before 31 December 1979, as defined in regulation 1 paragraph 28.1, 1/15,000 of the total quantity of the particular cargo of which the residue formed a part, and for tankers delivered after 31 December 1979, as defined in regulation 1 paragraph 28.2, 1/30,000 of the total quantity of the particular cargo of which the residue formed a part;
- the tanker has in operation an oil discharge monitoring and control system.

In relation to special areas any discharge into the sea of oil or oily mixture from the cargo area of an oil tanker shall be prohibited.

Regulations 15 (D) of annex I provide that whenever visible traces of oil are observed on or below the surface of the water in the immediate vicinity of a ship or its wake, a prompt investigation should be undertaken, taking into account such elements as wind and sea conditions, the track and speed of the ship, other possible sources of the visible traces in the vicinity and any relevant oil discharge records. This however does not apply to the situations when (as specified by Regulation 4):

(a) the discharge into the sea of oil or oily mixture was necessary for the purpose of securing the safety of a ship or saving life at sea; or
(b) the discharge into the sea of oil or oily mixture resulted from damage to a ship or its equipment:
  (i) provided that all reasonable precautions were taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimizing the discharge; and
  (ii) except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or
(c) the discharge into the sea of substances containing oil was approved by the Administration for the purpose of combating specific pollution incidents in order to minimize the damage from pollution. Any such discharge shall be subject to the approval of any Government in whose jurisdiction it is contemplated the discharge will occur.

1.2.1.2 Annex II – Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk

Similar rules concern discharges of noxious liquid substances in bulk into the sea in annex II. There is a general prohibition of discharge of such substances (in MARPOL they are grouped in four categories), but there are also exceptions (see Regulation 13) which allow for discharges to take place in particular circumstances (e.g. an exemption for a prewash may be granted by the Government of the receiving Party on request of the ship's master), under the following conditions:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled; and
(b) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
(c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land in a depth of water of not less than 25 metres.

The part of enforcement in the text of MARPOL is provided for in articles 4-6. Article 4 provides for the enforcement powers of flag States. The flag State should prosecute a violation wherever it

occurred after being informed and if the evidence is sufficient. The same article provides that a coastal State shall either prosecute offences occurred in its jurisdiction regardless the flag of the ship or report the offences to the flag State for the purpose of initiating proceeding there. The coastal State may also request a port State control inspection to a port State that the ship in question visits.

Articles 5 and 6 provide that a port State may inspect the ships that arrived to its ports or offshore terminals for the purpose of verifying whether the ship has discharged any harmful substances, on its own initiative, or if it has received a request, together with accompanying evidence, from another State to perform such inspection. The inspection is performed according to the rules on Port State Control. In some circumstances the ship can be detained. This will happen for example when a ship does not carry a valid required certificate on board or if the data in the certificate does not correspond to the data or conditions of the ship.

Image 1: Illegal discharge of a MARPOL annex II substance above the waterline

1.2.1.3 *Annex III – Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form*

According to annex III, regulation 7, jettisoning of harmful substances carried in package form (including empty packaging) is prohibited except where necessary for the purpose of securing the safety of the ship or saving life at sea, or when appropriate measures have been taken to regulate the washing of leakages overboard.

1.2.1.4 *Annex IV – Regulations for the Prevention of Pollution by Sewage from Ships*

Annex IV applies only to certain categories of ship. Regulation 11, article 1, provides that discharge of sewage from ships other than passenger ships in all areas and discharge of sewage from passenger ships outside special areas, is prohibited, except when:

(a) the ship is discharging comminuted and disinfected sewage at a distance of more than 4 nautical miles (nm) from land, or in the case of sewage which is not comminuted and disinfected at a distance of more than 12 nm from land, and when the ship is en route and proceeding at not less than 4 knots; or

(b) the ship has in operation an approved sewage treatment plant and the effluent shall not produce visible floating solids nor cause discoloration of the surrounding water.

These provisions do not apply to ships operating in the waters under the jurisdiction of a State and visiting ships from other States while they are in these waters and are discharging sewage in accordance with such less stringent requirements as may be imposed by such State (article 2).

Regulation 11, article 3, states that from 1 January 2016 for new passenger ships and from 1 January 2018 for existing passenger ships, the discharge of sewage from a passenger ship within a special area shall be prohibited except when the ship has in operation an approved sewage treatment plant and the effluent shall not produce visible floating solids nor cause discoloration of the surrounding water.

Article 4 provides that when the sewage is mixed with wastes or waste water, the more stringent requirements shall apply.

Exceptions (regulation 3) are made when discharges are necessary for securing the safety of a ship and those on board or saving lives at sea, or when the discharge results damage to the ship or its equipment if all reasonable precautions have been taken.

1.2.1.5 Annex V – Regulations for the Prevention of Pollution by Garbage from Ships

Annex V applies to all ships and prohibits the discharge of garbage into the sea (regulation 2; regulation 3). There are a number of exceptions, which are listed in regulations 4-7 of the annex.

1.2.1.6 Annex VI – Regulations for the Prevention of Air Pollution from Ships

Annex VI sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances; designated emission control areas set more stringent standards for SOx, NOx and particulate matter.

1.2.2 UNCLOS: the United Nations Convention on the Law of the Sea

UNCLOS: the United Nations Convention on the Law of the Sea was adopted in 1982 and entered into force in 1994. It regulates a variety of issues related to shipping but for the purpose of counteracting ship source pollution only certain provisions will be highlighted in this chapter, namely those provisions that relate to the enforcement issues with respect to pollution by illegal discharges of oily and noxious substances to the sea.

1.2.2.1 Enforcement by flag States

Article 217 provides for the enforcement by flag States. When the ship commits a violation (e.g. MARPOL violation involving illegal ship source pollution), the flag State shall open, on its own initiative, an immediate investigation and, where appropriate, institute proceedings in respect of the alleged violation, irrespective of where it occurred.

Moreover, any State can actually request the flag State to investigate the alleged violation. If there is sufficient evidence, the flag State shall institute proceedings against the vessel without delay and inform the IMO and the requesting State.

1.2.2.2 Enforcement by port States

Article 218 provides for the enforcement by port States. Articles 219 and 220 also include provisions applicable by port States.

In relation to violations that occurred within the territorial sea or the exclusive economic zone of the port State, article 220 provides that the State may institute proceedings in respect of the vessel that

committed the violation when this vessel is voluntarily within a port or at an off-shore terminal of that State.

In relation to an illegal discharge from the vessel that occurred outside of the internal waters, territorial sea or Exclusive Economic Zone (EEZ) of the port State, article 218 provides that the port State may undertake investigations and, where the evidence warrants, institute proceedings in respect of that vessel, if the vessel is voluntarily within a port or at an off-shore terminal of that port State.

If the discharge occurred in the internal waters, territorial sea or EEZ of another State, the relevant port State may only institute proceedings at the request of the coastal State where the violation occurred or of a State damaged or threatened by the discharge, as well as the flag State, unless the discharge is likely to cause pollution in its own waters or in the EEZ, then it is free to institute proceedings on its own initiative.

The records of the investigation carried out by a port State at the request of the coastal, flag or another State will be transmitted to them.

Any proceedings instituted by the port State may be suspended at the request of a coastal State (if the violation occurred in the area of its jurisdiction) and then the evidence and records of the case have to be transmitted to that coastal State.

According to article 219, when a vessel is in a port or in an off-shore terminal and is in violation of applicable international rules and standards relating to seaworthiness and therefore threatens the marine environment, the port State may prevent the ship from sailing. It will however permit the vessel to proceed to the nearest appropriate repair yard.

1.2.2.3 Enforcement by coastal States

Article 220 provides for the enforcement by coastal States. Articles 111, 211 and 226 are also relevant for the enforcement by coastal States.

Article 211 (and in particular paragraphs 4 and 5) creates a legal basis for the coastal States: it provides that the coastal States may, in the exercise of their sovereignty within their territorial sea, adopt laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the right of innocent passage. Such laws and regulations shall not (in accordance with part II, Section 3 of the Convention) hamper innocent passage of foreign vessels. They may also adopt laws and regulations in respect of their exclusive economic zones for the purpose of prevention of pollution from vessels if these laws give effect to generally accepted international rules and standards established through the competent international organisation or general diplomatic conference.

In relation to the discharges in the territorial sea of the coastal State, article 220 paragraph 2 provides that when there are clear grounds for believing that a vessel navigating in the territorial sea of the coastal State has, during its passage therein, violated laws and regulations of that State or applicable international rules and standards for the prevention, reduction and control of pollution from vessels, a physical inspection may be undertaken and it may result in instituting judicial proceeding or detaining the vessel if evidence warrants so.

However, according to article 226 the inspection of a foreign vessel shall be the least burdensome possible, limited to an examination of required certificates, records or other documents. Further physical inspection may only be undertaken if the vessel does not possess such documents, or the content of documents is not sufficient to verify an eventual violation or there are clear grounds to believe that the state of the vessel does not correspond to the documents.

In relation to the discharges in the EEZ of the coastal State, article 220 paragraph 3 provides that where there are clear grounds for believing that a vessel navigating in the exclusive economic zone or the territorial sea of a coastal State has committed in the exclusive economic zone a violation of applicable international rules and standards or laws and regulations of that State giving effect to those rules, that State may require the vessel to give information regarding its identity and port of registry, its last and its next port of call and other relevant information required to establish whether a violation has occurred. However, if the violation mentioned resulted in a substantial discharge causing or threatening to cause significant pollution of the marine environment, that State may undertake physical inspection of the vessel. If the violation resulted in a discharge causing major damage or threat of major damage to the coastline or related interests of the coastal State, or to any resources of its territorial sea or the EEZ, that State may detain the vessel and institute judicial proceedings.

Last but not least, a coastal State is empowered, according to article 111, to pursue a foreign ship if there is a good reason to believe that the ship has violated the laws and regulations of that State. Such pursuit ('hot pursuit')must be commenced when the foreign ship or one of its boats is within the internal waters, the archipelagic waters, the territorial sea or the contiguous zone of the pursuing State, and may only be continued outside the territorial sea or even on the high seas if the pursuit has not been interrupted. The right of hot pursuit ceases as soon as the ship pursued enters the territorial sea of its own State or of a third State.

The right of hot pursuit shall apply accordingly to violations in the exclusive economic zone or on the continental shelf, including safety zones around continental shelf installations, of the laws and regulations of the coastal State applicable to the exclusive economic zone or the continental shelf, including such safety zones.

1.2.2.4 Notification to the flag State and other States concerned

Both port and coastal States shall promptly notify the flag State or any other State concerned of any measures against foreign vessels (article 231). The proceedings initiated by a port or coastal State in respect of MARPOL violations committed by a foreign vessel outside the territorial sea of the State, shall be suspended upon taking of proceedings by the flag State within six months of the date on which the proceedings were first instituted – the suspension lasts until the flag State has arrived at a final conclusion, then the suspended proceedings are also terminated. The flag State that requested the suspension, shall in due course make available to the State that previously instituted the proceedings access to the file and the records to the proceedings (article 228).

The proceedings will not be suspended if they relate to a case of 'major damage' to the coastal State or if the flag State in question has repeatedly disregarded its obligations to effectively enforce MARPOL (UNCLOS article 228).

1.3 Sea areas

International legislation contains a number of provisions related to sea areas; these often determine whether an action is considered legal or not, and determine the rights and obligations, including law enforcement obligations, of a state.

1.3.1 Maritime zones

Under international law, whether a violation of anti-pollution regulations has taken place in internal waters, territorial seas or exclusive economic zones, determines the possibilities to take action and/or to prosecute the violation, and may have a bearing on whether the case can be transferred to another State for prosecution. It may also have a bearing on the penalties and/or costs awarded.

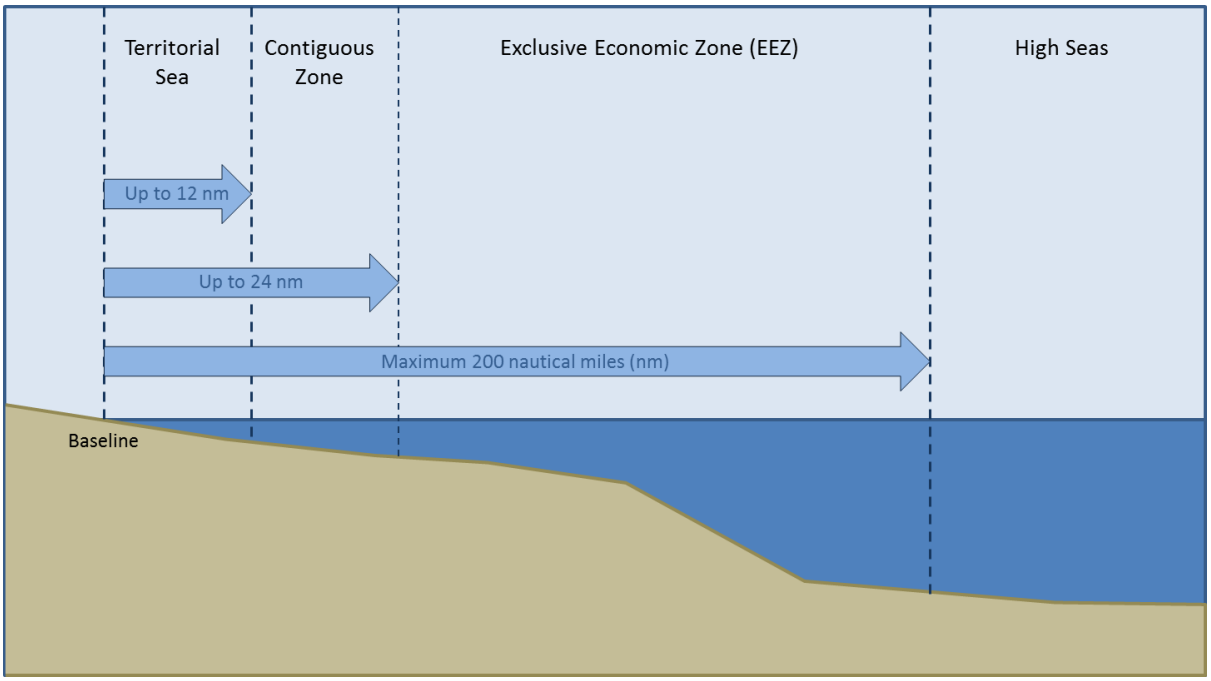

Figure 1: Maritime zones as defined by UNCLOS

Maritime zones are defined as extending from a baseline, usually the low-water line along the coast (excepting inlets, etc.). Waters on the landward side of the baseline of the territorial sea form part of the internal waters of the State; territorial waters may extend to up to 12 nautical miles (nm) of the baseline; the exclusive economic zone (EEZ)[3] may extend up to 200 nm of the baseline; beyond 200 nm or beyond the EEZ (if more limited), is termed 'high seas'. It should be noted that establishing an EEZ extends the jurisdiction of the coastal State beyond territorial waters.

1.3.2 Marine Protected Areas (MPA)

Marine Protected Areas (MPA), as the name suggests, are marine areas which have a protected status. This usually relates to the recognition that a particular area has landscape or biodiversity features which necessitate protection by law and the establishment of specific management tools.

[3] Coastal States may limit their claim for jurisdiction to the protection and preservation of the marine environment, for example, the establishment of the French Ecology Protection Zone (EPZ) in the Mediterranean Sea, which came into effect on 10 January 2004.

Certain activities, such as fishing, mining or vessel activity, may be restricted or prohibited. However, the definition of MPA can vary greatly, and encompasses a wide range of different institutional organisations with distinctive objectives. Of particular relevance to ship-sourced marine pollution are MARPOL-designated Special Areas, Particularly Sensitive Sea Areas (PSSA), and Mandatory Ship Reporting Systems (MRS), though regulations in other types of MPA may also impose restrictions.

1.3.2.1 MARPOL Special Areas

According to MARPOL, a 'special area' is 'a sea area where for technical reasons relating to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution [by the applicable polluting substance] is required'. Each annex to MARPOL contains the definition of special areas applicable to that annex. Consequently, special areas definition may differ depending on the polluting substance in question. Under MARPOL annex II: Regulation for the Control of Pollution by Noxious Liquid Substances, the regulations apply equally across all sea basins. In Europe, this removed the limited geographical application of special areas to the Black Sea and Baltic Sea areas, by in effect extending the more rigorous limits on annex II discharges to all sea areas. The map below shows the special areas for annex I, IV and V which most concern EU Member States as port or coastal States.

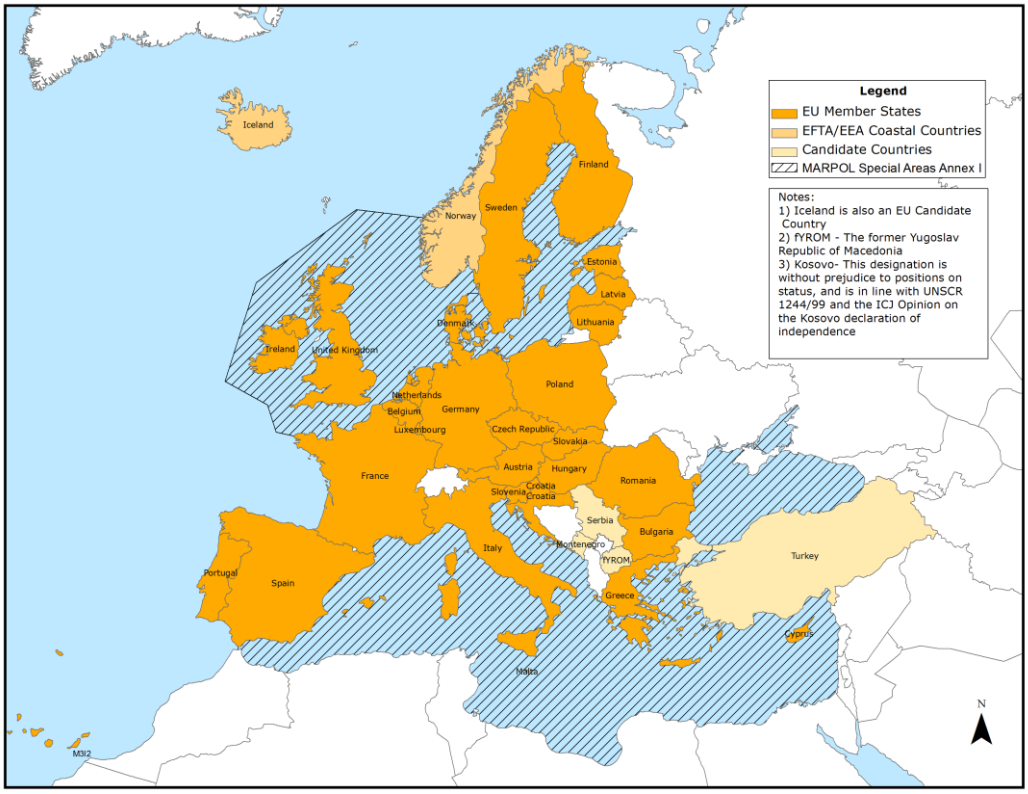

Figure 2: MARPOL annex I: Special Areas

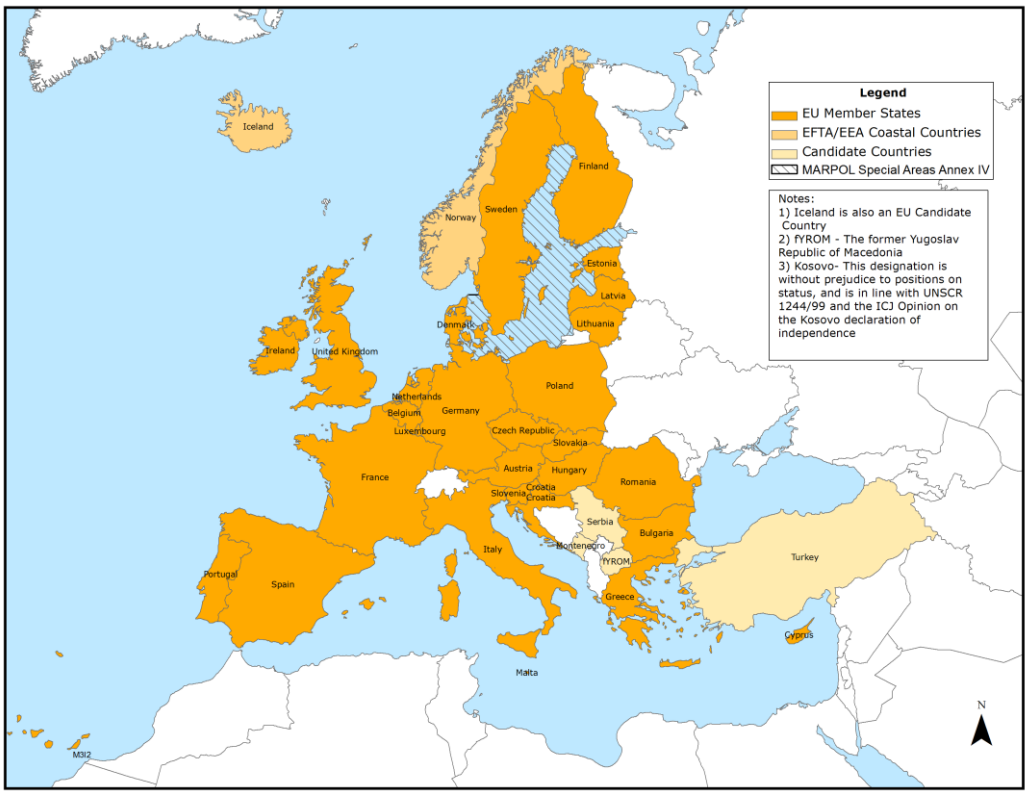

Figure 3: MARPOL annex IV: Special Areas

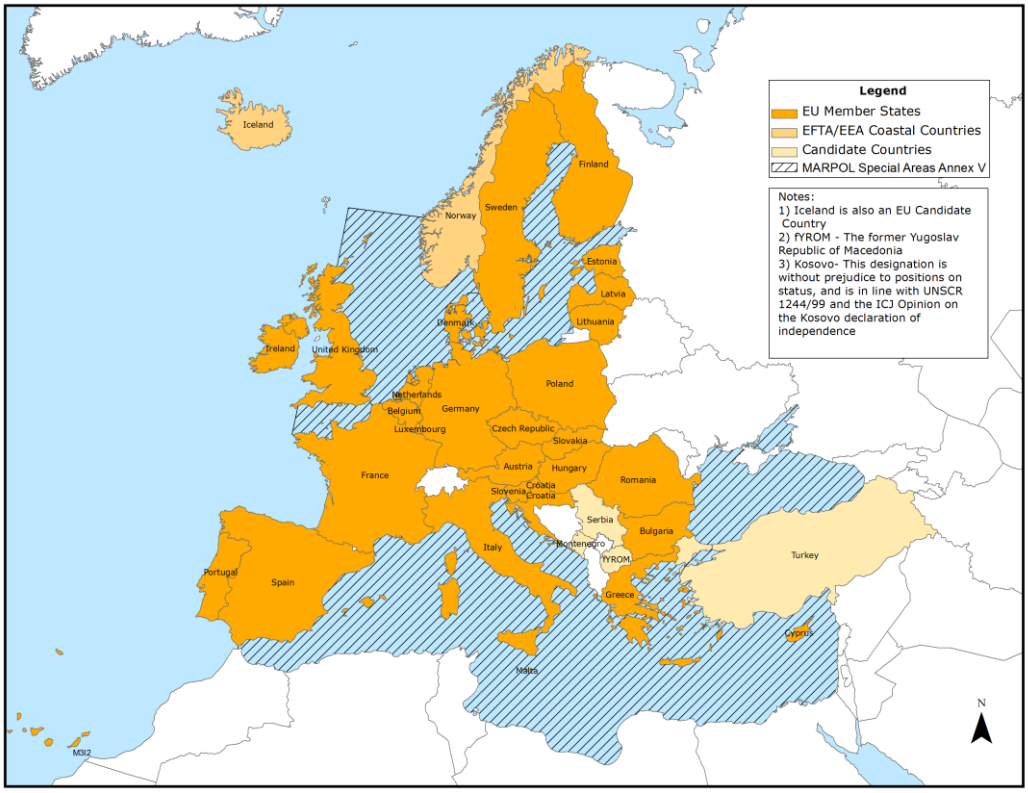

Figure 4: MARPOL annex V: Special Areas

1.3.2.2 *Particularly Sensitive Sea Areas (PSSA)*

According to IMO Guidelines, 'a PSSA is an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic, or scientific attributes where such attributes may be vulnerable to damage by international shipping activities'.[4] The process for designating PSSAs is found in the guidelines, and a list of current PSSAs may be found on the IMO website. The map below shows the areas that have been designated as PSSA in Europe.

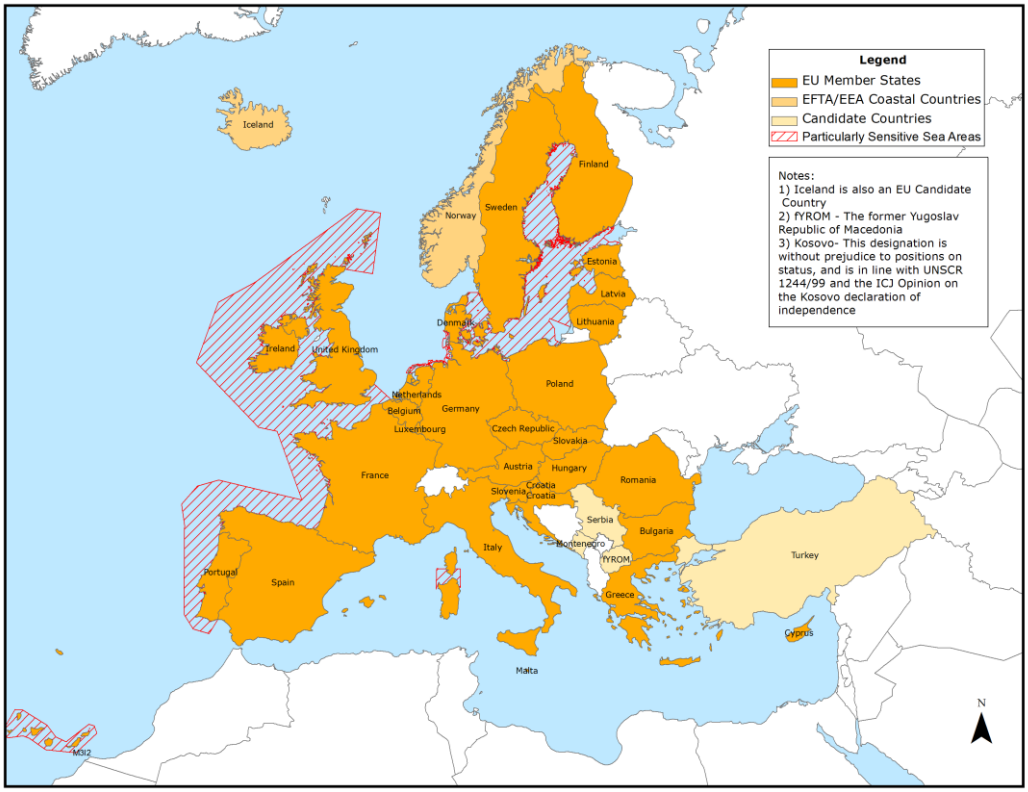

Figure 5: Particularly Sensitive Sea Areas in Europe

1.3.2.3 *Mandatory Ship Reporting Systems (MRS)*

Mandatory Reporting Systems (MRS) contribute to improve maritime safety; the main objective is to ensure safe and efficient traffic flow through confined and/or congested waters. MRS are established by States, with the endorsement of the IMO, in areas of particular environmental or navigational concern. Vessels transiting through the designated area send MRS messages to nearby coastal stations. In Europe, according to Directive 2002/59/EC as amended, the information received by coastal stations participating in a MRS should be exchanged through SafeSeaNet (see chapter 10.1.2).

[4] IMO Resolution A. 982 (24) Revised Guidelines for PSSAs.

1.4 EU law

1.4.1 Directive 2005/35/EC on ship-source pollution and on the introduction of penalties, including criminal penalties, for pollution offences, as amended by Directive 2009/123/EC

Directive 2005/35/EC was adopted on 7 September 2005. Its main objective is to incorporate into European law the standards introduced by MARPOL related to the prohibition of polluting discharges into the sea and to specify the sanctions to be imposed. Subsequently, it was amended by Directive 2009/123/EC which extended liability for discharges onto legal persons (thus making a wider variety of subjects potentially liable for the pollution) and obliged Member States to treat illegal discharges not only as infringements but also in some circumstances as criminal acts.

In relation to its geographical scope, the Directive applies to pollution wherever it occurs: ports, internal waters, territorial sea, straits used for international navigation, exclusive economic zone, other special zones and high seas. Article 3 of Directive 2005/35/EC delimitates the following geographical scope of the Directive: '(a) the internal waters, including ports, of a Member State, in so far as the MARPOL regime is applicable; (b) the territorial sea of a Member State; (c) straits used for international navigation subject to the regime of transit passage (…); (d) the exclusive economic zone or equivalent zone of a Member State, established in accordance with international law, and and (e) the high seas.'

In relation to its substantive rules, the Directive applies to 'discharges of polluting substances from any ship, irrespective of its flag, with the exception of discharges coming from warships, naval auxiliary or other ships owned or operated by a State and used, for the time being, only on government non-commercial service' (article 3.2). The Directive has therefore quite a wide scope – any discharge of polluting substances into the sea, committed with intent, recklessly or by serious negligence, from nearly any ship, is covered.

The Directive provides that 'Member States shall ensure that ship-source discharges of polluting substances into any of the areas referred to (…) are regarded as infringements if committed with intent, recklessly or by serious negligence' (article 4). This has been enhanced by Directive 2009/123/EC which brought a clarification that not only all discharges have to be treated as infringements but actually in the majority of cases those infringements should be considered crimes. Consequently, article 4 of the amended Directive provides that 'Member States shall ensure that ship-source discharges of polluting substances, including minor cases of such discharges (…) are regarded as infringements if committed with intent, recklessly or with serious negligence' and article 5(a) that 'Member States shall ensure that infringements within the meaning of articles 4 and 5 are regarded as criminal offences.'

The Directive further provides that only the discharges that are minor and do not cause deterioration of the quality of water are not considered crimes. They are still considered as infringements but they can be of administrative nature. However, even minor cases sometimes can be treated as crimes: 'minor cases that do not individually but in conjunction result in deterioration in the quality of water shall be regarded as criminal offence if committed with intent, recklessly or with serious negligence.'

Member States are to take the necessary measures to ensure that offences mentioned should be punishable by effective, proportionate and dissuasive criminal penalties (article 8).

The Directive refers to MARPOL and it explains that its objective is to provide for the criminalisation of MARPOL violations relating to pollution discharges but it also acknowledges most of MARPOL exceptions providing for situations when a discharge is not to be prosecuted. In particular, article 5 of the Directive provides that:

'1. A discharge of polluting substances into any of the areas referred (…) shall not be regarded as an infringement if it satisfies the conditions set out in annex I, Regulations 9, 10, 11(a) or 11(c) or in annex II, Regulations 5, 6(a) or 6(c) of MARPOL 73/78.

2. A discharge of polluting substances into the areas referred to in article 3. 1 (c-e) shall not be regarded as an infringement for the owner, the master or the crew when acting under the master's responsibility if it satisfies the conditions set out in annex I, Regulation 11(b) or in annex II, Regulation 6(b) of MARPOL 73/78.'

1.4.2 Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

Directive 2000/59/EC has as its objective to reduce the discharges, especially illegal discharges, of ship-generated waste and cargo residues into the sea, from ships using the ports in the EU Member States. This can be achieved by improving the availability and use of port reception facilities for ship-generated waste and cargo residues and at the same time by introducing incentives not to discharge into the sea, as well as effective enforcement and penalties for non-compliance with the requirements of the national laws implementing the Directive.

The Directive introduces into the EU law the MARPOL requirement to provide reception facilities for ship-generated waste and cargo residues in ports, and complements MARPOL (which specifies which wastes and under which conditions can be discharged into the sea) by introducing a requirement for the ships to deliver their ship-generated waste while calling at a Community port. In particular, article 7 of the Directive requires that the master of a ship calling at a Community port should deliver all ship-generated waste to a port reception facility before leaving the port. The ship may however proceed to the next port of call without delivering the waste if it has sufficient dedicated storage capacity for all ship-generated waste until the next port. Nevertheless, if there are good reasons to believe that adequate facilities for ship waste delivery are not available at the next port, or if this port is unknown, and therefore there is a risk that the waste may be discharged at sea, the Member State shall require the ship to deliver its waste before departure from its port anyway.

The Directive establishes also the advance notification requirement, criteria for exemptions and inspection, as well as the principles of the Waste Reception and Handling plans and cost recovery systems that the ports have to establish and follow.

According to article 6, the ships (other than fishing vessels or recreational craft authorised to carry no more than 12 passengers) bound for a port located in the Community shall forward a truly and accurately completed advance notification on a form specified in annex II of the Directive to the authority or body designated by the Member State for that purpose. The notification has to be kept on board at least until the next port of call and shall upon request be made available to the MS authorities. Furthermore, according to article 12, the Member States have to ensure that the notified information is appropriately examined.

Articles 11 requires the Member States to ensure that any ship should be subject to an inspection (which may be in the framework of Port State Control) in order to verify if it complied with the delivery requirements of the Directive. Ships that have not complied with the notification requirement, or notified dubious information, have to be targeted. If the relevant authority is not satisfied with the results of the inspection, it shall ensure that the ship does not leave the port until it has delivered its generated waste and cargo residues to a port reception facility. Moreover, when there is clear evidence that a ship has proceeded to sea without having complied with the requirements to discharge, the competent authority of the next port of call shall be informed and such ship shall not be permitted to leave that port until a more detailed assessment of the factors relating to the ship's compliance with the Directive has taken place.

Member States shall lay down a system of effective, proportionate and dissuasive penalties for the breach of national provisions adopted pursuant to the Directive.

1.4.3 Directive 2010/65/EU on reporting formalities for ships arriving in and/or departing from ports of the Member States

The Directive concerns the transmission of data required upon arrival in and departure from ports under, among others, Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues. In particular, it requires the master of the ship to submit a notification of waste and residues. Member States must ensure that the national single window for reporting formalities is fully operational by 1 June 2015.

1.4.4 Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system, as amended

The objective of the Directive is the setting up a Community vessel traffic monitoring and information system which should help to prevent accidents and pollution at sea and to minimise their impact on the marine and coastal environment.

In particular, article 17 of the Directive provides that ships sailing through search and rescue areas, exclusive economic zones or equivalent of Member States will report to the local coastal station ‘any incident or accident affecting the safety of the ship, any incident or accident which compromises shipping safety, as well as any situation liable to lead to pollution of the waters or shore of a Member State, such as the discharge or threat of discharge of polluting products into the sea or any slick of polluting materials and containers or packages seen drifting at sea. The relevant report message shall include at least the ship's identity, its position, the port of departure, the port of destination, the address from which information may be obtained on the dangerous and polluting goods carried on board, the number of persons aboard, details of the incident and any relevant information referred to in IMO Resolution A.851(20).’

Moreover, article 19 provides that ‘in the event of incidents or accidents at sea as referred to in article 17, Member States shall take all appropriate measures consistent with international law, where necessary to ensure the safety of shipping and of persons and to protect the marine and coastal environment’. Those measures may include, among others, restricting the movement of the ship or directing it to follow a specific course.

1.4.5 Directive 2009/16/EC on Port State Control, as amended

The Directive concerns a Port State Control system of inspections to monitor the compliance of ships with the international standards for safety, pollution prevention and on-board living and working conditions for which the responsibility lies primarily with the flag State. It applies to any ship and its crew calling at a port or anchorage of a Member State.

Article 19 provides that if any deficiencies are discovered, they have to be rectified. 'In the case of deficiencies which are clearly hazardous to safety, health or the environment, the competent authority of the port State where the ship is being inspected shall ensure that the ship is detained or that the operation in the course of which the deficiencies are revealed is stopped. The detention order or stoppage of an operation shall not be lifted until the hazard is removed or until such authority establishes that the ship can, subject to any necessary conditions, proceed to sea or the operation be resumed without risk to the safety and health of passengers or crew, or risk to other ships, or without there being an unreasonable threat of harm to the marine environment.'

1.5 Regional instruments

A number of international conventions, such as the Conventions establishing the Regional Agreements, have set up special rules and procedures which are applicable at regional level and contribute to the harmonisation of the enforcement of MARPOL regulations. There are both legal and operational aspects associated with Regional Agreements, which are covered in more detail in chapter 2.4).

1.6 National level

All European coastal States are parties to MARPOL, and all EU Member States are bound by the rules of the Directive 2005/35/EC as amended. That means that, according to the Directive 2005/35/EC in its initial version, they all had to have rules providing for sanctions of illegal discharges, be it administrative or criminal. The study on the implementation of the Directive on ship source pollution concluded by EMSA in September 2011 revealed that there was a preference for administrative sanctions in the Member States. This has changed since the amendment of the Directive: now the EU Member States have to provide for criminal – in most circumstances – sanctions of illegal discharges.

National laws regulate the procedure of collection of evidence, the evidence required, the courts proper for such cases, as well as the amount of fines imposed or length of the eventual imprisonment. National legislation varies considerably.

Non-EU Member States can have even more diverse legislation as they are not bound by the requirements of the EU law. That means that even if all of them, as parties to MARPOL, should have some system of penalising illegal discharges, in some countries those sanctions may only be administrative. It is advised to consult the particular national law and procedure for more details.

If the investigation of a ship does not reveal enough evidence to prove that an illegal discharge has taken place, the investigation could reveal other irregularities and relevant measures or sanctions may be taken accordingly. All national laws contain other provisions for sanctioning, for example non-delivery of garbage (if from the ship's documentation it seems that the garbage was discharged into the sea between the ports), as well as irregularities in ship's log books and false statements

As noted in the INTERPOL Manual, 'when considering the charges to be brought against those illegally discharging oil from vessels, investigators and prosecutors should consider the full range of national laws available, including false statements and records, conspiracy, failure to report, concealing or obstructing an investigation, tax regulations or other applicable criminal statutes.'[5]

[5] Interpol. 2007. Investigative manual for illegal oil discharges from vessels. p. 65.

Chapter 2: International cooperation

Given that enforcement responsibilities are shared between coastal, port and flag States, in most cases successful enforcement will only be possible through international cooperation. The majority of pollution incidents will require that various factors related to jurisdiction are taken into consideration: a vessel may be travelling between the ports of two different States, the pollution may affect a coastal State somewhere along the route, and the ship may be flying the flag of yet another State. In addition, the parties responsible for the ship may be registered somewhere else entirely, and the crew may well comprise individuals of various nationalities.

As presented above in the legal framework, MARPOL (article 6) requires that States cooperate in the detection of violations and the enforcement of pollution prevention regulations. The decision to initiate proceedings implies legal obligations regarding exchange of information and right of jurisdiction. States should go beyond the minimum obligations embodied in legal instruments, and follow the spirit of the conventions by identifying opportunities to cooperate across the entire enforcement chain, from detection to feedback. Successful enforcement will only result from active engagement of all parties involved within States and at international level.

The importance of cooperation is also noted in Directive 2009/123/EC, which states that 'the objectives of this Directive cannot be sufficiently achieved by the Member States acting alone, by reason of the cross-border damage which may be caused by the behaviour concerned'. In the absence of a global approach to tackle ship-source pollution, there is also a risk that successful enforcement in some sea areas, with the resulting deterrent effect, will result in increased pollution in others.

UNCLOS article 123 on the cooperation of States bordering enclosed or semi-enclosed seas is also of particular relevance for cooperation between EU and non-EU States. Amongst other provisions, this states that, 'States bordering an enclosed or semi-enclosed sea should cooperate with each other in the exercise of their rights and in the performance of their duties under this Convention. To this end they shall endeavour, directly or through an appropriate regional organization:… (b) to coordinate the implementation of their rights and duties with respect to the protection and preservation of the marine environment.'

Although there is considerable bi-lateral cooperation between States, a number of cooperation structures also exist in the field of enforcement of marine pollution legislation which can help promote a collaborative and harmonised approach to enforcement. Each of these structures has been established to perform a set of specialised tasks. These range from local to global, and each has a different focus, ranging from development of legislation to operational actions. This variety means that there are organisations with in-depth expertise and experience in almost every area of the enforcement chain. However, this specialisation also means that it can sometimes be difficult to coordinate across bodies, and to ensure that actors working in different geographical or thematic areas understand and support each other's activities. It is necessary that stakeholders working in the area of marine pollution develop a clear overview of the roles, responsibilities, and relationships of the various organisations, and an understanding of where each fits into the enforcement chain.

2.1 International Maritime Organization

The International Maritime Organization (IMO)[6] is a specialized agency of the United Nations which sets a regulatory framework to guide participating nations in the development of laws in the field of maritime transport. The IMO's mandate covers the safety and security of shipping and the prevention of marine pollution by ships. Most of the IMO's work is done through technical committees. The Marine Environment Protection Committee (MEPC) was established in 1973, and is responsible for coordinating activities in the prevention and control of pollution of the marine environment from ships. In 1973, the IMO hosted a conference which resulted in the development of the International Convention for the Prevention of Pollution from Ships (MARPOL).

The IMO facilitates the cooperation required under MARPOL in a number of ways: 1) through meetings, particularly of the MEPC, in which signatory States debate issues related to pollution legislation and State response; 2) through maintaining a database of the obligatory reports submitted and 3) by technical assistance on a regional or country basis. The IMO also publishes technical documents, such as the Manual on Oil Pollution, for example.

2.2 INTERPOL

The International Criminal Police Organisation INTERPOL (ICPO-INTERPOL) aims to ensure a coordinated international police cooperation between the police forces of INTERPOL Member States. It plays a vital role in supplying criminal information of a transboundary nature to the national police forces. One of INTERPOL's prime objectives is to ensure that INTERPOL Member States have a rapid, reliable, secure and permanently available electronic computer-to-computer mail service. In addition to the transmission of text messages, this mail system also enables law enforcement agencies to instantly transmit images, photographs, etc.

INTERPOL's permanent departments constitute the General Secretariat (in the Headquarters in Lyon, France), whose close contacts with the INTERPOL National Contact Bureaux (NCBs) in the various Member States provide the framework for day-to-day international police co-operation. The Organisation – through the NCBs - provides logistic support in police co-operation and requests for legal assistance (for example letters rogatory[7] in urgent cases). The NCBs can rapidly transmit requests for legal or police co-operation made by their own courts or police departments to the NCBs of other countries. The contacted NCB will ensure that the police actions or investigations requested by another country's NCB are carried out on its territory. INTERPOL covers all types of criminal activity with international ramifications.

Close cooperation in combating environmental crime is also encouraged via the INTERPOL network. This means for instance that, with respect to a MARPOL offender, request for police or judicial investigation of a suspect ship at the next port of call may be sent directly and rapidly from one law enforcement agency to another through INTERPOL.

[6] Previously called the Inter-Governmental Maritime Consultative Organization (IMCO)
[7] A letter rogatory is used to request judicial assistance from a foreign court.

In 2002, INTERPOL launched the 'Project Clean Seas' to address illegal pollution from shipping managed by the INTERPOL Environmental Crime Programme. The Clean Seas Project group has developed a state-of-the-art 'Investigative Manual for illegal oil discharges from vessels'[8] and a training course for law enforcement officers using the manual as a guide. The project also develops networks for the sharing of intelligence on ship-sourced polluters and analysing effective enforcement responses by flag States receiving referrals of violations.

2.3 Aquapol

AQUAPOL is a European network for cross-border cooperation in the area of law-enforcement in the waterborne transport domain, and acts as a platform for learning and the exchange of good practice for law-enforcement. It is a joint venture of fluvial, inland waterway, port and maritime police agencies and institutions. Officially established in 2003, AQUAPOL now has a network of 21 member organisations from across Europe. AQUAPOL aims at close cooperation with a number of strategic partners.

Aquapol's Maritime Working Group is active in the field of Marpol. The members make use of a secure database, 'Marpolweb', which contains police investigation information for intelligence-led policing activities regarding Marpol Annex I, II and V investigations.

2.4 Regional Agreements and conventions[9]

'Regional Agreements' refer to the agreements signed by countries around a particular sea area to combat pollution of the marine environment.

Regional Agreements play a vital role in pollution response preparedness in Europe, including the organisation of regular (mostly annual) expert meetings, scientific workshops, and practical pollution response exercises. They also develop reporting formats, manuals and guidelines to aid pollution response. In addition to pollution preparedness and response in relation to accidents involving large-scale oil spill incidents, all the Regional Agreements also address issues related to reducing operational discharges and preventing illegal discharges.

In addition to the Regional Agreements, there are also a number of bi-, tri-, and multi- lateral agreements on a sub-regional level between neighbouring States. Due to the geographical situation in Europe it is quite usual that some States have signed more than one such agreement.[10]

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[8] The manual has provided a very valuable source of information for this document.

[9] Much of the information in this section is drawn from the websites of the relevant bodies, and is subject to change. Please check the websites for more detailed information.

[10] Existing bi- or multi-lateral pollution response agreements include: Quadripartite plan; Odessa Declaration; Strategic Action Plan for the Rehabilitation and Protection of the Black Sea; Sofia Declaration; Trilateral Agreement: Cyprus, Egypt, Israel; Copenhagen Agreement; DenGer Agreement; DenGerNeth Agreement; SweDenGer Agreement; Bilateral Agreement: Finland, Estonia (Gulf of Finland); Bilateral Agreement: Finland, Russia; Manche Plan; Bilateral Agreement: France, UK; Mediplan; Biscay Plan; Lion Plan; Bilateral Agreement: Germany, Poland (Pomeranian Bight); Bilateral Agreement: Greece, Italy; Bilateral Agreement: Ireland, UK (Irish Sea); Bilateral Agreement: Lithuania, Russian Federation; NorBrit; Bilateral Agreement: Norway, UK; Bilateral Agreement: Norway, Russian Federation (Barents); Bilateral Agreement: Poland, Russian Federation; Bilateral agreement: Denmark, Canada (Baffin Bay, Davis Strait); Adriatic and Ionian Initiative Multi-lateral

The various Regional Agreements work closely together and the European Commission is either a Contracting party or has official observer status (Bucharest Convention) in all the Regional Agreements, except the Copenhagen Agreement. Informal inter-secretariat (INTERSEC) meetings, chaired by EMSA, are held on an annual basis with the participation of the Secretariats of the various Regional Agreements and the European Commission. These meetings aim to foster the exchange of information between the different parties regarding ongoing activities linked to marine pollution preparedness and response, as well as to identify common activities to be undertaken in this field.

There are currently five active Regional Agreements, and a sixth which is not yet in force.

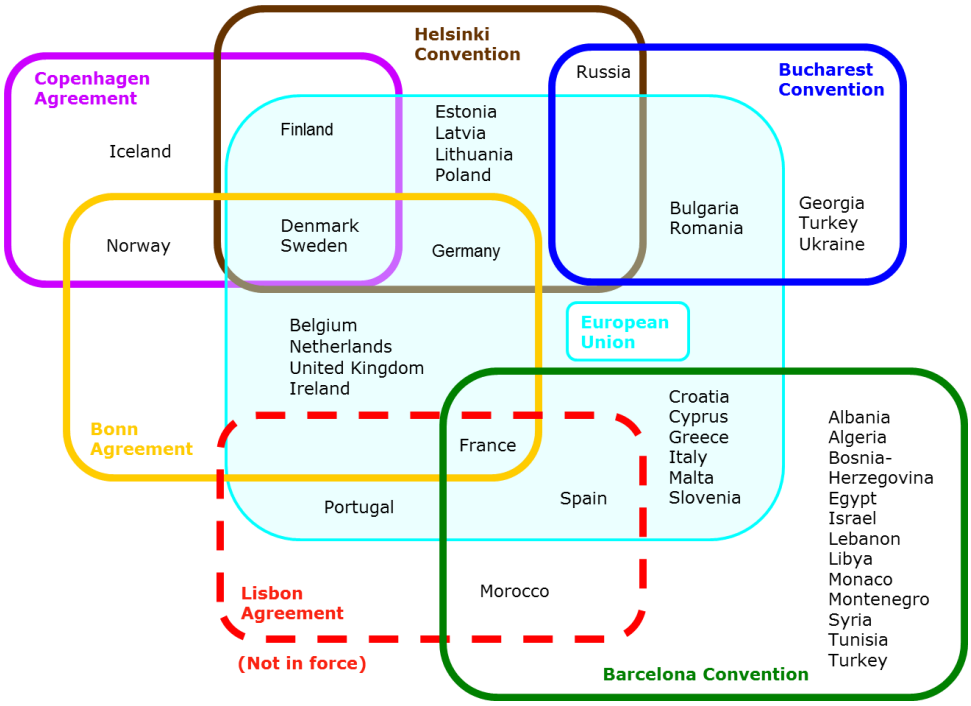

Figure 6: Regional Agreements

2.4.1 The Convention of 1974 and 1992 on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention, 'HELCOM'), www.helcom.fi

The Helsinki Convention was adopted in 1974 and entered into force in 1980. In light of political changes a new convention was signed by all the countries bordering the Baltic Sea, as well as the European Community, in 1992 and entered into force on 17 January 2000. The main goal of HELCOM is to protect the marine environment of the Baltic Sea from all sources of pollution, not only ship-sourced oil pollution. The Convention covers the whole of the Baltic Sea area, including the sea and

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Agreement: Italy, Slovenia, Croatia, Serbia and Montenegro, Greece, Bosnia and Herzegovina and Albania (Adriatic); RAMOGE: France, Monaco and Italy.

inland waters as well as the seabed. In addition to the Contracting Parties, there are some members with observer status, including Belarus, Ukraine and the Bonn Agreement.

The governing body of the Convention is the Helsinki Commission – Baltic Marine Environment Protection Commission (HELCOM) whose main goal is to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation between all contracting parties. The working structure of HELCOM, supported by a secretariat, consists of the annual meetings of the Helsinki Commission, the contracting parties' heads of delegation meetings, and the meetings of five technical working groups. Illegal discharges in the marine environment fall under the scope of HELCOM RESPONSE and HELCOM MARITIME. The Helsinki Commission adopts various recommendations as developed in these subsidiary bodies.

HELCOM also convenes an Informal Working Group on Aerial Surveillance (IWGAS). IWGAS is, under the auspices of the Response Group (HELCOM RESPONSE), responsible for cooperation in the field of joint aerial surveillance as well as for coordination of satellite based oil spill surveillance and evaluation of its results and operational effectiveness. One Contracting Party is appointed as Lead Country for an agreed period. The tasks to be undertaken are stated in terms of reference for the Lead Country and for the Informal Working Group on Aerial Surveillance.

2.4.2 The Convention of 1976 for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention), www.unepmap.org

The Mediterranean Action Plan (MAP) was created under the United Nations Environment Programme (UNEP) "umbrella" in 1975 leading to the adoption of the Barcelona Convention a year later which entered into force in 1978. In 1995 MAP Phase II was adopted, entitled "Marine Environment and the Sustainable Development of Coastal Areas of the Mediterranean" leading to a substantial review of the Barcelona Convention and its protocol. The Barcelona Convention attempts to address in a holistic manner all sources of pollution which may threaten the marine environment of the Mediterranean and its coastal areas.

In particular, the Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea is the legal framework within which regional cooperation in the Mediterranean region in the fields of prevention of and response to marine pollution from ships is developing. The Protocol was adopted on 25 January 2002 in Malta and entered into force on 17 March 2004. Furthermore, in 2005 a Regional Strategy for the Prevention of and Response to Marine Pollution from Ships, was adopted, setting specific objectives to achieve the goals of the protocol. Amongst these objectives two are particularly relevant:

- Improved follow-up of pollution events as well as monitoring and surveillance of illicit discharges
- Improve the level of enforcement and prosecution of discharges offenders

A dedicated Regional Activity Centre, the Regional Marine Pollution Emergency response Centre for the Mediterranean Sea (REMPEC), has been established by the Contracting Parties to the Barcelona Convention to assist the Mediterranean Coastal States in the field of prevention of, preparedness for and response to marine pollution from ships. For more information, see: www.rempec.org.

2.4.3 The Agreement of 1983 for Co-operation in Dealing with Pollution of the North Sea by Oil and other Harmful Substances (Bonn Agreement), www.bonnagreement.org

The first Bonn Agreement was established in 1969 following major oil spills including the TORREY CANYON. The current Bonn Agreement dates from 1983 and, unlike HELCOM, is focused on combating marine oil pollution by encouraging the North Sea States to jointly improve their basic capacity. In addition to the Contracting Parties, Spain, HELCOM and REMPEC have observer status. The working structure of the Agreement, supported by a secretariat, consists of the Contracting Parties' 'Heads of Delegation' meeting and a working group on Operational, Technical and Scientific questions concerning counter Pollution Activities (OTSOPA) which was established to promote the exchange of technical ideas. Both meetings occur once a year. The terms of the Bonn Agreement include to:

- Define procedures for notifying other Member States of an incident.
- Promote sharing of information and resources in response to a spill.
- Encourage sharing of surveillance resources as an aid to detecting and combating pollution and to prevent violations of anti-pollution regulations.

The Bonn Agreement has produced a number of documents which contain valuable information for the prevention, detection and prosecution of illegal discharges. These include for example, the Counter Pollution Manual and the Bonn Agreement Aerial Operations Handbook where the Bonn Agreement Oil Appearance Code (BA OAC) can be found.

The Agreement has an annual programme for 'Tour d'Horizon' activities as well as the Co-ordinated Extended Pollution Control Operations (CEPCO) programme in which all Contracting Parties are invited to participate.

2.4.4 The Agreement between Denmark, Finland, Iceland, Norway and Sweden about Cooperation concerning Pollution Control of the Sea after Contamination by Oil or other Harmful Substances (Copenhagen Agreement, 1971), www.copenhagenagreement.org

Denmark, Finland, Iceland, Norway and Sweden are contracting parties to the Copenhagen Agreement. The agreement was signed in 1971 and revised in 1993. Contracting parties have, through the agreement, undertaken to cooperate in protecting the marine environment. Areas of cooperation include monitoring, investigation, reporting, production of evidence, pollution control, assistance and exchange of information. Information is exchanged and cooperation fostered through plenary meetings, working groups, and bi- and trilateral exercises. The agreement also states that the parties shall cooperate in preparation of plans and guidelines and by implementing exercise activities.

2.4.5 The Cooperation Agreement signed in 1990 for the Protection of the Coasts and Waters of the Northeast Atlantic against Pollution (Lisbon Agreement)

The Lisbon Agreement (1990) is aimed at promoting mutual assistance between France, Spain, Portugal and Morocco. This international framework for cooperation in combating accidental marine pollution follows the models of the Mediterranean Action Plan, the Bonn Agreement and the Helsinki Commission. However, the Agreement has not yet entered into force. Despite this, some cooperation as outlined in the Agreement has been carried out in response to recent incidents in the region. The International Response Pollution Centre of the Northeast Atlantic (CILPAN) was created

in 1991 in order to fulfil the objectives of the Lisbon Agreement. The functioning of this centre is assured by the Portuguese government. The actions of this centre are greatly limited by the non-ratification of the Agreement. Prevention, monitoring, training and response to marine pollution by oil or other substances are the main remits of the agreement. The agreement also provides for the establishment of 'zones of joint responsibility'. All contracting States are obliged to render assistance to other parties, if required.

2.4.6 The Convention on the Protection of the Black Sea against Pollution (Bucharest Convention), www.blacksea-commission.org

The Bucharest Convention was ratified by all six legislative assemblies of the Black Sea countries in 1994. Its Permanent Secretariat is based in Istanbul, Turkey. One of the main stated objectives of the Convention is 'To prevent, reduce and control the pollution of the marine environment from vessels in accordance with the generally accepted rules and standards' (article VIII).

The implementation of the Convention is managed by the Commission for the Protection of the Black Sea against Pollution (the Black Sea Commission). The Black Sea Commission meets at least once a year and at request of any one of the contracting parties at any time. Among its many tasks, the Black Sea Commission (BSC) coordinates intergovernmental meetings on environmental issues related to shipping. The BSC also implements the Black Sea Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (BS SAP) which was developed in 1996 and further updated in 2009, to provide concrete actions to implement the Bucharest Convention. Advisory Groups, including experts from all Black Sea States, have also been created to provide sources of expertise, information and support to the BSC in implementing the BS SAP.

The Convention was signed by the Black Sea littoral states together with three specific Protocols:

- the control of land-based sources of pollution;
- dumping of waste; and
- joint action in the case of accidents (such as oil spills).

In 2009, at Ministerial Meeting/Diplomatic Conference in Sofia (Bulgaria), the Contracting Parties to Bucharest Convention signed the updated Protocol on land-based sources and activities.

Article 9 of the Protocol on dumping obliges Contracting Parties to cooperate in the exchange of information 'in case of suspicions that dumping in contravention of the provisions of this Protocol has occurred or is about to occur.'

2.4.7 OSPAR

In the North East Atlantic, there were originally three Conventions which addressed polluting substance in the marine environment: the 1969 Bonn Agreement (dealing with response to, and prevention of, pollution from ships and maritime accidents), the 1972 Oslo Convention (dealing with dumping from ships and aircraft) and the 1974 Paris Convention (dealing with land-based pollution, including offshore installations). In 1992, the Oslo and Paris Conventions were updated and unified to form the OSPAR Convention. Work on behalf of the Convention is undertaken by the OSPAR Commission, composed of government representatives of the Contracting Parties and the European Commission, representing the European Union. The OSPAR Commission and the Bonn Agreement

cooperate closely on many cross-cutting issues and the OSPAR Secretariat also fulfils the secretarial function for the Bonn Agreement and the North Sea Network of Investigators and Prosecutors.

2.5 Investigators and prosecutors networks

Enforcing regulation against ship-source pollution in the marine environment is a complex process which involves parties from different communities in different States. Legal systems and court practices may vary significantly. Informal networks of investigators and prosecutors have been established in order to improve the understanding and cooperation in the different stages of the enforcement process. The main goals are to ease the flow of information between practitioners, to exchange information on cases so as to establish best practices, and to understand each other's evidential and prosecutorial requirements. A particular added value of such networks is to exchange information on available evidence for an on-going case prior to a formal request. Experience shows that smaller networks without formal rules and processes allow greater flexibility and better opportunities for the individuals involved to get to know one another.

The two existing networks, NSN and ENPRO (see below, 2.5.1 and 2.5.2), work in close collaboration with Regional Agreements, and have also established links with each other. The development of additional networks in regions where they still do not exist should be encouraged. As more networks are established, it is recommended that they develop a forum to exchange information and ideas with each other, in line with the model established for the INTERSEC meeting of Regional Agreements.

2.5.1 North Sea Network of Investigators and Prosecutors (NSN)

The North Sea Network of Investigators and Prosecutors (NSN) is associated to the OSPAR Commission, and cooperates closely with the Bonn Agreement, e.g. through the organisation of joint workshops on judicial issues. The NSN promotes an informal exchange of information on requirements in the different national legal systems for the main types of evidence in order to improve the use of evidence in jurisdictions other than those where it has been collected. The NSN meets annually and members maintain a close contact intersessionally. As well as organising events and workshops, the NSN produces relevant documentation, including the North Sea Manual on Maritime Oil Pollution Offences.

2.5.2 The Network of Prosecutors on Environmental Crime in the Baltic Sea Region (ENPRO)

ENPRO is the Network of Prosecutors on Environmental Crime in the Baltic Sea Region. ENPRO works under the auspices of the Network of the Prosecutors General in the Baltic Sea region i.e. the Member States of the Council of the Baltic Sea States (CBSS): Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden. The members of ENPRO are prosecutors appointed by the Prosecutors General of the Member States of the CBSS. ENPRO convenes once a year at a conference but the members of the Network work also between the conferences. The chairmanship of the Network rotates every two years. ENPRO reports to the Prosecutors General on an annual basis, and the Prosecutors General also confirm ENPRO's plan of action on basis of the recommendations of ENPRO. ENPRO also cooperates closely with HELCOM.

ENPRO's focus is to create direct contacts between the prosecutors of the Member States and form the basis for practical cooperation, information exchange and discussion, e.g. by following and analysing cases and common problems in the prosecution, educating its members, promoting

specialization on environmental crime and establishing contacts and cooperation with other organizations working in the area. It also collects information on legislation and on prosecuting environmental crime in Member States. ENPRO follows and analyses interesting cases on environmental crime in order to exchange information and experience on problems and solutions for the prosecution of environmental crimes. ENPRO works for the specialisation of public prosecutors in the field of environmental crime, reasoning that this specialisation will promote the prosecution of environmental crimes and specialised public prosecutors will be able to form a national knowledge base in this field.

2.5.3 Mediterranean network of investigators and prosecutors

The Regional Strategy for the prevention of and response to marine pollution form Ships has identified the setting up of a regional network on this specific issue as a means to strengthen the cooperation between the Coastal States and assist in a better enforcement of MARPOL regulations. However, despite several preliminary meetings, this regional network is not yet operational.

2.6 Memorandums of Understanding (MoU) on Port State Control

Inspection by port State control (PSC) Authorities of a foreign ship voluntary in port has the purpose of ensuring that the condition of the ship and its equipment comply with the requirements of international regulations (e.g. MARPOL), and that the ship is manned and operated in compliance with these rules. If the ship is considered deficient in any way, the PSC Authorities will take administrative action, which may include detention of the ship until the deficiency(ies) is (are) rectified.

Given that ships will often visit ports of more than one State when voyaging in a given region, there are considerable advantages in organising inspections on a regional basis. This reduces the burden on individual States of conducting inspections and minimises delays to ships by ensuring that they are not repeatedly inspected in short time frames, yet provides that all merchant ships are inspected on a regular basis. It also helps to prevent regional 'port shopping', whereby a vessel may choose to call more often at a port where inspections are less likely, either because the vessel is sub-standard or because even for compliant vessels the inspections take time.

The establishment of a system of harmonized inspection procedures throughout a region is done through a PSC agreement known as Memorandum of Understanding (MoU). There are currently nine MoUs which, along with the United States Coast Guard PSC Programme, cover almost all seas areas around the world[11]. The term MoU refers not only to the agreement which has been ratified by the participating Maritime Authorities, but frequently also refers to the institutional framework of the MoU. Each MoU has an executive body, known as a PSC Committee, which comprises representatives of the participating Maritime Authorities and meets on a regular basis. Observers to these meetings may include other MoUs, the International Maritime Organisation (IMO), and other

[11]Europe and the north Atlantic (Paris MoU); Asia and the Pacific (Tokyo MoU); Latin America (Acuerdo de Viña del Mar); Caribbean (Caribbean MoU); West and Central Africa (Abuja MoU); the Black Sea region (Black Sea MoU); the Mediterranean (Mediterranean MoU); the Indian Ocean (Indian Ocean MoU); and the Riyadh MoU.

organisations as relevant, e.g. the International Labour Organisation (ILO) and the European Commission. In between meetings, the activities of the MoUs are managed by the secretariats.

It is important to note that MoUs may have some legal obligations with regard to the collection of evidence for the enforcement of MARPOL, but this is not their primary purpose.

2.6.1 The Paris MoU

The Paris Memorandum of Understanding on Port State Control (PSC), hereafter called PMoU, took effect on 1 July 1982. There are currently (2013) 27 maritime authorities ('the Authorities') participating in the PMoU: all 23 coastal Member States of the European Union, Canada, Iceland, Norway, and the Russian Federation.

According to the PMoU, each Authority will maintain an effective system of PSC with a view to ensuring that, without discrimination as to flag, foreign merchant ships calling at a port of its State, or anchored off such a port, comply with the standards laid down in the relevant instruments; inter alia MARPOL.

When an inspection is carried out and deficiencies are detected which are clearly hazardous to safety, health or marine environment, the Maritime Authority will ensure that the hazard is removed before the ship is allowed to proceed to sea and for this purpose will take appropriate action, which may include detention. However, when exercising control under the Memorandum, the Authorities will make all possible efforts to avoid unduly detaining or delaying a ship. It should also be noted that the Authorities party to MARPOL (relevant instrument), will ensure that no more favourable treatment is given to ships of non-Parties.

The New Inspection Regime (NIR) of the PMoU entered into force 1 January 2011[12]. The NIR introduced a number of new elements to overcome the main problems connected with the former PSC regime and, in particular, the freedom in selecting ships for inspection by the Authorities. The NIR contains improved mechanisms for targeting substandard ships which are now selected for expanded inspection every 6 months, while quality ships are rewarded with longer inspection intervals of up to 36 months. To facilitate the selection of ships for inspection and to report and store inspection results, the NIR is supported by a new information system called Thetis.

The target mechanism of the NIR is based on the Ship Risk Profile (SRP) which allows ranking ships into Low Risk Ships, Standard Risk Ships and High Risk Ships. A ship's risk profile based on criteria such as its type, age, flag, recognized organisation, inspection history and notably, managing company (the International Safety Management manager). Consequently, the SRP determines the periodicity of inspection.

An alleged violation of the provisions on discharge of harmful substances or effluents by a ship may reduce the interval between inspections if introduced in Thetis by an Authority as an 'overriding

[12] The NIR was embedded into European legislation through the Directive 2009/16/EC as amended by Directive 2013/38, which applies to all Member States of the European Union, plus Norway and Iceland as part of the European Free Trade Agreement. Russia, and Canada apply the NIR with minor differences compared with the content of the abovementioned EU Directive.

factor' that triggers an additional inspection. During this inspection, the Authorities will endeavour to secure evidence relating to suspected violations of the requirements on operational matters of MARPOL. Obviously, when during a 'regular' PSC inspection an alleged violation of the provisions on discharge of harmful substances or effluents by a ship arises, or if a request is received from another Authority, the Authority will proceed in the same way. [13]

The PSC inspection report and supporting documentation in the case of an alleged violation on discharge of harmful substances or effluents may be part of a judicial file. As the main purpose of the PMoU is to prevent the operation of sub-standard ships, the inspection report is not always adequate to deliver valid or sufficient evidence for criminal prosecution purposes; consequently, sanctions do not necessarily follow.

In addition, PSC inspections may include a Concentrated Inspection Campaign (CIC) in relation to a specific topic of a relevant instrument. A CIC is periodically held, normally once a year, for a period of three months. The primary purpose of a CIC is to improve the safety of life at sea, prevent pollution of the marine environment and improve maritime labour conditions. A CIC will propel the achievement of the declared mission of the Paris MoU; the elimination of substandard shipping through a harmonised system of PSC. In achieving this policy a CIC will assist in raising the awareness of ship owners, operators and crew on the specific requirements the CIC will address. This will build up the safety attitude and in extent will create a safer marine and labour environment.

The possibility of also using the network of MoU on Port State Control for the exchange of judicial inquiries and information should be considered, although this would require an adequate legal basis to be established. Together with additional arrangements within the MoU-framework on the institution of proceedings as regards discharge violations, Port State enforcement in European Waters could thus be strengthened considerably.

2.6.2 Black Sea MoU

Bulgaria and Romania, along with Georgia, the Russian Federation, Turkey and Ukraine are part of the MoU on PSC in the Black Sea Region; the Black Sea MoU. The Memorandum entered into effect in the Black Sea region for three Maritime States in December 2000, and for all six States in December 2002. The Secretariat is based in Istanbul. The Russian Federation has developed and launched the Black Sea Information System (BSIS), a PSC computerized information system for the Black Sea MoU.

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[13] According to Section 6 of the PMoU (34th amendment), 'the Authorities will upon the request of another Authority, endeavour to secure evidence relating to suspected violations of the requirements on operational matters of Rule 10 of COLREG 72 and MARPOL. In the case of suspected violations involving the discharge of harmful substances, an Authority will, upon the request of another Authority, visit in port the ship suspected of such a violation in order to obtain information and where appropriate to take a sample of any alleged pollutant. Procedures for investigations into contravention of discharge provisions are listed in a PSC Instruction.' (Paris MoU. 2011. *Instruction 44/2011/20: Procedure for Investigation under MARPOL* (Confidential)

2.6.3 Mediterranean MoU

The Mediterranean Memorandum of Understanding on Port State Control was signed in 1997. Its current members are Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta Morocco, Tunisia, and Turkey. The secretariat is hosted by Egypt and the Information Centre is located in Morocco. The Med MoU has recently strengthened its information system and has become the first PSC MoU to directly exchange information with IMO, thus alleviating the burden of its Members to report under MARPOL.

2.6.4 Cooperation between MoUs

Alerting and exchange of information is usually well organised between members of the same MoU. For European Member States, this issue is addressed not only by the PMoU but more importantly in the Directive 2009/16/EC. Communication between States belonging to different MoUs or non-signatory States of MoUs is more complicated.

MoUs have secretariats which are independent of each other, and are in direct contact with participating PSC authorities of the MoU. MoU secretariats, especially at the early stage of a suspected violation, can help facilitate more immediate action by serving as intermediaries between authorities belonging to different MoUs. These existing structures, which allow communication between counterparts, should be used in particular when there is a need for an inspection in a port outside of the Paris MoU region following an alleged MARPOL violation. These structures may also facilitate feedback and reporting. However, any feedback provided with the intention that it may be used in a criminal case should normally go directly to the requesting State in order not to frustrate the usability of the collected evidence.

Cooperation agreements between MoUs exist on a case by case basis. Many MoU secretariats are observer members in other MoUs. Occasionally MoUs also organise joint activities, such as combined CICs. The effectiveness of the CICs should be enhanced when they are carried out simultaneously in different parts of the world.

2.7 EMSA

The European Maritime Safety Agency is one of the EU's decentralised agencies, and was established in 2002 by Regulation (EC) No 1406/2002. 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.

EMSA's role in addressing issues related to unlawful discharges was reinforced in 2013, with the revision to the Agency's Founding Regulation. The mandate of the Agency in this area was confirmed by Article 4(f), which states that one of the Agency's core tasks is to 'facilitate cooperation between the Member States and the Commission… in improving the identification and pursuit of ships making unlawful discharges in accordance with Directive 2005/35/EC on ship–source pollution and on the introduction of penalties for infringements.'

Directive 2005/35/EC, as amended, tasks EMSA with working with Member States in relation to the implementation of the Directive. This includes a range of activities, such as developing information systems, establishing common practices and guidelines, developing technical solutions (e.g. satellite

monitoring), and assisting the Commission. On the basis of this Directive, EMSA developed CleanSeaNet, the satellite-based oil spill monitoring and vessel detection system. EMSA also hosts and manages other EU information systems which contribute to the objective of reducing pollution in EU waters. For more information, see chapter 10.1.

In addition to the operational systems managed by the Agency, EMSA also provides support in terms of training on a wide range of issues to representatives of the Member State authorities, as well as to European Neighbourhood Policy countries. Training is given on maritime legislation, including MARPOL, as well as regular training for Port State Control officers. Occasional ad-hoc trainings are also given in relevant areas, such as aerial surveillance.

EMSA provides logistical support to a number of forums which foster cooperation in the areas of pollution prevention and response. One of these forums is the Consultative Technical Group for Marine Pollution Preparedness and Response (CTG MPPR) whose main objective is to provide a platform for Member States to improve preparedness for and response to accidental and deliberate pollution from ships. The forum enables participants to exchange information, views and opinions, share best practice, and define current and future priority actions. The representatives also form working groups which are active throughout the year to address areas of common concern, such as dispersant testing across Europe or lessons learnt from major incident response.

EMSA regularly participates in and contributes to, as part of the European Commission delegation, meetings of the IMO's Oil Pollution Preparedness, Response, and Cooperation Hazardous and Noxious Substances OPRC/HNS Technical Group, which is the main technical IMO forum on marine pollution preparedness and response. With respect to Regional Agreements, EMSA provides technical support to the European Commission during relevant meetings by submitting papers and participating in discussions. EMSA also chairs the Regional Agreements' INTERSEC meetings.

Chapter 3: Pollution in the marine environment

The purpose of this chapter is to briefly introduce vessel-source pollution discharges in the marine environment.

UNCLOS defines pollution in article 1.1.(4) in the following way: "pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities."

Pollution in the marine environment has been an issue of concern since the late nineteenth century. In particular, the issue of oil pollution gained prominence with the advent of engine powered shipping. The first major Convention to address the issue was the International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL), 1954. Following the Torrey Canyon disaster in 1967, in which 120,000 tonnes of oil was released into the marine environment, oil pollution became a main issue on the agenda of the International Maritime Organization, leading to the adoption of MARPOL 73/78. Increasing concern in the intervening period about other types of pollution, from garbage to air emissions, is also reflected by MARPOL through the subsequent adoption of annexes II-VI.

In this chapter, types of polluting substances are presented following the classification adopted in the different annexes of the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978 (MARPOL Convention). The chapter addresses primarily pollution by oil and 'hazardous and noxious substances' (HNS), and briefly addresses some other types of pollution[14].

3.1 Pollution by oil[15] – MARPOL annex I

Although large-scale pollution incidents receive more media attention, a greater volume of oil is released into the marine environment through chronic oil pollution – the cumulative effects of smaller but recurrent legal and illegal discharges of oil over long periods of time resulting from 'normal' ship operations. Operational discharges are estimated to make up 45% (and shipping accidents 36%) of vessel-sourced oil entering the environment[16]. The environmental and socio-economic damage caused by oil pollution is determined by a range of factors, including: type of oil; physical, biological and economic characteristics of the location; amount and rate of spillage; and time of year.

[14] Certain types of vessel-source marine pollution are not covered by MARPOL legislation (e.g. noise pollution, ballast water), and these have not been presented.

[15] As defined under MARPOL annex I, regulation 1.1, "Oil" means: "petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products…[and] includes the substances listed in appendix I to [annex I]."

[16] GESAMP. 2007. Report n° 75: Estimates of Oil Entering the Marine Environment from Sea-Based Activities, IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. (http://gesamp.imo.org/).

In general, light refined products (e.g. gasoline, diesel) and light crude oils do not persist on the surface of the sea for any considerable length of time due to rapid evaporation of the volatile components, and they are more likely to disperse and dissipate naturally, especially in rough seas. Such oils tend to be more toxic and can result in mortalities of marine plants and animals if sufficient concentrations of oil enter the water column through wave action and are not rapidly diluted by natural sea movements. In contrast, heavy crude oil and heavy fuel oils, whilst generally lower in toxicity, are considerably more persistent in the marine environment due to the lesser volatile compound content. Hence, they do not readily evaporate, disperse or dissipate naturally and rough sea conditions are more likely to accelerate the emulsification process.

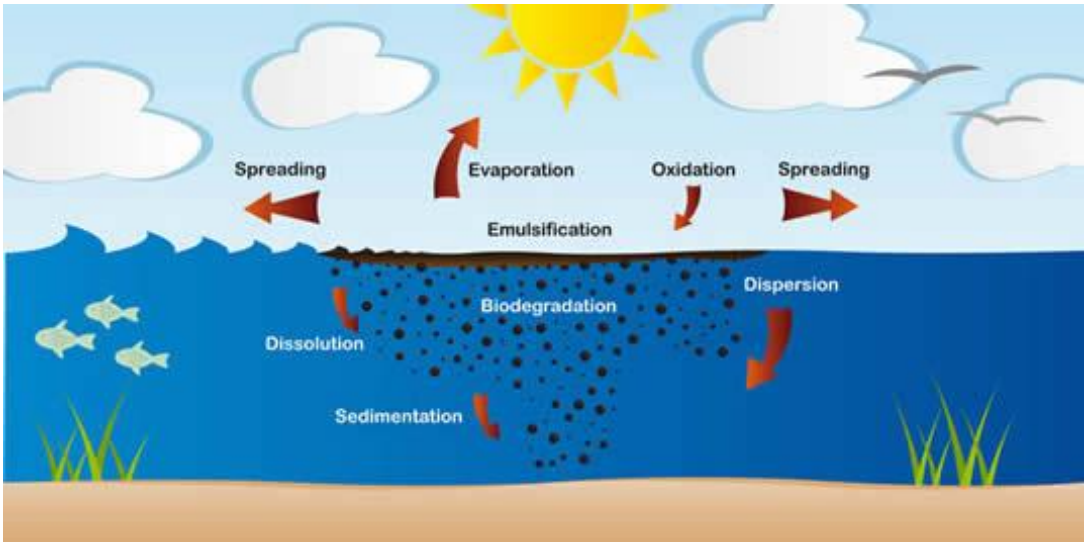

Figure 7: Fate of oil spilled at sea showing the main weathering processes (Source: ITOPF[17])

Oil which is incorporated in the sediment of coastal waters can be taken up by benthic (seabed) organisms and enter the food chain, impacting population dynamics and health of shellfish and fish. Refined oils in particular may taint edible fish, shellfish and other marine products, particularly in areas where there is regular chronic oil pollution, for example in busy shipping lanes. Fish and shellfish taste different if they have ingested hydrocarbons, and this can also affect their economic value.

Oil on the sea surface, even in very small quantities, is dangerous to sea birds. Seabirds may be immobilised by large amounts of oil: the water-repellent properties of their feathers are impaired which can result in hypothermia, and even small amounts of oil in the plumage cause seabirds to give up feeding[18]. Studies of seabird populations are one of the most common ways to assess levels of oil in the marine environment. Weathered oil may also form tarballs[19], which wash up on beaches

[17] The International Tanker Owners Pollution Federation (ITOPF), www.itopf.com
[18] Camphuysen C.J. 2007. Chronic oil pollution in Europe, a status report. Report Royal Netherlands Institute for Sea Research, commissioned by International Fund for Animal Welfare (IFAW), Brussels.
[19] When oil weathers, the lighter components evaporate. Heavier components remain, and mix with water to form an emulsion. These emulsified patches of oil are broken up into smaller pieces, known as tarballs. Tarballs

and in sensitive coastal zones. Although the situation has improved, according to a study by GESAMP, 'the occurrence of coastal tar appeared to be substantial, both in quantity and global distribution. This showed that considerable oil presumed to be largely from shipping or ship-based activities were still entering coastal waters'[20].

In addition to the impact on marine life, oil pollution can also have a detrimental effect on natural resources in coastal zones, including protected areas. This in turn may impact economic and social resources, such as tourism and leisure activities in the affected areas.

The impacts of oil pollution vary considerably, depending on the quantity and location of the discharges, sea and weather conditions and the time of year, as well as the characteristics of the resource impacted. The level of pollution in any given area is a complex equation between the traffic density and actions taken by coastal States to prevent illegal discharges. In general, dense traffic routes will have at least a low level of recurrent pollution based on legal levels of discharges. In areas where discharges are recurrent, it is more difficult for natural resources to recover. Beached bird surveys show that on beaches along busy shipping routes, a greater proportion of dead birds were oiled.[21]

Coastal zones with shallow waters, especially where there are delicate ecosystems such as estuaries and wetlands, can be easily damaged. As noted by OSPAR, 'For each group of organisms there are different danger periods, the spring season for breeding birds and fish larvae, summer for benthic organisms and seals and winter for migratory or wintering birds.'[22] Air and water temperature also make a big difference: oil disperses much more quickly in warmer environments. This implies that in areas such as the Arctic, discharged oil will persist in the environment for much longer periods of time. To address some of these issues, a number of Particularly Sensitive Sea Areas (PSSA) have been defined in waters under the jurisdiction of EU Member States.

The level of chronic oil pollution in waters under the jurisdiction of EU Member States is difficult to measure. Evidence from beached bird and tar ball surveys indicate that levels of oil pollution have dropped considerably over recent decades, although levels remain above what is legally permitted. More recent evidence from aerial and satellite surveillance indicates that over the past five years illegal discharges from vessels have been reducing in volume in across Europe. CleanSeaNet statistics for example show an overall reduction in the number of possible spills detected from 10.77 possible spills identified per million km^2 monitored with satellite images in 2008, to 7.61 in 2009, 5.68 in 2010, 5.08 in 2011 and 4.53 in 2012. However, this trend is unevenly distributed, and the reduction is more evident in some sea basins than others.

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are usually a few centimetres in diameter, though they can be much larger. They are persistent in the marine environment, and can be carried large distances.

[20] GESAMP. 2007. Report n° 75: Estimates of Oil Entering the Marine Environment from Sea-Based Activities, IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. (http://gesamp.imo.org/), p. 1.

[21] Camphuysen. 2007.

[22] OSPAR Commission. 2010. North Sea Manual on Maritime Oil Pollution Offences, p. 6.

3.2 Pollution by noxious liquid substances in bulk[23] – MARPOL annex II

In MARPOL annex II, 'noxious liquid substance' means any substance indicated in the Pollution Category column of chapter 17 or 18 of the International Bulk Chemical Code or provisionally assessed under the provisions of regulation 6.3 (MARPOL) as falling into Category X, Y, Z, or other. In accordance with regulation 6.3, the IMO's Marine Environment Protection Committee issues an annual circular with the provisional categorization of liquid substances. The annexes to the circular provide lists of noxious liquid substances with associated categories and minimum carriage requirements which have been established through Tripartite Agreements and registered with the IMO Secretariat.[24]

3.3 Harmful substances carried by sea in packaged form[25] – MARPOL annex III

Severe weather, rough seas, inadequately secured cargo, and accidents and incidents can result in containers falling overboard. Harmful substances in packaged form should be transported in accordance with regulations on packaging, marking, labelling, documentation, stowage and quantity limitations. Marine pollutants, including those in packaged form, are defined under the International Maritime Dangerous Goods Code (IMDG Code) and should be marked with a 'marine pollutant' symbol.

Figure 8: Marine pollutant symbol

[23] As defined under MARPOL annex II, regulation 1.10, "Noxious Liquid Substance" means: "any substance indicated in the Pollution Category column of chapter 17 or 18 of the International Bulk Chemical Code or provisionally assessed under the provisions of regulation 6.3 as falling into Category X, Y or Z."

[24] For updated information, visit the IMO website: http://www.imo.org/blast/mainframemenu.asp?topic_id=1785

[25] As defined under MARPOL annex III, regulation 1.1, "harmful substances" means "those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code)* or which meet the criteria in the appendix of the annex," and "packaged form" is defined as "the forms of containment specified for harmful substances in the IMDG Code."

The effects on the marine environment of harmful substances in packaged form depend on what the package contains, and the level of exposure to the environment. Many marine pollutants carried in packaged form are hazardous and noxious substances, described in more detail above.

3.4 Properties of hazardous and noxious substances (HNS)

Noxious liquid substances (MARPOL annex II) and harmful substances carried by sea in packaged form (MARPOL annex III) also fall under the definition of 'hazardous and noxious substances' (HNS). HNS is defined by the IMO OPRC-HNS Protocol (2000) as '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'[26,27].

HNS substances can be released into the sea in a number of ways: from containers falling overboard, to chemical tankers cleaning their cargo tanks and discharging overboard, to operational chemical substances (e.g. lubricants, cleaning agents, etc) which end up in bilge water tanks. Marine pollution caused by HNS differs from oil pollution in having a wide range of potential fates and behaviours once released into the marine environment.

It is the physical fate of the HNS once it is released into the environment which determines whether the substances' flammable, reactive, toxic, explosive, corrosive properties will have an impact. Some materials behave in a similar way to oil spills (not least because a number are derived from petroleum products), but others react differently, such as forming gases, evaporating into the atmosphere, dissolving into sea water, igniting, etc.

HNS substances can be divided into four major categories:

- Evaporators: Comprises all volatile liquids which are less dense than sea water;
- Floaters: Comprises all non-volatile liquids which are less dense than sea water;
- Sinkers: Comprises all products which are more dense than sea water, and;
- Dissolvers: Comprises all products which are soluble in sea water.

[26] For more complete information on HNS substances in the marine environment, see: EMSA, 2007, Action Plan for HNS Pollution Preparedness and Response.

[27] There are a number of IMO conventions and codes designed to ensure maritime safety and prevention of pollution by HNS substances, including dangerous liquid substances carried in bulk (IBC code), liquefied gases carried in bulk (IGC code), packaged hazardous materials covered by the International Maritime Dangerous Goods (IMDG) Code, bulk materials associated with chemical hazards – such as fertilizers - covered by the International Maritime Solid Bulk Cargoes (IMSBC) Code, amongst others.

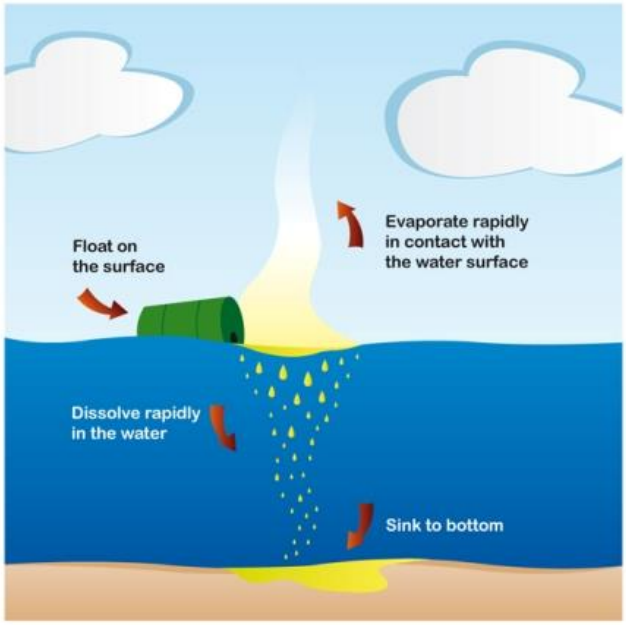

Figure 9: Processes that can act on a chemical spill (Source: ITOPF[28])

Even low doses of HNS substances can produce sublethal effects to marine organisms, producing impairments which may be detrimental to individual organisms, species, populations or marine communities over the longer term. Although major effects are more likely following large-scale HNS incidents involving considerable quantities of toxic substances, it is possible the effect of continual small discharges in a limited area may also cause changes in the community structure. The significance of such effects is dependent on the location; for example, changes in salinity and oxygen content in an estuarine or already polluted area may have little impact due to the natural tolerance of the resident marine community, whereas if regular spills start to occur in a previously pristine area the effects are likely to be greater.

The characteristics of some metals and organic chemical compounds can result in incorporation into biological pathways. Such material is known as a 'conservative pollutant'; it cannot be broken down by bacterial processes and is effectively a permanent addition to the marine environment. If a substance is bioavailable (can be taken up by an organism) but cannot be readily excreted, it will accumulate over the life span of the organism (bioaccumulation). Concentration across the food chain is known as biomagnification. The lethal and sublethal effects of this process can be detected in the top predators of marine communities, including humans.

There is limited information available regarding trade of HNS in waters under the jurisdiction of EU Member States[29], and it is therefore difficult to assess the scale of potential release of such

[28] The International Tanker Owners Pollution Federation (ITOPF), www.itopf.com

[29] The situation is likely to improve when the EU Member States ratify the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 as revised by the Protocol of 2010 to the Convention (2010 HNS Convention). Information about HNS importers and the quantity and type of HNS imported by sea will then be made available.

substances into the marine environment. The European Union's chemical industry is one of the world's largest chemical producers, and regional seas around the EU have a relatively high share of seaborne transportation of liquid substances in bulk (which probably include a substantial amount of HNS).

On 20 January 2009, Regulation 1272/2008/EC on classification, labelling and packaging of substances and mixtures entered into force. It aligns existing EU legislation to the United Nations Globally Harmonised System of Classification and Labelling of Chemicals (GHS).

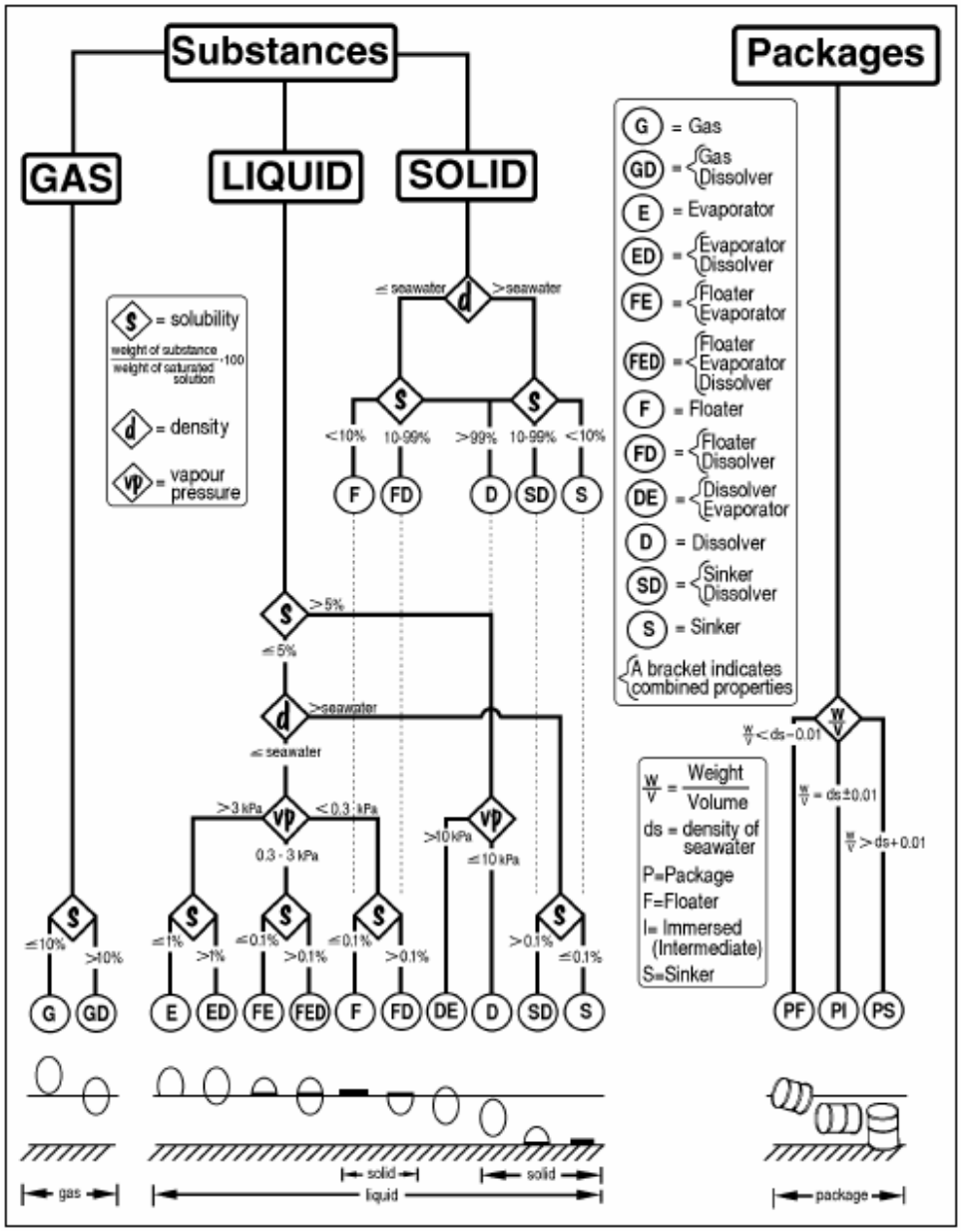

Figure 10: Flow chart of a joint European system for classification of chemical spills in water[30]

[30] *HELCOM Manual on Cooperation in Response to Marine Pollution*.

3.5 Sewage[31] – MARPOL annex IV

Sewage (black water) waste, if discharged near land, can cause harm to ecosystems and pose a public health threat. Sewage can contain harmful nutrients, bacteria, pathogens, diseases, viruses, and parasites. Nutrients may change the balance of the ecosystem, resulting in excessive algal growth and possibly eutrophication. Virus, pathogens and bacteria can contaminate fish and shellfish, and are also a potential public health risk.

Passenger ships (cruise ships and ferries) make up approximately 8% of the world shipping fleet[32]. Overall passenger figures in Europe are dropping[33], but there is an increase in the number of cruise passengers, from 3.1 million to 5.5 million between 2005 and 2010[34]. Cruises pose a particular problem due to the relatively large amount of sewage waste produced and because the majority of cruise ships travel close to the coastline, where ecosystems are more sensitive. Approximately 50 tonnes of sewage per day are produced by an average cruise ship[35], between 20 and 40 litres per person per day. Cruises also discharge considerable quantities of grey water, comprising other waste water such as from kitchens, laundries, showers, etc. This also contains organic matter, and can result in algal growth and eutrophication.

3.6 Garbage from ships[36] – MARPOL annex V

Garbage (also termed litter or debris[37]) poses a threat to the marine environment in a number of ways. Garbage floating on the sea surface and washing up onshore in unsightly, and undermines the aesthetic appearance of the area in question, with possible impacts on tourism and recreation. The physical characteristics of discarded materials may have an impact on wildlife, for example through ensnaring marine mammals, birds and fish, or through ingestion. It can also cause damage to ships,

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http://www.helcom.fi/groups/response/en_GB/respmanual/

[31] As defined under MARPOL annex IV, regulation 1.3, "Sewage" means: '(1) drainage and other wastes from any form of toilets and urinals; (2) drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises; (3) drainage from spaces containing living animals; or (4) other waste waters when mixed with the drainages defined above.'

[32] EMSA. 2010. The world merchant fleet in 2010. Statistics from Equasis (http://www.emsa.europa.eu/implementation-tasks/equasis-a-statistics/items/id/472.html?cid=95)

[33] 'The total number of passengers passing through EU-27 ports in 2010 is estimated at 396 million (inwards movements plus outwards movements), a drop of 2 % compared to the previous year'. (EUROSTAT, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Maritime_ports_freight_and_passenger_statistics)

[34] Maritime Knowledge Centre. 2012. International Shipping Facts and Figures - Information Resources on Trade, Safety, Security, Environment,

[35] Butt, N. 2007. The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton, Marine Policy 31

[36] For a full definition, see the revised MARPOL annex V (entered into force 01 January 2013). Garbage includes, food waste, cargo residues, cleaning agents and additives, animal carcasses, and all other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse.

[37] Marine debris and marine litter are other terms used to describe (usually man-made) materials which have been discarded, disposed of or abandoned in the marine environment. The terms marine litter and marine debris are also often considered to include items entering the sea from land-based sources (e.g. rivers, sewage systems, etc.), as well as sea-based sources such as shipping and fishing. However, in many contexts these terms are used interchangeably.

for example, tangling in the rudder. Floating garbage can also act as a raft, enabling the spread of alien species across wide distances.

Plastic is recognised as particularly problematic as it persists in the marine environment; it does not fully degrade, but only breaks down into increasingly small particles. This means that it is dangerous to wildlife both because it can directly entangle, harm and suffocate, but also because it is easily ingested across the food chain. Some additives to plastics are toxic, and plastics can also attract other toxic compounds in the water, increasing toxicity. Approximately 6.5 million tonnes of plastic a year are estimated to enter the oceans from vessels[38].

The diagram below shows what types of garbage are likely to be discharged by different vessel types:

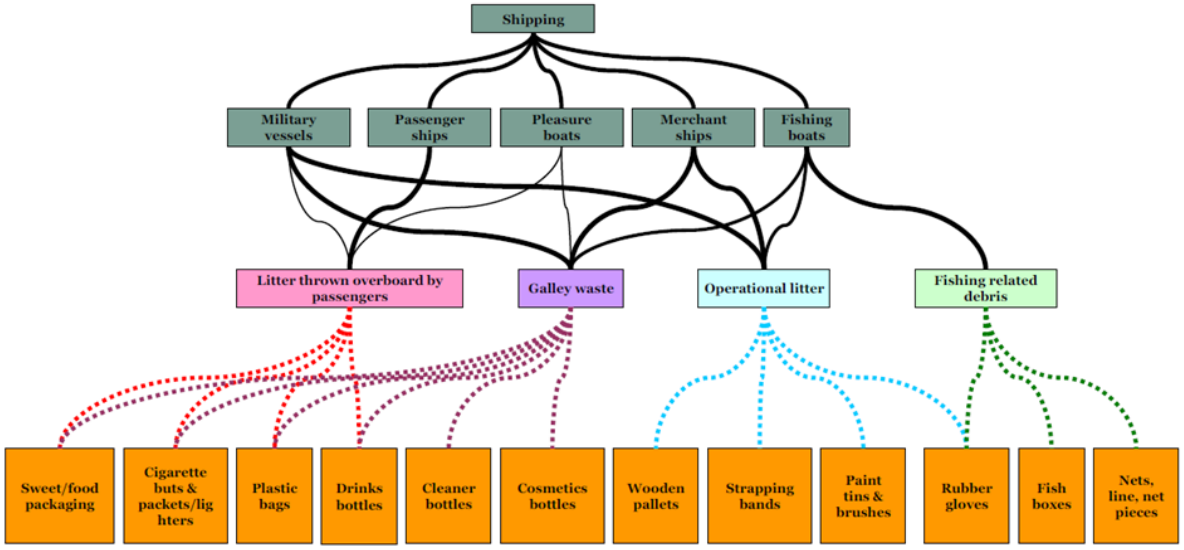

Figure 11: Sources of litter [Garbage from Ships][39]

3.7 Air pollution from ships[40] – MARPOL annex VI

Air emissions from ships affect the environment through changes to the atmosphere, e.g. acid rain, as well as decreasing overall air quality for populations living near shipping routes and in ports. Detection and measurement of air pollution does not fall directly within the scope of this document, although some aspects of inspection in port may have bearing on enforcement of air pollution regulations.

[38] Derraik J.G.B . 2002.The pollution of the marine environment by plastic debris: a review. Marine Pollution Bulletin 44: 842-852.

[39] MFSD GES. 2011. Marine Litter - Technical Recommendations for the Implementation of MSFD Requirements. Marine Strategy Framework Directive Good Environmental Status (MSFD GES) Technical Subgroup on Marine Litter.
Although the report and diagram refer to 'litter', this can be understood as garbage from ships in this context.

[40] As defined under MARPOL annex VI, regulation 1.7, "emission" means "any release of substances, subject to control by this Annex, from ships into the atmosphere or sea".

Chapter 4: Production of oily waste by vessels

This chapter covers: i) how oily waste is generated; ii) how oily waste is disposed of[41], and iii) the reasons why illegals discharges occur. Information provided comprises a very basic overview for investigators and prosecutors from outside the maritime field who may not be familiar with how and why oily waste is produced and discharged.

4.1 How oily waste is generated

The volume of oily waste generated and/or stored on board a vessel depends on various factors. These include, for example:

- Type, age and size of vessel
- Type and age of equipment related to oil separation and storage
- Maintenance of vessel and equipment
- External factors such as availability of Port Reception Facilities

Three categories of oily waste generally accumulate on board large vessels. These are:

- Oily bilge water, defined in MARPOL annex I as water which may be contaminated by oil resulting from things such as leakage or maintenance work in machinery spaces. Any liquid entering the bilge system including bilge wells, bilge piping, tank top or bilge holding tanks is considered oily bilge water. In addition to oil, bilge water often contains quantities of detergents and solvents.

- Oil residue (sludge), defined in MARPOL annex I as the residual waste oil products generated during the normal operation of a ship such as those resulting from the purification of fuel or lubricating oil for main or auxiliary machinery, separated waste oil from oil filtering equipment, waste oil collected in drip trays, and waste hydraulic and lubricating oils.

- Oil cargo (refined product or crude oil) residues on tankers.

The components of bilge water and quantities produced vary considerably from vessel to vessel, but the waste generated is usually a thinner and lighter than sludge waste. It is also comprised of more varied elements. Quantities of sludge waste by comparison, are more consistent in composition and quantity, at about 1-2% of the volume of fuel oil consumed on board. Sludge is much thicker and heavier than bilge water, and more persistent. The properties of oil cargo residues will depend on the type of cargo carried.

4.1.1 Oily bilge water

Machinery spaces on large commercial vessels contain a wide array of engineering systems, including those used to manage fuel, lubrication, fuel and lubricating oil purification, saltwater service, bilge

[41] Some sections of 5.1 and 5.2 of the text on the generation and disposal of oily waste have been reproduced and adapted with permission from INTERPOL, from the 2007 Investigative manual for illegal oil discharges from vessels.

and ballast, firefighting and sewage. Each system contains numerous pumps, fittings, control devices and other components, along with extensive lengths of piping. All components are engineered to prevent and minimize leakages through the use of mechanical seals, gaskets, etc. Despite this, because machinery spaces are so huge, waste accumulation of 20 cubic metres per day or more may occur. Bilge collects in bilge wells, and from there is pumped to bilge water holding tanks, where fitted.

4.1.2 Oil residue (sludge)

Deep-draught vessels generally burn low quality heavy fuel oil in their engines. This fuel contains contaminates. To prevent damage to engine components, retard wear, and improve combustion, the fuel is purified by centrifuges before entering the engines. At preset intervals, a shoot cycle occurs, which ejects contaminates (sludge), which drain to a sludge tank.

Compared with bilge water, fuel oil sludge is generally less varied and the quantities are more predictable, provided the quality of the fuel oil remains constant. Sludge waste is much heavier than bilge water. As a general rule of thumb, approximately 1-2% of the heavy fuel oil burned in a vessel's main engine and generators ends up as sludge. The quantity could vary depending on the fuel's quality, its compatibility with previous shipboard fuels and the condition of the equipment used to store, transfer and heat it.

Main and auxiliary engine lubricating oil is similarly processed. The equipment may be self-cleaning, and the resultant sludge and waste fluids enter a sludge tank. The waste quantities produced in this process are normally less than the quantities resulting from fuel oil. Depending on the engine type, the area between the pistons and cylinders may also be lubricated by a separate system. The waste gravitates to a separate sludge oil tank known as a stuffing box or lantern ring drain tank.

4.1.3 Product (refined oil) cargo residue waste

Tanker vessels have numerous tanks and may carry many different cargos at the same time, varying from different types of petroleum products to chemicals and food products. As a result, these cargo tanks must usually be cleaned between carrying different cargos. Tanks carrying refined petroleum products can be cleaned by pumping water through the cargo tank washing system, by steam cleaning or spraying pressurized hot water.

A quantity of sea water, up to several hundred tonnes, will be taken on board into a slop tank. This water is recycled from the slop tank through the cargo tank washing system. On completion of tank washing, and stripping of the washed tanks and pipelines, the slop tank will contain the saltwater used for washing, the cargo residues, and unpumpable quantities from each tank. These quantities will be measured, the interface recorded and cubic metres calculated.

The vessel may choose to discharge a quantity of the slops (water) through its Oil Discharge Monitoring and Control system into the sea after the slops/cargo residues have settled out and the interface-measured quantities have been calculated, in accordance with MARPOL requirements.

4.1.4 Crude oil cargo residue waste

On completion of crude oil discharge operation from a tanker, there will be unpumpable quantities of cargo residue in each tank. Unpumpable quantities in crude tankers will vary more than for product tankers, due to the size of the cargo tanks and nature of the cargo.

In the past, the process was essentially the same as for refined product cargo, but in recent years specific crude oil washing (COW) processes have been introduced, which use the crude oil cargo of the oil tanker to clean the residue from the tanks. The crude oil is heated then sprayed using high pressure nozzles onto the walls of the cargo tank. This reduces considerably the amount remaining on board, resulting in savings due to the increased quantity discharged, whilst also reducing the eventual volume of waste. MARPOL made COW systems mandatory for oil tankers of 20,000 tonnes or more.

4.1.5 Oily waste tanks

The names and arrangement of oily waste tanks on vessels will differ according to the type and size of vessel. All vessels over 400 gt are required to have tanks for collecting oily residues (sludge) and they should be of a size that is adequate to the operation of the vessel. Bilge water holding tanks are not mandatory but are fitted to most vessels. Vessels over 400 gt are also required to be fitted with oil filtering equipment that may include any combination of a separator, filter or coalescer, and also a single unit designed to produce an effluent with oil content not exceeding 15 ppm.

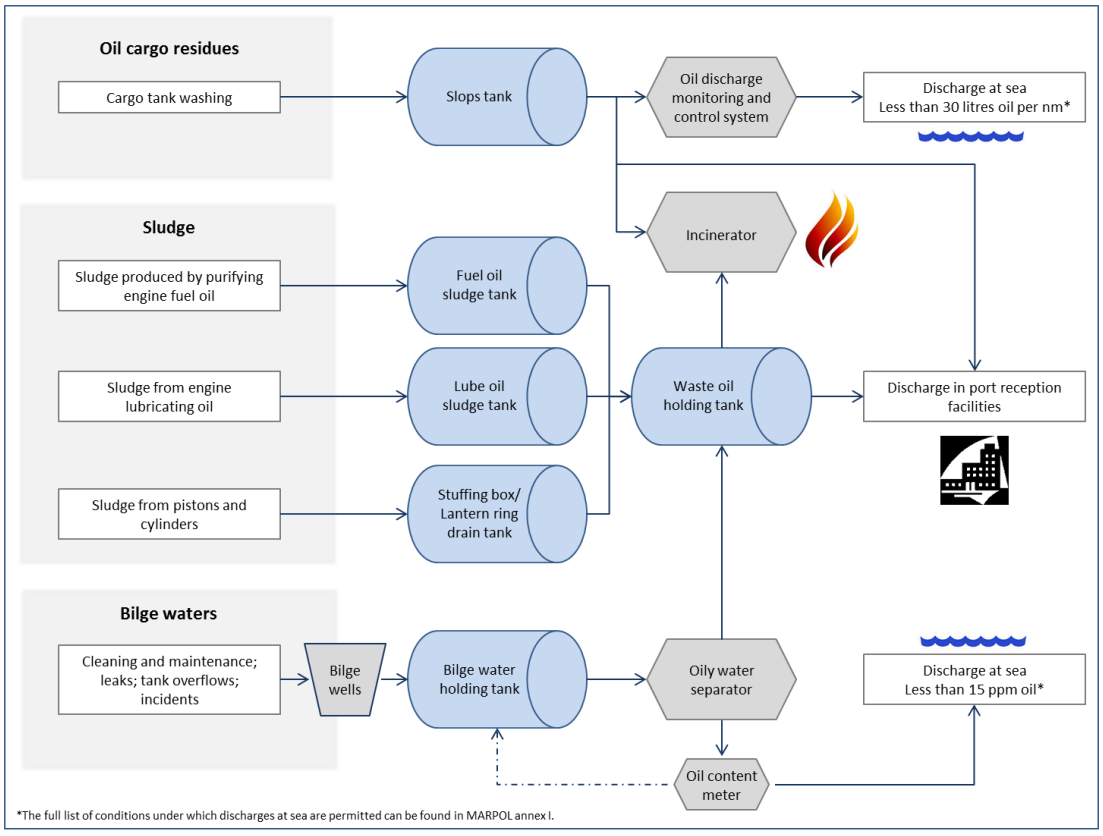

Figure 12: A possible example of oily waste production and tank arrangements

The International Oil Pollution Prevention (IOPP) certificate and appendix will contain information about the tanks and equipment on board that particular vessel for the handling of oily waste. The vessel will also have piping and tank diagrams for the various systems. The IOPP certificate, piping diagrams and Oil Record Book should contain a tank plan. The ship's Oil Record Book contains instructions on the information which must be recorded relating to oil transfers as well as the mandatory log of oil, sludge and bilge water transfers.

4.1.6 Normal disposal of waste

There are very few options for legal disposal of sludge and bilge water waste. Sludge and bilge water waste are pumped to, and then contained in, various holding tanks. The oily water that is collected in the bilge wells and transferred into holding tanks can be transferred ashore via a fixed transfer system, provided there is enough storage capacity on board. However, there is often a large amount of water in the waste, and disposal ashore is often not considered cost efficient by the vessel. If not transferred ashore, the bilge water waste should be processed by the oil filtering equipment. Sludge should be either stored on the vessel for eventual disposal ashore, or burnt in the incinerator in areas where this is permitted.

Oil filtering equipment consists of any combination of separator, coalescer or other equipment that separates oil and water, and is commonly referred to as an Oily Water Separator (OWS). This equipment is required to be designed and tested to separate oily water mixtures to a maximum limit of 15 parts oil to one million parts water (15 ppm). The equipment may be fitted with an Oil Content Meter (OCM) and automatic stopping device which prevents the discharge of any effluent above the 15 ppm limit, but this is only required on vessels over 10,000 gt. Such equipment must be approved to international standards under MARPOL. The approval standards are specified in IMO Resolutions.

The piping system connecting the various bilge wells to the bilge pump may be cross-connected to other systems. Such cross-connections may be considered as internal bypasses and connected to larger pumps, sometimes known as the 'bilge and ballast pump', or 'general service pump'. These cross-connections can facilitate the rapid pumping of the bilge overboard and are required by the International Convention for the Safety of Life at Sea (SOLAS), but are intended for emergency use only.

The Oil Record Book (Part I for all ship types and Part II for oil tankers) must contain all records of loading, unloading of oil cargo, internal transfers, ballasting of cargo tanks, discharge of water from slop tanks and disposal of oil residues. Each of the machinery space operations, including the overboard discharge of bilge water waste, is required to be 'fully recorded without delay' in the Oil Record Book.

Vessels are also required to keep record of waste disposal through the Garbage Record Book and the Cargo Record Book for chemical tankers.

4.2 Illegal disposal of ship-generated and cargo wastes

Illegally disposing of ship-sourced polluting substances normally involves the discharge of polluting substances overboard at levels over the limit prescribed by MARPOL, or other applicable limits (more stringent limits are often applied, e.g. in Particularly Sensitive Sea Areas). The limits vary depending on the type of substance, type of vessel, and the location (distance from the coastal, sensitive areas, etc.).

Discharge violations imply the falsification or omission of records in ship records (e.g. Oil Record Book, Cargo Record Book, Garbage Record Book).

In relation to oil products, there are two main ways to illegally dispose of waste: 1) through bypassing the Oily Water Separator entirely, and piping waste directly overboard using a bypass pipe (often referred to as a 'magic pipe'); and, 2) by tampering with the OWS so that it does not register

when waste with more than 15ppm of oil is being discharged (for example, by flushing with seawater). Both these scenarios also require that crew falsify the Oil Record book.

In some legal systems, discharging polluting substances in violation of MARPOL is an absolute and strict liability offence.[42] In others, and as embodied in Directive 2005/35/EC, the discharge is considered to be an infringement if the act was intentional, reckless or due to serious negligence.

4.3 Reasons illegal discharges occur

Whether an illegal discharge is due to negligence (such as poor maintenance of equipment) or is deliberate (even actively promoted by the company), it is usually the result of action/inaction both on the part of ship operators, and of ship master and crew. On some occasions, violations of pollution regulations may result from lack of awareness by operators and crew. Deliberate illegal discharges occur due to a conjunction of two factors: 1) there are economic advantages for ship operators; 2) there is a low risk of being caught and penalised. Motivations for the individual crew members are slightly different; these are less likely to include cost savings, but may be based on an intention to follow perceived instructions (often implied rather than explicit) and/or fear of losing a job.

There is considerable evidence, both anecdotal and from sources such as governmental, IMO and PSC MoU reports that illegal pollution is a widespread problem. With respect to oily waste, for example, for which there is more information available than other substances, the OECD report states that 'evidence from port State inspections reveal that nearly half of vessels inspected violate at least one aspect of the international environmental rules concerning the stowage and disposal of oil'[43]. While many transgressions are relatively minor, it is indicative that non-compliance with environmental law is common in the sector.

4.3.1 Incentives to pollute

For the ship operator, discharging illegally is advantageous for a number of reasons, but the main motivation is undoubtedly the potential cost savings that can be realised; vessels intentionally pollute in the expectation that this will bring economic benefits and give them advantages over more compliant competitors.

One estimate puts environmental compliance costs at approximately 3.5 to 6.5% of the daily operating costs of a vessel.[44] When this is extended over a fleet of vessels, the savings can be substantial. Penalties of 18 million USD were paid by both the Royal Caribbean and Carnival Cruise Lines for cases of fleet-wide MARPOL violations, 'which represented 0.7% and 0.4% of operating revenues respectively for those companies in the year the fines were imposed'. [45]

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[42] In absolute and strict liability offences, there is no need to prove 'mens rea' or intention; evidence that the offence has been committed is sufficient.

[43] OECD. 2003. Cost savings stemming from non-compliance with international environmental regulations in the maritime sector. Maritime Transport Committee. Organisation for Economic Co-operation and Development, p. 4.

[44] Ibid.

[45] Ibid., footnote, p. 49.

For oily wastes, as for other types of ship-generated waste, cost savings from non-compliance can be accrued from two main areas.

4.3.1.1 Maintenance and training costs

Ship maintenance and repair is costly. Some operators might neglect to properly maintain equipment such as pipes, pumps, and OWS, making the pollution prevention system ineffective. Training crew in proper use of anti-pollution equipment also involves costs.

4.3.1.2 Waste disposal costs

There are two possible costs associated with disposing of waste: 1) the direct cost of using port reception facilities, and 2) a potential indirect cost if the ship has to stay for a length of time in port to use Port Reception Facilities.

Calculating the costs of disposing of waste in Port Reception Facilities is complicated given the vast range of vessel types, sizes, and ages, the length of voyage, and the wide variety of charges in different ports. In addition, the costs per gross tonne of waste delivered, and costs per type of waste, may vary considerably.

In the European Union, fees for waste are regulated by Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues. However, the Directive leaves considerable scope for variation in the transposition to national law. Ports should implement cost recovery systems which promote the use of port reception facilities whilst ensuring that ships contribute significantly towards the costs (at least 30%). There is often an indirect fee for ship generated waste included in the port fee, although this very rarely covers the full costs. There are a wide variety of systems in place: the indirect fee might only cover a contribution to operation of reception facilities, with a direct fee payment for all waste delivered; it might cover waste delivered up to certain limits, with additional payments for waste in excess of the threshold; there may be a high deposit, with the option to reclaim part of it if port reception facilities are not used, etc.[46] For incompliant vessels, there is still a considerable financial incentive not to deliver ship-generated waste in port.[47]

An additional determinant element in the economic decision not to use port reception facilities is the additional time that a ship may have to stay in port to comply with waste disposal regulations. Interruption of commercial activities is costly for the ship operators. A vessel may have to wait a period of time before it is possible to discharge waste, depending on the availability of Port Reception Facilities, and the queuing system in place. In some ports, discharging at a port reception facility might also require a shift in berth, generating even more costs (use of tugs, linesmen, pilot, etc.). Shortage of staff available to undertake the task following proper procedures could also be an issue; the period in port is usually very busy, and there may not be staff available to undertake waste disposal operations unless the vessel stays longer in port for specifically this purpose.

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[46]Ramboll. 2012. Study on the Delivery of Ship-generated Waste and Cargo Residues to Port Reception Facilities in EU Ports, Report submitted to the European Maritime Safety Agency

[47] The regulation applies to ship-generated household waste, sanitary waste, and ship-generated engine waste. These categories are analogous those in annex V, annex IV and annex I of MARPOL.

Finally, the wide range of different systems in place requires that the ship operator, master and/or crew are proactive in selecting appropriate port reception facilities. As a minimum, they need to determine what types of waste can be offloaded, what volume of waste will be accepted, and what arrangements need to be made (which, if different types of waste are involved, may also require different procedures). This administrative and logistical burden can also be a deterrent to effective waste disposal, making illegal disposal seem not only a cheaper, but also an 'easier' option.

In the *Guide to Good Practice for Port Reception Facility Providers and Users* (IMO. 2013. MEPC.1/Circ. 671/Rev.1), it is stated that shipping contracts (charter party agreements) between ship operators and cargo owners should take into account any logistical and commercial considerations (time in port, disposal costs) related to discharging MARPOL wastes ashore. It is noted that 'such considerations are especially important when cargo tank pre-washes are required for certain annex II residues, and when charter agreements specify tank or cargo hold cleaning.' However, many charter agreements do not include these considerations, putting increased pressure on masters and operators to perform activities in short timeframes and with reduced costs.

4.3.2 Consequences of violation

In order to address the problem of illegal discharges, existing legislation should be enforced in a harmonised manner. Those responsible for discharging, whether at the level of operator or crew, will only risk acting illegally if the consequences are perceived as being low or non-existent. At company level, the main factors which are likely to be taken into account are the possibility of being caught and sanctioned, the type and level of penalty, and the resulting negative publicity. The reputation of the company is an important factor. At an individual level, many of these factors are also relevant for the crew members involved.

4.3.2.1 Likelihood of being caught

When discharging at sea, the risk of being caught is often lower further from the coast, than in coastal areas where surveillance by a variety of methods is usually more intensive. However monitoring efforts are not always sufficient in all areas to deter polluters.

Information from vessel tracking and waste reporting systems is also not sufficient to enable law enforcement authorities to determine whether waste is being disposed of legally. The range of systems in place in different ports makes checking Port Waste Facility receipts (where they exist) against Record Books extremely difficult.

Port State Control Inspectors have limited time to carry out inspections which cover a wide range of aspects. Verifications related to pollution prevention are often limited to a formal examination of the ship's records.

The development of satellite monitoring systems like CleanSeaNet has increased the likelihood that illegal discharges from vessels are detected. However, successful enforcement actions will always require timely follow-up action on-site and/or in port.

4.3.2.2 Type of penalty/Level of fine

Each case should be considered on its own merits in terms of what penalty should be meted by the court. Given the variety of legal systems in place, the defendant may be a natural person or may be a legal person (company), or both, and the penalty will reflect that. Penalties may include monetary

fines, imprisonment, or other sanctions such as banning crew members from working in a particular State's waters.

Financial penalties are frequently not set high enough to dissuade vessels from polluting. The aim of Directive 2009/123/EC was to strengthen the criminal law framework provided under Directive 2005/35/EC on ship source pollution and on the introduction of penalties for infringements. It widens the scope of that Directive by obliging Member States to introduce 'effective, proportionate and dissuasive sanctions' for specific criminal offences related to ship-source pollution. In addition to the penalty itself, States should consider the possibility of recovering costs, including investigative and legal costs.

A study on the transposition of the Directive into national law in the Member States found that minimum fines for legal persons often ranging from about 15,000 EUR (and considerably less for physical persons).[48] The analysis and evaluation of deficiency reports and mandatory reports under MARPOL for 2011 showed that globally the average fine imposed by port States for illegal discharge violations was just 5,220 EUR [£4,491] (min. 93 EUR [£80]; max. 678,940 EUR [£583,578]), and by flag States was even lower at an average of 2,680 EUR [£2,297] (min. 46.50 EUR [£40]; max. 21,090 EUR [£18,127]).[49] As the absolute number of reported fines is low (171 by port States and 211 by flag States respectively), it is also likely that the few very high fines imposed distort the average.

Protection and Indemnity (P&I) Clubs are mutual insurance associations, covering liabilities of over 90% the world's oceangoing tonnage, including liabilities arising from pollution. P&I Clubs may cover fines arising from accidental pollution, but will not cover costs arising from deliberate or operational discharges. Even in cases when the P&I Club may pay a bond for a vessel while a case is being decided, it will require reimbursement if the vessel's action is found to have been in violation of anti-pollution regulations.

[48] EMSA. 2011. Implementation of the Ship Source Pollution Directive in the Member States (Internal study)
[49] IMO. 2011. Analysis and evaluation of deficiency reports and mandatory reports under MARPOL for 2011 (FSI 21/4). In the MARPOL report figures are given in GBP. These figures have been converted at the annual average exchange rate for 2011, of 1 GBP=1.163399 EUR.

Part 2 – The Enforcement Chain

This part provides guidance on the operational steps that need to be taken in order to move from the initial detection of pollution to the successful prosecution of a violator. The enforcement process involves a number of parties, from operational authorities in charge of monitoring the marine environment, to vessel inspection authorities, and administrative and judicial enforcement authorities. Each of these parties should familiarise themselves with the activities which are undertaken across the entire chain, in order to know what can be expected from those earlier in the chain, and how best to support those later in the chain.

Chapter 5: The illegal discharge enforcement chain

5.1 Overview

There are a number of steps between the point at which a vessel discharges a polluting substance at sea and the application of adequate penalties if the discharge is found to be illegal.

5.1.1 Step 1: Initial indication of a possible violation

There are three main sources of information

- Detection at sea

Monitoring of the marine environment can result in identification of possible illegal spills. There are numerous means by which possible pollution at sea may be detected, including aerial surveillance by satellite or aircraft, reports of pollution sightings from other vessels in the vicinity, and observations from shore.

- Inspection in port

Vessels are regularly inspected to ensure that they meet international safety, security and environmental standards, and that crew members have adequate living and working conditions. These inspections may be undertaken by various authorities such as Port State Control, maritime police, MARPOL inspectors, etc. Results of such routine inspections may raise suspicion of possible violations.

- Information received

Information may come from crew members (‘whistle blowers’) and passengers on board the polluting vessel. It may also be received from authorities in another State, members of the public, NGOs, etc.

In order to continue with the investigation, additional evidence would have to be collected. Nevertheless, the decision to follow-up will depend on the characteristics of the initial indication, and the priorities and resources of the State in question. At this stage, an assessment needs to be undertaken on whether or not to proceed based on dialogue between authorities involved. This might require international cooperation.

5.1.2 Step 2: Further investigation and collecting evidence

Evidence collected will be used for four main purposes:

- Characterising the spill

The purpose is to determine the exact nature, location, and extent of a spill via remote sensing or on-site observation which can include taking samples from the spill and to assess the possible impact on the environment.

- Determining the source of the spill

This can be achieved in different ways. Polluters might be caught in the act by surveillance means. The link between a spill and a polluter can also be made *a posteriori* or confirmed by other means such as vessel traffic information systems or information collected on-board.

- Proving intent, recklessness or negligence

If it is proven that polluting substances have been discharged with intent, recklessness or serious negligence, this may have consequences on whether the discharge is regarded as an infringement, on who is held liable and on the level of penalty.[50]

- Gathering information that could later support the case

Other elements, such as any financial gain that the ship or the company can expect from its (illegal) behaviour, or the environmental damage that resulted from the discharge, can also influence the case.

It is important to note that timeliness is a critical element in the collection of evidence. It requires rapid and coordinated actions from all parties as the time window to be able to get information can be short: visible evidence of the spill at sea will often weather out in a couple of hours; the ship will move to other areas; etc.

It is therefore also important to have made arrangements for information exchange before any violation has occurred, e.g.:

- Determination of which information is needed for a successful prosecution
- Where this information could be obtained if needed and how this can be done
- Ensuring and verifying this information is gathered continually and consistently

Consequently, cross-border cooperation is essential, and should be organised to secure the collection of evidence even before a formal request for judicial assistance has been made. Care must be taken to ensure that evidence is collected in such a way that it is later accepted in the courts of the State building the case.

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[50] The interpretation of intent, recklessness or negligence is a matter of national responsibility; different countries may adopt different interpretations. See chapter 7.4 for more information.

5.1.3 Step 3: Building the case

The purpose is to decide, based on information available and on legal aspects, which is the most appropriate action to be taken.

- International cooperation

International cooperation can be complex and, in order to be effective, this needs to be organised beforehand through, for example, establishment of appropriate national procedures. A number of issues need to be addressed such as the acceptance of evidence collected by officials of another State. Templates for requesting and passing information can be used to ensure that requests are clearly understood and that information provided in return is complete and usable.

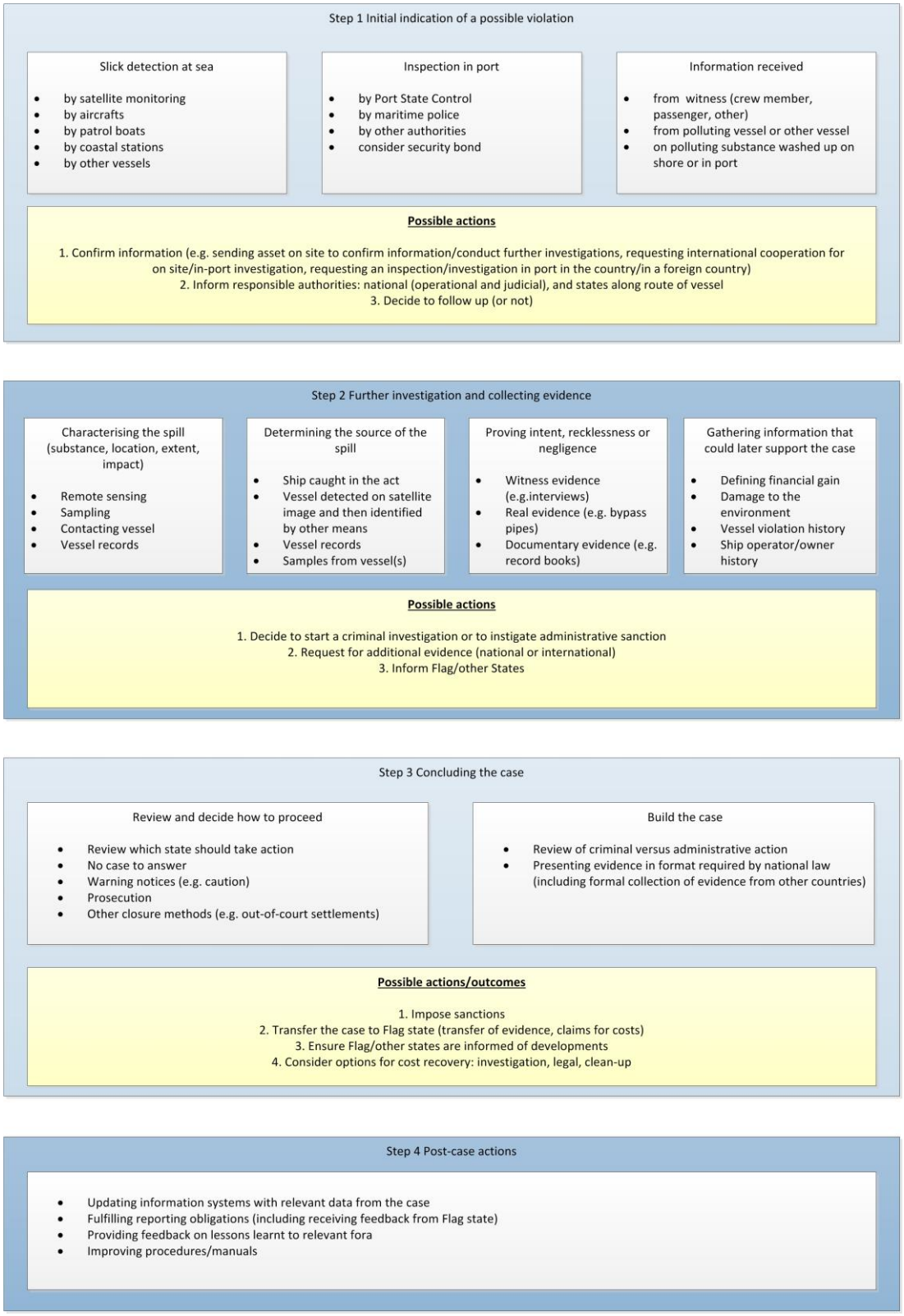
- Assessment of actions to be taken

A number of elements may influence the decision on where and how to bring the case. The purpose is to decide between the different options. Should the case be addressed through criminal prosecution or through administrative action? When there is the possibility that the case may be handled by the flag, port, or coastal State, which should proceed?

5.1.4 Step 4: Post-case actions

Keeping records of actions taken and issues encountered during enforcement procedures is important to, amongst other things, exchange best practices, determine whether or not a flag State has repeatedly disregarded its obligations to enforce MARPOL effectively, and build capacity for intelligence led enforcement.

5.2 Overview of steps in the enforcement chain



Chapter 6: Initial indication of a possible violation and decision to follow-up

There are numerous means by which possible pollution at sea may be detected, including aerial surveillance by satellite or aircraft, reports of pollution sightings from other vessels in the vicinity, and observations from shore.

6.1 Oil versus other substances

The type of factors which provide an initial indication of a possible violation can vary enormously depending on the type of violation committed, and in particular on the substance involved. Floating liquid substances such as mineral oil, or particular types of noxious liquid substances, which cover large sea areas are visible to radar surveillance and the human eye. This is not the case for substances which dissolve or evaporate, or for packages or garbage which, if they do float, occupy a much smaller sea area. This has implications on how authorities involved obtain a suspicion that a pollution violation has occurred. An initial indication of oil pollution may be provided as a result of a satellite image; a garbage pollution is more likely to be reported from a visual observation of garbage being thrown overboard. Documents which pertain to the different substances (e.g. Oil Record Book, Cargo Record Book, Garbage Record Book) and other evidence obtained on board may also be sources of initial indications of a violation.

The information in this chapter relates primarily to initial indications of oil discharges, though may also be relevant for other substances.

6.2 Monitoring and Detection

Sea areas to be monitored are vast while surveillance resources are limited and costly. Monitoring efforts should be coordinated to ensure an optimised use of time and resources and to develop links between operational parties. This includes processes on how to pass information quickly to all authorities in relevant States. The use of standardised reporting methods is essential to ensure information is complete and clearly understood. Authorities receiving information should also be organised in order to process it effectively which includes ensuring that information is passed to any other relevant service or organisation.

Regional Agreements have been very effective in developing cooperation in the field of surveillance: Coordinated Extended Pollution Control Operations (CEPCO) and Tour d'Horizon flights are good examples of how such activities can be organised. The standard pollution observation/detection log currently in use by HELCOM and the Bonn Agreement, provides a good example of a format for exchange and its use should be extended across Europe (see chapter 10.4).

6.3 Initial indication discovered at sea

6.3.1 Remote sensing

In order to effectively detect spills of substances that could damage the marine environment, it is necessary to set-up surveillance systems capable of monitoring wide areas at regular intervals. These systems require a combination of long range detection sensors and of additional sensors including visual observation for further characterisation of initial detections.

Long range detection is mainly based on radar sensors that measure the roughness of the sea surface. Radars generate electromagnetic pulses that 'illuminate' the ocean surface. Radar pulses are reflected by capillary waves that the wind creates at the surface of the sea (sea clutter). Radar systems will therefore detect any phenomena that suppress capillary waves. Some substances, for example oil, smooth the sea surface and reduce the level of the signal returned to the emitter. The signal is processed into an image where a clean sea will appear as a grey background; oil spills will appear as dark areas and vessels and platforms as bright spots. Oil, but also other substances and natural phenomena such as certain current patterns, ice and surface slicks associated with biological activity, will also appear as dark patterns on the radar image.

Radars are to a large extent able to detect very thin oil films floating at the sea surface day and night and through the cloud cover. There are limitations to this process as sea roughness is driven by the local wind speed and direction. Wind speeds below 2-3 m/s mask the dampening effect whereas speeds above 15 m/s also reduce detection capability.

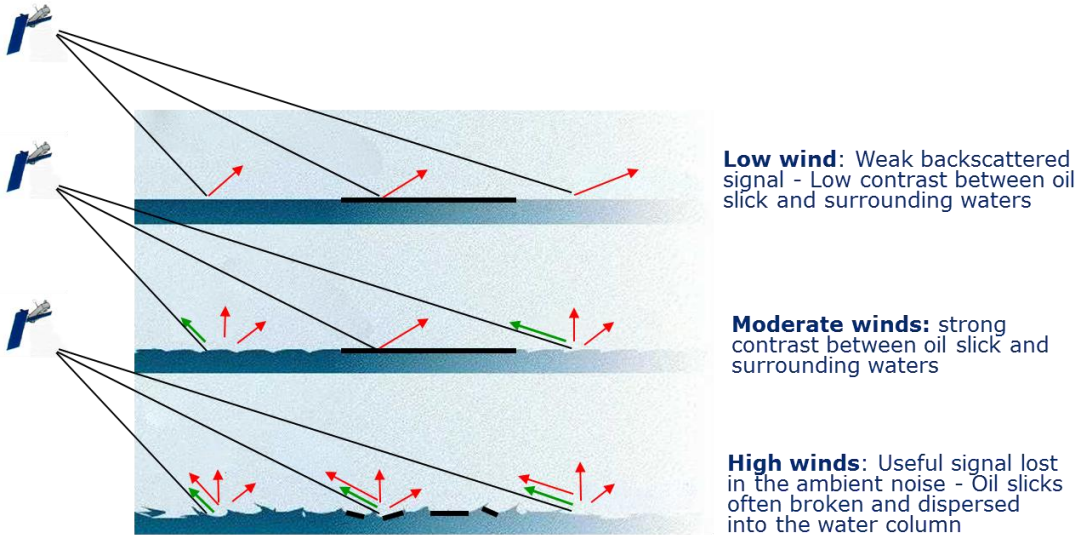


Figure 13: Impact of wind on radar detections

Trained operators are able to discriminate between natural phenomena and discharges from vessels. In particular, when an image shows the bright echo of a vessel at the end of a linear dark feature and when the shape of this feature matches the track of the vessel, there is little doubt that this vessel has been discharging. The discharged product could be oil but could also be another substance that would produce the same dampening effect. To confirm the nature of the substance detected and that the discharge exceeds the legal limits of MARPOL requires the collection of additional information on site and/or in port.

Two main types of radar are used for oil detection: Side Looking Airborne Radar (SLAR) and Synthetic Aperture Radar (SAR). The technology differs but operational capabilities to detect oil are similar. Most marine pollution surveillance aircraft are equipped with SLAR. SAR sensors are used for satellite detection. More detailed information on these sensors can be found, for example, in the Bonn Agreement Aerial Operations Handbook (see chapter 10.2).

Satellite and aerial surveillance are complementary and should be used in combination. Satellite are able to cover wide areas at low cost but can only provide an initial indication of a spill while it is

possible with an aircraft to immediately start further on-site investigations and collect evidence that, in some cases, might be sufficient to prosecute a pollution offence successfully.

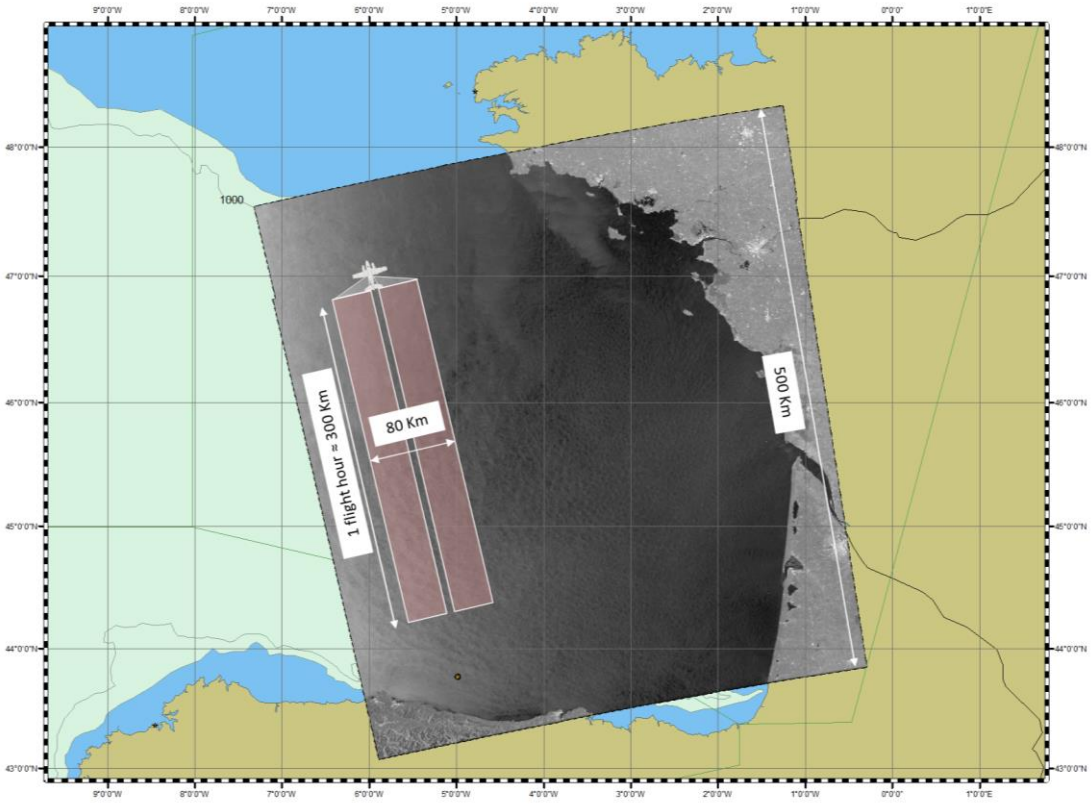


Image 2: Area covered by satellite versus area covered by aircraft during one flight hour

Spills in the marine environment weather out quickly[51]. All efforts should be made to send an aircraft to check the possible pollution detected by satellite with the shortest possible time delay[52]. Consequently, satellite acquisition planning and flight schedules should be coordinated in order to optimise both the use of satellite surveillance and of aerial surveillance. It should be noted that the 'Conditions of Use' of the European satellite-based oil spill and vessel detection service, CleanSeaNet (see chapter 10.1.1), require that coastal states using the service take the satellite monitoring schedule into account for the planning of national or regional, response, monitoring and surveillance resources (e.g. aircrafts, vessels).

Some countries have limited or no aerial surveillance resources dedicated to pollution control. It is highly recommended that international cooperation mechanisms between coastal States be set up[53] in order to maximise chances that aerial surveillance resources are available when needed. Having an aircraft on stand-by is a possible way to reduce the number of flights while ensuring that

[51] See chapter 3.1.

[52] The analysis of CleanSeaNet statistics demonstrates that 50% of spills are confirmed if they are checked within 3 hours of satellite detection. The rate of confirmation decreases with time.

[53] Cooperation should take into account that there may be restrictions regarding aerial surveillance i.e. what a foreign aircraft is allowed to do in other state's EEZ or in territorial seas.

adequate follow-up to satellite detections can be provided. If no spill is detected, flights can be re-tasked to monitor areas not covered by satellite.

In order to increase the likelihood of catching polluters, surveillance assets should be used in such a way that main traffic areas are monitored at regular intervals. However, the planning should not be predictable. Due to orbit constraints, SAR satellite times of passage are known in advance and cannot be modified[54]. In order to avoid being detected, ships that intend to discharge illegally might discharge deliberately between satellite passes. This can be mitigated by using several satellites[55] and by planning other surveillance assets in the interval. Areas outside main traffic areas should also be randomly monitored.

Patrol boats for the initial detection of illegal discharges are less effective than satellites. The range of ship borne radar sensors for detecting oil pollution is limited. Furthermore, it is not always easy to visually observe a spill from the bridge of a vessel. A patrol boat is likely to be spotted by potential polluters well before reaching pollution detection range. However, the presence of government assets increases the deterrent effect as it gives a clear signal to ship operators that their activities are closely monitored.

In coastal areas, aerial, satellite and patrol boat surveillance can be complemented by coastal radar detection. Having access to vessel traffic information, operational authorities are able to monitor closely and continuously the area within detection range and to detect a pollution event as soon as it occurs.

6.3.2 Reports received on pollution at sea

It is a legal obligation for all ship masters and platforms to report to the nearest coastal State any incident involving a harmful substance whether the ship/platform has been involved in the incident or the pollution was simply observed. Aircraft pilots also have the obligation to report spill observations.[56]

Coastal States receiving initial information about an incident involving harmful substances, have the obligation to assess the nature of the incident. They should ensure that the report from the informant contains the following information (if available):

- the time and location of incident;
- the type and quantity of harmful substance involved;
- the identity of ship(s) involved.

If the incident reported presents a threat to safety of life at sea or the environment appropriate measures should be taken.

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[54] SAR satellites have polar orbits. The frequency of observations is significantly greater at higher latitudes than at the equator. With one satellite, a given area can only be covered from approximately once a day in high latitudes to once every five days at the equator.

[55] By using several satellites CleanSeaNet is able to cover European waters several times per day according to the needs of each individual coastal State.

[56] Article 8 and Protocol I of MARPOL 73/78, and article 4 of the OPRC Convention.

Coastal States also have a key role in supporting the enforcement of pollution prevention regulations. National procedures should contain clear instructions on actions to be taken by coastal stations in order to confirm and/or forward the information received on pollution in order that a decision can be made on appropriate follow-up actions.

6.3.3 Assessment and follow-up

It is essential that information received is communicated without delay to authorities who have the power to decide upon follow-up actions. There are a variety of possible actions which can be conducted in parallel:

- sending an asset to the site to check the alleged pollution, or making a request for another country to perform this check;
- in case of an orphan pollution, identifying possible polluters through the combined use of vessel traffic information systems and of oil drift models (see chapter 9);
- when a vessel is identified as the possible source of the spill, communicating this information to authorities along the route of the vessel and/or requesting an inspection in the next port of call whether in the initial country or in a third country.

If information is passed to authorities in the next European port of call that a ship is suspected of having illegally discharged, an inspection of the vessel will be mandatory[57]. Reporting an alleged pollution in Thetis will trigger a Port State Control inspection in the next port of a Paris MoU State (see chapters 2.6.1 and 10.1.4). Pollution reported through the SafeSeaNet system (see chapter 10.1.2) might also prompt action along the route of the vessel. However, authorities making the request should always consider whether the tool used to convey information is the most appropriate for enforcement purposes, or whether additional procedures also need to be put in place.

It is important to note that a possible pollution detected on a SAR satellite image may be considered a sufficient suspicion that a ship has been engaged in a discharge. A growing number of coastal States use CleanSeaNet detections to trigger inspections in port when vessel traffic monitoring systems allow the clear identification of the source. A number of polluters have been fined on the basis of evidence collected during such inspections. It is not always possible, legally or technically, to prosecute the offender for the pollution observed on the image, even though this was the initial prompt for the inspection. It is therefore recommended, whenever possible, to send an asset to the site to characterise the spill. This is not an issue for spills detected by aircraft, as crews should systematically collect additional evidence for characterising the spill.

As time is critical for collecting actionable evidence, it is an advantage if coastal stations are authorised to take some of these decisions, in particular to dispatch an asset to the site. Coastal

[57] Article 6 of Directive 2005/35/EC of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements provides that if "information gives rise to a suspicion that a ship which is voluntarily within a port or at an offshore terminal of a Member State has been engaged or is engaging in a discharge of polluting substances into any of the areas referred to in Article 3 (1) that Member State shall ensure that an appropriate inspection … is undertaken". Areas listed in the article 3 of the Directive include the high seas.

stations should also know at which stage they need to involve administrative or judicial authorities to formally start an investigation.

In order to facilitate coordination between the different authorities involved in the illegal discharge enforcement chain, any initial indication of possible pollution should be available not only to operational contact points responsible for the receipt and transmission of pollution reports, but also to authorities who have the operational control over surveillance assets.

Coastal stations should be aware that the polluting vessel itself might report a pollution in order to allay suspicion. This might occur in one of two circumstances: 1) the vessel has polluted but reports a 'mystery spill', disassociating itself from the violation which has taken place; 2) if the discharge was deliberate, but the vessel then has reason to believe the discharge will be discovered.

6.4 Initial indication obtained ashore

6.4.1 Routine inspection

Vessels are regularly inspected in port; this provides an opportunity to identify possible pollution offences. Routine inspections of vessels can only be undertaken by authorised bodies: Port State Control; maritime police; and other bodies with recognised powers to do so (in some countries, the coastguard or navy may have these powers).

The scope and purpose of Port State Control inspections was detailed in chapter 2.6. In the course of undertaking a routine inspection, a Port State Control inspector may detect a deficiency which indicates that there has been a MARPOL violation. The indication is likely to be either:

- documentary evidence, e.g. a deficiency in the ship records, or
- real evidence, e.g. visible evidence that a violation may have occurred, such as the presence of illegal bypass equipment or tampering with pollution control equipment.

If the deficiency is such that it would be a hazard to the marine environment, the Port State Control authorities will ensure that the hazard is removed before the ship is allowed to proceed to sea. In general however, the authorities are under an obligation to avoid unduly detaining or delaying the ship.

A technical report will be produced as a result of the inspection, and this may later form part of the judicial file, although it should be reiterated that controls under the MOU are of an administrative and technical nature and are not always adequate to deliver valid or sufficient evidence for criminal prosecution purposes.

Depending on the type of deficiency detected, the PSC authorities may contact maritime police or similar bodies with criminal investigation powers in the port and/or inform other authorities along the route of the vessel. They should do this whenever there is evidence that illegal practices may have taken place.

It is recommended that a national procedure is established to support efficient cooperation and exchange of knowledge between administrative and judicial authorities, particularly between Port State Control inspectors and counterparts from authorities with powers of criminal investigation. It should be noted that criminal investigations on ship-source pollution offence have a different scope

than Port State Control inspections and require experienced and trained personnel. A number of documents, such as the Paris MoU procedures for investigations into contravention of discharge provisions[58] or the INTERPOL Manual[59] provide valuable information to any person involved in on board investigations.

Some maritime police and other authorities with powers to undertake inspections or proactive investigations also conduct periodic routine or 'spot check' inspections. This is an effective way to check for MARPOL violations, and it is recommended that in States where this is not currently standard, efforts should be made to introduce this practice.

When boarding a vessel either to conduct a routine inspection or based on information received, investigators should follow established procedures. Outside the Paris MoU framework, investigators must have appropriate powers or authority under national legislation to board the vessels. In some countries a search warrant may be required. It is important for investigators who board vessels to be familiar with vessel operations, or to be accompanied by people with such experience. Such expertise can be from Port State Control officers, marine surveyors or engineers.

6.4.2 Information received

Information may be received indicating that a possible pollution regulation violation has taken place. Information can come from a wide range of sources, for example:

- from persons on board the suspected vessel, whether crew member or passenger;
- from observers on shore;
- from another vessel or aircraft in the area;
- from a report of pollution washed up on shore or in port.

The practice of a crew member in the employment of the polluting vessel deliberately reporting and providing evidence of illegal activities is known as 'whistleblowing'. Whistleblowing is common in the United States, where it accounts for 50% of new MARPOL cases. This is largely due to the rewards awarded to whistleblowers, which can be up to half the penalty imposed for the violation. However, even without such financial incentives, whistleblowing can and does occur in Europe too.

A number of cases related to violation of MARPOL annex V (Garbage) by cruise ships have been initiated because of information and evidence (e.g. photos) submitted by cruise ship passengers.

6.4.3 Assessment and follow-up

When investigators receive information on a possible violation and schedule an inspection on board, thorough preparation is needed before boarding the vessel, including ensuring that investigators have the power to do so under national legislation (this may require, e.g. a search warrant). If possible, Port State Control and criminal investigators should arrange to board the vessel together. Everyone should be clear on the purpose of the investigation, what potential regulations may have been violated (based on information received), and what evidence is required to prove the

[58] Paris MoU. 2011. *Instruction 44/2011/20: Procedure for Investigation under MARPOL* (– Paris MoU – Confidential)
[59] Interpol. 2007. Investigative manual for illegal oil discharges from vessels.

violations. During the investigation, other evidence of violations may be uncovered. One person should lead the investigation and all involved must be clear on their roles.[60]

When pollution washes up on shore, it can be difficult to determine a) the source of the pollution and, b) the conditions under which it was discharged. A link needs to be made between the discharge and a possible polluter. If the substance is unusual, this might be done through a process of elimination, for example if only one vessel transiting the area in the preceding period has transported a particular cargo. If the substance was more common, but very few vessels transited the area, it might be possible to establish a link by taking samples on shore, and sampling on board the possible vessels. An assessment must be made regarding whether or not to request an investigation on board or to investigate documentation in relation to, one or more vessels.

[60] Further information is available in the Interpol. 2007. Investigative manual for illegal oil discharges from vessels. Chapter 6.

Chapter 7: Collecting additional evidence

The successful enforcement of pollution regulations will very often require collection of evidence both on site and on board the vessel.

Collecting evidence on site requires rapid and coordinated actions from all parties as the time window to obtain information can be short: visible evidence of the spill at sea will often weather out in a couple of hours and vessels can move far away from the position of the pollution. Aircraft and helicopters, and in particular aircraft equipped with specialised remote sensing equipment, are the most appropriate assets to investigate on-site initial indications of possible discharges in a timely manner. Vessels are slower to reach the area and it is more difficult to observe a spill from the bridge of a vessel than from the air. However, vessels or helicopters are necessary for taking samples or recovering sampling buoys dropped by aircraft (see below, 7.2.1.2). Vessels have also the capability to recover garbage floating in the wake of a vessel.

Collecting evidence in port as a result of shipboard investigation will often involve actions requiring cooperation at national and international level. This should also be done as quickly as possible, when the evidence is more easily linked to a pollution.

All stages in the collection of evidence are likely to require cooperation between different authorities. Evidence shall be collected to: characterise the spill; establish the link with the polluter; prove intent, recklessness or negligence (if this is required); and to otherwise support the case.

7.1 Cooperation in the collection of evidence

Early and informal cooperation is essential in order to ensure that evidence is promptly collected even prior to a formal request.

At international level, this implies identifying competent authorities in other countries and developing informal links with them, preferably before a violation occurs. This is greatly facilitated on a regional basis by informal networks of investigators and prosecutors in constant dialogue with maritime administrations.

It is important that parties engaged in the collection of evidence have a good understanding of marine pollution regulations in order to ensure that evidence brought to the case is sufficient and that evidence is collected and presented in accordance with national requirements of the state that will prosecute the offender.

7.1.1 Legal powers of investigators

Different sovereign states authorise different individuals or groups of individuals to carry out investigations into discharges into the sea. These may include police officers, specialist police officers, Maritime Administration officials, or individual specialist investigators. Whatever their position, it is essential that they have appropriate appointments and understand the legal basis for carrying out the investigation.

When evidence is collected by officials from another country, it is important that the requesting country ascertains under which conditions the evidence can be accepted in court.

7.1.2 Procedures for collection of evidence

Crews of surveillance assets and Port State Control inspectors will very often be the first people involved in collecting information that might later be used as evidence. Therefore, they must also be familiar with common procedures and methods to collect and exchange information aimed at proving that a pollution offence was committed. Adequate initial training and periodic refresher courses should be available. Manuals and handbooks, such as the Bonn Agreement Aerial Operations Handbook or the HELCOM Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea, are important tools to disseminate information on best practice methods and procedures.

In most cases, investigating possible offences of marine pollution prevention regulations involves on board investigation. The affected coastal State may decide to take immediate action against a vessel, as permitted under certain conditions by UNCLOS (Article 220), or the vessel might be bound to a port of the coastal State. In these two instances, the coastal State can undertake the on board investigation without requesting international assistance. Otherwise, the coastal State will have to request on board investigation to the State of the next port of call.

Coastal States should develop clear procedures on how to inform port States along the route of a vessel of a possible violation, and on how to request an inspection. Requests should clearly indicate what is expected from the inspection and how to report the results, following recommendations on the collection of evidence. Streamlining this at the level of Regional Agreements brings considerable added value. Regularly updated contacts and procedures should be maintained by Regional Agreements for States bordering the respective sea areas.

Within the context of the Paris Memorandum on Port State Control, routine inspection of vessels calling at ports in European States includes verification of compliance with MARPOL requirements. Regular inspections conducted in the framework of port State control are likely to be undertaken by port State control Officers with a more limited remit, while investigations undertaken on board following a suspected pollution incident may be undertaken by personnel with port State jurisdictional powers in criminal matters, such as maritime police. The distinctive competencies of these separate authorities should be recognised, and contact points must be clearly differentiated. Coastal State authorities either passing information on a possible spill or requesting cooperation from port State counterparts in another country, should be aware of which authority to contact (it may be both), and the procedures for doing so.

The use of existing information systems such as SafeSeaNet and Thetis can provide added value for rapid and simple exchange of information in a standardised way. These information systems will be presented in Chapter 10:.

7.1.3 Requesting and providing information

One main difficulty for the authority making the request is to describe clearly what is expected from cooperation partners. The use of standard forms to request and report information that could later be used as evidence is highly recommended. The North Sea Manual on Maritime Oil pollution Offences (e.g. ‘Request for Initial Information and Summary Report’) and the Baltic Sea Environment Proceedings n° 78: Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea (e.g. ‘Itemised list of possible evidence for collection in case of a suspected

violation'; 'Summation report of evidence collected on a suspected violation of anti-pollution regulation(s)') contain useful material.

Furthermore, as national legislation will specify the elements of the offences to be established, States providing evidence in support of a case should be aware of the requirements of the requesting State. In particular, the nature of the offence – whether it is absolute[61] or not – is also an important factor. Basic knowledge of jurisprudence and court practices in different countries with regard to the use of evidence is therefore equally important. Disseminating information on lessons learnt from relevant cases provides an important contribution.

In most legal systems, it is possible to present in court any type of evidence that is deemed useful to support the case. Depending on the legal system and practices, some types of evidence carry more weight, and some may have specific legal consequences such as reversing the burden of proof. In France for example, this is the case for official statements from government aircraft observers. The way evidence, such as witness statements and samples, is collected and transmitted should also be carefully considered.

When physical evidence - such as photos, samples, and documentary evidence - has been collected which may later be used in court, it is important that clear 'chain of custody' procedures are followed to ensure the integrity and credibility of the evidence. Chain of custody refers to the procedures, and associated documentation, related to collecting, controlling and transferring evidence. Chain of custody should be recorded using a standard form, which should indicate: how the evidence was obtained; that it has been stored securely and under appropriate conditions; all personnel who have handled the evidence; if and when the evidence has been transferred and how this has been done. Appropriate chain of custody procedures make it easier to demonstrate the reliability and acceptability of the evidence, and establish to the court that the evidence is related to the alleged crime. Particular procedures may exist for certain types of evidence, such as oil samples, which require specific conditions to be met to maintain the integrity of the evidence.[62]

7.2 Characterising the spill

Proving a MARPOL violation will require collecting evidence to characterise the spill with regards to: 1) the type of substance, and 2) the conditions under which the substance was discharged (such as concentration of discharge, distance from shore, type and speed of vessel).

Additional information on the size of the spill and on its impact on the environment may also have consequences on inspection and jurisdiction rights of the coastal State and may be used to determine the level of penalty.

[61] In legal systems where "absolute" offences exist, it is sufficient to show that the event which constitutes the prohibited act took place even if the person responsible was not even aware that the event occurred.
[62] For information on how to collect, store, and transport oil samples, see chapter 7.3.5.2.

7.2.1 Substance type

7.2.1.1 Substance type determination through visual observation and remote sensing

Oil floating at the sea surface alters the way light is reflected, making visual observation possible if the concentration is high enough. Concentrations below 50 parts per million (ppm) cannot be observed. Concentrations between 50 and 100 ppm can exceptionally be observed.[63] Consequently, when MARPOL annex 1 sets a limit of 15 ppm for oil content of effluent, the discharge cannot be observed.

Conclusions of investigation into oil discharges visibility limits have been endorsed in an IMO resolution[64] stating that 'A visible trace of oil is an element of proof that the 15 ppm discharge standard of annex 1 of the MARPOL convention may have been violated'.

The visual appearance of mineral oil at the sea surface depends on the layer thickness. The Bonn Agreement Oil Appearance Code (BAOAC) is the reference document for observers to describe visual observation of oil spills in flight reports.

Code	Description	Layer thickness interval (µm)	Litres per km^2
1	Sheen	0.04 – 0.30	40 – 300
2	Rainbow	0.30 – 5.0	300 – 5000
3	Metallic	5.0 – 50	5000 – 50,000
4	Discontinuous True Oil Colour	50 – 200	50,000 – 200,000
5	Continuous True Oil Colour	More than 200	More than 200,000

Table 1: Bonn Agreement Oil Appearance Code

The possibility of identifying the type of substance by visual observation will depend on circumstances. Experienced observers are able to distinguish between natural phenomena such as cloud shadows or algae blooms, and discharges from ships. When high BAOAC code values are observed, the confidence level that the substance is mineral oil is high. However, it is sometimes not possible even for experienced observers to distinguish mineral oil from other products falling under the annex II of MARPOL, for example when the spill appears only as sheen.

The type of vessel is an important element in the analysis to determine the type of substance discharges. Vessels such as cruise ships or container carriers are not expected to legally discharge any substance with a visual appearance similar to oil. For oil tankers outside special areas, discharges allowed by MARPOL may result in visible traces of oil on the surface.[65] The same applies to discharges of MARPOL annex II products. Consequently, in some cases, proving an annex I or annex II MARPOL violation will only be possible after an investigation on board the vessel has been carried out.

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[63] International Maritime Organization (IMO). 1993. Visibility limits of oil discharges of Annex I of MARPOL 73/78. Marine Environment Protection Committee, resolution MEPC Resolution .61(34): adopted on 9 July 1993: 'discharges of oily mixture from machinery spaces with a concentration of 15 ppm cannot be observed'.

[64] Ibid.

[65] Rules set-up by MARPOL (annex 1 – regulation 34) for the discharge of oil or oily mixtures from the cargo area of an oil tanker may result in concentrations exceeding visibility limits.

It is important to emphasise as stated in the North Sea Manual on Maritime Oil Pollution Offence that 'direct visual observation is one of the most effective ways of recognising and assessing an oil spill exceeding the legal limits of MARPOL'. In some Member States visual observation is considered sufficient for bringing a suspected vessel into port for further investigation, and is accepted in court as the main piece of evidence. Visual observation official statements should include photos and videos.

Many European coastal states have developed day/night and all weather marine pollution monitoring capabilities based on integrated multi-sensor surveillance systems mounted on low flying aircraft. Information obtained from different sensors - Side Looking Airborne Radar (SLAR), Infrared/Ultraviolet Scanners (IR/UV), Microwave Radiometers (MWR), Low Light Level Television camera (LLLTV), and Laser-Fluorescence Sensors (LFS), etc. - is combined with navigational data to provide an overall picture of the spill in terms of extent, location, and thickness. However, only LFS would be able to provide information on the type of substance.

Detailed information on visual observation and airborne remote sensing capabilities, and on how to collect, record, and document data on a spill a can be found in the Bonn Agreement Aerial Operations Handbook, 2009 and in the North Sea Manual on Maritime Oil Pollution Offence.

Visual observation during daytime, and LLTV and Forward Looking InfraRed (FLIR) sensors at night, can also be used to detect the disposal of garbage in violation of the annex V of MARPOL.

7.2.1.2 Substance type determination through sampling

'Sampling' refers to the process of taking samples for the identification of a substance, providing information on the physical and chemical properties of the substance. Samples can be taken at sea (for substances in/on the water), on board vessels, and onshore.

Taking samples at sea is one possible way to determine the substance of a spill. One of the main practical challenges is to physically recover the samples before the spill weathers out. Samples can be taken directly by helicopter or boats, which is be problematic if the spill occurs far from the coast. The use of sampling buoys dropped by aircraft can overcome this issue by reaching the site rapidly. The buoys must then be recovered from the sea by a boat or a helicopter, and analysed in accordance with approved procedures by accredited laboratories.

Whatever technique is used to take samples, it is important to be able to prove that they were taken from the right location in order that there is no doubt that the sample was taken from the slick itself. Whenever possible, samples should be taken from various points of the slick and also from surrounding clean waters.

Sampling is undertaken primarily when there is a suspicion of mineral oil; sampling procedures and analysis have been developed extensively in this area, and can provide very complete information on the type of oil spilled. The results of the sampling will show what type of mineral oil it is, e.g. bilge water, cargo tank washing, etc, which may prove useful later in the investigation. It will also indicate if it contains other substances such as lubricating oils. Detailed analysis can provide an 'oil fingerprint'.

The sample analysis may reveal that the substance is not mineral oil. When the substance is not mineral oil, the analysis will still provide information on the type of substance involved. Investigator

and prosecutors must determine whether any pollution regulations were being violated or not. Many MARPOL annex II and III substances, ranging from vegetable oils and paraffin to toxic chemicals such as nonylphenol also form 'slicks' that can be detected by surveillance assets when being discharged from vessels. Whether or not a violation has occurred depends on the substance and the conditions. Results of sampling analysis may not be as detailed as for mineral oil, but nonetheless may be sufficient for investigators and prosecutors to secure evidence that the substance in question was illegally discharged.

Proper procedures must be followed at all times in order to ensure that samples are taken properly, stored appropriately, and, if necessary, transported carefully. Analysis of samples is undertaken by specialised accredited laboratories. Authorities involved in taking samples should be familiar with techniques of sampling; authorities involved in investigation and prosecution should familiarise themselves with how to request a sample from an accredited laboratory, and should know how to interpret the results which are returned. Investigators and prosecutors should also identify oil sampling experts who are considered to be objective and neutral, and can be accredited by the Courts. They should know how to request input of such experts in preparing a case and, if necessary, for giving evidence in court.

A network of oil sample identification laboratories and experts has been formed under the name OSINET (Oil Spill Identification Network)[66].The main purpose of the cooperation is to give mutual assistance, to maintain a high level of professionalism and to accredit laboratories. In case of large spills in which two or more countries are involved, the laboratories will compare analysis results.

For more information on practical aspects of sampling, please refer to the Bonn Agreement Manual, Chapter 32: Guidelines for the Exchange of Oil Samples/Results between countries, and to the European Committee for Standardization (CEN) guideline, CEN/TR 15522 Oil spill identification - Waterborne petroleum and petroleum products. CEN/TR 15522 consists of two parts: Part 1, describing sampling at sea; and Part 2, on the analysis and interpretation of the results.

There are not only substantial practical difficulties involved in taking samples at sea (much more so than for taking samples on shore, for example), but also high costs involved in sending assets to the scene, in getting the sample analysed, and in calling expert witnesses to court.

In many cases, it will not be possible to obtain samples. Proving the type of substance via other means (visual observation, inspection in port) should be sufficient to successfully prosecute the case. It is therefore generally acknowledged that while sampling can bring valuable additional information to a case, it should not be obligatory in order for a case to advance.

7.2.2 Conditions of the spills

The principle set up in MARPOL is to prohibit the discharge of any substance that could present a risk to the marine environment and only to authorise exceptions under certain conditions. Depending on the type and age of vessel, and on the type of substance, MARPOL might impose conditions on 1) the

[66] Information about OSINET, a list of participating laboratories and reports of the annual Round Robins can be found on the OSINET section of the BONN Agreement website (www.bonnagreement.org).

speed of the vessel; 2) the location of the discharge; 3) the concentration of the effluent expressed in parts per million (ppm), on quantities spilt in litres per nautical mile, or on total quantities as a percentage of the particular cargo.

The condition that the vessel must be en route is imposed to ensure that '*any discharge is spread over as great an area of the sea is reasonable and practicable*'[67]. Speed conditions apply for noxious liquid substances on the same principle. Therefore, it is important that evidence collected includes all information on the track and speed of the suspected vessel whether observed by surveillance assets, required from the vessel[68], or extracted from vessel traffic information systems.

MARPOL annexes also include different conditions depending on the location such as a minimum distance from the coast, a minimum depth of water. The fact that the ship is in a 'special area' is also an important factor to take into consideration. The information collected on track and speed will also be used to assess if the conditions on location were satisfied.

Proving that the concentration of the effluent exceeds the limits of MARPOL is more difficult. In some cases, information collected at sea will not bring decisive evidence that the quantities spilled exceed the legal limits.[69] Proving a MARPOL violation on these grounds will require a shipboard investigation.

The detailed examination of the ship records such as tank sounding records and cargo record books, checking the consistency of information, checking if it matches with information collected at sea and extracted from information system should enable experienced investigators to determine whether a spill constitutes a MARPOL violation.

7.2.3 Other characteristics of the spill

Criteria such as the size of the spill or the impact on the environment cannot help to establish whether a MARPOL violation was committed or not. However, it is important to collect this type of information for two reasons:

- It has legal consequences on the powers of the coastal state for inspecting the vessels and institute proceedings[70].
- The size of the discharge and the damage to the environment are likely to influence the decision as regards the level of penalty imposed.

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[67] See unified interpretation to regulation 15.2.1 of the revised MARPOL annex 1: "En route means that the ship is underway at sea on a course or courses, including deviation from the shortest direct route, which, as far as practicable for navigation purposes, will cause any discharge to be spread over as great an area of the sea as is reasonable and practicable. (Added by MEPC.55)".

[68] See UNCLOS art 220 for the powers of the coastal State to require information from suspected vessels (identity, last and next port of call and other relevant information required to establish whether a violation has occurred) and consequences if information is not provided or inconsistent with factual evidence.

[69] Information collected at sea may sometimes be sufficient, e.g. where oil discharges are limited to 15 ppm, annex II discharges, discharge pipe over the waterline, speed and distance to shore not in line with regulations.

[70] See UNCLOS article 220

The method how to estimate the volume of an oil spill based on the Bonn Agreement Oil Appearance Code (BAOAC) can be found in the Bonn Agreement Aerial Surveillance Handbook. It is possible by visual observation only to provide an estimate of the minimum and maximum amount of oil visible at the surface. The accuracy can be improved by using other sensors like the Side Looking Airborne Radar (SLAR) for mapping the spill. However, this method only provides an order of magnitude and cannot be applied to other substances than oil. Proving what actual quantities were discharged will again require that an investigation is carried out on board the vessel.

There is no similar method for estimating quantities of substances other than oil based on visual observation and remote sensing information. Therefore, in the case of liquid noxious substances creating a sheen on the sea surface, only an investigation carried out on board the suspected vessel will bring sufficient evidence to prove that an annex II discharge has exceeded the limits permitted by MARPOL. For other MARPOL annexes, investigation on board is also likely to be required.

The damage to the environment is addressed in the section on impact assessment.

7.3 Establishing the link with the polluter

Determining the source of pollution can be achieved in different ways. The link between a spill and a polluter is obviously established when a vessel is caught in the act of discharging. The link can also be made by other means such as vessel traffic information systems or information collected on board.

7.3.1 Ongoing discharge detected by aircraft or satellite

Ongoing discharges from vessels will usually be detected by SLAR equipped aircraft or on SAR satellite images. Whenever possible, all efforts should be made to catch polluters in the act.

When the initial detection has been obtained by an aircraft, given the limited detection range of airborne sensors, the aircraft is nearby and able to reach the scene without much delay. This increases the chance of catching the polluter in the act.

As satellite images cover wider areas, it might take longer for an asset to reach the position of an ongoing discharge detected on an image. It is extremely important to minimise delays between a satellite observation and dispatching the aircraft in order to increase the likelihood that the vessel will still be in the act of discharging when the aircraft reaches the site.

Whether the vessel is still discharging or not, identification details, position and track of the vessel (name, IMO number, etc.) should be collected and accurately recorded. Information gathered should clearly demonstrate that the vessel was not sailing through a pre-existing slick but was actually the source of the spill being investigated.

Image 3: Picture showing clean water in front of the vessel with a slick behind

Visual observation statements, records of optical systems, traffic positions of all vessels in vicinity based on radar detection, and AIS information are also useful to prove the link between the vessel and the spill. It is important to report if the discharge stopped when the ship discovered the presence of the surveillance asset. Visual observation statements should be corroborated by photographs and videos.

The combined use of aerial and/or satellite information and of vessel traffic information system data can support the identification of potential polluters. In CleanSeaNet, the identity of the possible source is part of the oil spill alert report. In case the aircraft arrives after the suspected vessel has stopped discharging, satellite images can be used as evidence to prove the link between the vessel and the spill. Information collected by the aircraft together with other information coming from vessel traffic information systems or resulting from an investigation carried on board the vessel should provide proof that the vessel observed on the satellite image and connected to the spill is the same as the one identified by the aircraft.

7.3.2 Information provided by the vessel itself

If interrogated on radio by surveillance assets and/or shore stations, a vessel in the exclusive economic zone or territorial water of a coastal State has the obligation to report to that State its identity, last and next port of call and other relevant information that could be required to establish whether violation occurred[71]. The vessel may admit the discharge and indicate the type of substance. Even if a vessel claims to be legally discharging MARPOL annex II or IV substances, authorities should

[71] See UNCLOS article 220

check that the information reported on the type of substance is correct, that it is not mixed with other products, and that conditions imposed by MARPOL such as distance from the coast, water depth or ship speed are met. It should be noted that proving the violation of some of these conditions can be achieved without the need to collect evidence on site.

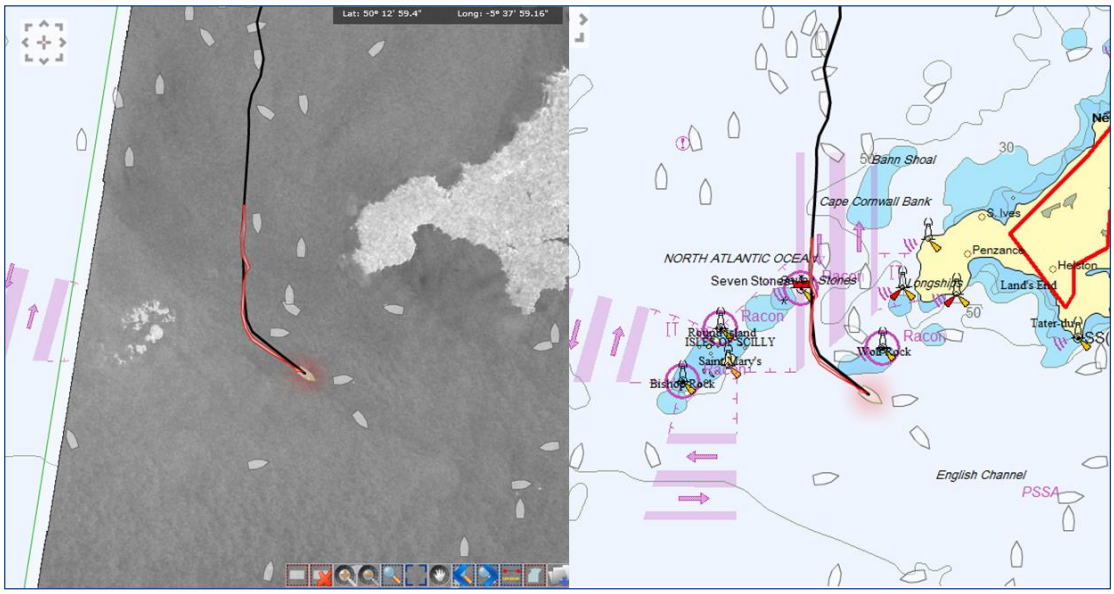

Image 4: CleanSeaNet evidence that a discharge took place within 12 nautical miles of the coast

7.3.3 Identifying the source of 'mystery' or 'orphan' spills

An oil spill, before it weathers out, may persist on the sea surface for a period of time. The length of time depends on the type of oil - from a couple of hours for light oil products, to several days for heavier products – and on weather conditions. Spills of other substances, for example annex II substances will persist on the surface for varying lengths of time depending on the properties of the product in question. Immediately after the substance has been discharged, it will start drifting with wind and current and changing appearance and properties. It is possible for experienced operators to assess if a spill is recent or not, but extremely difficult to determine the precise age. Therefore, the identification of the source is not always easy and sometimes impossible in dense traffic areas.

The main method used to identify the source of a mystery spill involves combining vessel traffic information with the results of drift model. Two approaches are possible: the backtracking approach or the forward tracking approach.

The backtracking approach is the most commonly used. Starting from the spill observation time and position, the drift model makes a backward calculation in order to check if, in the hours preceding the discovery of the spill, the backtracked position and shape of the spill could reasonably match the track of one or more vessels. Tools such as SeaTrackWeb[72] allow the simultaneous display on a map of drift model results together with AIS information. A replay function is used for operators to visually identify vessels whose track matches the spill at a given time.

[72] SeaTrackWeb is the official HELCOM oil drift forecasting system in the Baltic Sea

The forward tracking approach consists of simulating a scenario where all vessels passing in vicinity of the observed spill have been discharging an oily substance. Hypothetical spills are therefore generated along the track of each of these vessels. The drift model is run from the time of the hypothetical spill until the time of observation of the actual spill. Suspicious vessels are the ones for which the drift prediction of the hypothetical discharge match best the position and shape of the observed spill.

It should be noted that models can also be used to eliminate vessels from the list of possible sources and reduce the number of investigations.

However, most drift modelling tools have been designed to support response operations to accidental spills and work best when the substance and the quantity spilt are known. This is rarely the case for illegal discharges. In particular, discharge of oily residues from machinery spaces, i.e. bilge, consists of a mixture of a variety of products. Nonetheless, models may be used effectively as a first approximation to identify suspect vessels.

7.3.4 Identifying a vessel disposing of garbage illegally

When garbage is recovered from the sea or found after it was washed up on shore, the analysis of the content might bring evidence of the identity of the perpetrator, for example documents in the name of the company.

7.3.5 Information collected on board suspected vessels

Documentary, witness, and physical evidence can contribute to establish the link between the inspected vessel and the pollution. Taking samples on board can also support the identification of the polluter.

7.3.5.1 Documentary, witness, and physical evidence

The cross-examination of the ship records should enable experienced investigators to establish the link between a spill observed at sea and the vessel. The navigational log should be checked against vessel's track collected on-site by surveillance assets or from other sources, and compared to other documentation. If the ship has illegally discharged, this should result in discrepancies in the vessel records. Particular attention should be paid to the Oil Record Book, the Cargo Record Book, any receipts (oil receipts, port reception facility receipts), and tank sounding records. Interviews and physical evidence can also bring corroborating information on where and when the discharge took place.

The INTERPOL Manual provides valuable information on how to conduct shipboard investigation, to collect documentary and physical evidence, and to interview crew members.

7.3.5.2 Sampling

Another possible method to prove the link between the spill and the polluter is to take samples from the vessel and to check if they match those taken at sea or onshore. It should be noted that, in addition to positively identifying the culprit, samples can also be used to eliminate possible suspects.

Samples should be taken from all vessels identified as being a possible source of the pollution. It might be feasible to take samples from a number of vessels if the pollution took place in port or at anchorage. In case of ship-source pollution at sea, sampling all vessels in the vicinity is not likely to

be an option and a request for inspection in the next port of call should be made only when there is a reasonable suspicion.

Discharges at sea can result from the disposal of various types of ship-generated oily waste (e.g. tank cleaning, discharge of bilge waters, etc.)[73], as well as from other substances (e.g. those classified as liquid noxious substances). Samples from on board the vessel will only match those of the spill if they are taken from the tank or the pipes from which the product was spilt. Given the variety of ship installations depending of the type and size of vessels, of the number of tanks and wells, the selection of sampling points is critical. It is better to take samples from all potential sources rather than miss the opportunity to do so. National legislation may impose conditions such as the number of samples from each sampling point or on the volume of the samples. When the request for sampling is sent to another country, these requirements shall be clearly indicated.

The laboratory provides a detailed analysis of the substance, which has particular unique characteristics; in the case of oil, this is termed an oil 'fingerprint'. Even though each oil product has a unique fingerprint, when different sorts of oil are mixed, as happens frequently on board vessels, the particular combinations produced are even more distinctive. This is particularly true for waste products, for example, in the case of bilge. Comparisons of the samples taken should be done in laboratories in accordance with the European Committee for Standardization guideline, CEN/Tr 15522-2.

Although oil fingerprints are unique, interpreting the data to match two samples is complicated. Both the samples taken on board and the samples taken at sea will have undergone changes: for example, further mixing of on board oil; weathering of oil at sea; evaporation of lighter products; etc. Consequently, a 'one to one' match is not usually obtained. The method compares the non-volatile and stable components of the oil or oil product and gives, when relevant, a match conclusion based on 'no significant differences'. The expert report should clearly explain the reasons why the samples do not match exactly, and emphasize that the samples may nonetheless be from the same source. Otherwise, there may be a risk that the defendant will use the absence of an exact match to cast doubt upon the evidence.

7.4 Proving intent, recklessness or serious negligence

In some countries, violation of pollution regulations are absolute or strict liability offences. In other countries, it may be necessary to prove that the act of discharging polluting substances (the 'actus reus') was accompanied by some form of prior knowledge of the possible consequences ('mens rea'), i.e. that polluting substances were discharged due to intent, recklessness or serious negligence. This can have consequences on who is held liable and on the type and level of penalty imposed.

Directive 2005/35/EC states that 'ship-source discharges of polluting substances should be regarded as infringements if committed with intent, recklessly or by serious negligence.' The European Court of Justice defined serious negligence in its judgement in the case C-308/-06, Intertanko and others, in the following way: '"serious negligence" within the meaning of Article 4 of Directive 2005/35 must

[73]Issues linked with taking samples from the sea have addressed elsewhere.

be understood as entailing an unintentional act or omission by which the person responsible commits a patent breach of the duty of care which he should have and could have complied with in view of his attributes, knowledge, abilities and individual situation'. The detailed interpretation of intent, recklessness and serious negligence is, however, a matter of national competence, and it is the responsibility of each State to provide definitions in the national legal *acquis*.

The following definitions may be useful to provide a generic indication of the commonly understood meaning of the terms when used in a criminal law context:

> 'Intentionally' – A person 'intentionally' causes the social harm of an offense if: (1) it is her/his desire (i.e., her/his conscious object) to cause the social harm; or (2) she/he acts with knowledge that the social harm is virtually certain to occur as a result of her/his conduct.
>
> 'Negligence' – Criminal negligence (as opposed to civil negligence) ordinarily requires a showing of a gross deviation from the standard of reasonable care. A person is criminally negligent if she/he takes a substantial, unjustifiable risk of causing the social harm that constitutes the offense charged.
>
> 'Recklessness' – A finding of recklessness requires proof that the defendant disregarded a substantial and unjustifiable risk of which she/he was aware.
>
> Distinction Between Negligence and Recklessness – The line between 'criminal negligence' and 'recklessness' is not drawn on the basis of the extent of the defendant's deviation from the standard of reasonable care — the deviation is gross in both cases — but rather is founded on the defendant's state of mind. Criminal negligence involves an objective standard – the defendant, as a reasonable person, should have been aware of the substantial and unjustifiable risk she/he was taking; recklessness implicates subjective fault, in that the defendant was in fact aware of the substantial and unjustifiable risk she/he was taking but disregarded the risk.[74]

In the context of ship-source discharges of polluting substances, proof of intent could include, for example, the discovery of a bypass switch or magic pipe[75], an email from the company condoning illegal discharges, or falsification of record books. An example of recklessness might be failure to check that the vessel is beyond the 12 nm zone before starting a discharge which is permitted at such a distance, inadequate pollution prevention equipment[76], or postponing repairs when it has been observed that equipment is not functioning effectively. Evidence of negligence could include practices such as failing to undertake proper maintenance checks, poorly implemented Safety Management Systems, inadequate training for staff, etc. These examples are for illustrative

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[74] LexisNexis, 2007, *LexisNexis Capsule Summary: Criminal Law*. Accessed online, 02 May 2013: http://www.lexisnexis.com/lawschool/study/outlines/html/crim/crim05.htm

[75] See detailed description, including photos, in Interpol. 2007. Investigative manual for illegal oil discharges from vessels, p. 28

[76] MARPOL requires ships to be fitted with certain pollution prevention equipment (e.g. oil filtering equipment, oil discharge monitoring and control systems, oil content meters, oil/water interface detectors). This equipment should be approved by the issuing government, and should comply with the related IMO guidelines.

purposes only, and ultimately it is the court trying the case which determines the different forms of 'mens rea'.

Establishing 'mens rea' relies primarily on three types of evidence: witness evidence, physical or 'real' evidence, and documentary evidence. This is usually collected through investigation on board or on shore. When evidence is being requested and/or transferred between different authorities, particularly authorities in different countries, care should be taken to follow proper procedures. For all types of evidence, 'chain of custody' documentation should be maintained.

7.4.1 Witness evidence

Witness evidence can be given by anyone with information pertaining to the case. This includes crew (usually Captain, deck personnel, and engine room personnel), but may also include ship operators and charterers, witnesses such as cruise ship passengers, observers from other vessels or aircraft, amongst others. Some witnesses may come forward voluntarily, some even as initial informants ('whistleblowers'), whilst others will be identified by the investigators.

Witness evidence is most commonly obtained through interviews. Most pollution surveillance and law enforcement agencies have established policies, practices, and protocols for the collection of witness evidence. This includes guidelines on who should conduct interviews, how interviews should be conducted and how they should be transcribed. The transcribed document may also need to be translated from the language in which the interview was conducted, to the language of the country undertaking the interview and/or to the language of the requesting country.

7.4.2 Physical/'real' evidence

Physical proof of intent, recklessness or serious negligence, otherwise termed 'real' evidence, can be found by inspecting the vessel. Attention should be given to the general state of maintenance, particularly in the engine room and machinery spaces. In rare cases, irrefutable evidence of intent may be found in the form of pipes and bypassing equipment for direct overboard discharges. In addition, investigators should be alert for evidence that illegal practices have been covered up, such as bolt heads without paint or newly painted, and modified Oil Water Separators. Checking the of outlet line containing processed water from the OWS could also bring decisive evidence.

7.4.3 Documentary evidence

Documentary evidence includes vessel documents, ranging from vessel identity certificates to operational records such as oil record books. In some countries, certified copies will be accepted when the case goes to court; in others, the originals may have to be presented.

Documentary evidence may also comprise letters and records held by the agent, operator, charterer or other body. Instructions from the operator to the vessel are sometimes revealing, and may include, for example, advice such as where the vessel should not discharge illegally, implicitly recognising that the vessel will discharge illegally in other areas. Sometimes evidence of this type will also serve to raise suspicions regarding violations across a fleet of vessels, and can be useful not only in the individual case, but also in bringing the company to court for systematic fleet-wide violations.

7.5 Additional evidence to support the case

Other elements, such as any financial gain that the ship or the company can expect from its (illegal) behaviour, or the environmental damage that resulted from the discharge, can also influence the case.

7.5.1 Impact assessment

The environmental and socio-economic impact caused by pollution is determined by a range of factors, including: type of oil; physical, biological and economic characteristics of the location; amount and rate of spillage; and time of year.

If a discharge committed in the exclusive economic zone of a state is substantial, if it is causing or threatening significant pollution of the marine environment, if it is causing major damage or threat of major damage to the coastline or related interests of the coastal State, or to any resources of its territorial sea or exclusive economic zone, all these elements have legal consequences on the powers of the coastal for inspecting the vessels and institute proceedings[77]. The interpretation of substantial discharge, significant pollution, and major damage may vary depending on national legal systems and jurisprudence but appropriate evidence should be collected to support the case.

Pollution at sea, particularly near the coastline, may have a tangible impact on the environment. Authorities may undertake to monitor the importance and extent of such impacts, in both the short and long term. This may provide additional information on the nature of the pollution which could influence the decision of authorities on whether or not they should open a case, and/or could have a bearing on the level and type of penalty, or costs recovered from the polluter, if a case is successful.

Any additional proof of damage to the environment should be brought to the case as long as it is possible to link it with the pollution initially indicated.

7.5.2 Financial gain

Showing financial gain can help support a case by providing a 'mens rea', and may be useful once the case is taken to court in order to ensure that the level of the fine is sufficiently high that, as a minimum, it negates any profit the vessel may have accrued from illegal activities. Investigators should therefore take note of indications that the vessel has been cutting costs, for example, through discharging waste overboard rather than treating it or disposing of it to proper reception facilities, or through failing to repair equipment. Other forms of financial gain include bonuses paid to officers for keeping operating costs low, or for delivering cargo before the deadline, sometimes by missing essential portside operations such as discharging waste to port reception facilities.

7.5.3 Vessel and fleet history

Information should be gathered, when possible, on the past history of the individual vessel, the company and registered owner, and the charterer. Port State Control and police reports, databases, news articles, and court publications are all potential sources of information. Searches should be done by using unique identifiers (for example, IMO numbers, which apply to vessels, companies, and owners), as well as vessel names. This may uncover past violations by the vessel in question, or

[77] See UNCLOS article 220

violations by the company or owner. In addition to strengthening the case in question, such information could lead to a new investigation with a wider remit.

When investigations are conducted related to a company or owner, international cooperation may be required in order to request investigations on board all the vessels concerned. This should be done as quickly as possible, to limit the likelihood that incriminating evidence will be destroyed.

Chapter 8: Concluding the case

8.1 Assessment of actions to be taken

After all available evidence has been collected, there is a need to decide whether this is sufficient to bring the case to court, or whether other actions would be more appropriate. There are a number of aspects to be considered.

8.1.1 Where the case should be brought

Although European Union States may have jurisdiction to prosecute pollution offences anywhere, including the high seas, in general the state that it is best placed to pursue the matter through the courts will probably manage the case. It may be that the coastal State where the incident occurred has some evidence, the port States of the vessels origin and destination will have some evidence, as well as access to the ship, and the flag State may also hold evidence. If they are all one and the same State then it is clear where the matter should be heard, but if they are not then it is a matter for negotiation between the States, taking into consideration the requirements of UNCLOS Articles 217, 218, 220 and 228.

8.1.2 Transfer of case

Under certain conditions, proceedings instituted by a port State or a coastal State might be suspended upon the taking of proceedings by the flag State (UNCLOS, article 228). For violations committed within its internal waters, territorial sea, or exclusive economic zone, a coastal State may also request that a port State suspends a case in order for the coastal State to institute proceedings (UNCLOS, article 218). When a case is to be transmitted, the evidence and records of the case have to be transferred. Some elements (e.g. bond and financial security) depend on the case in question.

8.1.3 Who should be prosecuted

The investigation should identify who is responsible for the pollution, whether it is an individual shipboard act, system or equipment failure, or a management oversight failure. It may of course be a combination, such as an equipment failure caused by lack of management oversight of the maintenance regime. All European States should now have the facility to prosecute individuals or companies and although in some jurisdictions pollution is a strict liability offence (that applies liability regardless of how the incident occurred), it is appropriate to ensure that through the evidence obtained during the investigation, the culpable party is charged.

By issuing an International Safety Management (ISM) certificate, the ISM manager also has environmental responsibility and could potentially be prosecuted.

8.1.4 Criminal v. Administrative

Within the scope of Directive 2005/35/EC, all discharges in violation of MARPOL committed with intent, recklessly, or with serious negligence shall be regarded as criminal offences with the exception of minor cases where the act committed doesn't cause deterioration in the quality of water.

Practice in Europe varies. Some European States treat even minor discharges as criminal; whilst others depending on the case, can levy administrative fines in lieu of criminal prosecution. Interpreting which should be considered a minor case and what constitutes a deterioration of the quality of water is a matter of national competency. Administrative sanctions can have a strong

deterrent effect and be an appropriate solution when the circumstances of the case would make the outcome of criminal prosecution uncertain.

It should be noted that States have more scope to opt for administrative procedures for discharges not covered by Directive 2005/35/EC[78].

8.1.5 Presenting the case in court

When putting the case together for presentation in court, consideration must be given to whether information gathered from other authorities is acceptable to the court as evidence, taking into consideration the manner in which it was collected, the format in which it is presented and the manner of the transfer from one jurisdiction to another and the continuity of evidence that may be involved.

The case report format, from Investigator to Prosecutor and Prosecutor to the court, is a matter for individual states to determine. There may be extensive use of pre-formatted forms or there may be a free text approach, depending on the national system in place.

8.1.6 Costs to be borne by the polluter

In addition to the fines imposed on the polluter, authorities should, where possible, claim other costs. These may include the recovery of the costs of the investigation, damages for environmental harm, and clean-up costs.

The possibility to confiscate criminal gain obtained from the illegal behaviour should also be considered.

8.2 Feedback

There are a number of legal obligations on States to provide feedback on actions taken against ships suspected of violating anti-pollution regulations.

Port States and coastal States have the obligation (UNCLOS, article 231) to promptly inform the flag State of enforcement measures taken against its vessels, and should also inform any other State concerned. A flag State that has received a request to investigate an alleged violation by one of its vessels shall inform the requesting State and the IMO of actions taken (UNCLOS, article 217).

Directive 2005/35/EC as amended also requires that, following an inspection in port, if the inspection reveals facts 'that could indicate an infringement … the competent authorities of that Member State and of the flag State shall be informed' (article 6.2). It also states that flag States should be informed of any enforcement measures taken by coastal States (article 7.3).

Clear procedures should be established either at national or regional level on how to report information on actions taken and to whom. The HELCOM feedback report[79] is a good example of

[78] It should be noted that this Directive only covers Annex I and II of MARPOL.
[79] HELCOM. 2000. *Baltic Sea Environment Proceedings n° 78: – Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea*, – Format 3.

how a flag State may fulfil its obligations to report actions taken upon receiving evidence that one of its ships was suspected of violating anti-pollution regulations.

8.3 Documenting the case comprehensively

Clearly documenting all aspects of what has taken place - from the procedures used for investigation, to the key details of the case in court, to the eventual outcome - is important. A comprehensive case file provides a firm basis for all other actions, from reporting obligations to publicising the outcome, and means that an authorised person even without first-hand knowledge of the case can later access the file and quickly identify relevant information.

Chapter 9: Post-case actions

Effective post-case actions can contribute to and promote a number of positive outcomes. Post-case actions include, but are not limited to:

9.1 Fulfilling mandatory reporting obligations and voluntary reporting procedures

There are a number of legal obligations on States to provide feedback on actions taken against ships suspected of violating anti-pollution regulations. These include the obligation to between flag, port and coastal States for the prosecuting State to keep other affected States informed of any actions taken (UNCLOS articles 217 and 231).

The MARPOL Convention (article 11) requires the parties to the Convention to communicate to the IMO certain types of information which includes '*an annual statistical report, in a form standardized by the Organization, of penalties actually imposed for infringement of the present Convention'.* Formats for a mandatory reporting system under MARPOL 73/78 have been defined in IMO MEPC/Circ.318 dated 26 July 1996. The reporting system in place should allow the effectiveness of the application of the Convention to be assessed. In practice, the level of reporting is low[80] and information transmitted to the IMO is limited.

Aggregate information collected at European or international level, if it were to be available, could also contribute to:

- identify those flag States that repeatedly disregarded their obligations to enforce international legislation (UNCLOS article 228, MARPOL article 11);
- identify patterns of violations across Europe;
- provide comparative data for standardising enforcement across Europe, for example in levels of fines.

[80] International Maritime Organization (IMO). 2012. FSI 20/4 20 December 2011 *Analysis and evaluation of deficiency reports and mandatory reports under MARPOL for 2011.* Flag State Implementation Committee, FSI 21/42010.

9.2 Providing feedback across the enforcement chain

Active feedback should be given by ensuring that all individuals involved in the law enforcement chain have been informed of the outcome of the case, irrespective of whether the prosecution was successful or not (although if the case was not successful, there may be more stringent limitations on what information can be shared). Feedback can be a motivating force if shared across the enforcement chain. It allows pollution surveillance operators and on board investigators, who are often more involved in the initial stages, to obtain a better idea of what actions are effective or when procedures should be improved. In addition, successful prosecution based on these initial actions justifies the allocation of resources to these activities by the responsible authorities.

One alternative means of providing feedback is through the use of databases, though authorities with access to these should be proactive in using them. Some databases have already been constructed to share information between selected communities of interest. The North Sea Network maintains a qualitative database containing information on cases of particular interest to investigators and prosecutors, detailing the outcome. Many Aquapol members are populating a common database that provides brief reports on results of criminal inspections on board vessels, MarpolWeb; this is shared between Aquapol police forces and law enforcement organisations. Despite possible legal restrictions on disseminating information, all parties involved in the enforcement chain should make an effort to identify what information can be shared and with whom. Even when it is not possible to share identity information (e.g. vessel name or number), it may still be possible to share the investigation experience.

Compiling information on real cases is important in order to:

- uncover different types of practices related to illegal discharge of polluting substances;
- indicate why convictions sometimes fail (e.g. a regular lack of particular types of evidence) and to improve links and procedures of the enforcement chain;
- build a body of knowledge which can be used for intelligence led enforcement through developing vessel and fleet history and to comply with article 11 of MARPOL.

9.3 Disseminating information on particular lessons learnt or issues of interest

Exchange of information between interested parties through workshops and meetings, for example Regional Agreement Technical Groups or Networks of Prosecutors, is also an effective way of sharing best practice and collecting successful tips for prosecution. Compiling lessons learnt can also highlight some of the criteria to consider when assessing successful enforcement practices and to direct attention to areas of particular concern. Meetings and training events can be used to provide specific feedback on how different surveillance practices, information systems or investigation techniques may be useful to support enforcement actions.

Disseminating useful information increases the likelihood that enforcement will be pro-active and comprehensive, taking in to account a broader range of actors across the chain and patterns of illegal behaviour. It also enables States to learn from the experience of others and develop awareness of best practice. However, care should be taken that in more public forums, information is only disseminated, when permitted, on convicted polluters. Confidentiality of data – rules regarding which differ from country to country – should be respected.

9.4 Reviewing and improving existing procedures and updating guidance information

On a periodic basis, existing procedures and guidance should be reviewed and updated. This should be done at a European level to ensure that information on effective practices and procedures being implemented at Member State level are disseminated more broadly, to increase harmonisation between different states, and to update guidelines to take into account new developments such as alterations to information systems. At Member State level, reviews should be regularly undertaken to ensure that new legislation or government changes to the structure of government organisations are taken into account in training and guidance. Best practice and lessons learnt from around Europe should be reflected.

9.5 Publicising information on the outcome of a case

Publicising information on the outcome of a case serves a number of purposes. Most importantly, it has a strong deterrent effect on criminals; those deliberately engaging in illegal practices for financial gain become more wary of doing so, and those who are negligent become more aware of the consequences of not ensuring good maintenance, training and application of best practice on board vessels. However it also: disseminates information on illegal practices to the broader public; raises public awareness of what the justice system is doing to combat crime; encourages individuals with knowledge of criminal behaviour to come forward; enables comparison between countries on issues such as levels of fines; and builds up a body of knowledge which can be used for intelligence-led enforcement.

In many cases, sentences handed out in criminal court are part of a public record. Publicising outcomes to a wider audience is seen in many countries as a way of increasing the transparency and accountability of the criminal justice system, and is done as normal practice. Other countries have more restrictive policies. Respecting the limits imposed by national guidance on publicising sentencing outcomes, parties working for the effective enforcement of marine pollution regulations should, as far as possible, make this information available.

Chapter 10: Cooperation tools

Cooperation between countries involved in the pollution regulation enforcement chain can be facilitated and streamlined through various tools. Information systems have become an essential element for quickly exchanging information in a structured way and services have been developed at EU level in recent years. Manuals are also important to share experience and disseminate best practices. At any stage of the process, authorities should be aware of which procedures to apply. This requires establishing list of contacts and defining standardised forms.

10.1 EU Information systems

Streamlining and accelerating the exchange of information between maritime authorities on ship-source pollution, on vessel movements, and on the condition of ships that call in European ports is a key element to ensure a high level of environmental protection in maritime transport.

European legislation includes a number of obligations regarding the implementation of such information systems. At a European level, EMSA hosts and operates a number of operational systems: CleanSeaNet, the European satellite-based oil spill and vessel detection service; SafeSeaNet, the European vessel traffic monitoring and information system; the European Union Long Range Identification and Tracking Cooperative Data Centre (EU LRIT CDC); and Thetis.

Information made available through these systems, even if not always explicitly designed for enforcement purposes, can be extremely valuable to authorities engaged in combatting illegal discharges. Combining information from more than one system reinforces the added value to be obtained. It should be noted that not all authorities will be able to gain access to all systems; this should be ascertained on a case-by-case basis.

10.1.1 CleanSeaNet

Directive 2005/35/EC tasked EMSA to 'work with the Member States in developing technical solutions and providing technical assistance in actions such as tracing discharges by satellite monitoring and surveillance.' The Agency has set up and operates CleanSeaNet, the European satellite-based oil spill and vessel detection service. CleanSeaNet covers all European sea areas and, for a number of coastal States is the only remote sensing tool available to detect and monitor oil spills at sea. The service is based on the near real time[81] analysis of synthetic aperture radar images in order to detect possible oil spills on the sea surface. When a possible spill is detected within the alert area of a participating coastal State, an alert is immediately sent to the relevant authorities in the coastal State. Vessel traffic information based on e.g. Automatic Identification Systems (AIS) data extracted from SafeSeaNet is used in CleanSeaNet to identify, whenever possible, the source of the spill.

CleanSeaNet can provide in near real time a clear indication of the location and the dimensions of a possible floating pollution but cannot discriminate the type of pollution. Consequently satellite detections have to be verified on the spot. As spills weather out quickly, it is recommended that

[81] For satellite images covering 400 km by 400 km, the service is delivered to authorities in the coastal States within 30 minutes. For images of different dimensions the time varies slightly.

CleanSeaNet be used in combination with aerial surveillance. This is a cost effective solution in order to avoid flying over areas where no spills have been detected by satellite and to be able to ensure appropriate follow-up to CleanSeaNet detections whenever necessary. When coastal States cannot verify on site, the possibility to request an inspection in the next port of call should be considered.

CleanSeaNet satellite images are acquired in segments of up to 1 400 km and swaths[82] of up to 500 km. Consequently, most satellite images cover the waters of more than one coastal State. The best use of the service leads to increased cooperation between neighbouring countries in a number of areas. This includes planning satellite and aerial surveillance activities, exchanging information on pollution events and with respect to implementing follow-up actions. The CleanSeaNet system has been designed to facilitate this cooperation in particular for planning satellite acquisitions. In the Baltic Sea, for example, IWGAS[83] is responsible for defining the total operational needs for satellite images for the each of the three Baltic Sea satellite monitoring sub-regions.

According to the service conditions of use, users must enter feedback into CleanSeaNet to report the results of on-site verification activities. This feedback is immediately available to neighbouring countries. It is recommended that information on follow-up actions such as inspections in port of suspected polluters or any other enforcement actions are also reported. CleanSeaNet statistics based on feedback provided by the users, should be used to evaluate trends and to identify areas where surveillance effort should be concentrated.

During annual CleanSeaNet User Group meetings, coastal States are encouraged to share their experiences in using the service in enforcing pollution prevention regulation.

10.1.2 SafeSeaNet

Directive 2002/59/EC, as amended, established a Community vessel traffic monitoring and information system 'with a view to enhancing the safety and efficiency of maritime traffic, improving the response of authorities to incidents, accidents or potentially dangerous situations at sea, including search and rescue operations, and contributing to a better prevention and detection of pollution by ships'.

SafeSeaNet consists of a network of national maritime information systems, interconnected with a central system which was developed and is now operated and maintained by EMSA on behalf of the Commission. SafeSeaNet enables the 'receipt, storage, retrieval and exchange of information for the purpose of maritime safety, port and maritime security, marine environment protection and the efficiency of maritime traffic and maritime transport'. This information is made up of the following notifications:

- AIS based position (sent by vessels and received by shore based installations) and Mandatory Reporting System (MRS);
- pre-arrival, arrival and departure;
- dangerous or polluting goods (HAZMAT) and

[82] Swath coverage refers to the width of the strip covered by the radar at each overpass.
[83] HELCOM Informal Working Group on Aerial Surveillance

- Incident Report

These notifications are sent by designated authorities in participating countries.

'Coastal stations' (vessel traffic services, shore-based installations for a mandatory reporting system, and bodies responsible for coordinating search and rescue operations or operations to tackle pollution at sea) can have access to SafeSeaNet once authorised by the SafeSeaNet national competent authority.

Coastal stations holding information that a vessel poses a potential hazard to shipping or a threat to maritime safety, the safety of individuals or the environment, shall communicate this information to coastal stations concerned in the other Member States located along the planned route of the vessel. This is achieved in SafeSeaNet through a system of incident reports. The system can only be efficient if Member States ensure that, as required in Directive 2002/59/EC, information received is transmitted to the relevant port authorities and/or any other authority. Comprehensive information and advice on how and when to report incidents and accidents in SafeSeaNet is available in the EMSA SafeSeaNet Incident Report Guidelines.

Special attention should be given to the two following types of incident report which are particularly relevant for combatting illegal discharges at sea: the Pollution Report and the Waste Incident Report. A Pollution Report should cover any situation that is liable to lead to the pollution of the waters or coastline of a Member State or for reporting those ships for which there is proof or presumptive evidence of deliberate discharge of oil or other infringement of MARPOL. Waste Incident Reports are to notify the States along the planned route of a vessel that this vessel has not complied with the requirements of Directive 2000/59/EC for the delivery of ship-generated waste and/or cargo residues to a port reception facility. It is recommended that surveillance authorities have access to this information because such vessels might present higher risks of illegally discharging. It should be noted that, within the limits of their available staff capacity, an EU Member State receiving a SafeSeaNet POLREP should carry out the appropriate inspections or verifications.

Other information available in SafeSeaNet might be useful. Estimated and actual times of arrival and departure are automatically passed to Thetis to support the process of selecting vessels for inspection. Ship movement information contained in SafeSeaNet could also be used by enforcement authorities, for example to establish the location and speed of a vessel at a particular time. Information on cargo could also support the assessment of the situation after an initial indication of a possible pollution. This information is limited to HAZMAT. Mandatory Reporting System messages may also include a summary of cargo information.[84]

Should enforcement authorities want to use information available in SafeSeaNet as evidence in court, it should be formally requested from the country that provided the information to the system.

[84] Mandatory Ship Reporting Systems (MRS) are established by governments, with the endorsement of the IMO, in areas of particular environmental or navigational concern. Vessels transiting through the area send MRS messages to nearby coastal stations.

10.1.3 The European Union Long Range Identification and Tracking Cooperative Data Centre (EU LRIT CDC)

The Council Resolution of the 2 October 2007 tasked EMSA to set-up the EU LRIT CDC and stressed 'that the objective of the EU LRIT DC should include maritime security, Search and Rescue (SAR), maritime safety and protection of the marine environment, taking into consideration respective development within the IMO context'.

The objective of the LRIT system, which was set-up under the auspices of the IMO, is to bring about a global system for the identification and tracking of ships that allows monitoring also when ships have left the areas covered by the AIS coastal networks. This means ships can be tracked all over the world even from very large distances from the coast. The international LRIT system therefore receives, stores and disseminates LRIT information on behalf of all SOLAS Contracting Governments.[85]

The LRIT system is mandatory for all passenger ships, high speed craft, mobile offshore drilling units and cargo ships of over 300 gross tonnes and is in force from 1 July 2009.

The system specifies that Flag States should ensure as a minimum that four position messages per ship per day (every 6 hours) are sent, stored, and are available for those parties entitled to access LRIT information. The main users of the system are the following:

- Flag States demanding information on the location of their vessels irrespective of their location;
- Coastal States may request information on ships up to 1000 nm from their coasts irrespective of their flag;
- Port States may request information on those ships that have declared to have one of their ports as destination, irrespective of their location or flag (on receipt of the Notice of Arrival);
- Search and Rescue authorities.

An active and accurate long-range identification and tracking system has potential maritime safety, marine environment protection, and maritime search and rescue benefits. Accurate information on the location of the ship in distress as well as ships in the vicinity that could lend assistance for combatting illegal discharges at sea will save valuable response time to affect a timely rescue and perhaps minimise pollution along a coastline.

Relevant for combatting illegal discharges at sea, ship movement information contained in the EU LRIT DC could also be used by enforcement authorities after an initial indication of a possible pollution. Should enforcement authorities want to use information available in the EU LRIT DC as evidence in court, it should be formally requested from the country whose vessel provided the LRIT position data to the system.

[85] Contracting Governments means Contracting Governments to the 1974 International Convention of Safety of Life At Sea (1974 SOLAS Convention)

10.1.4 Thetis

EMSA is engaged in facilitating the correct and smooth functioning of the Paris MoU's New Inspection Regime (NIR). To that effect, the Agency has developed an advanced information system called Thetis, which contains all the functionalities stemming from the requirements of the Directive 2009/16/EC and the Paris MoU. The system is hosted, maintained and operated by the Agency.

The mechanism by which the NIR targets ships for inspection is based on the ship risk profile (SRP). Thetis calculates and attributes to each ship in the database a risk profile which is updated daily. It ranks ships into Low Risk Ships (LRS), Standard Risk Ships (SRS) and High Risk Ships (HRS). A ship risk profile is based on criteria such as its type, age, flag, recognized organization, inspection history and notably, managing company (the International Safety Management manager). Consequently, the SRP determines the periodicity of inspection. In addition to the periodic inspections, additional inspections may be carried out in case of 'overriding' or 'unexpected factors' depending on the severity of the occurrence.

Thetis also calculates the inspection share of the inspection commitment of each Paris MoU Member State. Thetis monitors missed inspections, and at the same time allows postponing an inspection and for recording of the reasons for missed inspections.

Another important feature of Thetis is the processing of ship call information. The system receives ship arrival and departure information from SafeSeaNet. Connections have been established with Canadian and Russian equivalents of SafeSeaNet which allow Thetis to work as the central system of the Paris MoU. Thetis uses this ship call information to automatically indicate the ships due for inspection. All EU Member States are required through the Directive 2009/16/EC to have in place the necessary arrangements to facilitate the reporting of the actual time of arrival (ATA) and the actual time of departure (ATD). In case of estimated time of arrival or departure (ETA, ETD) shipowners, masters, agents or operators are required to forward the necessary information to SafeSeaNet according to the Directive 2002/59/EC, as amended.

With regard to the use of Thetis for enforcement purposes, Authorities should be aware that if an 'overriding factor' is entered into Thetis inspecting the vessel becomes mandatory regardless of the date of the last inspection. This 'overriding factor' can only be entered by PSC Authorities. Entering information into Thetis about an alleged pollution is a way to trigger an inspection in the next port of call within the Paris MoU region. However, the system has primarily been designed for administrative processes related to PSC. Though section 6 of the Paris MoU tasks participating Authorities with securing evidence of suspected MARPOL violations, Thetis is not designed to request or exchange evidence for enforcement purposes. Adding this kind of information would be technically feasible but would require a decision to extend the scope of the system beyond what was originally foreseen.

10.2 Manuals and procedures

Manuals and procedures are extremely important to disseminate best practices and organise cooperation both nationally and internationally. In particular, they can help strengthen harmonisation which is particularly important given the number of different systems in place across Europe.

Many documents have a focus on a particular area, but contain information which is applicable more broadly. In addition to widespread use of the documents as they currently stand for the generic advice, they can be used as templates for the development of similar documents in regions where these do not yet exist. In particular, regional manuals should include forms and templates for exchanging information in a standardised way.

Whilst there are many different manuals available at all levels, users of this manual may be particularly interested in the following selection[86]:

1. INTERPOL. 2007. *Investigative manual for illegal oil discharges from vessels*
   This manual provides useful information to both experienced and inexperienced investigators. It contains detailed information for inspectors conducting investigations on on-board vessels. Its scope is international. The list of Interpol publications is available on their site: http://www.interpol.int/Crime-areas/Environmental-crime/Resources/Publications. The manual is available in English to institutional users via a password protected website; authorities should make a request via the form available on the Interpol website, www.interpol.int; full address: http://www.interpol.int/Forms/EnvironmentalCrimeRestrictedAccess
   A translation in French is available on CD at the INTERPOL Secretariat.
   The manual also includes useful checklists, for example, the Comparison of Vessel Records (appendix 9) and Vessel Sampling checklist (appendix 11).

2. OSPAR Commission. 2010. *North Sea Manual on Maritime Oil Pollution Offences* This manual is addressed, in the first place, to the national enforcement agencies concerned with implementing international rules and standards against oil pollution from ships, and the national legislation applying them. The manual therefore aims to set out a common understanding of the impacts of oil pollution, how evidence of maritime pollution offences can be gathered, and the reliability of the methods used. It is also addressed to those involved in the processes of bringing offenders to justice.
   The manual is available on the OSPAR website, www.ospar.org; full address: http://www.ospar.org/html_documents/ospar/html/north_sea_manual_on_maritime_oil_pollution_offences.pdf

3. HELCOM. 2000. *Baltic Sea Environment Proceedings n° 78: Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea*
   These guidelines are meant as a tool to further the cooperation between the Baltic Sea states when investigation violations of anti-pollution regulations and prosecuting the offenders. It is intended to be used by operators collecting evidence and by prosecutors assessing collected evidence and bringing it to the courts to convict offenders. The guidelines aim to establish a feedback system between the two abovementioned communities and

[86] This selection has provided a very valuable source of information for this overview document.

thereby to enhance the knowledge and understanding of the conditions and the requirements under which they both work.
The guidelines are available on the HELCOM website, www.helcom.fi; full address: http://www.helcom.fi/stc/files/shipping/BSEP-78.pdf

4. ENPRO. 2012. *Manual on Prosecuting Environmental Crime in the Baltic Sea Region*
This manual is written by member States of the Network of Prosecutors on Environmental Crime (ENPRO). It is mean to serve as a handbook for prosecutors and other authorities who work on environmental crime and require information about the judicial system and legislation in the Baltic Sea States.
The manual is available on the HELCOM website, www.helcom.fi; full address: http://www.helcom.fi/stc/files/shipping/Manual%20on%20Prosecuting%20Environmental%20Crime.pdf

5. Bonn Agreement. 2009. *Bonn Agreement Aerial Operation Handbook*
The Handbook is designed to provide management and aircrew with brief but essential information for the planning and conduct of counter-pollution flights. It describes remote sensing techniques, cooperation in aerial surveillance operations such as CEPCOs or Tour d'Horizon, and reporting formats. 'Part 3: Guidelines for oil pollution detection, investigation and post flight analysis/evaluation for volume estimation' is of particular interest. It includes the 'Bonn Agreement Oil Appearance Code' which is widely used throughout Europe.
The handbook is available on the Bonn Agreement website, www.bonnagreement.org; full address:
http://www.bonnagreement.org/eng/doc/Bonn%20Agreement%20Aerial%20Operations%20Handbook.pdf

10.3 List of contacts

At the different stages of the enforcement process, international cooperation requires contacts with various authorities. It is therefore necessary to know how to quickly access contact details of relevant bodies (e.g. operational contacts points for surveillance operation, maritime police and port State control officers, judicial authorities). Cooperation is needed from across different communities of stakeholders (e.g. Regional Agreements, networks of prosecutors, MoUs) to ensure that contacts are kept updated and are disseminated as widely as possible.

The following lists of contacts should be developed and/or made available to authorities involved in the anti-pollution enforcement chain:

1. List of contact points 24-hour to manage requests received from another State for further investigation of a suspected violation of a MARPOL regulation
When a request is received, the contact point should forward the request to the relevant authority in the same country depending on whether this investigation shall be conducted at sea or in port. In order to facilitate cooperation between states, there should be just one contact point for receiving the initial request.
For example: Table 7 in *Baltic Sea Environment Proceedings n° 78: Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea*.

2. List of contact points for inquiries about the status of a case on a suspected violation of an anti-pollution regulation
   For example: Table 8 in *Baltic Sea Environment Proceedings n° 78: Guidelines on Ensuring Successful Convictions of Offenders of Anti-pollution Regulations at Sea*.
3. List of points of contacts for mission planning, scheduling and operations
   This list of points of contact is useful to plan surveillance missions in cooperation with neighbouring countries. It should include the list of authorities responsible for satellite surveillance planning.
   For example, the *HELCOM response manual* (volume 1, section 7.10) includes a list of contact points for joint aerial surveillance in the Baltic
4. List of contacts for in-flight reporting
   Aircrew detecting or observing pollution should pass information by radio communication to the appropriate focal point.
   For example: In the Bonn Agreement area, these focal points are listed in the *Bonn Agreement Aerial Operation Handbook*, Part 4: National Information.
5. List of points of contacts for post-flight detection reporting
   Points of contact for post flight reporting might be different from the ones used for in-flight reporting.
6. List of contact points for PSC matters
   This list should also include the contacts of all Secretariats of Memoranda of Understanding on Port State Control.

Some lists of contacts are mandatory and available on the IMO's GISIS website:

7. Flag State contact points for PSC matters, casualty investigation services and ships' inspection services (including Secretariats of Memoranda of Understanding on Port State Control)
8. List of national operational contact points responsible for the receipt, transmission and processing of urgent reports on incidents involving harmful substances, including oil from ships to coastal states

These contacts are available to authorised users via the IMO's Global Integrated Shipping Information System (GISIS), http://gisis.imo.org/. GISIS electronic reporting facilities also allow Parties to IMO instruments to provide all or part of the information covered by existing reporting requirements.

10.4 Standard forms for exchanging information

The use of standard forms and templates is essential for requesting and passing information between stakeholders. This ensures that elements exchanged are complete and correspond to what was requested. Agreed standards should be incorporated in national procedures and known by all parties involved.

There are a number of templates available, the widespread use of which is recommended across Europe.

1. Standard Pollution Observation/Detection Log. This template is common to the Bonn Agreement and HELCOM, and can be found in the *North Sea Manual on Maritime Oil Pollution Offences* (Chapter 6, annex A), and as an excel file on the HELCOM website.

2. Pollution Observation/Detection Report on Polluters and Combatable Spills (IMO). This template can be found in the *North Sea Manual on Maritime Oil Pollution Offences* (Chapter 6 annex B), and as an excel file on the HELCOM website.
3. Request for Initial Information and Summary Report. This form developed by the North Sea Network of Investigators and Prosecutors can be found in the *North Sea Manual on Maritime Oil Pollution Offences* (Chapter 5, annex 1). It is used to quickly and informally request and exchange information on available evidence prior to a formal legal assistance request. This request should be sent to the relevant contact point for inquiries.
4. HELCOM Summation Report for the summation of evidence collected on a suspected violation of anti-pollution regulation(s) under the Helsinki Convention, *Baltic Sea Environment Proceedings n° 78*, format 2.
5. HELCOM Feedback Report for feedback on a suspected violation of anti-pollution regulation(s) under the Helsinki Convention, *Baltic Sea Environment Proceedings n° 78*, format 3.
6. Letter of Undertaking For Financial Security, *INTERPOL Investigative Manual for illegal oil discharges from vessels* (appendix 13)
7. Notice of Detection of Vessel And Posting Of Security, *INTERPOL Investigative Manual for illegal oil discharges from vessels* (appendix 14)
8. Netherlands Coast Guard Pollution Prevention Report for Observed MARPOL Substances. This form is used to pass on information about suspected MARPOL violations, including MARPOL annexes I-VI.

In future, the use of electronic exchange of information between IT systems is expected to grow. The definition of standard interfaces should incorporate the different elements contained in the forms used for pollution regulation enforcement.

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About EMSA

The European Maritime Safety Agency is one of the European Union's decentralised agencies. Based in Lisbon, the Agency provides technical, operational and scientific assistance to the European Commission and Member States in the fields of maritime safety, maritime security, prevention of, and response to, pollution caused by ships as well as response to marine pollution caused by oil and gas installations. The Agency also contributes to the overall efficiency of maritime traffic and maritime transport.

http://www.emsa.europa.eu

EUROPEAN MARITIME SAFETY AGENCY