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Item 4 (e) (ii) of the provisional agenda*

**Matters related to the implementation of the Convention:
international cooperation, coordination and partnerships:
international cooperation and coordination**

**Draft guidance manual on how to improve the sea-land
interface**

Note by the Secretariat

As referred to in the note by the Secretariat on cooperation between the Basel Convention and the International Maritime Organization (UNEP/CHW.13/18), the annex to the present note sets out the draft guidance manual on how to improve the sea-land interface prepared by the Secretariat, which has been revised taking into account comments received from the European Union and Canada.¹ The present note, including its annex, has not been formally edited.

* UNEP/CHW.13/1.

¹ <http://www.basel.int/Implementation/LegalMatters/Ships/tabid/2405/Default.aspx>.

Annex

Revised draft guidance manual on how to improve the sea-land interface

Guidance manual on how to improve the sea-land interface to ensure that wastes falling within the scope of MARPOL, once offloaded from a ship, are managed in an environmentally sound manner

Draft of April 2017

Guidance manual on how to improve the sea-land interface to ensure that wastes falling within the scope of the International Convention for the Prevention of Pollution from Ships of 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997 (MARPOL), once offloaded from a ship, are managed in an environmentally sound manner.



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1. Background

1. This guidance manual has been developed in response to the decisions of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, that entered into force on 5th May 1992, and in cooperation with the International Maritime Organization. Its main objective is to provide guidance and tools in order to improve the sea-land interface to ensure that ship-generated wastes and residues falling within the scope of the International Convention for the Prevention of Pollution from Ships adopted in 1973, as modified by the Protocol of 1978 related thereto, entered into force on 2nd October 1983, and as further amended by the Protocol of 1997 (hereinafter referred to as “MARPOL” or “MARPOL Convention”), once offloaded from a ship, are being managed in an environmentally sound manner.
2. This guidance manual essentially builds on the existing relevant technical guidelines and guidance documents developed under the Basel Convention and the IMO. As MARPOL and associated Guidelines remain living documents, reference to the up-to-date provisions of IMO environment related Conventions and associated guidelines is essential.
3. During the development of this guidance manual, specific attention has been given to the provision of a complete overview of the relevant international, regional and national legal and policy frameworks regarding the management of ship-generated wastes and residues during its different stages: on board of ships, when the wastes are being delivered to port reception facilities at the sea-land-interface, and finally covering the processes of waste collection, transport and final disposal. The guidance manual also refers to the applicable categorization of wastes within the respective legal and policy frameworks.
4. As a proper strategy, aiming at the environmental sound management of ship-generated wastes, cannot be developed without embedding it in an overarching general strategy, linking it to the management of waste streams generated in land-based facilities and municipalities, the links between these two aspects are being assessed, including possible overlaps and synergies.
5. The core of this guidance manual focuses on the requirements at the sea-land interface for ensuring the environmentally sound management of ship-generated wastes. It provides an overview of legislative, administrative, policy and other measures, including possible measures to incentivize the delivery of segregated types of ship-generated wastes and residues. As one of the key elements regarding the delivery of ship-generated wastes, tools are provided in order to assess and ensure the adequacy of the port reception facilities that are being provided. The different types of port reception facilities are being described, including supporting financing tools and cost recovery schemes.
6. The manual also provides tools and guidance for the development of modern data and information management systems, including schemes for the tracking of documents following a cradle-to-grave approach.
7. In addition, the guidance manual gives a comprehensive overview of the different options for the collection, storage and transportation of the ship-generated wastes and residues covered in the Annexes to the MARPOL Convention, in order to facilitate their environmentally sound management.
8. The manual provides guidance regarding environmentally sound technologies that can be applied for recovery and final disposal.
9. As maritime shipping is an international industry with many different stakeholders at varying levels, the manual gives specific attention to the coordination and cooperation at the international, national and local levels.
10. Throughout the guidance manual, as practical illustrations and tools, several case studies have also been referred to, with respect to the practice that Parties to the Basel and/or MARPOL Conventions are implementing.

2. Introduction

2.1 Mandate

11. The issue of the environmental sound management of wastes generated on board ships, and in particular the processing of hazardous wastes from ships, has been the subject of discussion within the Basel Convention since many years. Especially after the 2006 *Probo Koala* incident¹ the need for legal clarity with regard to the application of the Basel Convention to hazardous wastes and other wastes generated on board ships was raised. States especially discussed this matter in the context of two international fora: the bodies of the Basel Convention and of the International Maritime Organization (IMO).

12. The question how far the Basel Convention regulates the management of wastes generated on board ships, including their transboundary movements, raised the question of the relationship between the Basel Convention and other treaties regulating maritime affairs that are under the framework of the IMO, such as MARPOL.

13. Cooperation between the Secretariats of the Basel Convention and the International Maritime Organization has been officialised since the ninth meeting of the Conference of the Parties, where it was agreed that:

(a) The Secretariat of the Basel Convention would keep the IMO informed, as appropriate, of any relevant developments arising in the context of the Basel Convention;

(b) The Secretariat of the Basel Convention would continue to strengthen its cooperation with the Secretariat of the IMO in relation to MARPOL 73/78 and other relevant IMO instruments and activities.

14. Parties to the Basel Convention would organize internal coordination between their IMO and Basel Convention representatives, and participate actively in any consideration of industrial production processes on board ships at sea or any consideration of the respective competencies of the Basel Convention and MARPOL 73/78; and the Secretariat would monitor any consideration by the Marine Environment Protection Committee (MEPC) of the IMO on industrial production processes on board ships at sea, or any consideration of the respective competencies of the Basel Convention and MARPOL 73/78, and to report thereon to the Open-ended Working Group at its next session and the Conference of the Parties at its tenth meeting.

15. Also during following COP's the need to strengthen the cooperation with the IMO has been emphasized and acknowledged.

16. At the tenth (decision BC-10/16) and eleventh (decision BC-11/17) meeting of the Conference of the Parties it was acknowledged that there was a strong need for an assessment of how far the Basel Convention technical guidelines cover wastes covered by MARPOL. This assessment was to be developed in cooperation with the IMO. In 2015 the Public Waste Agency of Flanders, on behalf of Belgium, finalized this assessment. In the assessment (UNEP/CHW.12/INF/29/Rev.1), which was approved at COP 12 in May 2015 (decision BC-12/16), it was concluded that basically the focus of the MARPOL requirements is on the on board collection and storage of ship's waste, while the Basel Convention technical guidelines focus on the environmentally sound management of hazardous waste or other waste, including the disposal, once offloaded from the ship. Nevertheless, in general no large gaps could be identified and for most of the wastes covered by the MARPOL Convention also Basel Convention technical guidelines could be found, with recommendations for an environmentally sound management of those wastes.

17. Following this assessment the Parties to the Basel Convention requested the Secretariat at COP 12 (decision BC-12/16) to prepare the development of the first draft of a guidance manual on how to improve the sea-land interface to ensure that wastes falling within the scope of MARPOL, once offloaded from a ship, are managed in an environmentally sound manner. This guidance manual was to build upon existing relevant technical guidelines and guidance documents already developed under the Basel Convention, and also take into account the revised version of the *IMO Comprehensive Manual on Port Reception Facilities*.

18. The first draft of this sea-land manual was made available on the Basel Convention's website by 31 December 2015, after which Parties and other stakeholders were invited for providing comments. The draft guidance manual was revised to take into account these comments, in view of the tenth meeting of the Open-ended Working Group in May-June 2016 (OEWG-10), which invited further comments by 31st October 2016. The present version takes into account the discussions at the OEWG-10 and comments received thereafter, for consideration by the Conference of the Parties at its thirteenth meeting.

¹ The illegal dumping ashore in Abidjan (Côte d'Ivoire) in 2006 of toxic waste from the ship *Probo Koala* directly and indirectly led to the death and injury of many local inhabitants.

2.2 Scope

19. This manual provides guidance regarding all aspects related to the development of a waste management strategy for the collection, transport and disposal², including storage, of all wastes delivered from ships, being:

- (a) Wastes that are generated through the normal operation of a ship;
- (b) Wastes that are generated through the handling of cargo.

20. This guidance manual therefore covers wastes and residues from ships as referred to in the following MARPOL Annexes:

Annex	Subject
Annex I	Prevention of pollution by oil
Annex II	Control of pollution by noxious liquid substances in bulk
Annex IV	Prevention of pollution by sewage from ships
Annex V	Prevention of pollution by garbage from ships
Annex VI	Prevention of air pollution from ships

21. The guidance manual also covers the most commonly applied means for the processing of these MARPOL wastes and residues, for recovery and final disposal. However, although this guidance manual in principal aims towards the environmentally sound management of wastes generated onboard a ship in, mostly, land based facilities, the focus is on improving the sea-land interface.

22. As the development of adequate port reception facilities for ship-generated wastes and residues covered by MARPOL might also be relevant for other ship-generated wastes and residues covered by other IMO Conventions (such as the Ballast Water Management Convention, the Anti-Fouling Systems Convention and the London Protocol/Convention), they are mentioned in the manual as well. In order to avoid confusion between MARPOL and the other conventions, clear reference is being made that these types of wastes/residues do not fall within the scope of MARPOL.

23. It should be noted that in this manual, different wordings (e.g. ship's waste, residues, ship-generated waste) may be used to refer to waste generated onboard a ship. The reason is that MARPOL and the Basel Conventions' provisions use different terminology, definitions, and apply corresponding specific requirements. Thus, under the present manual, depending on whether the ship wastes fall under the scope of the MARPOL or of the Basel Convention regimes, one or the other corresponding wording will be used, that is to say: i) on one hand, the MARPOL wording - i.e. residues - is being used when referring to ship's waste which is generated onboard the ship; ii) on the other hand, wording from the Basel Convention - i.e. wastes - is being used when referring to ship's waste which is managed on land. Yet, please bear in mind also that there may be Basel Convention wastes already carried on board a ship, alongside the waste generated on board a ship (see paragraphs 28 and 31 below). As a result, when referring to operations at the sea-land interface - where the waste from the ship is being handed over to the collection side - the wording used depends on the specific location of the waste, being either still on board or when it is collected.

24. This guidance manual does not cover wastes that are generated by other port related activities, such as wastes originating from stevedoring, maintenance of cargo handling equipment, container cranes, etc.

2.3 Objectives

25. The main goal of this manual is to provide guidance through an overview of tools, practices, procedures and measures³ in order to ensure that wastes and residues falling within the scope of the MARPOL Convention, once offloaded from a ship, are managed in an environmentally sound manner.

26. Therefore this manual seeks to provide guidance regarding:

- (a) The existing legal and policy frameworks at the international, regional and national levels;
- (b) The different types of wastes and residues that are generated during the operations of a ship;
- (c) Indications of which types of ship-generated wastes and residues can be considered as being hazardous;

² Throughout the manual "disposal" should be understood as defined in the Basel Convention and relevant documents under the Basel Convention, such as the Glossary Of Terms (UNEP/CHW/OEWG.10/INF/10).

³ An overview of practical measures and "to do's" for stakeholders has been listed in Annex 8 of this guidance manual.

- (d) The development of a waste management strategy, including planning, covering all wastes and residues that can be delivered from a ship in a port;
- (e) Options and processes for the collection, transport and final disposal, including storage, of ship-generated wastes and residues;
- (f) Information and monitoring schemes;
- (g) Options for coordination and cooperation between the different stakeholders involved.

3. Legal and policy framework

3.1 Introduction

27. From a technical, legal and operational point of view maritime shipping in general can be considered as a specific industry, as it does not only imply operations at the high seas in international waters and in coastal areas, but also operations in ports in order to transfer people and/or cargo to or from land. Therefore, the corresponding legal and policy framework for shipping and ship-related operations needs to cover these different areas, and address both sea- and land-based activities.

28. However, as the origin of both the land- and sea-based legal and policy frameworks often differ from each other, the frameworks for the onboard management of wastes and residues that are generated onboard ships, on one hand, and requirements regarding the collection, delivery and processing of wastes generated in land-based facilities, on the other hand, as a result, also differ from each other and in many cases, may not be compatible or just complementary.

29. As maritime and international shipping is a global industry, the majority of the legal and policy frameworks regarding maritime safety, pollution prevention and environmental protection originates and is being developed and maintained by international and intergovernmental bodies, such as the various UN agencies.

30. The specialized agency of the United Nations responsible for maritime shipping, the International Maritime Organization (IMO) is the global standard-setting authority for the safety, security and environmental performance of international shipping. Its main role is to create an international regulatory framework for the shipping industry that is fair and effective, universally adopted and implemented. It is therefore not a surprise that the majority of international rules and regulations regarding the environmental performance of shipping, including the onboard management of wastes and residues and the protection of the marine environment through the prevention of pollution by ships, originates from the IMO.

31. The legal and policy framework regarding the collection, transport and management of wastes and residues originating from shipping operations often finds its origin in regulations that mainly focus on the collection, transport and disposal, including storage, of wastes generated at land-based sources. It is therefore more land-oriented, and may not always be compatible with the legal and policy framework for operations at sea. It is important to highlight that although wastes generated on board ships are in principal excluded from the scope of the Basel Convention, also hazardous wastes loaded on a ship as a cargo and shipped for disposal under the Basel Convention regime can be carried on board. Rules for these wastes are different than for ship-generated wastes, and when these wastes are off-loaded care must be taken not to mix the applicable legal regimes.

32. This chapter gives an overview of the key elements and requirements of the legal and policy framework applicable to the management of wastes and residues originating from ships during their different stages, being the moment when they are generated during normal operations onboard a ship, during their transfer from the ship to the port reception facility at the sea-land interface, and finally during the disposal, including storage, at land-based facilities.

33. For each of these different stages, and when applicable, a distinction is being made between the legal and regulatory framework at, respectively, the international, the regional and the national levels. Please note however that the purpose of the present section is not to offer an exhaustive list of all legal and policy frameworks that exist at the regional and national levels; yet, some examples are provided.

34. The following table provides a visual overview of the legal and policy framework at the international level, in order to give an indication of the different conventions and the scope of their application.

Legal and policy framework at the international level Management of ship-generated wastes and residues		
On board ships	At the sea-land interface	At land based facilities
<ul style="list-style-type: none"> • United Nations Convention on the Law of the Sea (UNCLOS) • MARPOL • Ballast Water Management Convention • Anti-Fouling Systems Convention • London Protocol and Convention 	<ul style="list-style-type: none"> • MARPOL • Basel Convention 	<ul style="list-style-type: none"> • Basel Convention
Legal and policy framework at the international level Management of ship-generated wastes and residues: examples		

Onboard ships	At the sea-land interface	At land-based facilities
<ul style="list-style-type: none"> European Union (EU): European Sustainable Shipping Forum (ESSF) Case studies: United States of America 	<ul style="list-style-type: none"> EU Directive 2000/59/EC EU ESSF Case study: Netherlands 	

3.2 Management of ship-generated wastes and residues onboard ships

3.2.1 Legal and policy framework at the international level

35. Regarding the international legal and policy framework for the onboard management of ship-generated wastes and residues, it includes the United Nations Convention on the Law of the Sea (UNCLOS) and the IMO MARPOL Convention. In addition the IMO Ballast Water Management Convention (BWMC), the IMO Anti-Fouling Systems Convention and the IMO London Protocol/London Convention regarding the dumping of wastes may be relevant.

3.2.1.1 The United Nations Convention on the Law of the Sea (UNCLOS)

36. The United Nations Convention on the Law of the Sea also called the Law of the Sea Convention or UNCLOS is the international agreement that defines the rights and responsibilities of States and entities with respect to their use of the world's oceans, including protection of the marine environment.

37. With regard to the protection of the marine environment, UNCLOS provides that:

- (a) States have a general obligation to protect and preserve the marine environment (Article 192);
- (b) States have a duty to take measures, using the best practicable means at their disposal and in accordance with their capabilities, to minimize to the fullest possible extent pollution from ships, in particular measures for preventing international and unintentional discharges (Article 194);
- (c) States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment by dumping (Article 210);
- (d) Flag States have a duty to adopt laws and regulations which have at least the same effect as that of generally accepted international rules and standards established through the IMO (Article 211(2)).

38. Furthermore UNCLOS requires that when taking measures to prevent or control (marine) pollution, these measures should not lead to simply transferring the residues and pollution from sea to land.

3.2.1.2 The MARPOL Convention

39. The first MARPOL Convention was adopted on 2 November 1973 (MARPOL 73). As it was thought that there were certain shortcomings in MARPOL 73, a new Protocol to the MARPOL 73 Convention was adopted in February 1978. The combined MARPOL 73/78 entered into force on 2 October 1983. In 1997, an additional Protocol was adopted to amend the existing Convention.

40. The MARPOL Convention aims at preventing and minimizing pollution from ships, both accidental pollution and pollution from routine operations, and currently includes six technical Annexes:

Annex	Subject	Entry into force
Annex I	Prevention of pollution by oil	2 October 1983
Annex II	Control of pollution by noxious liquid substances in bulk	6 April 1987
Annex III	Prevention of pollution by harmful substances carried by sea in packaged form	1 July 1992
Annex IV	Prevention of pollution by sewage from ships	27 September 2003
Annex V	Prevention of pollution by garbage from ships	31 December 1988
Annex VI	Prevention of air pollution from ships	19 May 2005

41. As the MARPOL Annexes I and II are mandatory, States ratifying or acceding to MARPOL must give effect to the provisions of these two specific Annexes at a minimum, but will be automatically bound by the other Annexes unless they declare otherwise⁴. Nowadays all Annexes to MARPOL have entered into force.

42. The MARPOL Convention provides a set of requirements related to the handling and operational discharges of wastes and residues that are being generated onboard ships, including the provision of adequate reception facilities in ports. Discharge into the sea of oil, noxious liquid substances, sewage and garbage resulting from the normal operation of ships is strictly limited and/or prohibited:

(a) MARPOL Annex I residues (oil): in general it can be stated that, according to Regulation 15, oily-water mixtures from the engine room can only be discharged after the oil is being processed through an approved oil filtering device (oily-water separator), after which the oil content of the effluent without dilution does not exceed 15 parts per million;

(b) MARPOL Annex II (NLS residues): is in principle prohibited, unless the requirements of Regulation 13 on the control of discharges of residues of noxious liquid substances are being met;

(c) MARPOL Annex IV (sewage): is in principle prohibited, unless the ship is equipped with an approved sewage treatment system and the requirements of Regulation 11 are being met;

(d) MARPOL Annex V (garbage): in principle the discharge of all MARPOL Annex V wastes and residues is prohibited, unless it is explicitly allowed for specific types of residues (such as food waste, cargo residues and cleaning agents that are not harmful to the marine environment, and animal carcasses) and under specific conditions (comminuted/ground, inside/outside special areas, en route and at a specific distance from the nearest land). More details regarding the discharge requirements of MARPOL Annex V are in Annex 2 to this guidance manual;

(e) MARPOL Annex VI (air emissions): the residues controlled by this Annex are Ozone Depleting Substances (ODS) and equipment containing it, and residues from Exhaust Gas Cleaning Systems (so called "scrubber waste"). The deliberate discharge of ODS to the atmosphere is prohibited, and also the discharge of equipment containing ODS is prohibited. Residues from the use of Exhaust Gas Cleaning Systems can, under certain conditions, be discharged at sea.

43. In return for acceding, Parties to MARPOL have the right as a port State to take appropriate action to ensure that ships comply with MARPOL requirements. Therefore Port State authorities can inspect ships to verify documentation and determine if the ship has discharged or is likely to discharge substances in violation of the regulations.

A. Special Areas:

44. Also so called "Special Areas", with specific and more stringent discharge criteria on operational discharges, are included in most of the MARPOL Annexes (see also section 6.3.1 of this guidance manual).

45. An up-to-date list of the IMO Special Areas is given in the Annex 5 to this guidance manual, but can also be found at: <http://www.imo.org> (click on Marine Environment, then Special Areas).

B. IMO Guidelines:

46. It should be noted that the IMO also developed several guidelines and resolutions aiming to facilitate a smooth implementation of the requirements of the MARPOL Convention:

(a) 2012 Guidelines for the implementation of MARPOL Annex V: Resolution MEPC.219(63): These guidelines aim to assist governments in developing and enacting domestic laws which implement Annex V, to provide guidance to ship owners, ship operators, ships' crews, cargo owners and equipment manufacturers in complying with requirements set forth in Annex V and relevant domestic laws, and to help port and terminal operators in assessing the need for, and providing, adequate reception facilities for garbage generated on all types of ships;

(b) 2012 Guidelines for the development of garbage management plans: Resolution MEPC.220(63): As a ship's garbage management plan should detail the specific ship's equipment, arrangements and procedures for the handling of garbage, these Guidelines provide direction on complying with the requirements for a ship's garbage management plan, and are intended to assist the ship owner and/or operator in the implementation of regulation 10.2 of the revised MARPOL Annex V;

⁴ Article 14(1) of MARPOL reads: "A State may at the time of signing, ratifying, accepting, approving or acceding to the present Convention declare that it does not accept any one or all of Annexes III, IV and V (hereinafter referred to as "Optional Annexes") of the present Convention. Subject to the above, Parties to the Convention shall be bound by any Annex in its entirety." For Annex VI, acceptance is achieved via acceding to the 1997 Protocol.

(c) 2013 revised Guidance on the management of spoilt cargoes (MEPC.1/Circ.809): the Guidance on managing spoilt cargoes is intended to provide guidance to Governments, ship owners, ship operators, ships' crew, cargo owners, port reception facility operators, insurance agents and equipment operators to manage cargo that spoils during the voyage, either to sell for an alternate use, recycle salvageable materials, or to be disposed of in an environmentally safe manner.

3.2.1.3 Other relevant conventions

47. Other wastes and residues from ships, such as ballast water sediments and residues from anti-fouling systems, can be relevant when assessing the need for port reception facilities. Although not falling within the scope of the MARPOL Convention, also wastes and residues managed by the Ballast Water Management Convention, the Anti-Fouling Systems Convention and the London Protocol/London Convention, are discussed in the following sections.

A. The Ballast Water Management Convention:

48. Ballast water is pumped into the ship to maintain safe operating conditions throughout its voyage. And although ballast water is essential for safe and efficient shipping operations, due to the multitude of aquatic species carried in ships' ballast water it may also pose serious ecological, economic and health problems. These aquatic species carried in ballast water may include bacteria, microbes, small invertebrates, eggs, cysts and larvae of various species. The transferred species may survive in the port of discharge and even become invasive, disturbing the local ecosystem, human health, property and resources.

49. In 2004 the IMO adopted the "International Convention for the Control and Management of Ships' Ballast Water and Sediments" (BWM Convention). This convention will enter into force on 8 September 2017, and implies not only several requirements for onboard ballast water treatment, management and monitoring, but in addition requires that party States ensure the provision of adequate port reception facilities for the collection of ballast water sediments in ports and terminals designated by those party States where cleaning or repair of ballast tanks occurs.

50. Supplementing the BWM Convention, the IMO has developed *Guidelines for ballast water reception facilities* (G5) (resolution MEPC.153(55)), and *Guidelines for sediment reception facilities* (G1) (resolution MEPC.152(55)).

B. The Anti-Fouling Systems Convention:

51. When ships operate in the marine environment they often suffer from the growth of organisms (e.g. barnacles and algae) on the hull. This is called fouling, which has a detrimental effect on the ship's performance as the maximum speed of a ship decreases, and its fuel consumption increases.

52. In 2001 the IMO adopted the "International Convention on the Control of Harmful Anti-fouling Systems on Ships" (AFS Convention), which prohibits the use of harmful organotin compounds in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems. The AFS Convention entered into force on 17 September 2008.

53. The AFS Convention requires that Parties take appropriate measures to ensure that wastes that originate from the application or removal of anti-fouling systems are collected, handled, treated and disposed of in a safe and environmentally sound manner in order to protect human health and the environment. Since these types of wastes in most cases will be generated at ship repair or recycling yards, the environmentally sound storage and treatment of these waste types will also be related to the repair and recycling yard operations.

C. The 1996 London Protocol and the 1972 Convention:

54. The 1996 Protocol to the "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", which entered into force on 24 March 2006, is the most stringent, modern ocean dumping treaty in force. Its objective is for Parties to individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures to prevent, reduce and where applicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter.

55. According to the "London Protocol", an updated and more stringent treaty, all dumping of waste at sea is prohibited, except for a very short list of possibly acceptable wastes, following thorough assessment and permitting procedures. This list includes:

- (a) Dredged material;
- (b) Sewage sludge;
- (c) Fish wastes;
- (d) Vessels and platforms;
- (e) Inert, inorganic geological material (e.g., mining wastes);

- (f) Organic material of natural origin;
- (g) Bulky items primarily comprising iron, steel and concrete;
- (h) Carbon dioxide streams from carbon dioxide capture processes for sequestration.

56. It should be noted that ship-generated wastes would fall under the scope of the London Protocol/Convention if these were to be dumped at sea. If so, the Waste Assessment Guidance and permitting processes, as outlined in the London Protocol and Convention, applies. The disposal at sea of spoilt cargo is an example of a boundary issue between the LP/LC and MARPOL, with the deciding factor being the quantity or percentage of the cargo that is spoilt, in a way that some small amount of spoilage is “incidental to normal operations of a ship” while spoiling of the whole cargo is considered dumping and requires a permit.

3.2.2 Legal and policy framework at the regional level

57. As was already mentioned in the previous section 3.2.1 on the international character of maritime shipping, the main sources for the legal and policy framework for environmental, security and safety standards for shipping are being developed at the international level by specialized UN bodies and agencies such as the International Maritime Organization. Still, it can be noted that e.g. the dumping of wastes at sea is not only regulated through the London Protocol and Convention, but the obligation is clearly reflected in UNCLOS article 210, and in most of the regional conventions, either directly in the conventions or in specific protocols. Also the European Commission has launched several policy initiatives, although mainly linked to air pollution from ships.

58. In 2013 the European Commission established the European Sustainable Shipping Forum (ESSF), bringing together, through the ESSF, European Union Member States and maritime industry stakeholders in order to establish a structural dialogue, exchange best practices and coordinate on different environmental issues in shipping. In 2015, a Sub-group has also been established on port reception facilities (more information in section 3.3.2.1 of this guidance manual).

3.2.3 Legal and policy framework at the national level

59. Some countries have taken steps towards the development of a legal and policy framework for the prevention of pollution from ships that goes beyond the requirements established on the international or regional level.

60. A national example of components of such a specific framework consists in the adoption of regulatory measures, i.e. the revised United States Coast Guard (USCG) regulations on ballast water management, which entered into force 21 June 2012.

61. Another example is related to the use of certain hazardous materials on board of a ship.

Case study: the United States of America

The government has developed guidance manuals to help ensure the environmentally sound management of wastes generated on ships. The Environmental Protection Agency (EPA) prepared the “*Technical Guidance for Determining the Presence of Polychlorinated Biphenyls (PCBs) at Regulated Concentrations on Vessels (Ships) to be Reflagged*” manual as a resource to assist ship owners in identifying polychlorinated biphenyls (PCBs) in shipboard materials before their ships are transferred to a foreign flag registry, prior to export from the United States. Generally, if a vessel contains material and/or equipment with PCBs in concentrations greater than or equal to 50 parts per million, then export of that vessel for any purpose (such as scrapping) would violate U.S. regulations and the Toxic Substances Control Act. The guidance also refers ship owners to other guidance and information about how to manage the PCB waste in an environmentally sound manner.

62. Some countries have also developed supplementary regulations or guidance on the management of wastes and residues generated through the normal operation of ships.

Case Study: the United States of America⁵

The Environmental Protection Agency developed the 2008 “Cruise Ship Discharge Assessment Report,” which examines five primary cruise ship waste streams: sewage, gray water, oily bilge water, solid waste, and hazardous waste. For each waste stream, the report discusses:

⁵ The United States of America also have a general permit they issue on discharges “incidental to the normal operations” of a ship: there is a list of discharges that are presumably considered low risk, and there is a list of practices that are not considered to qualify as “incidental to normal operations” (e.g. discharges of spent chemicals from the photo lab, or the dry-cleaning service, or biomedical or pharmaceuticals waste. Disposal of substances not “incidental to” at sea could fall under the London Protocol/London Convention.

- (a) What the waste stream is and how much is generated;
- (b) What laws apply to the waste stream;
- (c) How the waste stream is managed;
- (d) Potential environmental impacts of the waste stream;
- (e) Actions by the U.S. government to address the waste stream; and (6) a wide range of options and alternatives to address the waste stream from cruise ships in the future.

The US also developed a “Vessel general permit for discharges incidental to the normal operations of vessels” (VGP), which provides authorization to discharge under the national pollutant discharge elimination system.

3.3 Management of ship-generated wastes and residues at the sea-land interface

3.3.1 Legal and policy framework at the international level

3.3.1.1 The MARPOL Convention

63. In order to reduce and eliminate pollution from ships, the provision of adequate port reception facilities is a key requirement: the ability to fully comply with the discharge requirements of Annexes I, II, IV, V and VI of MARPOL⁶ is directly related to the availability of adequate reception facilities in port. Therefore each Party is to ensure the provision of adequate facilities at ports and terminals to meet the needs of ships using them, without causing undue delay.

64. Furthermore, MARPOL also indicates the categories of ports and terminals that require reception facilities together with their capacities:

Annex I	Oil: in loading ports, ship repair yards, bunkering ports
Annex II	Noxious Liquid Substances (NLS) in bulk: in ports and terminals an adequate reception needs to be present for cargo residues resulting from compliance with Annex II and in ship repair ports where repair of NLS-tankers can take place
Annex IV	Sewage: ports and terminals in all areas and in Special Areas in particular when ports and terminals are used by passenger ships
Annex V	Garbage (including cargo residues not covered by other Annexes): each Party undertakes to ensure the provision of adequate facilities at ports and terminals for the reception of garbage without causing undue delay to ships, and according to the needs of the ships using them
Annex VI	Ozone-depleting substances together with equipment and materials (such as insulation foams) containing the same: in ports, terminals, repair ports and ship recycling facilities; residues from exhaust gas cleaning systems as these are developed and enter into service: in ports, terminals, repair ports

65. All of the MARPOL provisions for port reception facilities are similar in the way they begin, stating that: “The Government of each Party to the Convention (MARPOL) undertakes to ensure the provision of ...”. The wording then differs but basically states to undertake to ensure the provision of reception facilities adequate to meet the needs of ships using their ports or terminals. It may be noted that the MARPOL provisions state that the “government” undertakes to ensure the provision of adequate reception facilities. This however does not mean that only the government of a Party must provide the facility: it means, in practice, that the government may require a local authority, e.g. the port authority, or terminal operator to provide the facilities.

A. *IMO’s Global Integrated Shipping Information System (GISIS):*

66. In order to facilitate the dissemination of information and promote public access to sets of data collection by the IMO Secretariat, the IMO has developed an internet based database on information for shipping: the Global

⁶ It must be noted that, differing from all other MARPOL Annexes, Annex III does not explicitly requires the provision of port reception facilities.

Integrated Shipping Information System (GISIS)⁷. This database contains both information open to the general public and a member's area section with more specific information only accessible to registered IMO users⁸.

67. The Port Reception Facility Database (PRFD) provides data on facilities for the reception of all categories of ship-generated waste (incl. MARPOL Annex V). While the public is allowed free access (following a simple initial registration) to all the information on a view-only basis, only the respective party States can update data for reception facilities via a login password. The database aims at improving the rate of reporting alleged inadequacies of reception facilities so that the problem can be tackled more effectively.

B. IMO Guidelines on port reception facilities:

68. The use and provision of port reception facilities for ship-generated wastes and residues is fundamental to the overall success of the MARPOL Convention in its objective of reducing and ultimately eliminating intentional pollution of the marine environment by ships. In order to improve the efficient delivery of MARPOL wastes and residues to port reception facilities, the IMO has developed specific additional guidance that outlines how the shipping community and port reception facility providers can best conduct their operations in order to comply with MARPOL:

(a) 2014 Consolidated guidance for port reception facility providers and users: Circular MEPC.1/Circ.834:⁹ This Consolidated Guidance is intended to be a practical guide for:

- (i) Ships' crew who intend to deliver MARPOL wastes and residues ashore;
- (ii) Port reception facility providers who seek to provide timely, efficient port reception services to ships.

(b) The consolidated guidance provides a basis for establishing best practice procedures, with an eye towards improving the integration of port reception facilities into a more comprehensive waste management scheme, in which the processing and final disposal of MARPOL wastes and residues occurs in a manner that protects the environment. It is based on the fundamental requirements established in the MARPOL Convention, the guidance provided in the IMO "Comprehensive Manual on Port Reception Facilities"¹⁰ and the Guidelines for ensuring the adequacy of port waste reception facilities (resolution MEPC.83(44)). Building further upon the Manual and the Guidelines, this Consolidated Guidance suggests how environmental management systems and procedures can assist with the improvement of the delivery of MARPOL wastes and residues ashore. Procedures recommended by the IMO include communication and reporting procedures and the use of standardized forms, such as the:

- (i) Format for reporting alleged inadequacies of port reception facilities;
- (ii) Standard format of the advance notification form for waste delivery to port reception facilities;
- (iii) Standard format for the waste delivery receipt.

(c) 2012 Guidelines for the development of a regional PRF plan: Resolution MEPC.221(63): This guideline provides guidance for the development of a Regional Reception Facilities Plan (RRFP), in order to assist party States in specific geographic regions of the world in the appropriate and effective implementation of the MARPOL regulations that require the provision of adequate port reception facilities. Considering that unique circumstances of Small Island Developing States (SIDS) pose unique challenges for these states in meeting international shipping's needs for discharging ship-generated wastes and residues, this guideline provides tools in order to facilitate the development of a port reception facilities plan, including the provision of adequate reception facilities, on a regional basis. In accordance with the Guidelines, "the majority of States participating in an RRFP should be SIDS. Although non-SIDS may participate, they should do so only so far as their ports may be Regional Waste Reception Centres. The obligations of non-SIDS to provide adequate reception facilities in all ports and terminals will not be satisfied by regional arrangement."

(d) 2011 Guidelines for reception facilities under MARPOL Annex VI: Resolution MEPC.199(62), The main objectives of which are to:

- (i) Assist Governments in developing and enacting domestic laws which give force to and

⁷ <https://gis.imo.org/Public/Default.aspx>.

⁸ Rights to access and use of the GISIS electronic reporting facilities are left to the discretion of party States. For detailed information, reference is made to Circular letter No. 2639 of 8 July 2005. This undertaking requires a marine administration capable of producing the required documents.

⁹ These guidelines consolidate in a single document and supersede the circulars MEPC.1/Circ.469/Rev.2, MEPC.1/Circ.470/Rev.1, MEPC.1/Circ.644/Rev.1, MEPC.1/Circ.645/Rev.1 and MEPC.1/Circ.671/Rev.1.

¹⁰ It must be noted that this IMO Comprehensive Manual on PRF has been updated in 2014 and 2015, and the revised manual "Port Reception Facilities – How to do it" was approved at IMO's 69th meeting of the Marine Environment Protection Committee (MEPC) in April 2016.

implement provisions set forth in regulation 17 on reception facilities of MARPOL Annex VI;

- (ii) Assist port and terminal operators and ship repair ports, and ship recycling facilities in assessing the need for and providing adequate reception facilities for Ozone Depletion Substances (ODS) and equipment containing ODS;
- (iii) Assist port and terminal operators in assessing the need for, and providing adequate reception facilities for exhaust gas cleaning residues.

69. In addition it may be noted that in 2012 the IMO has also adopted two resolutions amending MARPOL in order to include regional arrangements for port reception facilities under the different Annexes to MARPOL:

(a) Resolution MEPC.216(63) on regional arrangements for port reception facilities under the MARPOL Annexes I, II, IV and V;

(b) Resolution MEPC.217(63) on regional arrangements for port reception facilities under MARPOL Annex VI.

C. The IMO manual “Port Reception Facilities – How To Do It”:

70. The first manual was published in 1995. In 2013 and 2015 it was updated and revised in order to:

- (a) Take into account updates on the regulatory framework;
- (b) Include several new waste management methods;
- (c) Broaden the scope to the management of other ship-generated wastes and residues such as ballast water sediments and residues from the application or removal of anti-fouling systems.

71. The title of this manual has been amended into “Port Reception Facilities – How to do it.”

72. The manual contains practical information to Governments and competent (port) authorities, in particular to those in developing countries, as well as to the shipping industry, agencies and waste contractors seeking guidance when implementing MARPOL. It also provides guidance on how to deal with possible inadequacies, as, in order to fully comply with MARPOL, a party State has to ensure the provision of adequate port reception facilities meeting the needs of ships normally using their ports, without causing undue delay to the ships.

73. As MARPOL does not contain any explicit requirements regarding the downstream processing and treatment of ship-generated wastes and residues once received in a port reception facility, it should be noted that as an addition the manual does elaborate on the downstream management of the ship-generated wastes and residues once received ashore.

3.3.1.2 The Basel Convention

74. The “Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal” was adopted on 22 March 1989.

75. The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. It covers “hazardous wastes” as well as two types of “other wastes”¹¹.

76. Under the Basel Convention, guidelines have been developed regarding the management of certain waste streams and certain disposal operations. These guidelines are available on the Basel Convention's website¹².

77. Although the Basel Convention explicitly excludes “wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument” (Article 1.4), the Parties to the Convention developed a clear interest in the collection and disposal of ship-generated wastes and residues. Especially after the 2006 Probo Koala incident, where toxic wastes were dumped at several sites in Abidjan (Côte d’Ivoire), specific activities under the Basel Convention were initiated both on legal and technical matters, in particular as to capacity building.

78. Through successive decisions¹³, the Conference of the Parties to the Convention has underlined the importance of close cooperation between the Secretariat of the Basel Convention and the IMO. The Conference of the Parties to the Basel Convention also recognized the need to:

- (a) Identify any possible gaps between these instruments;

¹¹ Wastes collected from households and Residues arising from the incineration of household wastes.

¹² <http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx>.

¹³ More information can be found on the ship’s waste page of the Basel Convention’s website: <http://www.basel.int/Implementation/LegalMatters/Ships/tabid/2405/Default.aspx>.

- (b) Identify options for addressing those gaps.

79. Through successive decisions, the Conference of the Parties to the Basel Convention has also underlined the importance of close cooperation between the Secretariat of the Basel Convention and the IMO, in order to deal with common concerns as efficient as possible and by a holistic approach. An overview of the decisions taken within the framework of the Basel Convention (Conference of the Parties - COP - and Open-Ended Working Group - OEWG) related to MARPOL and the cooperation with IMO is given in Annex 3 to this guidance manual.

A. Legal analysis of the application of the Basel Convention to hazardous and other wastes generated on board ships:

80. In order to determine in what way provisions of the Basel Convention might apply, or not, to waste generated on board ships, a legal analysis of the application of the Basel Convention to hazardous and other wastes generated on board ships was prepared by the Secretariat of the Basel Convention. This legal analysis (UNEP/CHW.11/INF/22) was taken note of by COP 11 (decision BC-11/17).

81. Although it has been noted that it is complicated and difficult to make a clear distinction on the application interface between the Basel Convention and MARPOL, issues that had to be clarified in the analysis were:

- (a) The scope of the wastes covered by Article 1 of the Basel Convention, and in particular the exclusion clause in its paragraph 4;
- (b) The application of the obligations:
 - (i) To minimize the generation of wastes onboard ships;
 - (ii) To control the transboundary movements of wastes generated onboard ships;
 - (iii) To manage wastes generated onboard ships in an environmentally sound manner.

82. In decision BC-11/17 Parties to the Basel Convention “took note” of the revised legal analysis and the conclusions therein, because full agreement could not be reached on all of its conclusions. In general, the legal analysis concluded that the provisions of the Basel Convention do not apply to wastes generated from the normal operations of a ship, as they are specifically excluded from the Basel Convention.

83. However, once these wastes or other wastes generated on board a ship that were not part of the normal operations of the ship are offloaded, it is clear that certain Basel Convention obligations do apply to the port State if it is Party to the Basel Convention. For example, the general obligation in Article 4.2(c) regarding environmentally sound management would apply, and if there is a subsequent transboundary movement from the port State, the Basel Convention and its priority informed consent procedure would apply.

B. Assessment of how far the Basel Convention technical guidelines cover wastes covered by MARPOL:

84. During its 10th meeting, the Conference of the Parties acknowledged the importance of assessing how far the current Basel Convention technical guidelines cover wastes covered by MARPOL. This assessment has been undertaken by a Party to the Basel Convention, and was approved at COP 12.

85. The assessment did not focus on the legal requirements governing hazardous wastes or other wastes generated onboard ships, nor was it about the content of the Basel Convention’s requirements when there is a subsequent transboundary movement from the port State to the place of disposal. It rather provides authorities with information as to which content the Basel Convention technical guidelines are most likely relevant in the light of the environmentally sound management of hazardous wastes and other wastes generated on ships.

86. Although basically the focus of the MARPOL Convention requirements is on the collection and storage on board, while the Basel Convention technical guidelines focus on the environmentally sound management of hazardous wastes or other wastes, it could be concluded that most of the wastes covered by MARPOL, once they are offloaded from the ship, can be also covered by one or more of the Basel technical guidelines.

87. This also means that, although the explicit requirement for States to provide adequate port reception facilities for ship-generated wastes and residues is explicitly stated in the MARPOL Convention (in its Annexes I, II, IV, V and VI), this does not mean that the responsibility of a Party to MARPOL ends with merely the provision of adequate facilities to receive ship’s residues: within the requirements of the global framework there is also a responsibility for Basel Convention Parties to ensure the environmental sound management of these wastes, along with other land-generated wastes.

3.3.2 Legal and policy framework at the regional level

3.3.2.1 The European Directive 2000/59/EC on port reception facilities

88. In 2000 the European Community adopted Directive 2000/59/EC on port reception facilities. The purpose of this Directive is to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the European Union, by improving the availability and use of port reception

facilities for ship-generated waste and cargo residues, thereby enhancing the protection of the marine environment. Although the purpose of the Directive is similar to the main goal of MARPOL, there are some differences regarding their key requirements (see table below).

89. The Directive applies to all ships, including fishing vessels and recreational craft, irrespective of their flag, calling at, or operating within, a port of a Member State, with the exception of any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service; and to all ports of the Member States normally visited by these ships.

90. Key requirements of the PRF Directive include:

(a) An obligation for the Member States to ensure the availability of PRF adequate to meet the needs of ships normally visiting the port, without causing undue delay;

(b) Ports have to develop and implement a waste reception and handling plan, following consultation with all relevant parties, in particular the port users. These plans shall be evaluated and approved by the competent authority in the Member State;

(c) The master of a ship has to complete a notification form and forward it in due time (at least 24 hours prior to arrival), informing the port of call about the ship's intentions regarding the delivery of ship-generated waste and cargo residues;

(d) A mandatory delivery for all ship-generated waste, however taking into account a possibility for the vessel not to deliver waste if it has sufficient dedicated waste storage capacity till the next port of delivery;

(e) The implementation of a cost recovery system applying the “polluter pays” principle through the application of a waste fee, providing an incentive to ships not to discharge ship-generated waste at sea;

(f) The establishment of an enforcement scheme, by which Member States ensure that any ship may be subject to inspection.

91. The Directive 2000/59/EC provides guidance on what is to be considered an “adequate” port reception facility:

“To achieve adequacy, the reception facilities shall be capable of receiving the types and quantities of ship-generated waste and cargo residues from ships normally using that port, taking into account the operational needs of the users of the port, the size and the geographical location of the port, the type of ships calling at that port and the exemptions provided for under Article 9.”

92. The Directive 2000/59/EC also contains two annexes:

(a) Annex 1 provides an overview of elements to be addressed in the port’s Waste Reception and Handling Plan;

(b) Annex 2 provides a standardized format for the advance waste notification on the amounts of waste to be delivered to the PRF.

Table: Overview of the main differences regarding PRF requirements between MARPOL and EU Directive 2000/59/EC

	MARPOL	EU Directive 2000/59/EC
Definitions:	Although both MARPOL and the EU PRF Directive contain several definitions of wastes and residues there are no ¹⁴ commonly used definitions, which sometimes leads towards different understanding. Also the current version of the PRF Directive uses some references to MARPOL that are outdated due to updates of MARPOL or its guidelines (e.g. “cargo-associated waste” which in MARPOL has been redefined as “operational wastes”)	
Provision of adequate PRF:	Required by MARPOL	Required by PRF Directive
Downstream processing and treatment:	No requirements in MARPOL	Treatment, recycling, energy recovery or disposal to be carried out in accordance with EU waste legislation
Port waste plans:	Not required by MARPOL	To be developed and implemented for each port. Required content of the plan is set out in Annex I of the EU Directive

¹⁴ It can be noted that the EU Directive contains a definition of “ship-generated waste” being wastes and residues which are generated during the service of a ship and that fall under the scope of the MARPOL Annexes I, IV and V.

Mandatory delivery of ship's waste:	Not required by MARPOL, except for certain types of cargo residues and washing waters (MARPOL Annex II)	Mandatory delivery of all ship-generated waste, except in case of sufficient dedicated storage capacity
Advance waste notification:	Not required by MARPOL, although encouraged by IMO guidelines ¹⁵	Required by PRF Directive, incl. the use of standardised format (Annex II)
Waste fee systems:	Not required by MARPOL	Required by PRF Directive: cost for PRF, incl. collection and treatment, has to be paid by fee from ships. Cost recovery system is to provide incentive not to discharge at sea

93. In addition, the European Commission has developed guidelines for the interpretation of Directive 2000/59/EC (Commission Notice 2016/C 115/05 of 01.04.2016). The Commission Notice is presented to explain the Commission's views on how certain provisions should be implemented, such as:

- (a) The issue of "adequacy";
- (b) Certain key elements related to the waste reception and handling plans (mandatory elements, scope, consultation with relevant parties, evaluation/approval/monitoring, reporting of inadequacies;
- (c) Principles of mandatory delivery;
- (d) Sufficient storage capacity;
- (e) Intended port of delivery;
- (f) Monitoring and enforcement;
- (g) Exemptions.

3.3.2.2 The European Sustainable Shipping Forum (ESSF)

94. As mentioned in section 3.2.2 the European Commission established the European Sustainable Shipping Forum (ESSF), including a Sub-group on port reception facilities. Initially this PRF Sub-group was established to advise the European Commission on issues related to the implementation and operation of Directive 2000/59/EC, as well as on the need and scope of a possible revision of the Directive. Its work is to include sharing of expertise and best practices, such as the development and monitoring of the waste reception and handling plans and the implementation and enforcement of the different requirements. In addition, the work of the PRF Sub-group can serve as basis for the future revision of the Directive, and as such can provide direct input to the impact assessment for such a revision.

3.3.3 Legal and policy framework at the national level

95. In some countries, initiatives have been taken to develop national or local policies and other measures regarding the management of ship-generated wastes and residues at the sea-land interface. These measures can be taken by the national government, but also by local authorities such as municipalities or port authorities.

96. An example of these national or local policies and other measures aiming to improve the sea-land interface for the delivery of ship-generated wastes on a national level, may be found in the Netherlands.

Case Study: the Netherlands

"The Green Deal on ship-generated waste":

The Green Deal is a voluntary agreement between parties from different areas of the Dutch society and Government with the purpose to work together on green growth, with the Government assisting sustainable joint initiatives by eliminating barriers and connecting stakeholders.

The main goals of the Green Deal on ship-generated waste are:

- (a) To assist the Netherlands to meet its obligations pursuant to the Marine Strategy Framework Directive (MSFD)¹⁶. It contributes to the elaboration of the national Plastic Cycle Value Chain Agreement and is thus conducive to the ambition of the government and civil society organisations to

¹⁵ Consolidated guidance for PRF providers and users (MEPC.1/Circ.834).

¹⁶ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy (Marine Strategy Framework Directive).

transform our economy into a circular economy by means of a green growth strategy.

- (b) The scope of this Green Deal is national; however, in view of the global nature of the shipping industry, it is desirable to promote the agreements in this Green Deal internationally and to advertise them as far as possible as best practices at the international level.

A Green Deal covering marine litter and port reception facilities was signed in September 2014 between several partners including port authorities, Non-Governmental Organizations (NGOs)', shipping industries, etc. The ambition of this deal is to close the loop on ship-generated waste through waste prevention and optimization of delivery to port reception facilities.

The objectives of the Green Deal programme are, by 2017:

- (a) 50% of the ships would deliver their plastic waste separately;
- (b) 100% of the collected clean plastic is recycled or processed into fuel.

The main elements of the deal include:

- (a) Prevention: through the minimisation of waste from the suppliers and the reduction of package material before departure;
- (b) Enforcement: through more efficient and effective targeting of ships for waste inspection, raising awareness and checking that waste has been delivered before departure ;
- (c) Plastic waste separation: through the provision of adequate port reception facilities designed to collect segregated waste streams, and financial incentives for pyrolysis facilities; and,
- (d) Harmonisation, through collaboration between reception facilities and ports in the Netherlands and in Belgium.

Already the Green Deal Process has proved to be a positive and constructive collaboration between stakeholders, resulting in positive results at both economic and environmental levels.

97. Another example of national legal measures adopted in order to improve the sea-land interface for the delivery of ship-generated wastes consists in the Certificate Of Adequacy (COA) approach in the United States of America.

3.4 Downstream management of ship-generated wastes at land-based facilities

3.4.1 Legal and policy framework at the international level: the Basel Convention

3.4.1.1 Overview of the Basel Convention

98. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989, and entered into force on 5 May 1992. The overall goal of the Basel Convention is to establish strict controls over transboundary movements of hazardous wastes and other wastes to protect human health and the environment against the adverse effects which may result from the generation and management of these wastes.

99. The Conference of the Parties to the Basel Convention, at its tenth meeting, in its decision BC-10/2¹⁷, adopted a Strategic Framework for the implementation of the Basel Convention for 2012-2021, setting out the following strategic goals and objectives:

- (a) Goal 1: Effective implementation of Parties' obligations on transboundary movements of hazardous and other wastes;
- (b) Goal 2: Strengthening the environmentally sound management of hazardous and other wastes;
- (c) Goal 3: Promoting the implementation of the environmentally sound management of hazardous and other wastes as an essential contribution to the attainment of sustainable livelihood, the Millennium Development Goals and the protection of human health and the environment.

100. At the time it entered into force in 1992, the Basel Convention represented new norms, rules and procedures in law governing the movements and disposal of hazardous wastes at the international as well as national levels. In this context, this instrument represents the intention of the international community to solve this global environmental problem in a collective manner. A regulatory system for the monitoring and control of the transboundary movements of hazardous wastes is reflected in the full text of the Convention.

¹⁷ See the report at: <http://archive.basel.int/meetings/cop/cop10/documents/28e.pdf>.

101. Each Party to the Basel Convention is legally bound by all the obligations set out under the provisions of the Convention. As a result, a Party to the Basel Convention has to implement and enforce the requirements of the Convention in its jurisdiction, e.g. through the adoption of adequate implementing legislation. Any person¹⁸ within the jurisdiction of a Party to the Basel Convention, who is involved in transboundary movement of hazardous wastes or other wastes, is therefore legally bound to comply with the relevant national legislations and regulations governing the transboundary movements of wastes and their disposal that implement the Basel Convention provisions.

3.4.1.2 Framework for the environmentally sound management of wastes

102. “Environmentally sound management” is defined in article 2 of the Basel Convention as:

“taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.”

103. However, it is widely acknowledged that ESM is understood and implemented differently. While implementation of the Basel Convention requires application of its provisions in a consistent manner, countries as well as facilities may have different ways of applying ESM as they face different realities. In addition, ESM of wastes cannot be guaranteed within the confines of waste management without effective legal and institutional systems, including government oversight, and adequate infrastructure to protect the occupational safety and health of workers, communities and the environment. In the absence of such effective systems and infrastructure, ESM may not be readily available in some countries and as regards facilities.

104. Therefore, the “*Framework for environmentally sound management of hazardous wastes and other wastes*”¹⁹ was developed, in order to identify what countries should do at the national level and, collectively, as Parties to the Basel Convention, to address the challenges of implementing ESM of wastes in a systematic and comprehensive manner. Intended as a practical guide for all stakeholders participating in the management of such wastes, the framework is comprised of three sections:

- (a) A common understanding of what ESM encompasses;
- (b) Tools to support and promote the implementation of ESM;
- (c) Strategies to identify strategies to implement ESM.

105. In order to support and promote the implementation of ESM different tools can be used, including a combination of legislation and regulations, guidelines and/or codes of practice, voluntary certification schemes, voluntary agreements and schemes, mechanisms for cooperation at the international, regional, national and local levels, including with industry, training and awareness programmes and incentive schemes. These tools may be tailored to address specific waste streams.

3.4.1.3 Technical guidelines

106. The Basel Convention stipulates that technical guidelines for the environmentally sound management of the waste falling under its scope should be developed and adopted by the COP. This has been done for numerous waste streams and disposal operations. These guidelines are available at the Basel Convention's website.²⁰

107. Although not legally-binding per se, the technical guidelines provide for the foundation upon which countries can operate at a standard that is not less environmentally sound than that required by the Basel Convention. These guidelines are aimed at assisting countries in ensuring the environmentally sound management of hazardous and other wastes.

3.4.1.4 Ban Amendment

108. The so-called “Ban Amendment” (decision III/1), which has not yet entered into force, provides for the prohibition by each Party included in Annex VII²¹ of:

- (a) All transboundary movements of hazardous wastes covered by the Convention to States not included in that Annex VII, that are intended for operations according to Annex IV A (final disposal operations);
- (b) Of all transboundary movements to States not included in Annex VII of hazardous wastes covered by paragraph 1 (a) of Article 1 of the Convention that are destined for operations according to Annex IV B (recovery operations).

¹⁸ “Person” means a natural or legal person as defined in Article 2 paragraph 14 of the Basel Convention.

¹⁹ <http://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMFramework/tabid/3616/Default.aspx>.

²⁰ <http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx>.

²¹ Parties and other States which are members of the OECD and EC, and Liechtenstein.

3.4.2 Legal and policy framework at the regional level

109. In some regions, e.g. the European Union, specific initiatives have been taken to address the management of ship-generated waste at land-based facilities.

Case Study: the European Union

Directive 2008/98/EC: the EU Waste Framework Directive

The Waste Framework Directive (WFD)²² outlines the basic principles and definitions related to waste management in the European Union, such as definitions of waste, recycling, energy recovery, etc. In addition the WFD explains when waste ceases to be waste and becomes a secondary raw material (through the so called end-of-waste criteria), and how to distinguish between waste and by-products.

The WFD also lays down some basic cautionary principles, as it requires that waste is being managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. The EU Member States' waste legislation and policy shall apply as a priority order the following waste hierarchy: (i) prevention, (ii) preparing for re-use, (iii) recycling, (iv) other recovery, e.g. energy recovery, and (v) disposal.

Also the "polluter pays principle" is being introduced by the WFD, as is the so-called "extended producer responsibility". It also contains provisions on hazardous waste. The WFD also requires that Member States adopt waste management plans and waste prevention programmes.

Regulation (EC) No 1013/2006: the Waste Shipment Regulation

Regulation²³ (EC) No 1013/2006 (Waste Shipment Regulation – WSR) lays down procedures for the transboundary shipments (i.e. transport) of waste. The WSR implements into EU law the provisions of the Basel Convention as well as the OECD Decision²⁴ concerning the control of transboundary movements of wastes destined for recycling and recovery operations. The WSR includes a ban on the export of hazardous wastes to non-OECD countries ("Basel ban") as well as a ban on the export of waste for disposal.

3.4.3 Legal and policy framework at the national level

110. The majority of countries worldwide already have national legislations and other measures in place for the management of wastes originated within their geographic borders. These measures can be taken by the national government, but also by local authorities such as municipalities.

111. Although it is fair to say that in most cases, the basic principles of these national waste-related measures, legislations or regulations or others, may find their origin in the implementation of the international regulatory framework on the management of hazardous wastes and other wastes, still, some countries do have their own specific national or local measures in place in order to specifically ensure the environmentally sound management of wastes and residues generated through the normal operations of a ship, once delivered ashore.

²² <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>; a consolidated version is available at <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1443602085118&uri=CELEX:02008L0098-20150731>.

²³ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006R1013>.

²⁴ Decision C(2001)107/Final, as amended by C(2004)20.

4. Identification of hazardous wastes and other wastes covered by the manual

112. To have a clear view on the different types of wastes and residues that are generated by a ship, it is of key importance to understand how they have been classified in the MARPOL Convention and its guidelines. Therefore this chapter contains an overview of the most relevant definitions of MARPOL and its relevant guidelines. In addition an indicative list is provided of ship-generated wastes that might be considered hazardous according to the Basel Convention, and an overview is given of the requirements for ship documentation for ship-generated wastes and residues.

4.1 Relevant MARPOL definitions of types of wastes and residues generated on board ships

113. The MARPOL Convention includes definitions of the different types of wastes and residues generated on board ships. Based on the 2015 Basel Convention assessment on how far the current Basel Convention technical guidelines cover wastes covered by the MARPOL Convention and on the legal analysis of the application of the Basel Convention to hazardous and other wastes generated on board ships (see *supra* in section 3.3.1.2.A), there are definitions contained in the MARPOL Convention, its Annexes and Guidelines, which are relevant to identify MARPOL wastes and residues that could be hazardous wastes and other wastes that are subject to the Basel Convention once offloaded from a ship.

4.1.1 General definitions

114. The following relevant definition can be found in Article 2 of the MARPOL Convention:

“Harmful substance (Art. 2.2): means any substance which, if introduced into the sea, is liable 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, and includes any substance subject to control by the present Convention.”

4.1.2 Relevant definitions in MARPOL Annex I

115. This Annex contains regulations for the prevention of pollution by oil. The following relevant definitions can be found in Regulation 1 of the MARPOL Annex I (the number in brackets refers to the number of the definition within the regulation):

(a) Oil (1): means petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products (other than those petrochemicals which are subject to the provisions of Annex II of the present Convention) and, without limiting the generality of the foregoing, includes the substances listed in appendix I to this Annex.

(b) Oily mixture (3): means a mixture with any oil content

(c) Slop²⁵ tank (16): means a tank specifically designated for the collection of tank drainings, tank washings and other oily mixtures

(d) Oil residue (sludge) (31): means 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

(e) Oily bilge water (33): means 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.

4.1.3 Relevant definitions in MARPOL Annex II

116. This Annex contains regulations for the control of pollution by noxious liquid substances (NLS) that are being transported in bulk. The following relevant definitions can be found in Regulation 1 of the MARPOL Annex II (the number in brackets refers to the number of the definition within the regulation):

(a) Noxious Liquid Substance (10): means any substance indicated in the Pollution Category column of Chapter 17 or 18 of the International Bulk Chemical (IBC) Code²⁶ or provisionally assessed under the provisions of Regulation 6.3 as falling into category X, Y or Z.

²⁵ The definition of “slop tank” is relevant as it is the only definition in MARPOL that refers to “slops”. MARPOL does not contain a definition of “slops”, which is to be considered as being a mixture of oil, water and sediments originating from the cleaning of cargo holds.

²⁶ The IBC Code, which is the “International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk”, provides an international standard for the safe carriage in bulk by sea of dangerous chemicals and noxious liquid substances (listed in chapter 17 of the Code). The IBC Code has been amended through different IMO resolutions.

- (i) *Category X*: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment.
- (ii) *Category Y*: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment.
- (iii) *Category Z*: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment.
- (iv) *Other substances*: Substances indicated as Other Substances (OS) in the pollution category column of chapter 18 of the IBC Code¹⁶ which have been evaluated and found to fall outside Category X, Y or Z because they are, at present, considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning or deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing only substances referred to as "Other Substances" are not subject to any requirements of MARPOL Annex II
- (b) Residue (12): means any noxious liquid substance which remains for disposal
- (c) Residues/water mixture (13): means residue to which water has been added for any purpose (e.g. tank cleaning, ballasting, bilge slops).

4.1.4 Relevant definitions in MARPOL Annex III

117. This Annex contains regulations for the prevention of pollution by harmful substances carried by sea in packaged form. It must be noted that this Annex does not contain any definitions describing any waste or residues, nor does it include a requirement for the provision of adequate port reception facilities.

118. However, it can be noted that packaging wastes originating from the handling of MARPOL Annex III cargo in principle is similar to solid ship-generated waste such as garbage, which is covered by MARPOL Annex V. Therefore issues related to the collection and disposal of packaging waste will not be addressed individually in this guidance manual, but will be dealt with in the sections on MARPOL Annex V.

119. Definitions related to the onboard generation of residues and wastes can be found in regulation 1 of MARPOL Annex III:

- (a) 1.1. For the purpose of this Annex, "harmful substances" are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code)²⁷ or which meet the criteria in the Appendix of this Annex;
- (b) 1.4. For the purposes of this Annex, empty packaging, which have been used previously for the carriage of harmful substances, shall themselves be treated as harmful substances unless adequate precautions have been taken to ensure that they contain no residue that is harmful to the marine environment.

4.1.5 Relevant definitions in MARPOL Annex IV

120. This Annex contains regulations for the prevention of pollution by sewage from ships.

121. Although not specifically defined by MARPOL Annex IV, a distinction is often made between "black water" (wastewater containing faeces, urine and flush water from flush toilets) and "grey water" (wastewater generated from activities such as laundry, dishwashing, bathing and showering). However, MARPOL Annex IV does not cover grey water. It must be noted that, although "grey water" is not to be considered as garbage in the context of MARPOL Annex V, a definition of "grey water" is being included in the 2012 IMO Guidelines for the implementation of MARPOL Annex V²⁸ (Resolution MEPC.219(63)).

122. The following relevant definitions can be found in Regulation 1 of the MARPOL Annex IV (the number in brackets refers to the number of the definition within the regulation):

- (a) 1.3 Sewage means:

²⁷ Reference can be made to the IMDG Code adopted by the IMO by Resolution MSC.122(75), as amended by the Marine Safety Committee.

²⁸ See [http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219\(63\).pdf](http://www.imo.org/ourwork/environment/pollutionprevention/garbage/documents/219(63).pdf).

- (i) Drainage and other wastes from any form of toilets and urinals;
- (ii) Drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs, and scuppers located in such premises;
- (iii) Drainage from spaces containing living animals; or
- (iv) Other waste waters when mixed with the drainages defined above.

4.1.6 Relevant definitions in MARPOL Annex V

123. This Annex contains regulations for the prevention of pollution by garbage from ships. It seeks to eliminate and reduce the amount of garbage being discharged into the sea from ships. In the revised MARPOL Annex V, which entered into force on 1 January 2013, the following relevant definitions of Regulation 1 are to be applied (the number in brackets refers to the number of the definition within the regulation):

- (a) Animal carcasses (1) means the bodies of any animals that are carried on board as cargo and that die or are euthanized during the voyage;
- (b) Cargo residues (2) means the remnants of any cargo which are not covered by other MARPOL Annexes and which remain on the deck or in holds following loading or unloading, including loading and unloading excess and spillage, whether in wet or dry condition or entrained in wash water, but does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship;
- (c) Cooking oil (3) means any type of edible oil or animal fat used or intended to be used for the preparation or cooking of food, but does not include the food itself that is prepared using these oils;
- (d) Domestic wastes (4) means all types of wastes not covered by other Annexes of MARPOL that are generated in the accommodation spaces on board the ship. It does not include grey water;
- (e) Fishing gear (6) means any physical device or part thereof or combination of items that may be placed on or in the water or on the sea-bed with the intended purpose of capturing, or controlling for subsequent capture or harvesting, marine or fresh water organisms;
- (f) Food wastes (8) means any spoiled or unspoiled food substances and includes fruits, vegetables, dairy products, poultry, meat products and food scraps generated aboard ship;
- (g) Garbage (9) means all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes of MARPOL. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing;
- (h) Incinerator ashes (10) means ash and clinkers resulting from shipboard incinerators used for the incineration of garbage;
- (i) Operational wastes (12) means all solid wastes (including slurries) not covered by other Annexes that are collected on board during normal maintenance or operations of a ship, or used for cargo stowage and handling. This also includes cleaning agents and additives contained in cargo hold and external wash water. It does not include grey water, bilge water or other similar discharges essential to the operation of a ship, taking into account the guidelines developed by the Organization;²⁹
- (j) Plastics (13) means a solid material which contains as an essential ingredient one or more high molecular mass polymers and which is formed (shaped) during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic. For the purposes of this annex, "all plastics" means all garbage that consists of or includes plastic in any form, including synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products;
- (k) Special Area (14) means a sea area where for recognized technical reasons in relation 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 garbage is required (see Reg. 1.14).

124. Also the 2012 IMO *Guidelines for the implementation of MARPOL Annex V* (Resolution MEPC.219(63)) contain the following relevant definitions:

²⁹ With "Organization" the IMO is being meant.

(a) 1.6.1 Dishwater means the residue from the manual or automatic washing of dishes and cooking utensils which have been pre-cleaned to the extent that any food particles adhering to them would not normally interfere with the operation of automatic dishwashers;

(b) 1.6.2 Grey water means drainage from dishwater, shower, laundry, bath and washbasin drains. It does not include drainage from toilets, urinals, hospitals, and animal spaces, as defined in regulation 1.3 of MARPOL Annex IV (sewage), and it does not include drainage from cargo spaces. Grey water is not considered garbage in the context of Annex V;

(c) 1.7.3 The definition of "operational wastes" (regulation 1.12 of MARPOL Annex V) excludes grey water, bilge water, or other similar discharges essential to the operation of a ship. "Other similar discharges" essential to the operation of a ship include, but are not limited to the following:

- (i) Boiler/economizer blowdown;
- (ii) Boat engine wet exhaust;
- (iii) Chain locker effluent;
- (iv) Controllable pitch propeller and thruster hydraulic fluid and other oil to sea interfaces (e.g. thruster bearings, stabilizers, rudder bearings, etc.);
- (v) Distillation/reverse osmosis brine;
- (vi) Elevator pit effluent;
- (vii) Firemain systems water;
- (viii) Freshwater layup;
- (ix) Gas turbine washwater;
- (x) Motor gasoline and compensating discharge;
- (xi) Machinery wastewater;
- (xii) Pool, spa water and recreational waters;
- (xiii) Sonar dome discharge;
- (xiv) Welldeck discharges.

125. It should be noted that grey water (including dishwater) is not being considered a MARPOL residue in the context of MARPOL Annex IV nor V.

4.1.7 Relevant definitions in MARPOL Annex VI

126. This Annex contains regulations for the prevention of air pollution from ships. The following relevant definitions can be found in Regulation 2 of the MARPOL Annex VI (the number in brackets refers to the number of the definition within the regulation):

(a) Ozone depleting substances (16) means controlled substances defined in paragraph (4) of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annexes A, B, C or E to the said Protocol in force at the time of application or interpretation of this Annex. Ozone depleting substances that may be found on board ship include, but are not limited to:

Halon 1211	Bromochlorodifluoromethane
Halon 1301	Bromotrifluoromethane
Halon 2402	1, 2-Dibromo-1,1,2,2-tetrafluoroethane (also known as Halon 114B2)
CFC-11	Trichlorofluoromethane
CFC-12	Dichlorodifluoromethane
CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane
CFC-114	1,2-Dichloro-1,1,2,2-tetrafluoroethane
CFC-115	Chloropentafluoroethane;

(b) Sludge oil (20) means sludge from the fuel oil or lubricating oil separators, waste lubricating oil from main or auxiliary machinery, or waste oil from bilge water separators, oil filtering equipment or drip trays.

127. Also the 2011 *Guidelines for reception facilities under MARPOL Annex VI* (Resolution MEPC.199(62)) contain the following relevant definitions:

(a) 2.4 Exhaust Gas Cleaning System (EGCS) Residues are products of the water treatment process. The residue can be formed and removed from the water with different treatment techniques. Such residues contain sulphates, ash/soot, metals and hydrocarbons removed from the water;

(b) 2.5 Ozone Depleting Substances (ODS) and equipment containing ODS are defined in regulation 2.16 and equipment as referred to in regulation 12.4.³⁰

4.2 Requirements for ship documentation on hazardous wastes

128. As the MARPOL Convention does not distinguish between hazardous and non-hazardous wastes and residues, this section provides guidance on documents related to both hazardous and non-hazardous wastes that can found on board ships, which can be specifically relevant for information and enforcement purposes.

4.2.1 Hazardous wastes on board ships: categorization in MARPOL

129. The MARPOL Convention does not include a definition of “hazardous waste”, and therefore does not make a specific distinction between hazardous and non-hazardous wastes and residues. However, according to the legal analysis on the applicability of the Basel Convention to hazardous and other wastes generated on board ships³¹ conducted under the framework of the Basel Convention its requirements apply to ship-generated wastes and residues once they are offloaded from the ship. Therefore ship-generated wastes and residues at that stage can be classified as hazardous waste when meeting the corresponding characteristics of the applicable land-based waste regulations. It should be emphasized that when hazardous wastes and other wastes are solely carried (not generated through the normal operation of the ship) as part of the transport chain, they are subject to the Basel Convention.

130. The MARPOL Convention does use the terms “harmful substance”, “dangerous goods” and “noxious liquid substances”, but not with an explicit link to waste.

“Harmful substance” is defined in its Article 2 as meaning “*any substance which, if introduced into the sea, is liable 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, and includes any substance subject to control by the present Convention*”.

131. “Noxious liquid substances” (NLS) are defined in MARPOL Annex II, which applies to the carriage in bulk of all noxious liquid substances except oil (as defined in MARPOL Annex I). Liquid substances posing a threat or harm to the marine environment are divided into three categories, Category X, Y and Z. The substances of Category X present a major hazard when being discharged into the marine environment, Category Y presents a hazard and Category Z presents a minor hazard. A fourth category, other substances (OS), identifies those liquid substances that, at present, are considered to present no hazard to the marine environment.

132. Regarding “dangerous goods” it can be noted that both the MARPOL Convention and the 1974 International Convention for the Safety of Life at Sea (SOLAS, particularly Chapter III on “Life-saving appliances and arrangements” would be relevant) apply. The carriage of dangerous goods in packaged form or in solid form in bulk as well as carriage of liquid goods and condensed gases in bulk is being regulated by Chapter VII of SOLAS. The requirements include that the goods shall be classified and that separate information about the goods must be available onboard.

133. It may be noted that in MARPOL Annex V and the 2012 “Guidelines³² for the implementation of MARPOL Annex V” several types of garbage are defined, without defining or indicating a possible hazard or risk.

134. It may also be noted that the implementation guidelines provide additional guidance regarding cleaning agents or additives, as their character does have an impact on the discharge requirements: cleaning agents/additives may be discharged into the sea as long as they are not harmful to the marine environment (HME). A cleaning agent or additive is considered not harmful to the marine environment, if it:

- (a) Is not a “harmful substance” in accordance with the criteria in MARPOL Annex III; and
- (b) Does not contain any components which are known to be carcinogenic, mutagenic or reprotoxic (CMR).

135. Cargo residues are considered harmful to the marine environment and subject to regulations 4.1.3 and 6.1.2.1 of the revised MARPOL Annex V if they are residues of solid bulk substances which are classified according to the criteria of the United Nations Globally Harmonized System for Classification and Labelling of Chemicals (UN GHS).

³⁰ Regulation 12.4: the substances referred to in this regulation (being Ozone Depleting Substances), and equipment containing such substances, shall be delivered to appropriate reception facilities when removed from ships.

³¹ See section 3.3.1.2 in this manual.

³² Resolution MEPC.219(63).

136. The following non-exhaustive list gives an indication of ship-generated wastes and residues that might be considered “hazardous wastes” according to the definition of the Basel Convention³³:

- (a) MARPOL Annex I: bilges, sludge, wash waters and slops containing oil;
- (b) MARPOL Annex II: cargo residues and wash waters containing certain chemicals;
- (c) MARPOL Annex V: medical wastes and expired medication³⁴, paints, expired pyrotechnics, batteries, light bulbs, used chemicals (e.g. solvents), cooking oil, aerosol cans, printer cartridges, incinerator ash;
- (d) MARPOL Annex VI: devices containing Ozone Depleting Substances (ODS), waste from Exhaust Gas Cleaning Systems (e.g. scrubber sludge).

4.2.2 Documentation required to be kept on board ships

137. As ships in general need to comply with an extensive amount of requirements related to safety, environment, communication, passengers, etc., systems of certification and documentation are widely applied in the maritime industry.

138. An overview of certificates and documents that, according to IMO requirements, are to be kept onboard the ship, can be found in the following joint circular from the three IMO committees FAL (Facilitation Committee), MEPC and the MSC (Maritime Safety Committee): FAL.2/Circ.127, MEPC.1/Circ.817 and MSC.1/Circ.1462. This circular provides an overview of all certificates and documents that are required to be carried on board ships. All certificates to be carried on board must be valid and drawn up in the form corresponding to the model where required by the relevant international convention or instrument

139. Specifically, the following documents, which according to MARPOL need to be kept on board ships, can provide relevant information related to the management of wastes and residues:

- (a) Record Books, such as the Oil Record Book, Garbage Record Book and ODS Record Book;
- (b) Garbage Management Plan.

Legal basis	Examples of wastes	Document
MARPOL Annex I, regulations 17 and 36	Bilges, sludge, wash waters, slops containing oil	Oil Record Book <p>Every oil tanker of 150 gross tonnage and above and every ship of 400 gross tonnage and above other than an oil tanker shall be provided with an Oil Record Book, Part I (Machinery space operations).</p> <p>Every oil tanker of 150 gross tonnage and above shall also be provided with an Oil Record Book, Part II (Cargo/ballast operations).</p> <p>The Oil Record Book shall be completed on each occasion whenever machinery space operations and/or cargo operations take place in the ship (e.g. cleaning fuel or cargo tanks, discharge of bilge water, bunkering fuel, disposal of residues, etc.).</p>
MARPOL Annex V, regulation 10	Medical wastes and expired medication, paints, expired pyrotechnics, batteries, light bulbs, used chemicals (e.g. solvents), cooking oil, aerosol cans, printer cartridges, incinerator ash	Garbage Record Book <p>Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 persons or more engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention and every fixed and floating platform engaged in exploration and exploitation of the seabed shall be provided with a Garbage Record Book.</p> <p>The Garbage Record Book shall be completed and signed for on the date of the incineration or discharge by the officer in charge in case of each discharge operation, or completed incineration.</p>

³³ Article 1: “scope of the Convention”.

³⁴ To the extent that these are “not incidental to or derived from the normal operations of a ship”, they would also be covered by the dumping prohibitions under the London Protocol and Convention.

Legal basis	Examples of wastes	Document
MARPOL Annex VI, regulation 12.6	Devices containing Ozone Depleting Substances (ODS), waste from Exhaust Gas Cleaning Systems (e.g. scrubber sludge)	<p>Ozone-depleting Substances Record Book</p> <p>Each ship subject to MARPOL Annex VI, regulation 6.1 that has rechargeable systems that contain ozone-depleting substances shall maintain an ozone-depleting substances record book.</p> <p>Entries are to be made in respect of Ozone Depleting Substances when specific actions are carried out such as supply, charge and discharge of system, repair and maintenance.</p>
MARPOL Annex II, regulation 15.2	Cargo residues and wash waters containing certain chemicals	<p>Cargo Record Book</p> <p>Ships carrying noxious liquid substances in bulk shall be provided with a Cargo Record Book, whether as part of the ship's official log book or otherwise, in the form specified in appendix II to Annex II.</p> <p>In the event of an accidental discharge of a noxious liquid substance or a mixture containing such a substance or a discharge under the provisions of regulation 3 of this Annex, an entry shall be made in the Cargo Record Book stating the circumstances of, and the reason for, the discharge.</p>
MARPOL Annex V, regulation 10; resolution MEPC.71(38); MEPC/Circ.317	Medical wastes and expired medication, paints, expired pyrotechnics, batteries, light bulbs, used chemicals (e.g. solvents), cooking oil, aerosol cans, printer cartridges, incinerator ash	<p>Garbage Management Plan</p> <p>Every ship of 100 gross tonnage and above and every ship which is certified to carry 15 persons or more shall carry a garbage management plan which the crew shall follow.</p> <p>The garbage management plan should detail the ship's equipment, arrangements and procedures for the handling of garbage, and includes written procedures for minimizing, collecting, storing, processing and disposing of garbage, including the use of the equipment on board. The garbage management plan is to be drafted in the working language of the crew, and should identify crew responsibilities for the management of the garbage in accordance with the plan, and procedures for all aspects of handling and storing garbage on board the ship.</p> <p>Additional guidance can be found in the IMO "Guidelines for the development of garbage management plans" (see Annex 4 of this guidance manual).</p>

5. Developing a strategy and planning for the environmentally sound management of ship-generated wastes delivered at ports

5.1 Introduction

140. Waste management is being influenced by various issues, such as climate change and air emissions, life cycle assessments and circular economy, contamination of land, water and air, energy efficiency targets, etc. Therefore waste management strategy and planning has not only become a complex issue from the legal, technical and commercial points of view, but also from a public and societal angle.

141. Proper planning of a cost-efficient waste management infrastructure for ship-generated wastes and residues, embedded in an ambitious and well-developed strategy aiming at environmentally sound waste management and linked to a sustainable and circular economy, is therefore of crucial importance.

5.2 Principles for the development of a strategy for ship-generated wastes

5.2.1 General principles

142. The development of a waste management strategy is a powerful tool to establish a coherent system of integrated waste management practices and facilities. A proper waste management strategy leads to an efficient and effective operating waste management system easing the transition towards a circular economy, and therefore it should facilitate the development of legislation, procedures and infrastructure (facilities) that lead towards the environmentally sound management of both hazardous and non-hazardous wastes. It describes the objectives and goals, and it outlines the practical issues such as collection, transport and disposal, including storage. In most cases it also addresses enforcement measures.

143. Strategies to implement environmental sound waste management should ensure that all the following core goals are met together:

- (a) Establish a comprehensive legal framework to:
 - (i) Effectively govern all waste management operations aiming towards a circular economy;
 - (ii) Protect public and worker health and safety;
 - (iii) Protect the environment;
 - (iv) Address transboundary movements of waste in accordance with applicable international and regional agreements and conventions, including the Basel Convention;
- (b) Implement effective compliance and enforcement measures to assure conformity with applicable legal requirements;
- (c) Build sufficient domestic infrastructure and capacity to ensure the availability of adequate facilities to undertake waste management operations and ensure those facilities achieve ESM.

144. Key stakeholders such as governments and national/local authorities, waste generators, waste collectors and transporters, dealers, brokers, waste disposal facilities and non-governmental organizations, have a crucial role to play.

145. The priority in which wastes should be managed is embedded in the waste management hierarchy, which can be defined as follows: “prevention, minimization, reuse, recycling, other recovery including energy recovery, and final disposal; in doing so, encouraging treatment options that deliver the best overall environmental outcome, taking into account life-cycle thinking”.

Case Study: El Salvador**National Strategy for Environmental Sanitation:**

The Government of El Salvador has developed a “National Strategy for Environmental Sanitation” (ENSA), which provides the framework for the development and execution of measures aiming at overturning the environmental pollution, and which may be agreed at the central and municipal levels.

The ENSA is one of the operational instruments of the “National Environmental Policy”, and focuses on three main objectives, including the objective of establishing an integrated management for solid and hazardous wastes. The strategy also integrates the life-cycle management of hazardous wastes throughout the different stages.

The strategy also involves other sectors such as non-governmental organisations, scientific institutions (academic and professional), the entrepreneurial sector and citizen associations.

ENSA also provides the institutional requirements that are necessary for executing actions, and is guided by five transversal topics:

- (a) Awareness raising;
- (b) Research;
- (c) Education and training;
- (d) Technology; and
- (e) Financing.

By its participative and multidisciplinary nature, the integrated management of solid and hazardous wastes requires strategies that allow the strengthening of citizen participation and involvement, such as communication and agreement between the public and private actors within the sector, for which different lines of conduct are defined.

5.2.2 Developing a port waste strategy in practice

146. When developing a waste management strategy for ship-generated waste delivered in ports, the general strategy elements mentioned in the above section 5.2.1 are to be brought into practice. Therefore, as a tool for guidance, it might be useful to take into account and develop more in detail the following elements:

- (a) Administrative, legislative and policy measures:
 - (i) Choose the optimal level to implement the different legislative and administrative measures;
 - (ii) Specific schemes for licensing and permitting for the collection and disposal of ship-generated wastes and residues, particularly in the case of transboundary movements of collected waste for final disposal;
 - (iii) Apply a ship’s waste fee systems in order to incentivize a maximum delivery of ship-generated wastes and residues to port reception facilities, in order to get as much waste as possible from ship to shore and thus avoiding discharges at sea;
 - (iv) Incentivize the delivery of segregated waste streams rather than mixtures of wastes, as the recovery of segregated waste is usually much easier;
 - (v) Embedding the management of ship-generated wastes in a general waste strategy, facilitating the circular economy;
- (b) Technology and facilities required:
 - (i) Provision of adequate port reception facilities, in order to meet the port users’ needs and facilitate a smooth delivery from the ship without causing undue delay;
 - (ii) Introduce modern technology to be implemented by the waste management industry, in order to minimize the impact of waste management towards the environment, avoiding emissions to land, water and air (this issue is being addressed in chapter 9 of this guidance manual);
- (c) Processes and coordination mechanisms:
 - (i) Stakeholder involvement both from the industry side as from competent authorities, in order to facilitate communication and exchange of information and practices;

- (ii) Cooperation between ports;
- (iii) Install a modern data and information system monitoring the delivery and management of the delivered ship-generated wastes and residues, such as web-based systems providing direct access to all stakeholders and enforcing authorities, especially in the case of transboundary movements of collected waste for final disposal.

147. Some of these elements are described more in detail below:

(a) Waste prevention and minimization:

As a priority, waste prevention and minimization is an important element of a waste management strategy. Unnecessary waste generation burdens on waste transport and disposal facilities and should be avoided. However, it is not always possible to efficiently incentivize waste prevention and minimization on board ships by applying a land-based waste strategy. Some ports have implemented voluntary (financial) incentive schemes, such as a reduction of port fees or (partial) reimbursement of waste fees for ships that have installed technology or apply management schemes that lead to reduced amounts of on-board generated waste.

(b) Addressing both ship- and land-generated waste:

A basic principle when developing a waste management strategy for ship-generated wastes and residues that are being delivered to reception facilities in a port or terminal, is that it should be borne in mind that these ship-generated wastes should not be seen separate from land-based wastes: after all, ship-generated waste systems within a port do not exist in isolation from the rest of the port operations, services and infrastructure, and becomes a part of the total waste stream of a port, once received on shore. As both ship-generated wastes and land-generated wastes in the port are to be managed in an environmentally sound manner, it is obvious that a proper waste management strategy should address the management of both ship-generated wastes and land-generated wastes, either from a domestic or industrial origin.

Especially in smaller ports such as in regional or local commercial, fishing and recreational ports, the volumes of ship-generated wastes delivered to port reception facilities might not be sufficient enough in order to develop a cost-efficient waste management. However, when combining the ship-generated wastes and residues with similar wastes generated by land-based industrial activities and municipal wastes, volumes might be sufficient enough in order to establish not only an economically viable business opportunity, but also facilitate environmentally sound waste management.

(c) Cooperation between ports:

Also cooperation between ports might be a valuable and economically viable option. In this case the strategy would be that all ship-generated wastes and residues can be received in all of the participating ports, but then subsequently are being transported to central disposal facilities. Such a strategy can be more cost-efficient and effective than the provision of disposal facilities in each of the participating ports.

An inter-port strategy may be applicable at a regional level, where ports in neighbouring countries cooperate, or on a local level, where ports in one country cooperate. In particular if ports are located in remote areas or in case of a cluster of small ports (e.g. located on several small islands), inter-port cooperation in the field of reception and treatment will be worthwhile to consider.

It can be noted that the IMO has already developed a specific framework and guidance for addressing the adequacy of port reception facilities on a regional and inter-port level:

- (i) 2012 Resolution MEPC.216(63): Regional arrangements for port reception facilities under MARPOL Annexes I, II, IV and V;
- (ii) 2012 Resolution MEPC.217(63): Regional arrangements for port reception facilities under MARPOL Annex VI (and Certification of marine diesel engines fitted with Selective Catalytic Reduction systems under the NOx Technical Code 2008);
- (iii) 2012 Resolution MEPC.221(63): Guidelines for the development of a regional reception facilities plan.

(d) Circular economy:

Another important element is that an integrated approach to waste management incorporating the entire life cycle of waste, from the moment of generation until its final disposal, may save considerable future expenses (the so-called “cradle-to-grave approach”). In addition, ship-generated as well as land-generated wastes may contain valuable materials, which can be recovered as a resource material for other industrial activities. Final disposal of these wastes would be an inefficient use of resources, and recovery options should be explored (the so-called “cradle-to-cradle approach”).

5.3 Planning port waste management infrastructure

148. The proper planning of a cost-efficient waste management infrastructure, embedded in a strategy aiming at environmental sound waste management and linked to a sustainable and circular economy, is of crucial importance in order to address the problems that influence today's economic, environmental and societal reality.

149. When planning waste management infrastructure in a port area in general or port reception facilities specifically, it should be borne in mind that ports can be very different due to a huge set of variable characteristics, such as:

- (a) Geographical location (incl. seasonal influences such as obstruction of traffic because of occurrence of floating ice);
- (b) Size of the port;
- (c) Types of traffic (commercial, fishing, recreational, navy, offshore support, etc.);
- (d) Types of cargo being handled in the port;
- (e) Number of ships calling the port;
- (f) Size of the ships calling the port;
- (g) Port structure and governance;
- (h) Presence of industrial clusters in the port;
- (i) Existing capacity for waste collection, storage and treatment;
- (j) Presence of densely populated areas in the port or in the immediate vicinity.

150. It is clear that the need for adequate port reception facilities, including the waste disposal facilities, is primarily determined by the port users' needs. And as their needs will be very different in differing ports, the provision of adequate port reception facilities and the waste disposal options requires good planning and design.

151. Key elements during the planning phase are:

- (a) Collection of data and information;
- (b) Assessment of these data and information;
- (c) Decisions regarding the type of port reception facility.

152. Each of these steps is explained more in detail in the following sections.

5.3.1 Collection of data and information

153. An essential first step in the planning phase of port reception facilities is the collection of reliable data and information about the existing situation in the port, supplemented with an overview of the applicable regulatory framework. Key data and information to be collected should include, but are not limited to:

- (a) Data/information regarding the port:
 - (i) Geographical characteristics;
 - (ii) Waterborne traffic;
 - (iii) Terminals and cargo flows;
 - (iv) Industrial clusters in the port;
 - (v) Forecasts regarding the expected traffic in the near and mid-term future;
 - (vi) Safety requirements (e.g. LNG-terminals);
- (b) Ship-related data/information:
 - (i) Number and types of ships calling the port (commercial/non-commercial, chemical/oil tankers, passengers, fishing, recreational, etc.)
 - (ii) Forecast for the near and mid-term future;
 - (iii) Safety requirements (e.g. LNG);
- (c) Data/information regarding the types and quantities of waste:
 - (i) An overview of the types and quantities of ship-generated wastes and residues currently received;

- (ii) Estimates of the types and quantities of ship-generated wastes and residues that are expected to be delivered in the near and mid-term future, taking into account possible changes of traffic;
- (iii) Waste streams in the port that are being generated through other activities (land-based industry, stevedoring and cargo handling, etc.);
- (d) Data/information regarding the waste handling:
 - (i) The options for disposal including temporary storage and (pre-)treatment for ship-generated wastes and residues that are already available in the port area and its vicinity;
 - (ii) The possible need for additional waste storage, pretreatment and disposal capacity and infrastructure;
- (e) Applicable regulatory framework:
 - (i) Overview of the applicable legal requirements (national and local) regarding waste management in general and ship-generated waste specifically;
 - (ii) Overview of the key elements of the overarching waste management strategy.

5.3.1.1 Where to get these data

154. Depending on how ports are being organized (private/public), data and information on port characteristics will most likely be available at the port authority or the competent governmental administration responsible for ports. Also the data regarding types of ships, traffic and cargo turnover should be available at the same source.

155. Data regarding the types and quantities of ship-generated wastes and residues might also be available at the port authority, although not every port authority registers it. In case an advance notification scheme for ship-generated waste is being applied in the port, the information about the types and volumes of wastes intended to be delivered by the ship should be available with that stakeholder (in many cases it is the harbour master's office). In some ports, for logistical reasons, the providers of port reception facilities may require advance notification from the ship of its intention to use the facilities³⁵. Providing advance notification to the reception facility of the type and quantity of MARPOL residues/wastes on board and the type and quantity intended to be delivered will greatly assist the reception facility operator in receiving the materials while minimizing any delay to the vessel's normal port operation. General recommended practice is to provide at least 24 hours' notice, although specific requirements may vary by reception facility. If a ship visits a port on a regular basis, a standing arrangement with the PRF may prove to be most efficient. Although in EU ports the mandatory notification format provided by Directive 2000/59/EC is required, outside the EU shipmasters are recommended to use the standardized Advance Notification Form³⁶ as developed by IMO. Port authorities, agents and facility operators are urged to accept the standardized format; however, some operators may require an alternate form.

156. In most cases also waste collectors and existing port reception facilities should be a reliable source of relevant information, not only on amounts and types of wastes that are being collected³⁷ but also regarding the existing infrastructure for collection, transport and disposal. Especially when a system with waste delivery receipts is being applied in the port, reliable data on delivered volumes and types of ship-generated wastes and residues should be available.

157. In case these data and information are not directly available, also the usage of questionnaires might be considered. However, a thorough consultation of stakeholders is in either case very much recommended.

158. More specific information regarding advance notification schemes is provided in section 6.3.2 of this guidance manual.

5.3.2 Assessment of the information

159. The first goal of the assessment should be to reveal shortcomings in existing port and ship-related practices, and suggest improvements. Also the assessment should look into possible changes in the port's infrastructure (such as new terminals), operations (such as increased traffic) and management (such as introduction of new financial schemes).

160. Some of the key elements that should be addressed in the assessment are:

³⁵ Further information on this requirement is provided in section 4 of the Guidelines for ensuring the adequacy of port waste reception facilities (resolution MEPC.83(44)).

³⁶ Annex 2 of IMO Circular MEPC.1/Circ.834.

³⁷ As in most cases the port reception facility will use a register to note incoming and outgoing waste streams.

Possible change:	Possible impact:	Possible response:
More ships calling (increased traffic)	More ships delivering waste	Additional collection and disposal capacity required
Other types of ships calling (new traffic)	Other types of waste being delivered	New types of receptacles required
Expansion of the port: new terminals in operation	More ships delivering waste, and other types of cargo residues and wash waters being delivered	Additional and specific types of receptacles/means of collection required
Introduction of financial schemes incentivising delivery (e.g. fee systems)	More ships delivering (more) waste	Additional collection and disposal capacity required

161. Other issues that are to be taken into consideration are:

- (a) The expected investment and operational costs related to the new collection and treatment facilities;
- (b) Means of transport (e.g. trucks, railway or ships) that may have to be commissioned and licensed;
- (c) Agreements may be needed on who transports the waste;
- (d) In case of a regional strategy, the international agreements that need to be prepared (such as the implications of transboundary movements of waste).

5.3.3 Decisions regarding the port reception facility

162. After the collection and assessment of the data and information as mentioned in the above sections, a decision will have to be taken whether additional an/or other types of port reception facilities are needed in order to establish or maintain the necessary adequacy level, and whether additional waste management operations (such as storage and treatment) are required.

163. Decisions will need to be taken regarding, but not limited to:

- (a) The type of port reception facilities required, including the necessary capacity for collection of ship-generated wastes and residues;
- (b) Who will invest in and operate the reception facility as well as the downstream waste treatment infrastructure.

164. It should also be noted that the provision of additional port reception facilities and/or waste processing and treatment infrastructure should be embedded in and be complementary with the overarching waste management strategy.

5.3.3.1 Choice of the type of port reception facility

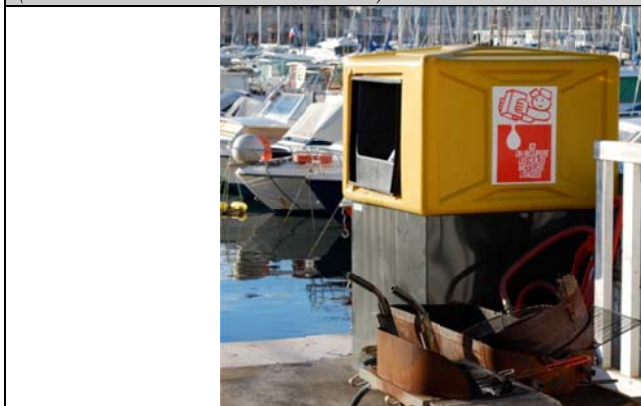
165. Of key importance during the planning of port reception facilities is the selection of the type of reception facility that will be operated in the port. Especially in case of fixed facilities, the choice of location for these facilities will be crucial. In that case a site selection assessment should be included.

Example of a fixed reception facility in the port of Antwerp (Belgium)
(Photo credits: MAC2 Antwerp, Belgium)



166. While the disposal facilities for the ship-generated wastes and residues will always be located on shore, the equipment for the collection can either be mobile or shore-based at a strategic point. Options are to choose between different types of mobile and fixed port reception facilities, although in large ports both can be applied.

Example of a receptacle used for collecting oil from recreational vessels in the port of Marseille (France)
(Photo credits: Peter Van den dries)



167. Mobile port reception facilities have the advantage that the investment cost is less than for fixed facilities, and that they can be put in operation rather quick and flexible. Possible disadvantages can be their interference with other operations, such as loading/unloading of cargo, and a restricted or prohibited access for mobile facilities on jetties, such as those where oil products, liquefied gases, noxious liquid substances or packaged dangerous goods are being handled.

Example of a barge used for collecting garbage in the port of Rotterdam
(Photo credits: Bek & Verburg, NL)



168. Fixed facilities on the other hand have the advantage that they might be able to collect more types of wastes (as they can be designed and equipped in a way that all ship-generated wastes and residues can be collected), that they have a larger capacity for collection and storage, and that they can combine the collection, storage and treatment of different waste types, also from land-based facilities. A substantial disadvantage is the higher investment cost for these facilities, and the fact that they are to be located at a strategic location that is easily accessible for ships.

169. More details on the different types of port reception facilities can be found in section 6.2.2 of this guidance manual.

5.3.3.2 Financing port reception facilities

170. When assessing the development of PRF from a financial/economical point of view, the outcome may be that its investment and operational costs are substantial. In some cases the provision of new port reception facilities and/or the expansion or conversion of existing facilities can have a significant financial impact in terms of investment and operational costs, strongly depending on the type of port reception facility that is being designed and planned.

171. When assessing the development of a new port reception facility from a financial perspective, at least the following issues should be taken into account:

- (a) Investment costs for equipment, technology and land acquisition;
- (b) Costs for staff, supervision, administration and training of personnel;
- (c) Operation of the facilities;
- (d) Maintenance and spare parts;
- (e) Consumables such as power and chemicals;
- (f) Costs for the final disposal of wastes (including costs for storage and transport);
- (g) Revenues from recyclable materials and delivered services.

172. The establishment of a port reception facility can require a substantial investment. When the available financial resources are insufficient, funding from external sources can be considered in order to cover the necessary investments and the costs related to the operation the port reception facilities.

173. Also the instalment of a fee system for ship-generated wastes, as described in section 6.3.4 of this guidance manual, can provide financial support.

A. *Options for external financing:*

174. Means for external financing can differ, depending on who is assigned to be responsible for the development of the reception facility (either a private or a public, or a private-public partnership), or which stakeholder takes the initiative to provide the facility.

175. Investment capital can be provided through different sources, such as by shareholders, in the form of equity (privately or via an initial public offering), creditors, in the form of bonds, and the firm's operations (cash flow). Short-term funding is mostly being provided by banks extending a line of credit.

176. Several external financing sources can be recognized:

- (a) Government;
- (b) Regional/local authorities;
- (c) Private sector investors;
- (d) Commercial banks;
- (e) European union funding schemes;
- (f) Multilateral donors³⁸;
- (g) Bilateral donors.

177. Financing can be secured through private sector contractors and investors, commercial banks or the government (public finance). A private sector contractor can provide capital investment for facilities at ports as a part of his general investment programme. Such a contractor may finance a facility from loans or internally generated funds. In return, the investor may well seek exclusive rights or other security of tenure for the funding of the facility. Alternatively, the investor may want guarantees of a minimum level of income. These are consequences that need careful consideration when allowing such parties to shoulder the risk.

178. Public finance relates to sovereign States and sub-national entities (states/provinces, counties, municipalities, etc.) and related public entities (e.g. provinces or districts) or agencies. It usually encompasses a long-term, strategic perspective regarding investment decisions that affect public entities. These long-term, strategic periods usually encompass five or more years.

179. Public finance is primarily concerned with:

- (a) Identification of required expenditure of a public sector entity;
- (b) Source(s) of that entity's revenue;
- (c) The budgeting process;
- (d) Debt issuance (municipal bonds) for public works projects.

180. Central banks, such as the Federal Reserve System banks (in the United States of America) and the Bank of England (in the United Kingdom), are strong players in public finance, acting as lenders of last resort as well as strong influences on monetary and credit conditions in the economy.

181. It can be noted that, in general, multilateral and bilateral donors do not provide loans directly to the private sector, but only to governments. Therefore, in case finances from these donors are to be allocated to port reception facilities, direct governmental involvement in the project is required.

182. Generally, two methods of financing can be distinguished, being loans and grant funding.

183. A loan application will always be assessed by the lending organization against a number of criteria. Many of these criteria have to do with the feasibility of the project and this may require a detailed financial analysis which addresses, amongst others things:

- (a) Sales revenues;
- (b) Operational costs;
- (c) Income statement;
- (d) Balance sheets;
- (e) Cash flow projections;
- (f) Net present value analysis;
- (g) Internal rate of return over a number of years.

184. In general, the bigger the project the more detailed the analysis must be. Donors have their own requirements regarding the structure and the details of the financial information that must be submitted together with the application for a loan.

185. A potential donor may carry out its own financial analysis, but in any case will assess the application against the applicable lending conditions. Again, these conditions may vary from one donor to the other. There are purely financial conditions such as applicable interest rates, grace period, repayment period, etc. However, other criteria may be applied as well. Especially when treatment processes are included, a project may be on such a scale that an

³⁸ Such as the World Bank, the United Nations, the European Union, the OESO, the EBRD, the European Investment Bank, the Asian Development Bank, the African Development Bank, etc.

environmental impact analysis must be carried out before a loan can be approved. It may also be necessary to include project components that are not directly related to the investment in equipment such as institutional capacity building, preparation of legislation, etc.

186. Another issue to be considered is that a port reception facility in itself can be a component of a larger port project, such as the construction of a new terminal. Since there is a clear connection between land-generated and ship-generated wastes (in particular when treatment and final disposal are considered), a project on land-generated waste can incorporate a ship-generated waste component.

187. Grant funding may be obtained for relatively small projects, such as feasibility studies or (preliminary) designs, whereas loans are to be considered for bigger projects with (usually) a significant investment component (equipment, construction works).

B. Investment and operation through private contractors:

188. Although the MARPOL Convention requires that the State-Party is to ensure the provision of adequate port reception facilities, this responsibility in many cases is delegated to the port authorities. Still, the actual provision and operation of port reception facilities can be carried out by private companies (for which this may provide a business opportunity) or by a public enterprise (under governmental responsibility).

189. An advantage of using private contractors is that existing companies may be the most cost-effective way to provide trained personnel, develop infrastructure for waste reception, storage and treatment, and knowhow. When port reception or treatment facilities already exist and operate in the port and/or its vicinity, they should already comply with the licensing system, the safety and environmental standards and regulations set by the competent authorities. A possible extension of the existing permits and/or an application for additional permits should, from an administrative and procedural point of view, in those cases not be too extensive.

190. In case there is more than one private port reception facility active in the port this normally leads to competition, which might also lead to higher service levels (swift collection of wastes 24/7), the use of state-of-the-art technology, and competitive price setting.

191. However, using privately operated port reception facilities may not lead to a distortion of the market, handicapping those facilities using technological treatment processes. In that case a comprehensive licensing system, identifying equal acceptance, treatment and disposal standards for those facilities dealing with a designated type of waste, will help to overcome this concern.

192. In addition also companies already using mobile facilities for other services in the port (e.g. bunker stations or collection of wastes from land-based industry) might be interested in extending their activities with the collection of ship-generated wastes and residues.

193. It should be noted that it is important that port reception facilities licensed to receive certain types and amounts of ship-generated wastes and residues should also have a duty to accept them. Otherwise certain companies may be tempted to select and only accept those ship-generated wastes and residues that are most profitable in terms of economic value. For example, oily water mixtures with a high content of oil are more profitable than these mixtures with a high content of water.

194. Despite the fact that the system provides some clear advantages, organising a comprehensive waste treatment and disposal scheme based on a free market system may be difficult or impossible without direct government involvement. A waste management system controlled and operated by a government has certain advantages as well as disadvantages. An advantage of governmental responsibility through a public enterprise is that it should lead to the rapid build-up of a comprehensive waste handling system, provided sufficient funds and/or incentive based delivery schemes are made available and the standards adopted are relevant to the principles of public policy. A disadvantage is that the government operating the facilities also exercises control and enforcement of the rules.

6. Requirements at the sea-land interface for ensuring the environmentally sound management of ship-generated wastes

6.1 Introduction

195. The availability of adequate port reception facilities is an important prerequisite for ensuring the environmentally sound management of ship-generated wastes and cargo residues. Still, the provision of adequate reception facilities and the delivery of ship-generated waste and cargo residues to these facilities are not standing alone issues, as they are part of a whole chain of actions, communications and procedures. Therefore it is obvious that the adequacy of port reception facilities and the whole process of delivery of waste from ships can be improved when they are embedded in a well coordinated port-wide reception and handling plan, describing all processes related to the delivery ship-generated waste and cargo residues.

196. The following sections in this chapter describe the required elements in the process of ensuring a proper and swift delivery of ship's waste: ensuring the adequacy of port reception facilities (including the different types of reception facilities) and the development of a port waste reception and handling plan. Subsequently some of the key elements of the port waste management plan are described in detail, such as the process of advance waste notification, the fee systems for ship's waste, and coordination and communication of information.

6.2 Ensuring the adequacy of port reception facilities

6.2.1 The issue of "adequacy"

197. The Annexes I, II, IV, V and VI to the MARPOL Convention require the provision of adequate port reception facilities, which are to meet the needs of ships normally visiting the port without causing undue delay. However, when implementing the MARPOL Convention some States have chosen to shift the responsibility to provide these adequate port reception facilities to local authorities such as municipalities or port authorities, or to private stakeholders (e.g. terminal operators). In addition, the interpretation of "adequacy" is left to the port State and the port's users (being the ships visiting the ports).

198. As the thereto assigned competent authority, which can resort under either a maritime, port or environmental department, should ensure that these requirements regarding "adequacy" are brought into practice, it must consequently be made clear, both for the enforcing authority as for the stakeholder that is required to provide the port reception facilities, how "adequacy" is to be defined. However, determination of adequacy has been proven quite difficult.

199. In order to give guidance regarding the determination of adequacy, the IMO has adopted the "*Guidelines for ensuring the adequacy of port waste reception facilities*" (resolution MEPC.83(44)). In this guideline "adequate" is being described as:

"To achieve adequacy the port should have regard to the operational needs of users and provide reception facilities for the types and quantities of wastes from ships normally visiting the port."

200. In addition "adequate facilities" are being described as those which:

- (a) Mariners use;
- (b) Fully meet the need of ships regularly using them;
- (c) Do not provide mariners with a disincentive to use them; and
- (d) Contribute to the improvement of the marine environment.

201. Furthermore the provided port reception facilities must "meet the needs of the ships normally using the port" and "allow for the ultimate disposal of ship-generated wastes and residues to take place in an environmentally appropriate way".

202. According to the "Guidelines for the implementation of MARPOL Annex V" (resolution MEPC.219(63)) the methodology for determining the adequacy of a reception facility should be based on the number and types of ships that will call at the port, the waste management requirements of each type of ship as well as the size and location of a port.

203. When ship operators, ports and terminals assess the expected quantities and types of ship-generated wastes and residues on a per ship basis, the following issues should be considered:

- (a) Types of garbage normally generated;
- (b) Ship type and design;
- (c) Type of main fuel used by the ship (as cleaner fuel such as diesel/gasoline generates less sludge);

- (d) The ship's speed (as fuel consumption can indicate sludge production);
- (e) The ship's operating route;
- (f) Number of persons on board (both crew and passengers);
- (g) Duration of the voyage;
- (h) Time spent in areas where discharge into the sea is prohibited or restricted;
- (i) Time spent in port.

204. As a minimum, the capacity of reception facilities at cargo unloading, loading, and repair ports and terminals should be capable of receiving those residues and mixtures which are normally handled within that port and which ships intend to deliver to port reception facilities. All ports, including marinas and fishing ports regardless of their size, need to provide adequate facilities to receive garbage and oil residues from engines, etc. Larger ports, with more and various types of ships calling, will need to provide more extensive reception capacity (e.g. for cargo residues, bilge water, quarantine waste, etc.).

205. The receiving capacity should be at least appropriate in time and availability to respond to the continuing needs of the ships normally using the port. Arrangements needed to facilitate the discharge of residues, mixtures and all types of ship-generated wastes without causing undue delay to ships, such as prior notification of types and quantities of wastes and residues expected to be delivered, piping or equipment required for discharge etc. are to be made timely between the ship and the port reception facility (see also section 6.4.2 on advance notification schemes).

206. When assessing the adequacy of reception facilities, governments should also take into account the technological challenges related to the recycling, treatment and discharge of ship-generated wastes and residues. Therefore governments should take action within their national strategies to consider standards for ship-generated wastes and residues. When doing so, it is recommended that relevant international standards be taken into account as it helps ensuring that the ultimate disposal of the ship-generated wastes and residues is environmentally sound.

207. When selecting the most appropriate type of reception facility for a particular port, attention should be given to alternative methods available: floating facilities, such as barges, might be considered more effective, in particular where vehicular access is not practicable.

208. It should also be noted that due to additional treatment processes, especially when the principles of environmentally sound management are being applied, port reception facilities might promote or (financially) incentivize the on board separation of:

- (a) Non-recyclable plastics and plastics mixed with non-plastic garbage;
- (b) Rags;
- (c) Recyclable material:
 - (i) Cooking oil;
 - (ii) Glass;
 - (iii) Aluminium cans;
 - (iv) Paper, cardboard, corrugated board;
 - (v) Wood;
 - (vi) Metal;
 - (vii) Plastics (including styrofoam or other similar plastic material)
- (d) Garbage that might present a hazard to the ship or crew (e.g. oily rags, light bulbs, acids, chemicals, batteries, etc.);
- (e) E-wastes such as electronic cards, equipment, computers, printer cartridges, etc.

209. Undue delay may arise when the time spent in port for the delivery of residues, mixtures or wastes goes beyond the normal turnaround time of the ship in that port, unless the delay is caused by fault of the ship, its master, its owner or his authorized representatives, specific safety requirements in place or the normal port procedures. In order to provide maximum flexibility for the ship to deliver wastes while avoiding undue delay, in major ports the availability of reception facilities on a 24/7 basis might be considered.

Case Study: the United States of America**Certificate of Adequacy (COA):**

The U.S. Coast Guard implements provisions in MARPOL and enforces regulations in each of the MARPOL Annexes relating to the provision of adequate port reception facilities (PRF) for ship's waste through the Act to Prevent Pollution from Ships (APPS). The U.S. Coast Guard inspects and certifies each port or terminal that receives operational waste from ships, including hazardous and quarantine wastes, to ensure that it is managed in an environmentally sound manner, does not re-enter the marine environment during or after offloading from the ship, and is disposed of in accordance with all local, state and national regulations. After inspecting a facility, the U.S. Coast Guard issues Certificates of Adequacy (COA) for reception facilities. A port or terminal may not receive ships on international voyages without first being issued a COA and the U.S. Coast Guard investigates all allegations of inadequacies at PRFs.

6.2.1.1 Adequacy on a regional scale

210. When ships can deliver their wastes and residues only in a few ports in a region, this will either mean that these ports carry the burden for the whole region (i.e. receiving ship-generated wastes and residues that should have been delivered to a port reception facility in other ports) or (even more likely) that ships are more inclined to discharge their wastes and residues illegally. If the area is designated as a Special Area, a lack of adequate port reception facilities has even greater implications.

211. It is fair to acknowledge that some of the requirements on providing adequate reception facilities can raise concerns, in particular for Small Island Developing States (SIDS). In that respect, reference can be made to regulation 8.3 of MARPOL Annex V, which provides that Small Island Developing States may satisfy the requirements of reception facilities through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements.

212. For the implementation of regional arrangements the IMO has developed guidelines³⁹ to provide guidance for the development of a Regional Reception Facilities Plan (RRFP), to assist States in specific geographic regions of the world in the appropriate and effective implementation requirements of the MARPOL Convention

6.2.1.2 Special Areas

213. The IMO has identified and designated several seas as so-called "Special Areas". When a particular sea area is designated as a Special Area for one or more Annexes of the MARPOL Convention, the discharge requirements for ships in that area are more stringent than outside Special Areas.

214. This also means that States bordering a Special Area have a special responsibility to ensure the provision of adequate reception facilities in all ports that receive ship-generated wastes and residues. The Special Area status cannot come into effect until there are adequate port reception facilities in States bordering that area.

215. A table providing an overview of the Special Areas under the MARPOL Convention is given in Annex 5 to this guidance manual, but can also be found at: <http://www.imo.org> (click on Marine Environment, then Special Areas).

6.2.2 Types of port reception facilities

216. It is obvious that ports and terminals should be aware of the needs of the ships calling their port or terminal, and arrange the provision of the necessary reception facilities before implementation of each Annex of the MARPOL Convention. Although it is recognized that in general ports should identify their needs on a more individual basis, most ports in all cases will need reception facilities for garbage (MARPOL Annex V). Other ports (bunkering ports, major traffic ports, oil terminals and refineries that load oil in bulk) will also need reception facilities for oily residues. Depending on the port's characteristics, some ports will also need port reception facilities for specific types of ship-generated wastes (e.g. fishing nets) and residues (e.g. wash waters containing Noxious Liquid Substances).

217. Of key importance is the selection of the type of reception facility to operate in the port. Especially in case of fixed facilities, the choice of location for these facilities will be crucial. In that case a site selection assessment should be included.

218. While the disposal facilities for the ship-generated wastes and residues will always be located on shore, the equipment for their collection can either be mobile or shore-based at a strategic point. Options are to choose between different types of mobile and fixed port reception facilities, although in large ports both can be applied.

219. According to the IMO "Guidelines for ensuring the adequacy of port reception facilities" (resolution MEPC.83(44)) waste reception facilities should be available in all ports where there is a need for ships to deliver

³⁹ 2012 Guidelines for the development of a regional reception facilities plan (resolution MEPC.221(63)).

wastes ashore. They should be easily accessible and be equipped to deal with the various waste streams and quantities that users deliver. Reception facilities must be able to deal with the range of wastes that is likely to arise from ships using the port. Where appropriate the facilities should be capable of handling wastes resorting under the MARPOL Annexes I, II, IV, V and/or VI, although it is also possible to provide port reception facilities for specific types of wastes only (e.g. liquid hazardous wastes such as wash waters containing certain chemicals).

220. It is necessary for ports to provide adequate reception facilities to cater for each type of waste delivered by ships using the port, being both cargo residues and wastes generated through the normal operation of the ship. Following a consultation process (as also described in section 6.3 of this guidance manual) the port will be in a better position to tailor the facilities it will need to provide in order to meet individual circumstances according to the port's normal traffic.

221. For various waste streams, where appropriate, port authorities may prefer ship operators or their agents to make their own arrangements with waste contractors. However, the port authority must retain responsibility for ensuring that the reception facilities provided are sufficient for the amounts and types of ship-generated wastes and residues received. The port authority can do this by exercising general oversight as part of its waste management plan.

222. As already mentioned, some States impose specific requirements regarding quarantine waste (such as food and catering waste) from international modes of transport. Therefore this type of ship-generated waste may require separate receptacles, which should be clearly marked and sufficiently secured to prevent birds and animals from entering. The location of facilities for quarantine waste should not present an increased health risk to the people living in the vicinity of the site, nor during its transportation, treatment and final disposal. In addition ports should ensure that specific national requirements relating to quarantine wastes are properly notified and communicated to the ship owners and operators, and their agents.

223. It can be noted that also the ISO International Standard 16304 relating to the "Arrangement and management of port reception facilities"⁴⁰ provides guidance regarding the selection of types of port reception facilities.

6.2.2.1 Mobile port reception facilities

A. *Floating reception facilities:*

224. When choosing for floating reception facilities for ship-generated wastes and residues, usually barges (either being towed or self-propelled) provide the best option. As barges used for collecting liquid ship-generated wastes and residues in most cases have only limited draught requirements, they will present little difficulties in terms of adequate water depths.



225. However, sufficient calm weather berthing space and suitable docking facilities must be made available for the delivery of the ship-generated wastes and residues that have been collected. Port reception facility barges can often use berthing facilities, which were built for other purposes. In ports where berths have become obsolete due to increased ship size, the old berths may be converted into docking port reception facilities for barges.

⁴⁰ The ISO Standard 16304 is available on the ISO website (www.iso.org).

Example of a barge collecting solid wastes only
(Photo credits: Vlamo, port of Antwerp, Belgium)



226. In any case no sub-standard tankers should be used to serve as port reception facilities. Also care should be taken that adequate spill remediation equipment is available on board, and that the crew is sufficient and well trained.

227. Using barges for the collection of solid ship-generated wastes can in some cases also be combined with a simultaneous collection of liquid residues.

Example of a barge combining the collection of wastes
(Photo credits: Martens Cleaning, Vlissingen NL)



228. A disadvantage of a combined collection, however, could be that on board of a tanker barge there might not be sufficient free space to provide for a segregated collection of the solid ship-generated wastes and residues (e.g. by using several skips on deck) in the case the ship wants to land segregated waste streams.

229. When using floating reception facilities, the ship-generated waste is off-loaded directly from the delivering ships to a barge craft. Care should be taken that nets or other means of coverage are used to prevent garbage from ending up into the water.

Example of delivering garbage to a collecting barge in the port of Rotterdam
(Photo credits: Bek & Verburg, Rotterdam NL)



230. When the ship-generated wastes and residues are being collected by a barge or other floating collection device (e.g. a towed pontoon), the waste at some point needs to be off-loaded to shore to be hauled to a disposal facility. Some provisions must be made for off-loading the waste barge either in the port at which the wastes and residues are being collected, at the disposal site (if it is accessible to the barge), or at another port if the wastes and residues are being transported by water to another port.

Example of a collection barge delivering oily waste to a fixed port reception facility for further processing
(Photo credits: MAC2 Antwerp, Belgium)



B. Vehicles and trucks

231. When land vehicles are used for the reception of ship-generated wastes and residues, a high flexibility can be achieved not only regarding the place of collection of the wastes, but sometimes it can also be combined with a shorter service waiting time as compared to barges.

Example of a truck collecting oily waste
(Photo credits: Kayak Maritime Services Antwerp, Belgium)



232. However, while vehicles share to a large extent the same advantages as floating port reception facilities, there are certain aspects that need to be observed and taken into account, as the loading capacity of vehicles is usually smaller than the capacity of barges, and terrain and road surfacing in the port might not always be suitable for a safe and swift transport.

Example of a truck collecting liquid waste from a cruise ship
(Photo credits: Peter Van den dries)



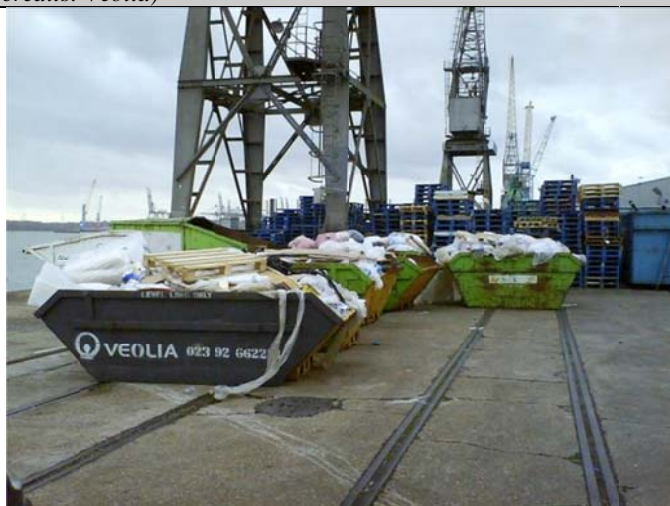
233. Trucks or other vehicles used to collect solid ship-generated wastes (such as garbage) by off-loading directly from ships require easy access to get close to the ships, which requires a good road system within the port area and terminals. Good logistics will be required to coordinate the waste collection. As with collection vessels, care should be taken from garbage blowing into the water during off-loading. In the case of segregated waste streams, it might also be necessary to order more than one vehicle to collect the different waste streams in order to prevent the residues getting mixed (e.g. hazardous with non-hazardous solid waste).

Example of a truck collecting garbage
(Photo credits: Urgence Marine Inc, Canada)



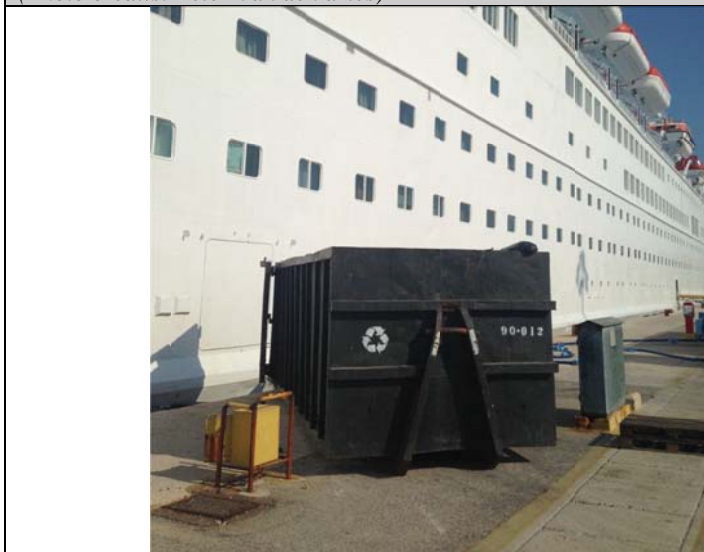
234. It can be noted that also receptacles such as skips and containers can easily be transported to a berthing area where ships intend to deliver solid wastes (e.g. garbage).

Example of receptacles for garbage from ships
(Photo credits: Veolia)



235. An advantage is that in those cases a truck can transport the receptacle to the berthing place in the port, leave it there for the period of time the ship needs for delivering the waste, and return afterwards for collection when the receptacles are filled with the garbage. However, in that case a good communication between the ship and the port reception facility is particularly necessary in order to prevent that the receptacles being used have sufficient collection capacity and are adequate (e.g. in case of delivery of food waste) for the ship's use.

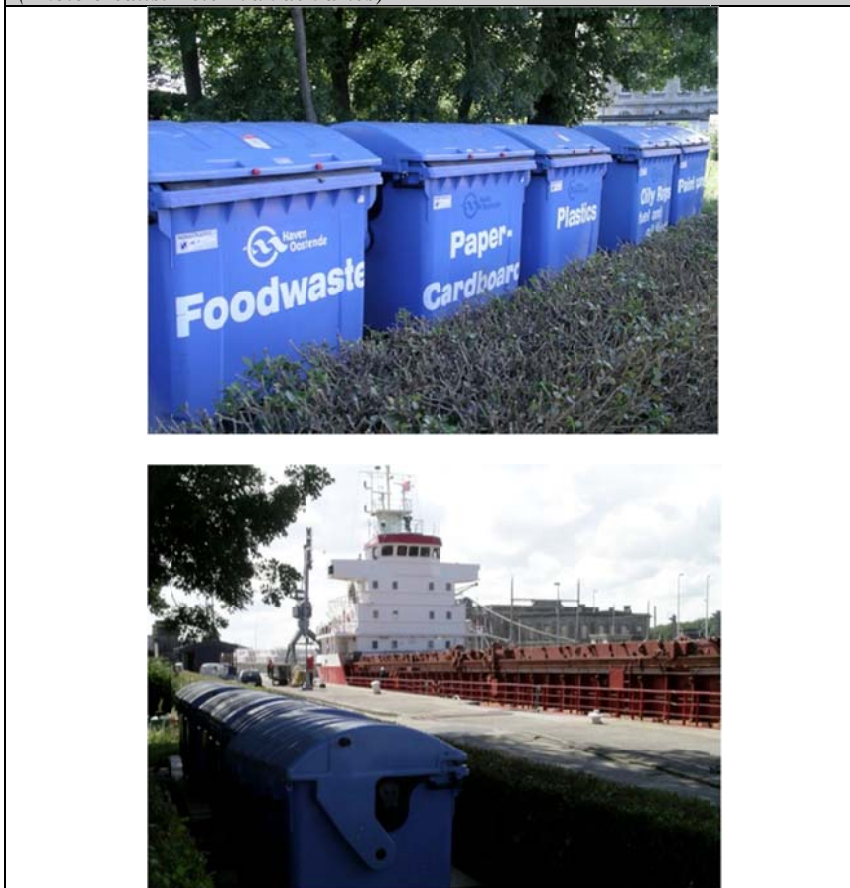
Example of a container for collecting garbage from a cruise ship
(Photo credits: Peter Van den dries)



6.2.2.2 Fixed port reception facilities

236. A valid alternative for mobile collection is to have one or more centrally located shore-based waste collection points (such as containers or skips) in a port. For smaller ports this solution might be suitable, especially when the reception facility is located on a strategic place (e.g. at a lock providing the main access to the port).

Example of containers for solid waste, strategically located at a lock in the port of Ostend (Belgium)
 (Photo credits: Peter Van den dries)



237. Especially in smaller port such as fishing and recreational ports, limited types of fixed reception facilities can be applied, taking into account that:

- (a) Only limited amounts of ship-generated wastes and residues will be delivered in those ports; and
- (b) Although they can be specific (e.g. Fishing nets, synthetic fishing lines, etc.), also limited types of ship-generated wastes (mainly household wastes and garbage) will be delivered.

Example of receptacles for collecting garbage from fishing vessels in the port of Tromsø (Norway)
 (Photo credits: Peter Van den dries)



238. Also in recreational ports it is not always necessary to provide large and differentiated reception facilities. As in these ports the main type of ship-generated waste delivered will be garbage and household waste, general

receptacles designed for the collection of the most common fractions of household waste will be sufficient. However, depending on the size of the port (e.g. facilitating large motor yachts) and the number and type of the ships calling, it might be useful to equip the facility with a pumping station for the collection of bilge water (oily water mixture, mainly consisting of water) and/or waste from chemical toilets.

Example of a reception facility for garbage in the recreational port of Nieuwpoort (Belgium)
(Photo credits: Peter Van den dries)



Example of a combined reception facility for bilge water and garbage in a recreational port
(Photo credits: Peter Van den dries)





239. For larger ports the main disadvantage of a fixed reception facility is that in order to deliver wastes and residues, a ship has to shift berth if reception of the ship-generated wastes and residues is located at a fixed place. Shifting berths is a very time-consuming and expensive operation, which may lead to undue delay. If port reception facilities are located in a less suitable place, delays, congestion and an increased risk of accidents and collisions will result.

Example of a large fixed port reception facility in the port of Antwerp
(Photo credits: MAC2 Antwerp, Belgium)

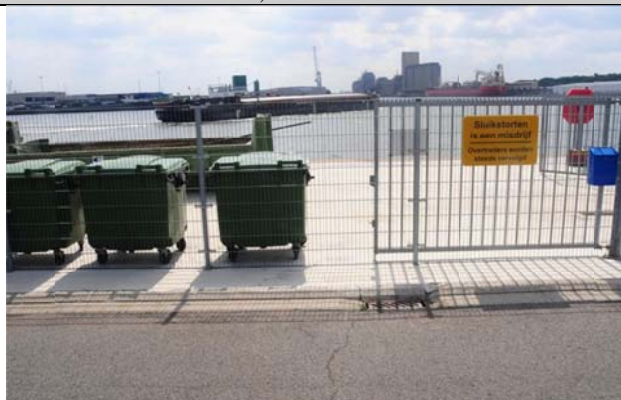


240. Appropriate sites for fixed garbage receptacles include wharves adjacent to moorages, access points to docks, fuel stations and boat launching ramps.

241. For reception of oily residues and other liquid ship-generated wastes and residues, the construction of pipelines to each berth might be a feasible option, especially if the reception is combined with a tank cleaning facility, e.g. at an oil terminal.

242. If receptacles are placed at a designated site for the collection of ship-generated wastes and residues, they can be placed in a compound or environmental shelter, which is used to physically and visually shield the containers, to discourage use by non-port users, and to prevent the ship-generated wastes and residues from blowing away.

Example of receptacles for collecting ship-generated wastes at a designated and covered area in the port of Antwerp
(Photo credits: Peter Van den dries)



243. Depending on the size of the port, stationary receptacles can be placed either in one central location or at multiple sites within the port area. The space required depends in part on the number and type of receptacles to be placed together and on the types and volumes of ship-generated wastes and residues to be collected at a single site. For example, some States have strict requirements regarding the collection and disposal of international catering waste, often referred to as quarantine waste. In these States, waste contractors have to provide separate bins in order to collect the ship-generated wastes and residues concerned. Also the disposal methods are often the subject of specific requirements, and will be further discussed in Chapter 9 of this guidance manual.

6.3 Processes and coordination mechanisms

244. In order to ensure the environmentally sound management of ship-generated wastes and residues, the assigned competent national authority should ensure that all issues related to the delivery of ship-generated wastes and residues to port reception facilities and their further processing and disposal are made operable, meet the applicable requirements, and should be as simple and expeditious as possible in order to avoid undue delay of the ship. Therefore *outlining all processes* related to the delivery of ship-generated wastes, and *coordination of information and processes between all stakeholders* but especially between the port and the ship, is of crucial importance.

245. Developing and implementing a comprehensive waste management plan can achieve this coordination of information and processes. As the port waste management plan provides a comprehensive overview of all requirements and processes, it can also be used as a guidance document for the delivery and disposal of ship-generated wastes and residues

246. An important element of the coordination between ship and shore is the advance waste notification, as this gives the port reception facilities a good insight in the amounts and types of ship-generated wastes and residues that will be delivered. As this advance notification facilitates a proper planning by the port reception facility taking into account the ships needs, it will avoid undue delay for the ship.

247. Also a consistent communication of all processes with all relevant port users is a key element. Thereto modern communication and media tools can be applied such as internet, mailing lists etc., but also flyers, workshops and stakeholder meetings.

6.3.1 Port waste management plans

248. Although the development of port waste management plans falls outside the scope of the MARPOL Convention, it is generally acknowledged that an up-to-date port waste management plan⁴¹ (PWMP), when established in consultation with all relevant parties, will not only improve the adequacy of port reception facilities but also provide a detailed coordinated compendium of all processes related to the delivery of ship-generated wastes and residues.

249. Such a PWMP should preferably be a public and legally binding document, that not only can be used as a compilation of all applicable relevant requirements related to the management of ship-generated wastes and residues, but also as a guidance manual for port users and other stakeholders. The PWMP preferably should also take into account requirements and goals of the national waste management strategy, translating the goals regarding the environmental sound management of waste into practical processes and procedures, and the port waste strategy.

250. Preferably, the PWMP should be developed by the port authority, in close consultation with all port users such as ship owners, ship agents, waste collectors, possible port-based disposal facilities, and relevant competent authorities such as port State control, environmental agencies and maritime authorities. However, in some cases it might be useful that also independently managed areas in the ports, such as fishing ports, oil terminals and chemical plants, draft their own plans and are responsible for managing their services on reception of wastes and residues from ships as part of their operations.

251. When drafting a PWMP, and specifically when assessing the adequacy of existing port reception facilities and analysing the need for additional reception capacity, it is important that this assessment is done based on reliable and detailed information on types and quantities of ship-generated wastes and residues. The plan should also take into account the characteristics of the port, and of its users.

252. The PWMP should include all relevant information on, but not limited to, the following key elements:

- (a) An overview of the relevant applicable legislation on waste management, including the responsibilities under national waste laws of the relevant parties involved in the port;
- (b) A list of existing port reception facilities, including location, type (fixed/mobile), capacity and the wastes they collect;
- (c) An assessment of the need for additional port reception facilities, taking into account possible changes in traffic in the upcoming years;
- (d) An overview of type and quantities of ship-generated waste received and handled;
- (e) A description of the procedures for the reception and collection of ship-generated waste;
- (f) A description of the charging system (when applicable);

⁴¹ Detailed guidance for waste management planning is included in the IMO manual "PRF: how to do it" and in the ISO Standard ISO 16304 on "Arrangement and management of port waste reception facilities".

- (g) Procedures for how to report and take action on alleged inadequacies of reception facilities;
- (h) Procedures on notification and reporting of ship-generated waste;
- (i) Procedures for consultations with local stakeholders;
- (j) Enforcement measures.

253. Ports within a region may also choose to develop a common PWMP and to apply a similar waste collection and cost recovery system. If the reception facilities also serve more than one port, care should be taken that these mobile port reception facilities may be able to serve the ships without undue delay in all ports involved. For that reason these ports should be located within the borders of a State Party to the Basel Convention, as otherwise the Prior Informed Consent (PIC) procedure under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal would apply and, especially when transporting dangerous waste, cause delay. Indeed, pursuant to Article 6 paragraph 1 of the Basel Convention and the decision of the Conference of the Parties VIII/18 on “harmonization of forms for notification and movement documents and related instructions”, the Basel Convention sets out a detailed PIC procedure with strict requirements for transboundary movements of hazardous wastes and other wastes. Such procedure is at the heart of the Basel Convention control system and is based on four key stages: 1) notification, 2) consent and issuance of movement documentation, 3) transboundary movement and 4) confirmation and disposal.

254. Some of the key elements of a port waste management plan are described more in detail in the following sections.

Case Study: European Union

European approach towards port waste management plans

It can be noted that the European Directive 2000/59/EC on port reception facilities for ship-generated wastes and cargo residues contains specific requirements for port waste reception and handling plans. The Directive also provides in its Annex I the detailed requirements for the development and content of these port waste reception and handling plans, which include an assessment of the need for port reception facilities, a detailed description of the charging system and the procedures of the reception of the wastes, an overview of available reception facilities, the types and quantities of wastes received and handled, etc.

The procedures for reception, collection, transport and disposal should conform in all respects to an environmental management scheme suitable for the progressive reduction of the environmental impact of these activities (which is presumed if the procedures are in compliance with the EU Council Regulation No 1836/93 allowing voluntary participation by companies in the industrial sector in an EU eco-management and audit scheme⁴²).

According to the EU Directive 2000/59/EC these waste reception and handling plans can, when required for reasons of efficiency, be developed in a regional context with the appropriate involvement of each port, provided that the need for, and availability of, reception facilities are specified for each individual port.

EU Member States must evaluate and approve the waste reception and handling plan, monitor its implementation and ensure its re-approval at least every three years and after significant changes in the operation of the port.

6.3.2 Advance notification schemes

255. In some ports, either for logistical or policy reasons, the local authorities and/or providers of port reception facilities may require an advance notification from the ship of its intention to use the reception facilities. Further information on this requirement is provided in section 4 of the “*Guidelines for ensuring the adequacy of port waste reception facilities*” (resolution MEPC.83(44)).

256. To be able to maintain and improve the adequacy of its reception facilities, the port authority (or other competent administration) should ensure that an effective advance notification and monitoring arrangement⁴³ is in place. The notification requirement should be communicated clearly to ships and their representing agent in the port, in order to ensure a timely and complete exchange of the information related to the delivery of ship-generated wastes and residues.

⁴² EU Official Journal L 168, 10.7.1993, p. 1.

⁴³ More information regarding the monitoring of advance notification data can be found in Chapter 7 of this guidance manual.

257. In addition the use of an advance waste notification procedure can ensure that ports receive a regular supply of documented material that they can use to monitor the provision and adequacy of their reception facilities. In addition such a scheme will assist them in reviewing and planning the processes that are needed in order to ensure the environmental sound management of the delivered ship-generated wastes and residues.

258. For the arrangements to be effective, the ships' masters should provide the information regarding the intended waste delivery at least 24 hours prior to arrival or, upon departure of the previous port if the voyage is less than 24 hours or, for passages of shorter duration, as soon as possible.

259. Shipmasters are recommended to use the standardized Advance Notification Form as developed by the IMO in the appendix 2 of the "Consolidated guidance for port reception facility providers and users" (MEPC.1/Circ.834). Port authorities, agents and facility operators are urged to accept the standardized format, although some operators may require an alternate form.

260. It should be noted that also the EU *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* provides in its Annex II an advance notification format. Recently (2015) this notification format has been revised, aligning it as far as possible with the revised MARPOL Annex V and IMO Circular MEPC.1/Circ.834, and strengthening implementation and enforcement of the Directive by requiring the provision on the format of accurate information on the types and quantities of wastes actually delivered.

261. The advance waste notification can be sent to the port authority or directly to the port reception facility. If a ship visits a port on a regular basis, a standing arrangement with the port reception facility may prove to be most efficient.

6.3.3 Reporting of alleged inadequacies of port reception facilities

262. In cases when ships want to deliver their ship-generated waste and/or cargo residues in port but they can't because of absence or possible non-adequacy of the available reception facility, the ship's master can use the format for reporting alleged inadequacies of PRF that is provided by Appendix 1 of the IMO Circular MEPC.1/Circ.834.

263. Flag States are requested to distribute this format to ships and urge masters to use this format to report alleged inadequacies of port reception facilities to the maritime administration of the flag State and, if possible, to the authorities of the port State. It is the obligation of the flag State to notify IMO and to inform the Parties concerned of any case where facilities are alleged to be inadequate. Port States should ensure the provision of proper arrangements to consider and respond appropriately and effectively to reports of alleged inadequacies, informing IMO and the reporting flag State of the outcome of their investigation.

264. Also the PRF database in GISIS contains information regarding reported alleged inadequacies.

6.3.4 Fee systems for ship-generated wastes

265. A basic objective of a strategy for ship-generated wastes and residues embracing the principles of environmentally sound management is to reduce the discharges of ship-generated wastes and residues into the sea by maximizing their collection in ports. A way to achieve a maximal delivery of wastes and residues from ship to shore, and thereby enhancing the protection of the marine environment, could be through the application of the "polluter pays⁴⁴" principle.

266. In addition to ensuring the availability of adequate port reception facilities that have to meet the needs of the ships normally using the port and without causing undue delays for ships, applying the "polluter pays" principle to ship-generated waste could be by installing a specific cost recovery system using a fee from the ships calling the port, irrespective whether they make use of the reception facilities or not. This can promote the use of these port reception facilities.

267. Under the "polluter pays" principle, which is already generally applied for covering the costs for the management of land-based wastes and residues worldwide, the costs for the collection, transport and disposal of ship-generated wastes and residues is to be covered by ships. In the interest of protecting the marine environment, cost recovery systems should encourage ships to deliver their waste to ports instead of discharging them into the sea. This can be facilitated by requiring ships to contribute significantly to the costs for the reception and management of ship-generated waste, irrespective of their use of the facilities.

268. It should be noted that, while the MARPOL Convention does not contain any requirement related to such cost recovery systems, the EU Directive 2000/59/EC requires the provision of a cost recovery system through its Article 8. The specific requirements of that Article 8 are further described in Annex 6 to this guidance manual.

269. As Directive 2000/59/EC applies to ports within the EU only, today all EU ports have cost recovery systems for ship-generated wastes in place. However, also several ports outside the EU have established such fee systems. As

⁴⁴ The "polluter pays" principle is enacted to make the party responsible for producing pollution responsible for paying for the damage done to the natural environment.

the Directive 2000/59/EC only provides a regulatory framework, it leaves room for interpretation by the individual Member States of some of the key elements of the Directive, including some of the elements of the requirements related to the cost recovery. Therefore there are currently a large variety of fee systems in place.

270. The European Maritime Safety Agency⁴⁵ (EMSA) has conducted a Horizontal Assessment, based on the individual Member States inspection visits, in which it provided information on the level of implementation of the Directive 2000/59/EC by the Member States, but also identified practices or actions that can help Member States implement the legislation. According to this Horizontal Assessment the cost recovery systems in place in the EU ports could be classified in two main categories:

(a) One approach is based on the so called no special fee (NSF) concept, where the ship is (always) charged a fee irrespective of the use of the port reception facility and is allowed to deliver at least a reasonable amount of ship-generated wastes within that fee;

(b) The other approach is based on an administrative fee (ADM) supplemented with direct waste charges based on the types and the amounts actually delivered.

271. When the EU Directive on port reception facilities was introduced in 2000, and with it its requirements regarding fee systems for ships, some criticism was voiced regarding its impact on inter-port competition. However, whether a cost recovery system interferes with inter-port competition or not depends on several factors. Inter-port competition linked to the delivery of ship-generated wastes might be established when cost recovery systems in competing ports contribute to significant differences in port dues, waste fees or other charges or to complex administrative matters for the ship owner.

272. In practice, however, it is unlikely that a ship will avoid a particular port because of higher port dues when it has to (un)load its cargo there. Besides that, it seems unlikely that waste fees significantly affect inter-port competition, as compared to the total cost for a ship calling a port the waste fee is only a minor amount. However, inter-port competition is still possible in other ways: ports could compete in terms of services rendered or in terms of the environmental provisions like a port reception facility with a good, fast service.

273. Application of the polluter pays principle to ship-generated wastes and residues might however require the implementation of a monitoring and control system to track the delivery and collection, handling (incl. transport) and downstream treatment of the wastes, and thus ensure compliance with the requirements to ensure their environmentally sound treatment.

274. Several studies have looked at waste delivery trends and the possible impact of fee systems on the delivery of ship-generated waste to port reception facilities:

(a) The 2012 EMSA Horizontal Assessment identified a trend that indicated a general increase of delivered ship-generated waste between 2005 and 2008. Whether this increase can be fully or partially attributed to the installment of fee systems in EU ports is difficult to say;

(b) In 2012 the EMSA-commissioned “study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports⁴⁶” concluded that for MARPOL Annex I and V wastes delivery trends show an increase up to 2008/2009 and then a decrease and stabilization in 2010 (the increase from 2004 to 2008/9 was explained by the implementation of the PRF Directive, while the decrease after 2008/9 was explained by reduced port calls following the economic crises). In addition the study concluded that it is difficult to say whether one fee system is better than the other, and the waste delivery data cannot document that one system should be more effective than another;

(c) In 2015 the “Ex-post evaluation of Directive 2000/59/EC on PRF⁴⁷” identified a lack of comparable data on actual waste deliveries in ports in the EU. For this reason, the study estimated waste volumes delivered to EU ports in the period 2004 to 2013, based on the answers received on a targeted stakeholder consultation. Based on data collected in this evaluation, deliveries of ship-generated waste on average increased or remained the same in the early years of the implementation of the PRF Directive. For MARPOL Annex I wastes considerable variations were observed, while the delivery of MARPOL Annex V (garbage) has increased.

6.3.5 Incentivizing the delivery of segregated wastes

275. Procedures for collecting garbage generated on board⁴⁸ should be based on the consideration of:

⁴⁵ EMSA is the EU Agency that provides technical assistance and support to the European Commission and EU Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security (www.emsa.europa.eu).

⁴⁶ EMSA/OP/06/2011, study developed by Ramboll.

⁴⁷ Developed by Panteia/PwC for the European Commission (DG MOVE), within the framework of the EC’s Regulatory Fitness and Performance programme (REFIT) for the revision of the Directive 2000/59/EC.

⁴⁸ According to the IMO “Guidelines for the implementation of MARPOL Annex V”, resolution MEPC.219(63).

- (a) What is permitted and what is not permitted to be discharged into the sea while en route; and
- (b) Whether a particular garbage type can be discharged to port reception facilities for recycling or reuse.

276. Still, in order to reduce or avoid the need for extra sorting after the garbage has been collected and to facilitate reuse and recycling, it is preferable that the waste is directly being segregated on board according to the recommendations of the IMO “Guidelines for the implementation of MARPOL Annex V”, which recommends that garbage be segregated according to the following waste types:

- (a) Non-recyclable plastics and plastics mixed with non-plastic garbage;
- (b) Rags;
- (c) Recyclable material:
 - (i) Cooking oil;
 - (ii) Glass;
 - (iii) Aluminium cans;
 - (iv) Paper, cardboard, corrugated board;
 - (v) Wood;
 - (vi) Metal;
 - (vii) Plastics;
- (d) Garbage that might present a hazard to the ship or crew;
- (e) E-waste generated on board (e.g. Electronic cards, gadgets, instruments equipment, computers, printer cartridges, etc.).

277. As this is a recommendation ships can still decide to deliver mixtures of wastes and residues.

278. However, taking into account the principles of environmentally sound waste management, some ports have decided to incentivize the delivery of certain types of segregated ship-generated wastes. A certain practice that already has been applied in several ports is to grant ships that deliver segregated wastes and residues a reduction on the port dues and/or waste fee.

Case Study: the Netherlands

Example: “The Green Deal on ship-generated waste”:

The Green Deal is a voluntary agreement between parties from different areas of the Dutch society and Government with the purpose to work together on green growth, with the Government assisting sustainable joint initiatives by eliminating barriers and connecting stakeholders.

A Green Deal covering port reception facilities was signed in September 2014 between several partners including port authorities, NGOs, shipping industries, etc. The ambition of this deal is to close the loop on ship-generated waste through waste prevention and optimization of delivery to port reception facilities.

The objectives of the Green Deal programme are, by 2017:

- (a) 50% of the ships would deliver their plastic waste separately; and,
- (b) 100% of the collected clean plastic is recycled or processed into fuel.

One of the main elements of this agreement is plastic waste separation: through the provision of adequate port reception facilities designed to collect segregated waste streams, and financial incentives for pyrolysis facilities.

279. Sometimes the shipping industry indicates that even when ship-generated garbage is being segregated on board according to the recommendations of the IMO guidelines, port reception facilities still collect all wastes in one receptacle and thus mixing everything again. An option therefore could be to address this issue in national or local waste or port regulations.

Case Study: the Flemish Region in Belgium

Mandatory collection of segregated ship-generated garbage:

According to the Flemish waste regulatory framework “VLAREMA” (which is the implementing decision running in parallel with the material decree, and contains detailed prescriptions on wastes, raw materials, selective collection and transport, registrations, extended producer responsibility, etc.) ship-generated wastes and residues that are delivered to a port reception facility, are in principle to be accepted that way by the port reception facility and be kept segregated for further processing, in order to maximize their potential for recycling.

6.3.6 Stakeholder consultation

280. An essential element in order to develop a proper PWMP is the consultation of stakeholders. When determining the appropriate level of service for the management of ship-generated wastes and residues, it is important to thoroughly consult all port users to assess their needs with respect to the provision of port reception facilities. Extensive consultation will also identify ways to improve practices.

281. The methodology for consultation can of course differ and may depend on the size and type of the port, the way local stakeholders are organized through associations, and take into account the port's institutional framework (private or public port). Consultation can be done in the form of informative meetings, using workshops, or through an official consultation procedure where the draft plan is made public and every interested party can submit their comments within a certain timeframe.

282. To guard that the stakeholders' consultation process is ensured and transparent, it can be useful that the procedures for public consultation of PWMP are implemented in national and/or local environmental and port regulations.

6.4 Communication of information

283. As individual ports may need to comply with varying local requirements for specialized handling (such as quarantine) of certain types of MARPOL wastes and residues such as animal, plant and food wastes generated on board the ship, ship operators should – prior to arrival – check frequently with local agents, port authorities, harbour masters or reception facility providers for port-specific requirements in order to plan for and accommodate any special handling requirements for that particular port. This may include any additional segregation that may need to take place on board well in advance of arrival.

284. It is obvious that such information should be taken into consideration during the planning of the ship's voyage, and therefore it should be well available beforehand.

285. The port waste management plan already provides a comprehensive overview of all regulations, processes and local requirements related to the collection and processing of ship-generated wastes and residues. Also the GISIS Port Reception Facilities Database (PRFD) provides detailed information on available reception facilities.

286. Still, the port waste management plan and/or the GISIS PRFD only might not always be an appropriate means of communication. Therefore a port or local authority might also consider communicating more directly with the port users and stakeholders. Modern communication and media tools can be applied such as internet (e.g. providing a specific page on PRF on the port's website), mailing lists etc., but also flyers, workshops and stakeholder meetings.

287. It should be noted that the Annex I to the EU *Directive 2000/59/EC on port reception facilities for ship-generated wastes and cargo residues* explicitly provides an overview of information that should be made available to all port users, being:

- (a) Brief reference to fundamental importance of proper delivery of ship-generated waste and cargo residues;
- (b) Location of port reception facilities applicable to each berth with diagram/map;
- (c) List of ship-generated waste and cargo residues normally dealt with;
- (d) List of contact points, the operators and the services offered;
- (e) Description of procedures for delivery;
- (f) Description of charging system;
- (g) Procedures for reporting alleged inadequacies of port reception facilities.

7. Information management and monitoring, enforcement and control

7.1 Introduction

288. Even though the provision of adequate port reception facilities, developing waste management plans and installing coordinated procedures for delivery and incentivizing fee systems are important prerequisites in order to facilitate environmentally sound management of ship-generated wastes and residues, enforcement and control mechanisms are even so indispensable.

289. Modern information and data management in combination with proper monitoring can help to facilitate efficient enforcement. As with many regulations and laws, direct enforcement by government officials is considered one of the key elements of success in ensuring compliance. However, it is not always easy to accomplish, particularly when some of the stakeholders operate at sea. Therefore this chapter provides an overview of elements that can be useful when developing information monitoring and enforcement tools.

7.2 Information management and monitoring

7.2.1 Overview of available information

290. Adequate monitoring and tracking of ship-generated wastes and residues means that the location of these wastes and residues is known at all times ("from-cradle-to-grave" approach) and that it is ensured that they arrive at an appropriate facility for the environmentally sound waste storage, treatment and/or disposal.

291. A substantial set of documents, data and information regarding ship-generated wastes and residues is available during the process from generation to delivery, such as:

- (a) Waste notification by ships;
- (b) Recording waste levels delivered in port;
- (c) Information in Oil Record Book, Garbage Record Book and Cargo Record Book;
- (d) Waste transfer notes;
- (e) Waste delivery receipts;
- (f) Specific licenses granted to the involved stakeholders.

292. The Advance Notification Form⁴⁹ with the types and quantities of ship-generated wastes and residues on board and the type and quantity intended to be delivered, will greatly assist the reception facility operator in receiving the materials while minimizing any delay to the vessel's normal port operation.

293. As described in section 4.2.2 of this guidance manual, according to the requirements of the MARPOL Convention already some essential information regarding ship-generated wastes and residues is to be documented (Garbage Management Plan) and recorded (Oil Record Book, Garbage Record Book, Cargo record Book, Ozone-depleting Substances Record Book) on board of the ship. In addition, according to the IMO "Consolidated guidelines for port reception facility providers and users" (MEPC.1/Circ.834), the ships' crews need to understand the correct use of, and entries to, the Oil Record Book, Cargo Record Book and the Garbage Record Book.

294. Following delivery of ship-generated wastes and residues to the port reception facility, the master of the ship should request a Waste Delivery Receipt (WDR) to document the type and quantity of MARPOL residues/wastes actually received by the facility. The IMO has already standardized the format⁵⁰ of this document to facilitate its use and application and in order to provide uniformity of records throughout the world.

295. Also on shore the reception, transportation operators and disposal facilities are in most cases (depending on the national and/or local regulatory framework) required to record data and information on the types and amounts of ship-generated wastes and residues collected and disposed of.

7.2.2 Data and information management systems

296. Combining differing types of data and information from different sources is not always a straightforward task, and requires the use of modern IT information and data warehousing technology. As the usage of web-based applications nowadays is not extremely expensive, an internet based data and information management system can already provide a lot of advantages when implementing monitoring tools in order to establish or move towards an environmentally sound management of ship-generated wastes and residues. In addition, most ports already have an individual port communication system based on internet communication, to which additional tools for the monitoring of ship-generated wastes and residues can be added relatively easily.

⁴⁹ Appendix 2 of the IMO Consolidated guidance for port reception facility providers and users.

⁵⁰ In the appendix 3 of the "Consolidated guidelines for port reception facility providers and users" (MEPC.1/Circ.834).

297. Installing a proper port information and data management system for ship-generated wastes and residues will not only provide a comprehensive overview and deliver reliable statistics during the different steps in the process of ship-generated waste collection, transport and disposal that can easily be monitored and audited, but it will also facilitate efficient and effective enforcement.

298. Therefore it is recommended that port authorities develop an IT-supported data management system including procedures that can handle the following issues:

- (a) Waste notification by ships;
- (b) Recording waste levels delivered in port;
- (c) Information in Oil Record Book, Garbage Record Book and Cargo Record Book;
- (d) Waste transfer notes;
- (e) Waste delivery receipts;
- (f) Evaluation and calculation of annual waste levels by ship type and waste stream;
- (g) The provision of statistical data, if necessary;
- (h) Consultation with port users;
- (i) Invoicing and fees management.

299. A proper monitoring and information system for ship-generated wastes and residues can be developed on the port level and be operated and managed by the port authority, or on a national level, combining the data that is being provided by the individual ports. It is also preferable that all stakeholders involved, both private (such as private port reception facilities and ship agents) and public (such as enforcing authorities) have direct access to the system in order to facilitate a swift transfer of reliable data (real time information), to reduce bureaucracy (no paperwork) and to increase transparency. Of course not every stakeholder should be granted access to the whole system, but only to the fields that are relevant for that particular stakeholder.

Case Study: the Flemish region in Belgium

Port of Antwerp's information and monitoring system for ship-generated wastes (WASTECOL):

The Antwerp Port Authority (APA) developed already in 2007 a web-based information and monitoring system (WASTECOL) for ship-generated waste and residues. This system is used by different stakeholders:

- (a) By the port reception facilities to register the actual amounts of waste collected from an individual ship;
- (b) By port state control to target vessels for inspection;
- (c) By the port authority to:
 - (i) Calculate the waste fees;
 - (ii) Monitor waste flows in the port;
 - (iii) Register all authorized port reception facilities active in the port area;
 - (iv) To store relevant data (e.g. Advance waste notifications, volumes of waste actually delivered by the individual ship, etc.).

Every user is granted a login and password for a particular section of the system.

The WASTECOL system automatically verifies:

- (a) Whether the advance waste notification has been done timely and according to the requirements (information);
- (b) Whether the waste has been properly collected by the port reception facility;
- (c) Whether there is a significant difference between the intended waste delivery (notification by the ship) and the actual delivery (collection by the port reception facility);
- (d) Whether delivered amounts of waste correspond with the on board storage capacity (e.g. on board storage capacity for sludge is mentioned in the ship's International Oil Pollution Prevention Certificate IOPP).

Since the WASTECOL system has been in use, the reliability of the data has improved significantly, although not having led to more bureaucracy. The system also helps the port authority to assess the adequacy of the port reception facilities in place, and provides them with reliable statistics in order to monitor waste flows in the port.

7.3 Enforcement and control, including licensing

7.3.1 Enforcing the MARPOL requirements related to port reception facilities

300. When controlling whether ships comply with the requirements of the MARPOL Convention regarding the on board waste management and the provision of port reception facilities, specific tasks and responsibilities have been allocated to the State government, which has the duty to implement and enforce the standards contained in IMO Conventions to which it is a Party. Organizations recognised by the maritime administrations to act on their behalf have a duty to be impartial and exercise due diligence.

301. Shipping companies are responsible for applying the standards to individual ships. Shipyards have the task of putting into operation the various safety and anti-pollution measures applicable to ships. Some ship-owners operate their ships at a substandard level and enjoy a financial/competitive advantage. Flag States, Coastal and Port States authorities, classification societies, chartering and marine insurance interests and other interests need to cooperate to fully implement the MARPOL Convention.

302. The primary responsibility for ensuring compliance with IMO Conventions, including the MARPOL Convention, lies with the flag States. However, all the IMO conventions also include provisions in the right of a port State to intervene on board a foreign flagged ship in its port. Strict guidance and procedures have been developed by the IMO for the conduct of port State control (PSC) in an attempt to unify the application of PSC provisions contained in a number of treaties including the MARPOL Convention.

303. Also the “*Guidelines to ensure the adequacy of port waste reception facilities*” (Resolution MEPC.83(44)) identifies roles for flag and port State, especially related to addressing the issue of inadequate port reception facilities.

7.3.2 On shore mechanisms for control

304. The implementation of a reliable system for on shore waste management embracing the principles of environmentally sound management requires the establishment of comprehensive control mechanisms. These mechanisms are necessary to ensure that the technical and organizational methods defined are actually used and that illegal dumping after reception of ship-generated wastes and residues or other practices are avoided.

305. As already indicated successful control of ship-generated wastes and residues requires that adequate tracking and monitoring systems are in place, in order to enable competent authorities to act rapidly to minimize environmental damage due to the inappropriate handling of these wastes. If an incident does occur, control means that the authorities have the means, both legal and financial, to respond quickly in order to reduce any hazards posed to human health and/or the environment.

306. Monitoring and tracking of ship-generated wastes and residues means that the location of such wastes is known at all times, from “cradle to grave”, and that they do, in fact, arrive at an appropriate facility for the environmentally sound waste management. This is generally done by establishing a system that documents the routing and composition of wastes. As described in the previous section there are examples where parts of this process have been automated using web-based technology, leading to reduced bureaucracy for the users and increasing transparency.

307. The primary means of enforcing a comprehensive waste management strategy, and hence the main enforcement duties of the regulatory authorities, will be:

- (a) Licensing of reception, storage, treatment and disposal facilities;
- (b) Routine and non-routine surveillance and monitoring of licensed operations, with powers of revocation;
- (c) Collection and analysis of properly completed documentation and other data from waste producers, storage depots, carriers and treatment or disposal facilities;
- (d) Prosecution of illegal activities.

7.3.3 Licensing

308. In general a license may be issued by authorities to allow an activity that would otherwise be forbidden. It may require proving a capability, and may also serve to keep the authorities informed on a type of activity, and to give them the opportunity to set conditions and limitations. Licensing is one of the principal tools by which authorities can exercise regulatory controls of the reception, storage, treatment and disposal of wastes and residues. Licensing is applicable to both land-generated and ship-generated wastes.

309. As it allows compliance with standards and ensures proper handling and disposal, licensing can reduce the risk of illegal disposal. Licensing of facilities should be subject to a prescribed standardized procedure. In order to be effective, the following issues should be considered:

- (a) Application and validity of the licence;
- (b) Review of application by the authorities;
- (c) Verification of ability of the applicant;
- (d) Issue of licence with specific conditions (discharge limits, reporting procedures, inspection procedures, etc.).

310. In some cases licensing schemes are applicable to equipment used for waste collection, storage and treatment. Sometimes a more performance-based approach is being applied, with the licence setting clear performance and/or emission standards.

311. Applying for a licence is to be made obligatory. The relevant regulations should also specify the conditions under which a licence can be granted, altered or withdrawn. The licensing scheme should also fit into the overall waste management strategy principles.

312. The licence should be subject to periodical renewal as well as amendment and/or revocation. There should be provision for amending the licence to allow for modern technical and scientific developments. According to the chosen system of control, the relevant provisions should be incorporated into the licence with sufficient specifications to ensure that the terms of the licence can be enforced.

7.3.3.1 Licenses for collection, transport and disposal

313. As ships calling a port in many cases tend to deliver their garbage in that port, as they do not like to keep the garbage on board too long for hygienic reasons, collection operations by garbage haulage contractors may occur quite frequently. This may lead to increased movements and traffic in the port area with a come and go of trucks/barges, posing additional pressure on port security. Therefore the port authority might develop a specific permit or licensing scheme for the different contractors collecting ship's garbage, including an overview of the trucks/barges that are used to collect the garbage.

314. The collection and transport of wastes and residues are an essential part of waste management, as e.g. illegal disposal can significantly increase the waste collector's profit. So therefore, especially where there are several waste collectors operating on the market allowing a free choice to the waste generator, high standards should be placed regarding qualifications and performance. If the collection and transport of waste is licensed, the threat of losing the licence for malpractice will be a serious deterrent.

315. A licence should be granted only when strict standards are in place and when there is sufficient evidence that a reliable service can be guaranteed. Applicants for a licence should be required to prove their reliability and proficiency by permitting inspection of their technical equipment, verification of their financial situation, insurance coverage and trained personnel.

316. Licences should be issued only for the types of waste the applicant has sufficient technical means to handle. Different categories of wastes require separate collection and transport systems. This will help to avoid unsuitable mixtures and the widespread dispersal of hazardous wastes in other wastes, and to improve the opportunities for reuse or recycling wastes.

7.3.3.2 Licensing as a tool for monitoring wastes

317. Especially when installing procedures to ensure an environmentally sound management of hazardous ship-generated wastes and residues, it is necessary to track these wastes from the moment of collection at the port reception facility until disposal. Proof of disposal can be established by applying a system of notification and tracking documents.

318. These documents, that are to accompany every waste transport, should contain particulars regarding the type and quantity of the waste in question, the means of transport and details regarding the producer or generator, carrier and party attending to the disposal. In this way the waste routing becomes transparent both for the competent authorities and for the companies involved, as these documents link (e.g. through a tracking system) the different activities.

319. Many countries have adopted some kind of tracking system to document the generation, transport and disposal of hazardous waste. The documents accompany the waste shipments and provide a record of movement from the producer of the waste through each intermediate management state to disposal. Every time the waste shipment changes hands, the responsible person(s) sign(s) the allocated document. Often one or more of the relevant competent government bodies requires a copy of the document at crucial stages during the transfer, in order to monitor the movements of the waste. In some cases the documents can also be accompanied by chemical analyses.

320. Before handing over the waste to another party it is important that the waste collector issues a document listing the source, (hazardous) characteristics, destination and the planned methodology for intermediate collection,

transport, storage and final disposal of the waste. The ships' master or responsible officer and the receiver sign the document, and a copy is made available as proof of the legal discharge.

321. After that the document is to accompany the ship-generated waste to its destination at a disposal facility. The producer, the various intermediate operators and the operator of the facilities involved successively endorse the document on taking over the waste. Each keeps a copy endorsed by the following operator, and these copies are available for inspection by the enforcing and controlling authorities for a specific period (e.g. three years).

322. The enforcing and controlling authorities are to be granted the competence to ask for additional information in order to verify the waste's composition, or to take samples and perform chemical analyses themselves. In case of a dispute, samples should be available for contra-expertise.

Case Study: Malaysia

Electronic Scheduled Waste Information System (eSwis):

The Malaysian Department Of Environment has developed an Electronic Scheduled Waste Information System (eSwis) in order to track the movement of every scheduled waste from the waste generator to the prescribed premises by means of an internet based electronic submission, known as the e-Consignment note (e-CN).

The introduction of this e-CN was implemented in 2007. This system has been used since then and has undergone several revisions, before the currently applied and updated version, known as the Electronic Scheduled Waste Information System (eSwis), has taken effect.

323. Installing a proper port information and data management system for ship-generated wastes and residues will not only provide a comprehensive overview and deliver reliable statistics during the different steps in the process of ship-generated waste – from collection over treatment to final disposal – that can easily be monitored and audited, but it will also facilitate efficient and effective enforcement.

8. Options and processes for the collection, storage and transportation of hazardous wastes and other wastes from ships

8.1 Introduction

324. The effectiveness of ships to comply with the discharge requirements of the MARPOL Convention and in conformity with the Basel Convention, especially within special areas, largely depends upon the availability of adequate port reception facilities. Hence, governments are to ensure the provision of adequate reception facilities at ports and terminals for the reception of ship-generated wastes and residues that are also Basel Convention wastes, without causing undue delay to ships, and according to the needs of the ships using them.

325. Also the overarching strategy aiming at the environmentally sound management of hazardous wastes and other wastes according to the Basel Convention should be developed in an effective way with an awareness of the infrastructure and support services in the ports and terminals. Although these storage and disposal facilities not necessarily have to be located within the port area, still suitable waste transport, storage and disposal facilities should be in place. Hazardous waste management strategies should also incorporate proactive mechanisms to inform and educate those having an interest in using the port reception facilities.

326. As the alternatives for the collection, storage and transportation of the ship-generated wastes and residues largely depend on the type (and amount) of the waste, the options for collection, storage and transportation presented in this section will use the categorization applied in the different Annexes to the MARPOL Convention. In addition, as the MARPOL Convention does not define “hazardous wastes”, to be within the Basel Convention perspective, the options presented in this manual will also include an indication to the specific situations that might occur when collecting possible hazardous wastes and residues from ships.

8.2 General requirements for the collection and temporary storage of wastes

327. When designing and developing adequate facilities for the reception of ship-generated wastes and residues, criteria are in general based on the required collection capacity (the amount that can be received from a ship, without causing undue delay) and the further disposal and storage capacity for these waste streams (choice of disposal options).

328. When specifically looking at the requirements for collection and temporary storage in order to ensure an environmentally sound waste management, it should be noted that also the need for segregated storage of certain waste streams is to be taken into consideration, in order to facilitate the recovery of wastes. Especially when certain MARPOL Annex V wastes and residues already have been segregated on board the ship, the port reception facility should be able to receive and store the different waste streams separately. This facilitates the disposal of the wastes according to the waste management hierarchy. Appropriate and designated storage capacity and equipment is therefore indispensable.

329. Also for hazardous wastes some general requirements for appropriate collection and storage should be taken into account, such as:

- (a) Receptacles used for collection and storage of hazardous wastes are to be made of material that is compatible with the waste (e.g. For corrosive wastes polyethylene containers are better than metal drums);
- (b) The containers must be leak proof (also for powders), and not be corroded;
- (c) For specific hazardous or poisonous wastes secondary containment might be necessary;
- (d) Containers should be safe to handle by the workers;
- (e) Receptacles should be properly labelled;
- (f) Incompatible hazardous wastes are to be kept separate;
- (g) Receptacles for hazardous wastes should be kept closed and out of the weather.

330. Depending on the national and/or local regulatory waste framework, also the containers for hazardous wastes that are being emptied but have not yet been cleaned are sometimes to be categorized as hazardous waste, and need to be managed accordingly.

8.3 Options for the collection and storage of liquid oily wastes (MARPOL Annex I)

331. Liquid oily wastes generated on board ships are in general mixtures of oil, water and sediments. The exact composition between these components can differ significantly, depending on the place where the oily mixture is generated on board the ship:

- (a) Oily bilge water;
- (b) Oil residues (sludge);

- (c) Oily tank washings (slops);
- (d) Dirty ballast water;
- (e) Scale and sludge from tank cleaning.

332. Oily residues consist mainly of oil that might be contaminated with water, whereas oily tank washings, bilge water and dirty ballast water consist mainly of water contaminated with a limited amount of oil. For collection purposes sludge is in general considered to be a separate category, because of its higher solids content, the fact that in most cases sludge is not easily pumpable, and contains a considerable amount of oil (50-75 %).

333. Although the collection of oily residues from ships can be accomplished in different ways, barges are a good option as they have limited draught requirements and a relatively large collection capacity. These barges can either be propelled motor barges or towed barges.

Example of a barge collecting oily wastes
(Photo credits: Martens Vlissingen, NL)



334. As in most cases the liquid oily waste will only be temporarily stored on the barge (after collection), it might not be advisable to already use on board oil/water separators. After proper chemical analysis, separation of oily-water mixtures is preferably performed in land-based waste treatment facilities. In addition, barges usually do not have sufficient space for installation of a separation unit. Furthermore, in many ports the effluent discharge from a barge into the water is prohibited because of local/national water quality regulations.

Example of a truck collecting liquid oily waste
(Photo credits: Kayak Maritime Services Antwerp, Belgium)



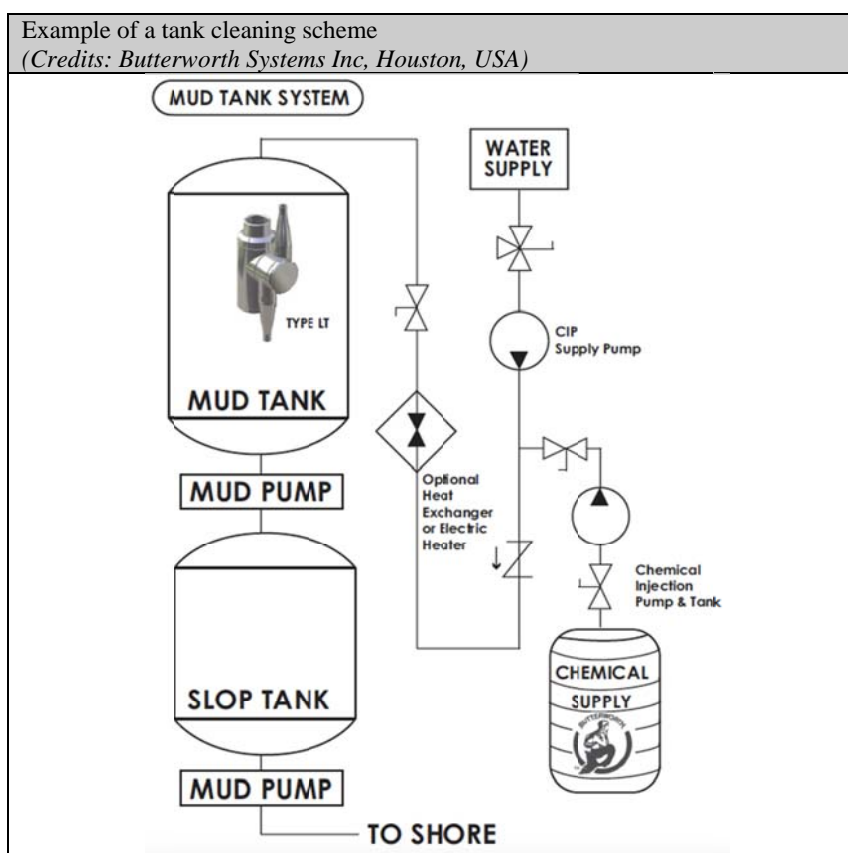
335. On shore collection can be done using tank trucks or at a central fixed collection facility. In these cases storage tanks with pumping facilities for the oily residues will be needed, to which the ships, collection barges or collection vehicles (depending on which system is used for collection) can discharge their (collected) oily residues.

336. As in most countries oily wastes are being categorized as hazardous wastes its management is to be carried out accordingly, taking into account specific handling, collection and storage requirements.

8.4 Options for the collection and storage of residues containing noxious liquid substances (MARPOL Annex II)

337. Chemical tankers transport a large variety of chemical cargoes. Often these chemicals are to be considered as noxious liquid substances (NLS) according to the Annex II to the MARPOL Convention. Depending on the categorization of these noxious liquid substances in one of the sub-categories X, Y or Z, regular tank cleaning is to be carried out. And as cargo residues and washing waters from cargo holds containing substances that are to be considered as being harmful to the marine environment (HME) are not allowed to be discharged at sea, they therefore need to be delivered to a port reception facility suitable for the collection and temporary storage in port of substantial amounts of wash waters.

338. Tanks for chemical cargoes are usually cleaned using hot or cold water in which cleaning additives might be added. Some noxious liquids cannot be cleaned with water only, and specific cleaning agents are required for proper tank cleaning.



339. The main concern for a port reception facility collecting MARPOL Annex II residues is that the received cargo residues in wash water can contain a wide variety of noxious liquid substances, each with their own special chemical characteristics and toxicity. Therefore also collection and temporary storage facilities will have to be adapted to be able to deal with a large variety of residues.

340. MARPOL Annex II wash water containing residues to be categorized as noxious liquid substances usually result from mandatory prewashes and commercial tank cleaning activities and therefore the option exists to combine tank cleaning facilities with port reception facilities. As the volumes of these wash waters in most cases will be substantial, the collection will require efficient pumping devices and relatively large storage tanks. Therefore both barges and trucks certified for the carriage of dangerous goods can be used, but also fixed port reception facilities that can combine the collection of wash waters containing noxious liquid substances with the cleaning activity itself.

341. Still, as it is common for chemical tankers to wash their own tanks leading to situations that ships calling a port already have large amounts of washing water on board which they might want to deliver to a reception facility, pumping devices and storage tanks might be required at a central place in the port. As the amount of this type of waste may be substantial and the variety of the possible residues big, it is advisable to consult with the relevant cargo handling companies in order to get a good insight of the amounts and types of washing waters to expect.

Example of a fixed facility combining tank cleaning and the reception of wash waters
 (Photo credits: MAC² Antwerp, Belgium)



342. As these wash waters containing noxious liquid substance are in most cases to be considered to be hazardous wastes according to land based catalogues, the handling of MARPOL Annex II residues additionally requires strict consistency to safety measures. The most important safety aspect for the reception of MARPOL Annex II residues is to conscientiously see to it that the noxious liquid substances are not mixed, as this may create risky situations for the environment and human health.

8.5 Options for the collection and storage of sewage (MARPOL Annex IV)

343. Sewage from ships consists of so-called “black water” (sewage from toilets and urinals) and mixtures of black water and grey water (generated from activities such as laundry, dishwashing and bathing). In some cases sewage also includes mixtures with oil and other substances such as drainage from medical premises via wash basins, wash tubs and scuppers located in such premises, and from spaces containing living animals or other waste water when mixed with these drainages. It can be noted that also residues from on board sewage treatment systems, such as sewage sludge and bio-residues fall within the scope of MARPOL Annex IV.

344. Although the collection of sewage can be done using both mobile or fixed reception facilities, when taking into account the significant volumes of sewage that can be delivered to a port reception facility by a single ship, mobile collection preferably is to be done using a barge. Trucks have limited capacity for the adequate collection of sewage, and their use may lead to an unnecessary delay for the delivering ship.

345. Reception of sewage can be organized either by temporary storage in tanks, or by pumping the sewage directly into the municipal sewage system or a sewage treatment facility. Regulation 10 of MARPOL Annex IV provides specified standard dimensions of flanges for sewage discharge connections to enable pipes of port reception facilities to be connected with the ships' discharge pipeline.

Example of a facility for the direct reception of sewage in the port of Trelleborg (Sweden)
(Photo credits: Clan Baltic Sea Shipping)



346. Especially in ports receiving a significant amount of passenger and cruise ships it might be an efficient option to provide the possibility to pump the ship's sewage directly into the municipal sewer system. Especially where ships always call at the same terminal (such as passenger or cruise terminals), the cost for building the piping system might be relatively low.

Example of a facility for direct collection of sewage in the port of Helsinki (Finland)
(Photo credits: Clean Baltic Sea Shipping)





8.6 Options for the collection, storage and transportation of ship-generated garbage (MARPOL Annex V)

8.6.1 Collection and temporary storage

347. When establishing a system of environmentally sound management of ship-generated wastes and residues it is not only elementary to provide port reception facilities that are adequate to meet the needs of the ships using them, but it is also of key importance that already during the collection phase the disposal of waste according to the waste management hierarchy is being facilitated. Therefore the facilities and equipment used for the collection of the ship-generated garbage should be suitable for the separate collection of the main waste types that are being delivered.

348. According to the IMO Guidelines for the implementation of MARPOL Annex V, it is recommended that the following garbage types are to be kept separate on board of ships:

- (a) Non-recyclable plastics and plastics mixed with non-plastic garbage;
- (b) Rags;
- (c) Recyclable material:
 - (i) Cooking oil;
 - (ii) Glass;
 - (iii) Aluminium cans;
 - (iv) Paper, cardboard, corrugated board;
 - (v) Wood;
 - (vi) Metal;
 - (vii) Recyclable plastics; (including styrofoam or other similar plastic material);
- (d) Garbage that might present a hazard to the ship or crew (e.g. Oily rags, light bulbs, acids, chemical, batteries, medical waste, etc.);
- (e) E-waste such as electronic cards, gadgets, equipment, computers, printer cartridges, etc.

349. Therefore also the equipment for handling ship-generated garbage in a port should basically facilitate the collection, temporary storage and subsequent transport of these segregated types of ship-generated garbage. Actual processing of garbage in the port for purposes other than transport (compacting) is not always likely to occur, unless there is substantial industrial activity in the port area so waste handling and treating processes from both shipping and land-based activities can be combined.

Example of a facility for the collection of segregated types of garbage in the port of Göteborg (Sweden)
(Photo credits: Port of Göteborg Authority)



350. A large variety of containers and bins can be used for collecting ship-generated garbage, but basically the applied receptacles need to be safe, functional and easy to use. Shipping companies frequently entering a port can consider re-usable containers, as a full container can be immediately replaced with an empty one of the same size and type.

Example of closed receptacles used for the collection of garbage
(Photo credits: AlphaLogic)



351. When evaluating the different options for selecting receptacles for the collection of MARPOL Annex V wastes and residues, the following elements need to be considered:

- (a) The capacity of the receptacles should at any time (including estimated increased delivery in the near future) match the demand by the users, not only in terms of their individual size and capacity, but also the number of receptacles that is required;
- (b) Also the ship types influences the required capacity, e.g.:
 - (i) Cruise ships generate more garbage than commercial ships;
 - (ii) Fishing vessels need specific collection and storage capacity for fishing nets;
 - (iii) In recreational ports seasonal fluctuations might have a serious impact on the delivery of garbage;
- (c) When selecting the differing types of garbage to be collected separately, the increased interest and value in the recycling of wastes as a potential source of raw materials should be taken into account;
- (d) In case more stringent standards are applicable for specific types of wastes (e.g. Quarantined food waste or medical waste) the reception facilities should meet the standards⁵¹ (e.g. Sealed and/or leak proof containers). Especially for medical waste specific containers are to be used in order to ensure hygienic and safe handling;

⁵¹ Section 4 of ISO 21070 on the management and handling of shipboard garbage addresses possible practices to segregate different types of garbage, and provides an example of a colour-coding labelling system.

(e) Especially for hazardous wastes specific types of receptacles are to be applied, ensuring that compatible material is used for the receptacles, that they are leak proof, etc (also see section 8.2 of this guidance manual);

(f) Receptacles for garbage collection may be placed on the ship, while in port. In that case, wire sling attachments may be required and the receptacles must be compatible with the maximum load of the available cranes;

(g) Receptacles should be constructed of durable materials and equipped with lids to control vermin, to prevent litter spreading on the quayside and to prevent offensive odours;

(h) In order to reduce the volume of the garbage to be transported, compactors or baling equipment may be used, leading to cost savings. However, the use of compactors should not impede the reuse or recycling possibilities.

Example of a facility for the collection of segregated types of garbage from a cruise vessel

(Photo credits: www.dep.state.fl.us)



352. According to the categorization of the Basel Convention several types of MARPOL Annex V wastes and residues can be considered as hazardous wastes, such as paint wastes, rags contaminated with oil and chemicals, solvents, batteries, light bulbs, small dangerous wastes, medical waste, etc. These wastes are not to be mixed with non-hazardous waste, and are to be handled taking into account the appropriate procedures and requirements (e.g. a signature should be kept for the records).

353. It can also be noted that according to certain regional, national or local regulations some types of waste are the subject of specific requirements related to the safe and environmentally sound disposal. For example, in Europe food wastes generated through international modes of transport are, in principle, to be incinerated.

354. In general the provision of port reception facilities for garbage should neither compromise the health and safety of the seafarers and port workers, nor compromise the sanitation and vermin control efforts within the port. Moreover, the reception of wastes should not interfere with business of the port.

355. Ideally, the schedule for emptying the receptacles is assessed at the same time the receptacle needs are assessed, in order that the two are to complement each other. The emptying schedule has implications on the labour and collection vehicle requirements. More frequent collection reduces health and safety concerns and requires less storage space, but may increase costs through the use of more vehicles, which also leads to increased CO₂ emissions, and labour. Emptying schedules should be revised periodically and adjusted if necessary.

Example of a receptacle used for the collection of light bulbs
(Photo credits: Peter Van den dries)



356. Another specific consideration when selecting the type of receptacle is the compatibility of the receptacle, in terms of unloaded weight, maximum load and size, with the available means of transport and other handling equipment such as forklifts and cranes. Since experience in some ports has shown that receptacles for garbage can be the object of littering, vandalism and theft, consideration should be given to selecting receptacles with characteristics which discourage their abuse or misuse.

Example of a waste compactor
(Photo credits: PDE, United Kingdom)



357. In some ports the reception facilities for garbage are being used by locals (non-port users) for the disposal of their household wastes, thus creating an additional (financial) burden for the port. To avoid this, access should be made inconvenient for local citizens (e.g. by using an electronic ID or entrance badge).

8.6.2 Transportation of ship-generated garbage

358. Several types of handling equipment can be used for the transport of ship-generated garbage, such as barges, trucks or other handling equipment (e.g. hoists and forklifts).

359. Barges are especially useful in case the amounts of garbage are substantial (too big for trucks), the use of trucks or other vehicles in the proximity of the ship is not permitted, as a result of safety regulations (sometimes trucks are not allowed on docks or piers), or when ships do not berth along the quay (e.g. single buoy mooring facilities). In case garbage is being transported by barge it should be covered using nets, tarpaulins, or containers in

364. Although MARPOL Annex VI entered into force in 2005, including the requirement for the provision of reception facilities in ports for ozone-depleting substances (and equipment containing them) and residues from exhaust gas cleaning systems, not much information is available yet on the amounts and characteristics of MARPOL Annex VI residues to be expected, nor on collection practices.

365. Depending on the type of scrubbers, the generated wastes and residues are different:

(a) Wet scrubbers in open loop use sea water for the cleaning of the exhaust emission. The scrubber water that contains sulphur, soot and various metals ends up into the sea, so in principle there is no delivery to a port reception facility;

(b) Wet scrubbers in closed loop use fresh water stored on board and an agent for cleaning the exhaust. There is then an extra step that treats the first scrubber water stream. Sludge containing the soot and metals is generated, which needs to be delivered to a port reception facility, as it is not allowed to incinerate scrubber sludge on board. Still, a yellowish water containing sulphur is discharged into the water;

(c) There are also so-called hybrid scrubbers, which can be used in either open or closed loop. The residues generated are similar to these generated by open and closed loop scrubbers, depending on the mode the system is being operated in;

(d) Dry scrubbers generate a gypsum-like residue. As these types of scrubbers are currently not generally being used, not much information about the residues is available.

366. Not much information is currently available on the volumes of wastes and residues that are generated by different types of scrubbers. However, some producers report that the amount of sludge generated is approximately 0.1 to 0.4 kg/MWh, while others indicate a sludge generation of 0.2 kg/MWh from a seawater scrubber.

367. It must be noted that the collection, storage and disposal of ODS and equipment containing ODS from ships is very similar with practices for devices on land. As these types of wastes and residues are in general to be considered as hazardous wastes, also their handling and disposal should meet the appropriate requirements. The receptacles should in any way be watertight and sheltered during transport and storage, in order to avoid drainage of possible contaminants in the sludge to water and/or soil.

368. Disposable equipment on board containing ODS, such as broken refrigerators and expired fire-extinguishers, should be placed in adequate receptacles or separate places on board in such a way that segregated discharge to port reception facilities is possible. The collection of these broken devices can be carried out in different ways: barges can be an option, when equipped for ship-to-ship transfer of rather large devices (e.g. with cranes). In any case, it is advisable to use collection barges with enough on or below deck capacity to safely store the wastes. For very large devices, onshore collection at a central collection facility in most cases might be a better option.

369. In all cases, appropriate storage capacity will be necessary to which the ships, collection barges or collection vehicles can deliver and safely store their (collected) wastes and residues.

370. The most appropriate way of temporary storage of these wastes is under a shelter on an impervious floor. In addition, the period of storage should be kept as short as possible, especially when the equipment is broken and when there is a substantial risk of leakage of ODS into the atmosphere. Although the temporary storage can be inside the port area, the treatment in most cases will not. This again depends on the port area and its degree of industrialization. The disposal of the equipment will take place in highly specialized treatment plants by trained personnel.

371. This is even more the case for the treatment of equipment containing ODS on board. Trained and specialized technicians should undertake the manipulation of such devices. They must not refill leaking equipment and must use proper recovery equipment and methods to prevent the release of ODS and halocarbon alternatives into the environment. The technicians should make sure that the ODS are properly packed and contained before sent for disposal.

372. It may be noted that, as facilities for the disposal of unwanted ODS are limited, in most cases the ODS that are not reusable in the place of collection must be sent to an appropriate facility for disposal elsewhere. As these facilities may not be located within the own State territory, the sender should be aware of the possible applicability of international requirements regarding the transboundary movement of this waste, as contained in the Basel Convention.

9. Options for the management of hazardous wastes and other wastes from ships, including after-care of disposal sites

9.1. Introduction

373. The MARPOL Convention as such does not provide specific requirements for the disposal of ship-generated wastes and residues received in a port, only for the reception of these wastes. Once the wastes are offloaded from a ship, Basel Convention wastes carried on the ship and the ship-generated wastes, which are hazardous wastes and other wastes falling under the scope of the Basel Convention (see previously, in section 2.2 on the scope and terminology under MARPOL or the Basel Convention), must be managed in an environmentally sound manner in accordance with the provisions⁵² of the Basel Convention, which set out specific requirements for these particular wastes, and taking into account the legal analysis of the application of the Basel Convention to hazardous and other wastes generated on board ships mentioned previously (UNEP/CHW.11/INF/22). In addition, the Basel Convention Technical Guidelines provide valuable guidance on a range of options for the environmentally sound management of specific waste streams.

374. Although not trying to be exhaustive, this chapter presents several options for the management of ship-generated wastes and residues. This chapter will follow the categorization indicated in the previous chapter on the different options for collection, storage and transport for the different types of ship-generated wastes.

9.2 Existing guidance on the management of ship-generated wastes and residues

9.2.1 Guidance developed by the IMO

375. Although the MARPOL Convention does not contain any legally binding requirements regarding the management of wastes and residues generated on board ships, the IMO has developed relevant guidance on the processing of ship-generated wastes and residues in its manual “Port Reception Facilities – How to do it”.

376. This guidance manual was approved at MEPC 69 in April 2016. The manual provides practical information to governments and competent (port) authorities, in particular to those in developing countries, as well as to the shipping industry, agencies and waste contractors seeking guidance when implementing the MARPOL Convention.

9.2.2 Guidance developed within the framework of the Basel Convention:

377. Under the Basel Convention extensive guidance for the management of waste is available, through the technical guidelines and guidance documents adopted by the Conference of the Parties over the last decades.

378. It must however be noted that not all available Basel Convention technical guidelines are equally relevant when looking at the management of ship-generated wastes and residues. In an assessment⁵³ adopted by the Conference of the Parties in 2015 on how far the current Basel Convention technical guidelines cover wastes covered by the MARPOL Convention (see also section 2.1 above), the following relevant Basel technical guidelines have been identified:

Basel technical guidelines	Possible relevance for ship-generated waste
Introduction document to the Basel Convention technical guidelines	Yes (general document)
The Framework document 1994 on the preparation of technical guidelines for the environmentally sound management of wastes subject to the Basel Convention	Yes
Technical guidelines on the environmentally sound co-processing of hazardous waste in cement kilns	Yes (incineration of MARPOL Annex I residues)
Technical guidelines for the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds	Yes
Technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal	Yes
Technical guidelines for the environmentally sound management of the full and partial dismantling of ships	Yes (although ships that are wastes do not fall within the scope of MARPOL, some of the MARPOL residues are covered by this guideline)

⁵² See Article 4 (general obligations) of the Basel Convention, in particular Article 4 paragraph 2. (c).

⁵³ See document UNEP/CHW.12/INF/29/Rev.1.

Basel technical guidelines	Possible relevance for ship-generated waste
Guidance paper on hazardous characteristic H6.2 (Infectious substances)	Yes
Work on hazard characteristics - Approach to Basel Convention hazard characteristic H11: characterization of chronic or delayed toxicity	Yes
Interim guidelines on the hazardous characteristic H12-Ecotoxic	Yes
Interim guidelines on hazard characteristic H13 of Annex III to the Basel Convention	Yes
Technical guidelines on hazardous waste from the production and use of organic solvents (Y6)	Yes
Technical guidelines on waste oils from petroleum origins and sources (Y8)	Yes
Technical guidelines on wastes collected from households (Y46)	Yes
Technical guidelines on specially engineered landfill (D5)	Yes
Technical guidelines on incineration on land (D10)	Yes
Technical guidelines on used oil re-refining or other reuses of previously used oil (R9)	Yes
Technical guidelines on hazardous waste physicochemical treatment (D9) / biological treatment (D8)	Yes
Technical guidelines for the environmentally sound management of waste lead-acid batteries	Yes
Technical guidelines on the environmentally sound management of biomedical and healthcare wastes (Y1; Y3)	Yes
Technical guidelines on the environmentally sound recycling/reclamation of metals and metal compounds (R4)	Yes

9.3 Licenses for disposal of ship-generated wastes

379. According to most national laws and regulations the disposal of wastes in land-based facilities is the subject of environmental licensing and permits. Licensing is one of the principal tools by which authorities can exercise regulatory controls of the reception and disposal, including storage, of wastes and residues. Therefore authorities are recommended to, when providing facilities and infrastructure for the disposal of ship-generated wastes, also embed them in a proper system of environmental licensing. In addition, according to the Basel Convention⁵⁴, the disposal of hazardous wastes or other wastes is only to take place on a site or in a facility that is authorized or permitted to operate for this purpose by a relevant authority of the State where the site or facility is located.

380. The main objective of licensing waste disposal is to allow it to occur in an orderly, regulated fashion, consistent with environmental protection and the maintenance of public health. Thus, it would be good to require a licence for all types of waste disposal facilities, such as storage sites, treatment and incineration plants and landfills. Licensing would also cover mobile facilities, such as those for dewatering, neutralization and detoxification. Mobile facilities can produce specific hazards through the improper disposal of residues such as contaminated wastewater, but because of their mobility they are difficult to control.

381. Facilities should be licensed for the handling of specified groups of waste, but without being unnecessarily restrictive (as a facility may be capable of handling differing types of waste). The list of permitted wastes should form part of the licence. Exceptions should require the prior, written approval of the competent authority.

382. The information to be provided when applying for a licence can be categorized as follows:

Site characteristics	<ul style="list-style-type: none"> • Location and size • Capacity
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⁵⁴ See Article 2.5 of the Basel Convention, which gives a definition of “approved site or facility”. See also Article 4, paragraph 7 (a), which sets a rule not restricted to a transboundary movement.

	<ul style="list-style-type: none"> • Accessibility (berths, roads, railways) • Possibility for expansion • (hydro)geological conditions, in particular applicable for landfills
Activities	<ul style="list-style-type: none"> • Description of waste disposal processes and equipment • Types, quantities and composition of waste disposed of • Possible further disposal processes
Environmental impact	<ul style="list-style-type: none"> • Estimated emissions of contaminants to air (flue gases, vapours), water (composition and quantity of wastewater discharged) and soil (leakage migration and composition) • Monitoring plan
Protective measures	<ul style="list-style-type: none"> • Description of protective measures that have been taken to reduce the emissions of pollutants to air, water and soil • Emergency response plan in case of hazard or accident

383. If site selection is not subject to an overarching waste management plan and is decided on a case-by-case basis, the applicant for a licence should be legally required to provide the information necessary to evaluate a site for selection. This is particularly important for landfills, but also applies to incinerators (compliance with air quality standards) and to physical, biological and chemical treatment plants (availability of wastewater treatment facilities and receiving watercourses).

384. To summarize, the following considerations are important when selecting a site, either as a fixed port reception facility and/or pre-treatment or temporary storage site:

- (a) Other port operation should not be hindered;
- (b) The risk for ship-generated wastes and residues to end up in the water should be minimized;
- (c) The necessary equipment to clean up spills or prevent spills from contaminating the whole port area should be easily available at the facility;
- (d) The site should be at a convenient place both for the ships and for port personnel and vehicles;
- (e) The site should have sufficient lighting to allow for and encourage ship-generated wastes and residues collection 24 hours a day;
- (f) Reception areas need to be clearly marked and easily located, especially when waste streams are to be collected in a segregated way;
- (g) Reception areas must be secure to prevent abuse or misuse and to ensure the safety of seafarers and port personnel using them;
- (h) The impact of the facilities on the surrounding community should be minimized, especially with respect to noise, odour and outer appearance;
- (i) The facilities must comply with national, local and other applicable legislation on the collection and processing of ship-generated wastes and residues.

9.4 Options for liquid oily wastes (MARPOL Annex I)

9.4.1 Options for pre-treatment

385. Oily bilge water and oil residues (sludge) can, after collection, relatively easily be pre-treated on-site. These oily-water emulsions have the physical characteristics that they, when left unhandled for a while during temporary storage, separate spontaneously in two fractions (oil on top, water below).

386. Although not always allowed according to local water quality requirements, technically the water fraction can be biologically treated before being discharged into the dock water. The oil can be loaded into a truck or barge again to undergo further treatment in a treatment plant.

387. When listing the different technical options for the pre-treatment of liquid oily wastes, the following alternatives can be listed according to the IMO manual "Port reception facilities – How to do it":

Primary treatment	<ul style="list-style-type: none"> • Buffering and equalizing • Settling tanks • Plate separators • Skimmers
Secondary treatment	<ul style="list-style-type: none"> • Chemical emulsion breaking/flocculation • Flotation • Filtration • Hydro-cyclones • Centrifuges • Molecular coalescence oil/water separator • Membrane separation
Tertiary treatment	<ul style="list-style-type: none"> • Biological treatment

388. When selecting one or more of these options the local situation in the port and area, including the national and local waste policy requirements and goals, will always need to be assessed, as the optimal facility will differ from location to location. When all processes have been evaluated for their applicability to a specific situation, a layout can be chosen, which might serve as the basis for further design and engineering.

389. In small ports that do not receive large quantities of contaminated ballast waters or wash waters, relatively small pre-treatment facilities for the recovery of oil can be used. After a rather simple separation of oil and water, the oil can be recovered and reused. The water effluent can be discharged after treatment. In these cases, relatively low cost installations can be suitable. These might consist of small storage tanks with a separation unit, either shore-based or floating.

390. A typical port pre-treatment facility for MARPOL Annex I waste and residues may include the following equipment:

- (a) Buffering/equalizing tank;
- (b) Plate separation;
- (c) Flocculation/flotation combination;
- (d) Centrifuge;
- (e) Biological treatment.

391. In such a facility the oily sludge and bilges are treated by a centrifuge, the sludge sediments are disposed of (through incineration or disposal at a licensed landfill) after oil separation and the recovered oil is used as fuel in the boiler house, to generate hot water for the tank cleaning activities. The effluent water stream, which leaves the facility, has been treated to comply with the local/national discharge requirements and can be discharged to surface water.

392. Of course this set-up is only one of several combinations of treatment technologies, and is used to illustrate the combination of various treatment processes. Important factors in the layout are the type of residues to be received and the desired/required effluent quality. As indicated in previous sections, every port has its own specific characteristics that influence the layout of port reception facilities, including the possible presence of local industry that also needs waste treatment facilities. In small ports, without local industries in its vicinity, a smaller facility with fewer treatments steps might be sufficient.

9.4.2 Options for recovery

393. After pre-treatment of liquid oily residues the options for recovery strongly depend on the quality (chemical characteristics) of the oil. Pre-treated oil can be used as an environmentally sound alternative for new oils, as a fuel in the cement kilns, as a blend product in maritime fuels, as a reductant in the steel industry, etc. However, regional and/or national regulations might prohibit the reuse of pre-treated oil, and they remain the legal status of waste until the recycling has been completed.

394. Recovery options for pre-treated waste oils include redistillation and use as fuel.

9.4.2.1 Redistillation

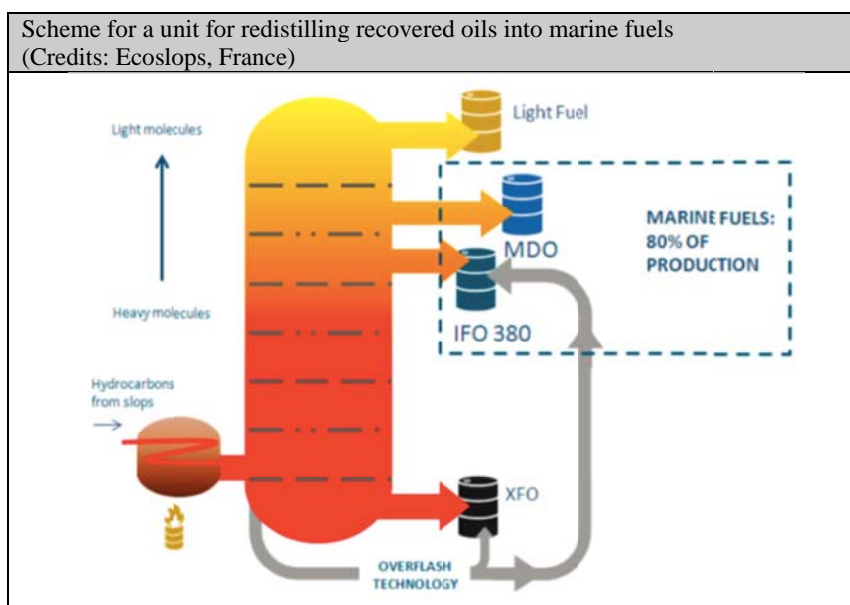
395. Pre-treated oil can be redistilled in a refining column, in which the more volatile parts of the oil are separated from the more fixed. After the pre-treated oil has been heated in a distillation column, a cooled receiver recovers the condensed products. Although this technique is currently already being applied, there are some constraints that must be solved before a refinery will or can accept recovered oil for further re-distillation:

(a) Basically the recovered oil should be nearly free of contaminants (such as sediments, solvents and water). Substantial concentrations of metals may even be detrimental to downstream processing units (poisoning of catalysts). Therefore a detailed chemical analysis will always be required;

(b) The added value of the recovered distillates must be sufficient to cover processing and handling costs.

396. An alternative might be to use a distillation unit that is dedicated to processing of oily residues only. The oily residues are distilled in several stages of increasing temperature and vacuum.

397. It should be noted that the design of such a plant requires specialized engineering skills and experience. In addition the cost-efficiency and feasibility of such a plant largely depends on the available quantities of recovered oil to be processed. The quantities of oil recovered from ship-generated oily wastes and residues in a single port may not be sufficient to justify such a plant from a cost-efficient point of view. However, this can also be assessed on a national and even international level, where it can be incorporated in the international structures of waste oil collection and processing, including land-based sources of waste oil.



9.4.2.2 Use as fuel

398. Pre-treated oil, which is blended in relatively small quantities with regular fuel oil, can in some cases be used as fuel for authorized and/or licensed land-based industrial installations equipped with exhaust gas cleaning systems. This option depends on:

(a) The existence of local industry such as (petro) chemical plants and power plants that can use the oil; and

(b) The technical possibility to produce recovered oil of an acceptable quality (free of contaminants and with a low water and sediment content).

399. It should however be noted that in some countries blending of residual and waste oil with regular fuel is prohibited, unless the mixture is incinerated in a licensed incineration plant equipped with exhaust gas cleaning systems.

400. Using pre-treated oil as fuel generates gaseous combustion products, some of which are harmless but some of which will have detrimental effects. As the composition of pre-treated oil is not well defined it may contain a range of additives, metals, detergents, chemicals and other substances, and incineration, in particular at relatively low temperatures, may therefore contribute significantly to air pollution (SO_x, NO_x, Particulate Matter, etc.) and health

problems. This applies in particular to small-scale options that are difficult to control. Large-scale industrial use of recovered oil as fuel may also contribute to air pollution, but due to the limited number of users and possibly the presence of exhaust gas cleaning systems, it is easier to control and monitor.

401. In ports where there is a substantial bunkering industry, it may be an option to use the recovered oil as a blending product with normal bunkers. It should be noted however, that in several countries the blending of recovered waste oils and residues in bunker fuels is prohibited, as the mixing of wastes and residues with products in many cases is prohibited.

9.4.3 Options for final disposal

402. As previously mentioned in section 5.1.1 of this guidance manual the final disposal of wastes and residues is only to be considered as the last option when all alternatives for recovery are not possible. Options for final disposal are incineration (without recovering the calorific value of the wastes and residues) and landfilling.

9.4.3.1 Incineration

403. There are several types of incinerators for oil residue (sludge) such as the rotary kiln, multiple hearth, fluidized bed, conventional furnace and vortex type. However, as these facilities are usually designed to incinerate a specific feed quality and quantity, not every type of oil residue (sludge) can be processed in every type incinerator. Therefore, the type of incinerator should correspond with the type of oil residue (sludge) to be burned.

404. Another important issue is that incineration of oil residue (sludge) can cause serious air pollution. Therefore facilities used for the incineration of oily residues should be equipped with exhaust gas treatment systems.

9.4.3.2 Landfill disposal

405. Liquid oil residue (sludge) should not be disposed of on a landfill unless there has been a pre-treatment operation.

406. Before being able to finally dispose of wastes and residues managed in an environmentally sound way, certain requirements need to be met.

407. For very toxic wastes more precautions are required, for example a concrete pit and a roof on the dumping facility, as well as more stringent safety and package requirements. More detailed information regarding landfill management can be found in the Basel technical guidelines on Specially Engineered Landfill (D5).

9.4.3.3 Disposal site aftercare

408. When considering the development of landfill sites it should be taken into consideration that the controlled disposal of wastes and residues at a landfill requires a long time of aftercare, treatment and monitoring. The destination of the site, after closure of the landfill, and the standards required will also have an effect on the total cost of the project.

409. When using the landfill site every waste layer is to be covered with an impermeable layer and then with soil, in order to maintain the necessary stability and to prevent land sliding within the landfill.

410. Landfill aftercare measures should be applied, ranging from soil and groundwater testing and remediation through to site rehabilitation and capping. A useful resource during the biological breakdown in sealed landfill repositories is methane gas. This can be piped from the site and used as an energy generating fuel.

Example of methane recovery at the Brookhaven Town landfill (USA).
(Photo credits: Phil Marino for The New York Times)



411. Also rehabilitation of closed landfill sites should be conducted, such as the conversion into industrial, recreational or natural areas.

9.4.4 Relevant recommendations in the Basel Convention technical guidelines

412. According to the Basel Convention's technical guidelines liquid oily wastes and residues generated on board ships can be recovered in various processes in land based facilities and/or disposed of through (co)incineration, with or without the recovery of energy.

413. The following technical guidelines are relevant for oily/hazardous waste:

- (a) Technical guidelines on waste oils from petroleum origins and sources (Y8);
- (b) Technical guidelines on used oil re-refining or other reuses of previously used oil (R9);
- (c) Technical guidelines on the environmentally sound co-processing of hazardous waste in cement kilns;
- (d) Technical guidelines on incineration on land (D10);
- (e) Technical guidelines on specially engineered landfill (D5).

9.5 Options for residues containing noxious liquid substances (MARPOL Annex II)

9.5.1 Options for pre-treatment:

414. Treatment methods are usually based on these physical/chemical properties. Due the large variety of residues covered by MARPOL Annex II it is therefore difficult to define a general treatment path for the processing of these residues.

415. When developing and operating a facility for the pre-treatment of MARPOL Annex II residues it is important to precisely analyse the received residues before processing it, in order to determine if they can be treated in the available processing facilities and to determine if the components present in the wash water might disturb the operation of the facilities (for instance components which are toxic for the micro-organisms in a biological treatment unit). A chemical distillation plant may be able to process wash water containing a certain amount of noxious liquid substances through distillation in such a way that, after distillation, it can dispose the water and recover the substances in its regular process.

416. From tank cleaning activities, prewashes and its remaining tank washings should be delivered to a port reception facility and any water subsequently introduced (which has a lower content of noxious liquid substances) may be delivered to port reception facilities, although they are usually discharged at sea in accordance with the discharge requirements under MARPOL Annex II. Commercial washings however, when delivered to a port reception facility, should be accepted.

417. Some of the possible pre-treatment options for residues containing noxious liquid substances (MARPOL Annex II) can be listed as follows:

Primary treatment	<ul style="list-style-type: none"> • Buffering and equalizing • Settling tanks • Plate separators
Secondary treatment	<ul style="list-style-type: none"> • Chemical emulsion breaking/flocculation • Flotation • Stripping • Evaporation • Activated carbon adsorption • Filtration • Centrifuges • Distillation
Tertiary treatment	<ul style="list-style-type: none"> • Biological treatment • Incineration • Oxidation

418. Also here when selecting one or more of these possible pre-treatment options the local situation in the port and area, including the national and local waste policy requirements and goals, should be assessed, as the optimal facility will differ from location to location. When all processes have been evaluated for their applicability to a specific situation, a layout can be chosen, which serves as the basis for further design and engineering.

419. In the selection of a treatment strategy and the development of processing facilities for treatment of residues containing noxious liquid substances also the national and/or effluent standards, the specific port characteristics and the type of noxious liquid substances to be received are important. For every situation, a study may be necessary to determine the best process options.

9.5.2 Options for recovery

420. Residues that are covered by the Annex II to the MARPOL Convention may include cargo residues, tank washings and dirty ballast. Differing from tank washings that are generated rather frequently, cargo residues and dirty ballast only appear on rare occasions only (spillage, accidents, technical failures, etc.). Also their composition can differ substantially: cargo residues obviously may consist entirely of one type of noxious liquid substance, so they are often being added to the cargo and/or used as product. Commercial tank washings however typically contain up to 99% of water. Some products (e.g. isocyanates) cannot be washed with water and require the use of a solvent.

421. Furthermore, when taking into account the variety of noxious liquid substances that are subject to the provisions of MARPOL Annex II, it is very difficult, if not impossible, to identify general options for recovery. Some oily substances may be used as fuel or be incinerated with recovery of the calorific energy. Most noxious liquid substances however do not have physical or chemical properties that make them suitable for other than their original purpose. For these substances recycling may therefore involve the reprocessing of waste into a product.

422. Most of the noxious liquid substances that are subject to the provisions of MARPOL Annex II are being used as raw materials or intermediates in different chemical production processes. As the industry already uses these substances in its processes, it may also operate facilities and equipment to process the residues that are generated during cargo unloading and tank washing in the port.

423. Processing may include not only recovery techniques such as stripping or distillation, but also treatment in a wash water treatment unit or recovery of the calorific value through incineration in heating systems or boiler. As this option might be the most cost-effective it therefore should be assessed first before other alternatives.

424. In case processing by local industry is not possible also treatment in a centrally located plant can be considered. Application of recovery techniques generally requires thorough segregation of residues, as mixtures of noxious liquid substances will always be more difficult to treat. As dedicated processing equipment often is expensive and technically complex to operate, a detailed assessment will be necessary in order to analyse the opportunities. An alternative might be a multi-purpose wash water treatment plant.

9.5.3 Options for energy recovery and final disposal

425. It has already been indicated that in most cases residues containing noxious liquid substances that are being delivered to port reception facilities will consist of a large number of components, especially in large ports (depending on the variety of cargoes that are handled). Each of these components may have its specific physical, chemical and processing properties.

426. As already indicated in the previous section the industry for which the cargo is intended in general has the best technical possibilities to manage the residues containing the noxious liquid substances resulting from the tank washing of their chemical tankers. MARPOL Annex II residues that cannot be discharged into the sea or be treated biologically or chemically will need to be disposed of through incineration or in a landfill.

9.5.3.1 Incineration

427. The incineration of chemicals in a licensed facility equipped with proper exhaust gas cleaning system in most cases transfers hazardous residues into relatively harmless substances (CO₂, water and particulate matter) will allow for the destruction of these chemicals and the recovery of valuable energy. Furthermore, when the MARPOL Annex II residue has a high calorific value, this can be recovered through the use of steam or heat exchangers.

428. However, a cost-efficiency assessment might influence the option to follow. Three important parameters in the economic selection are:

- (a) Calorific value of the residue;
- (b) Chemical composition of the residue;
- (c) Applicable legislation (incl. Emission standards).

429. The economic importance of the calorific value is obvious: if this value is too low, expensive auxiliary fuel is needed. In general, a mix of residues with different calorific values will be fed to an incinerator. This way a feeding stream with a relatively constant average calorific value can be put together. The chemical composition of the residue,

in combination with relevant environmental legislation, will determine if flue gas treatment is required. Some components in the waste will require special techniques and lead to higher incineration costs, such as:

- (a) Chlorine;
- (b) Fluor/sulphur;
- (c) Sodium/potassium;
- (d) Polychlorinatedbiphenyls (PCBs);
- (e) Volatile metals (e.g. mercury);
- (f) Brine wastes.

430. A modern incineration unit can, in average, reduce the waste by approximately 90% in volume and by approximately 75% in weight. The residues (slags) from an incineration unit should in general be transported to a controlled storage site.

9.5.3.2 Controlled final disposal

431. A controlled storage site for residues containing noxious liquid substances may require extra provisions, on top of the provisions indicated in section 9.4.3.2 and 9.4.3.3. Especially important is the percolation behaviour of the waste and its hazardous characteristics. For certain types of residues containing noxious liquid substances a concrete basin may be required in the landfill, in order to avoid leakage of the hazardous material.

9.5.4 General recommendations regarding the handling of noxious liquid substances

432. The transport of residues containing noxious liquid substances is technically and logistically different from the transport of oil and oil products. Due to the hazardous/noxious characteristics of the cargoes, chemical transports are often more advanced in a technical and operational way.

433. A common characteristic of these cargoes is also that they tend to be of high value, and require sophisticated handling for safety, health and loss prevention reasons. The ships are complex and technologically advanced. They are inherently more robust vessels compared to bulk tankers. The large number of separated cargo tanks, sophisticated cargo operating systems and supply of deck services enable them to carry a broad range of chemicals, in accordance with the requirements of the International Code for the Construction and Equipment of Ships Carrying Dangerous Cargoes in Bulk (IBC Code), and in strict accordance with regulations under MARPOL Annex II.

434. Every chemical cargo requires careful consideration during the planning process, and during the loading and unloading operations. Some cargoes are temperature sensitive, some are semi-gases, some need to be inhibited, some are sensitive to water, and some react with each other. Most of this information is set out in the IBC Code (International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk) or the BCH Code (Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk), for ships constructed before 1 July 1986.

435. General industry practices indicate that these residues are often being handled and further disposed of by the cargo receiver: as these terminal operators know how to deal with the cargo and are familiar with the characteristics of the product they handle, they also (should) know how to deal with the residues.

9.5.5 Relevant recommendations in the Basel technical guidelines

436. Due to the huge variety of chemical cargoes covered by MARPOL Annex II and its accompanying technical codes, the Annex II residues can also differ a lot. Therefore it is extremely difficult, when looking at the treatment and final disposal methods of these MARPOL Annex II residues, to assess their coverage by the Basel Convention technical guidelines. In general MARPOL Annex II residues can either be incinerated, or treated in a physicochemical way (possibly in combination with a biological treatment).

437. For the land-based treatment of MARPOL Annex II residues, the following Basel technical guidelines can be taken into consideration:

- (a) Technical guidelines on the environmentally sound co-processing of hazardous waste in cement kilns;
- (b) Work on hazard characteristics - Approach to Basel Convention hazard characteristic H11: characterization of chronic or delayed toxicity;
- (c) Interim guidelines on the hazardous characteristic H12 (ecotoxic);
- (d) Interim guidelines on hazard characteristic H13 of Annex III to the Basel Convention;
- (e) Technical guidelines on hazardous waste from the production and use of organic solvents (Y6);
- (f) Technical guidelines on incineration on land (D10);

- (g) Technical guidelines on hazardous waste physico-chemical treatment (D9) / biological treatment (D8).

9.6 Options for sewage (MARPOL Annex IV)

9.6.1 Options for pre-treatment

438. In ports where there are a lot of passenger and/or cruise vessels sometimes the ship-generated sewage is being discharged directly into the port's or municipal sewage treatment system. In most cases sewage can be entirely (biologically) processed together with land-based sewage streams. When the national or local water quality discharge standards are met, the treated water can be discharged directly into the surface water (docks/river/lake/sea). In addition, when conditions relating to sludge composition and treatment are fulfilled, it can be reused as fertiliser on land or soil conditioner.

439. As the specific composition of sewage varies (due to several factors such as ship type, number of passengers, length of the voyage and use of on board sewage treatment systems), pre-treatment is an important step, in order to generate a homogenous sewage stream that can be treated efficiently afterwards.

440. Flow equalization can be achieved using equalization basins. Several types of primary treatment or a combination of pre-treatment techniques for sewage can be applied, depending on the characteristics of the delivered sewage and the amounts of black water:

- (a) Sieving;
- (b) Plate separators, used for the collection of oil and fat;
- (c) Sand traps;
- (d) Coagulation/flocculation; or
- (e) Hydro-cyclones.

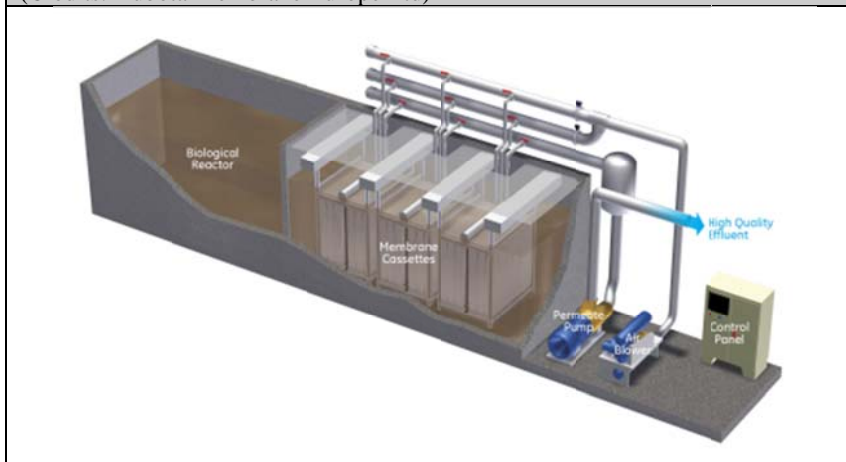
441. Secondary treatment of sewage is in general used in order to substantially degrade the biological content of the sewage, derived from human waste, soaps and detergent. In most cases the settled sewage is treated using aerobic biological processes in which purifying microorganisms break down the organic pollutants in the sewage. These microorganisms consume oxygen that is added through the use of aerators. During the purification process the microorganisms grow as flakes (bio sludge or activated sludge). These flakes are then separated from the treated sewage by settling or by membrane filtration.

442. To reduce costs the purification process and the settling are done in the same basin. The different steps of the treatment process are then performed alternately one after another. Therefore this type of sewage treatment is called a sequential batch reactor (SBR). The purification process in a SBR consists of at least four steps:

- (a) Supply with un- or pre-treated sewage;
- (b) Aeration;
- (c) Settlement; and
- (d) Discharge of treated effluent.

443. Membrane bioreactors (MBR) are micro-filtration or ultra-filtration membranes, in order to separate treated sewage from sludge flocs. These membranes have a pore size less than 0.1 microns and separate all of the bacteria and suspended matter from the treated sewage.

Concept of a membrane bioreactor
(Credits: Kubota Membrane Europe Ltd)



444. The purpose of tertiary sewage treatment is to provide a final treatment stage in order to further improve the effluent quality before it is being discharged into the receiving environment (sea, river, lake, wetlands, ground, etc.). Depending on the desired quality of the receiving waters (drinking water, swimming water, etc.), more than one tertiary treatment process may be used at any treatment plant. This can be done by filtration, nutrient removal, nitrogen removal or phosphorous removal.

9.6.2 Options for recovery

445. In general the only option for recovery of MARPOL Annex IV residues means the recovery of its nutritional value, such as a fertilizer or a soil conditioner. This is only possible when contaminating or interfering elements such as detergents, chemicals, oil or metals (especially Zn, Cu, Ni and/or Pb) have been eliminated. When sewage or sewage sludge are being used as a fertilizer, the nutrients (N, P, Ca, K, Mg) present in the sludge are used as food for plants and crops. When used as a soil conditioner, the sewage sludge is mainly used for improvement of the soil structure through the organic matter present in the sludge.

446. However, also the following recovery options can be practiced, such as:

- (a) Use as sealing material:

Sewage sludge can be used as an alternative sealing layer in a composite cover, e.g. to cover dumping sites. Studies have indicated that sewage sludge is effective for reducing oxygen diffusion to underlying tailings, and that as a poorly permeable material it can prevent water seepage;

- (b) More recently developed techniques that can also be applied for sewage sludge are pyrolysis, gasification, and vitrification.

9.6.3 Options for energy recovery and final disposal

447. Most waste water treatment sludge is not suitable to be used as a fertiliser or as a soil conditioner, because of possible contamination. Therefore the remaining options for final disposal are incineration (with or without energy recovery) and their use as sealing material in a landfill or simply disposal in a landfill.

448. In both cases a de-watering step is required. There are several processes possible to de-water, ranging from natural de-watering to the use of specially designed filters and centrifuges. The limit of mechanical de-watering lays around 40% dry matter (depending on the type of sludge). A higher level of de-watering can for example be obtained through the adding of chemicals.

9.6.3.1 Incineration

449. Before being incinerated the sewage sludge should be dried properly. This can take place in conventional or specialized dryers. Although not every type of incinerator is designed to process every type of dried sludge, it can be (co-)incinerated in several types of incinerators such as rotary kiln, cement kilns, and lignite kilns.

450. Another essential aspect is that pollution should not be transferred from solid waste to the air. As some components in the dried sludge can be transferred to the atmosphere and cause air pollution, an exhaust gas treatment system is required.

9.6.3.2 Options for environmentally sound management of final disposal operations in a landfill

451. Dried sewage sludge can, depending on its quality, composition and hazardousness, be disposed of in landfill. Before being put in a landfill, care should be taken that the impact of the dumping on the environment and the health of local residents is kept to a minimum. Also the safety and stability of the landfill should be taken into account when disposing sludge. For these reasons, sludge will need to be dried and stabilized before put in a landfill. Dried sludge also prohibits the growth of microorganisms, which has a positive effect on the stability of the landfill. In some cases, mechanical de-watering only will not be sufficient, and solidification may be necessary.

452. Several methods and techniques exist for the solidification/stabilization of dried sludge. A common technique is based on the addition of CaO, commonly known as quicklime. Adding quicklime will not only improve the solidness of the sludge, but will also lead to an additional disinfection of the sludge through an increase of the temperature during the process. Different installations for the blending of the waste and materials exist.

453. Dried sewage sludge can also undergo a composting process, before being put on a landfill. As in that case a large part of the organic materials will have disappeared leading to a dryer and more solid composition, dumping composted sludge will improve the geophysical stability of the landfill.

9.6.3.3 Sealing material for a landfill:

454. The purpose of a sealing layer is to prevent water leaking into and seeping out of the sealed zone, and prevent oxidation of the underlying materials. Therefore, the sealing layer is composed of a homogeneous layer of poorly permeable soil materials, surmounted with a seal made of welded foil materials.

455. Sewage sludge can be treated in such a way that it may serve as such poorly permeable soil material. Again, several processes exist, e.g. the above explained solidification through quicklime. In that case the treated sludge replaces other materials such as natural clay, sand and bentonite mixtures and soil-water glass mixtures.

456. As for all landfill sites, monitoring and aftercare (see section 9.4.3.3 of this guidance manual) are needed, in order to prevent the leaching of hazardous materials such as heavy metals and to monitor the stability of the landfill.

9.7 Options for ship-generated garbage (MARPOL Annex V)

9.7.1 Options for pre-treatment

457. When on-site pre-treatment and temporary storage are provided in the port, a valuable rule of thumb is that appropriate space must be available. Also on-site pre-treatment can take place using the collecting receptacle: compacting dumpsters, for example, both collect and compact garbage in the same piece of equipment.

458. Alternatively, garbage from ships can be collected from various points within a port and taken to a central location for compacting. Temporary storage areas should be accessible to vehicles used to haul garbage from collection sites and to haul garbage from storage to an incinerator or landfill. Storage areas must be accessible to collecting vehicles and should be protected from wind and other environmental elements and from for-aging animals, for public health, safety and aesthetic reasons.

9.7.2 Options for recovery

9.7.2.1 General methodology

459. Recycling operations usually involve the reprocessing of waste into products, materials or substances, though not necessarily for the original purpose⁵⁵. These recyclables still have useful physical or chemical properties, after having served their original purpose. Therefore the recycling of ship-generated garbage collected in a port should not be isolated from recycling garbage generated by land-based sources. Especially in smaller ports, the amount of ship-generated garbage will often be relatively small compared to municipal garbage.

460. The following benefits of recycling garbage are generally acknowledged:

- (a) It is an important step towards a circular economy, as it saves (scarce) raw materials;
- (b) It saves energy;
- (c) It reduced the impact on the environment, for example by minimizing the amounts of garbage which have to be land-filled;
- (d) It produces revenues by selling collected recyclable garbage or secondary raw materials.

461. As in many countries the disposal of garbage in landfills still is a common methodology, the benefits of the proper recycling of MARPOL Annex V residues generally have to be indicated. An important tool in this process is the waste management strategy, as both ship-generated wastes and residues and land-generated wastes may contain valuable materials, which can be reused as a resource material for other industrial activities. Therefore final disposing

⁵⁵ See the glossary of terms in document UNEP/CHW/OEWG.10/INF/10.

of these wastes and residues is an inefficient use of resources, and recycling options should thoroughly be explored (cradle-to-cradle approach).

462. It should however be noted that some types of garbage that are subject to special safety regulations (e.g. quarantined food wastes, medical wastes) cannot always be recycled. Furthermore, it should be noted that MARPOL Annex V residues can also contain or can be contaminated with hazardous materials (e.g. solvents, used batteries, light bulbs), which hampers recycling possibilities.

9.7.2.2 Options for recycling and energy recovery of MARPOL Annex V residues

463. Garbage contains a large variety of materials, such as wood, metal, paper, plastics, food wastes and glass. Further subdivision can take place, for example metal scrap may consist of aluminium, ferrous and non-ferrous materials. Recycling of garbage requires segregation, as already indicated. Some segregated streams can be recycled, for example:

(a) Metal can be recycled in steel mills, aluminium smelters, etc. Recycling scrap can lead to substantial energy savings when compared to production from primary resources. It also saves raw materials (ores);

(b) Used paper can be recycled in paper or cardboard manufacturing. Considerable savings in energy and raw materials consumption (wood) can be achieved;

(c) Organic wastes can be composted and used for soil improvement. A substantial volume reduction can be established for organic wastes. However, in many states food wastes from international shipping are to be incinerated;

(d) Glass can be recycled in glass production. Again, considerable energy savings are possible when compared with glass production from natural materials. However, materials such as silicates and sodium carbonate are not scarce;

(e) Some plastics can be recycled if properly segregated. Mixed plastics can be used to create other products with less demanding physical requirements;

(f) Used cooking oil can be recycled through refining into different types of bio-fuel. In some cases, waste contractors financially compensate the delivery of used cooking oil;

(g) The recycling of waste electrical and electronic equipment can, in most industrialized countries, be fully integrated with the treatment of land-based waste streams. The electrical and electronic devices are dismantled and the waste streams originating from the dismantling process are manually or mechanically segregated (cables, plastics, metals, etc.). Those segregated materials can then be recycled;

(h) Fishing gear: lately, the industry is developing interest for the recycling of waste fishing lines and nets. Hence, both plastic and steel can be, after recycling, segregated and recycled. The technology for this recycling process is currently under development and, therefore, it cannot be applied yet in every port/state. Another possibility is the use of used fishing gear as a source of energy in licensed incineration plants. Where possible, preference should be given, however, to the reuse of the materials since it avoids that the materials are lost and it saves additionally a significant amount of CO₂ emissions.

464. A major constraint of all these options is that, after delivery to a port reception facility, the recycling industry for these wastes does not always already exist. If such is the case, segregation of wastes and recycling still proves to be a viable option as, due to the transition towards a circular economy, more and more industries are seeking alternatives for using waste as possible raw material, and the economic value of segregated waste will increase. In addition, due to their increased economic value, it might be more interesting to transport segregated waste streams to regions where recycling industry is present. In that case the requirements of the Basel Convention on the transboundary movements of wastes will have to be taken into account.

465. In any case, the individual segregated wastes should meet the quality standards that are applicable to the regular raw materials used by manufacturers. Both reduced disposal costs (dumping or incineration) as well as revenues of selling the recyclable materials may result in a viable recycling program.

466. If the markets for recyclables as described above do not exist, recycling of ship-generated wastes and residues will be very difficult to implement. The amounts of segregated residues, and in particular ship-generated garbage, does not justify construction and operation of new production plants to recycle only these residues. Alternatively, local small-scale recycling options may be investigated, but it is questionable whether they can justify the administrative and operational costs for segregating these residues.

9.7.3 Options for final disposal

467. In certain cases the disposal of wastes and residues covered by MARPOL Annex V is closely linked with the disposal system that is being applied in the municipality. This means that it can be easily incorporated into it, and therefore the ship-generated garbage may either be incinerated or disposed of at a landfill. Incineration plants for

garbage are only cost-efficient for a more regional use, not for local use. Furthermore incineration plants require exhaust gas treatment systems in order to prevent air pollution, especially when hazardous wastes or wastes comprising potential health risks (such as medical wastes) are being incinerated.

468. Another garbage treatment option is the fermentation of garbage in a fermentation reactor, which might also be a feasible option for proceeding of ship-generated garbage, especially for food wastes. This means that garbage has to be segregated before processing.

9.7.4 Relevant recommendations in the Basel technical guidelines

469. The ship-generated wastes and residues covered by the Annex V to the MARPOL Convention can to a great extent be compared with land-based household wastes such as plastics, food wastes, domestic wastes (paper, rags, glass, metal, bottles, crockery, etc.) and cooking oil. These types of waste are in general being recycled, incinerated or disposed of in a landfill. Therefore the following Basel technical guidelines can be taken into consideration:

- (a) Technical guidelines on the environmentally sound co-processing of hazardous waste in cement kilns;
- (b) Technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal;
- (c) Technical guidelines on wastes collected from households;
- (d) Technical guidelines on specially engineered landfill;
- (e) Technical guidelines on incineration on land; and
- (f) Technical guidelines on the environmentally sound recycling/reclamation of metals and metal compounds.

470. For some of the hazardous waste streams (e.g. light bulbs containing mercury, rags contaminated with paints and solvents, batteries, medical waste, incinerator ashes, etc.), in addition to the ones mentioned above also the following Basel technical guidelines can be taken into account:

- (a) Technical guidelines for the environmentally sound management of wastes consisting of element mercury and wastes containing or contaminated with mercury;
- (b) Technical guidelines on hazardous waste physico-chemical treatment / biological treatment;
- (c) Technical guidelines for the environmentally sound management of waste lead-acid batteries; and
- (d) Technical guidelines on the environmentally sound management of biomedical and healthcare wastes.

471. Furthermore MARPOL Annex V also covers other specific wastes and residues from shipping such as operational wastes, dry cargo residues and washing waters containing these residues, animal carcasses and fishing gear. For these specific waste streams it is not always that obvious to identify its common ways of treatment/disposal.

472. However, taking into account general practices it can be assumed that for the disposal of these wastes the following Basel technical guidelines can be taken into account:

- (a) Operational wastes:
 - (i) Technical guidelines on specially engineered landfill;
 - (ii) Technical guidelines on incineration on land;
- (b) Dry cargo residues and washing waters containing these residues:
 - (i) Technical guidelines on specially engineered landfill;
 - (ii) Technical guidelines on hazardous waste physicochemical treatment/biological treatment;
- (c) Animal carcasses:⁵⁶
 - (i) Technical guidelines on incineration on land;
 - (ii) Technical guidelines on specially engineered landfill;
- (d) Fishing gear:
 - (i) Technical guidelines on incineration on land;
 - (ii) Technical guidelines on specially engineered landfill;

⁵⁶ Treatment/disposal of animal carcasses mainly depends on its hazardous character or not (e.g. in case of infectious diseases).

- (iii) Technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal.

9.8 Options for MARPOL Annex VI residues

9.8.1 Introduction

473. The management of exhaust gas cleaning residues can be integrated with similar waste streams originating from land-based exhaust gas cleaning systems. Given the high degree of specialization needed to treat these types of residues, their transboundary movement to a disposal plant might be necessary when there is no in-land expertise available. In this case, the sender should be aware of the possible applicability of international requirements regarding the transboundary movement of this waste, as mentioned in the Basel Convention on the Transboundary Movements of Hazardous Wastes and their Disposal.

9.8.2 Options for recovery

474. In the case of MARPOL Annex VI residues, recycling is not always possible. In some cases the residues can be recycled into construction material. If possible, preference should be given to this type of treatment.

475. A distinction can be made between practices regarding ozone-depleting substances and equipment containing such substances, and exhaust gas cleaning residues.

9.8.2.1 Ozone-depleting substances (ODS)

476. According to MARPOL Annex VI and the requirements of the Montreal Protocol, when servicing or decommissioning systems or equipment containing ODS, the gases are to be duly collected in a controlled manner and are to be landed to appropriate port reception facilities for banking or destruction. Any redundant equipment or material containing ODS should be landed ashore for appropriate decommissioning or disposal.

9.8.2.2 Residues from Exhaust Gas Cleaning Systems (EGCS)

477. Although currently not much information is available on the characteristics of EGCS residues/scrubber sludge, it is expected that these sludge are (highly) acidic and contain substantial amounts of salts and heavy metals. Therefore, it is rather difficult to develop pre-treatment techniques, in order to prepare these residues for possible recycling. Dry scrubbers on the other hand that are applied in a closed mode only, generate a dry gypsum-like residue that, according to the producer, can easily be recycled into material for construction works.

478. As only few ships are currently equipped with EGCS, very little residue treatment facilities have assessed recycling possibilities. This may change in the upcoming years, when more ships will have EGCS and want to deliver the residues to port reception facilities. As scrubbers are already being used in land-based industries, possible recycling options might be found there.

9.8.3 Options for final disposal

479. As recycling MARPOL Annex VI residues is not always possible, final disposal of these residues sometimes is the only option. Also here distinction can be made between the practices for final disposal of ozone-depleting substances and equipment containing such substances, and exhaust gas cleaning residues.

480. Ozone-depleting substances, when not suitable for reclamation or banking, should be sent for destruction. This process takes place in highly specialized destruction facilities. These plants can be especially designed to destroy ODS, or they can be incineration plants (which burn residues as a fuel) that are also capable to incinerate ODS, if licensed to do so. The two main types of destruction plants are destruction by incineration (in e.g. rotary kilns, industrial furnaces, cement kilns) and destruction by using plasma technology.

9.8.4 General recommendations and references in the Basel technical guidelines

481. The type and amount of residues and washing waters to be expected will depend on the Exhaust Gas Cleaning System (EGCS) installed and used on board ships. It is most likely to expect that the scrubber washing waters and the EGCS residues will differ significantly from washing waters and residues originating from gas exhaust cleaning in land-based facilities. This is mainly due to the possible use of salty seawater for exhaust gas cleaning, and the nature and composition of the gases to be cleaned (originates from burning heavy fuel oil, with a high sulphur content).

482. As today only few scrubbers have been installed on board ships, not much data is available on the types and characteristics of scrubber wastes. Therefore it is recommendable to investigate in-depth the effect that the legal (MARPOL) discharge of some of these washing waters might have, especially in ports and harbours, and whether or not this can be classified as environmentally sound management of this waste stream while in port. Taking into account the specific technicalities related to scrubbers on ships and the fact that the technical standards for the discharge of scrubber waste are agreed within the IMO, it is recommended that such impact assessment is carried out within the appropriate maritime forum such as IMO.

483. The sludge originating from the scrubber treatment plant, are likely to be classified as hazardous waste. As little is known today on the exact composition of this waste stream, it is advisable to first investigate the waste composition. This might allow deciding whether or not this waste stream can be incinerated and/or disposed of in an ESM according to the Basel Convention technical guidelines.

484. Given the fact that the type of equipment containing ODS or halocarbons is similar on land to on board ships, the facilities for these MARPOL Annex VI residues most likely can be integrated with land-based collection and treatment facilities. ODS are more in detail dealt with through the Montreal Protocol. Still, the Basel technical Guidelines on Hazardous Waste from the Production and use of Organic Solvents (Y6) can be applied here, as ODS are included as solvents.

9.9 Options for ballast water and ballast water sediments

485. The IMO *Guidelines For Ballast Water Reception Facilities (G5)* (Resolution MEPC.153(55)) contain information on the disposal of received ballast water. Ballast water discharged from a ship should be accepted by the ballast water reception facility including its suspended matter. Disposal of ballast water from a reception facility should not create a risk to the environment, human health, property and resources arising from the release or transfer to the environment of Harmful Aquatic Organisms and Pathogens. Where ballast water is disposed into the aquatic environment it should at least meet the ballast water performance standard specified in Regulation D-2 of the *International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004*. Disposal to other environments should be to a standard acceptable to the Port State and should not create a risk to the environment, human health, property and resources arising from the release or transfer to the environment of Harmful Aquatic Organisms and Pathogens.

486. In the case of facilities that specifically receive ballast water sediments, the IMO *Guidelines For Sediment Reception Facilities (G1)* (Resolution MEPC.152(55)) provide that disposal, handling and treatment measures applied to the sediment shall avoid unwanted side effects that may create a risk to or damage to the Party's environment, human health, property or resources or those of other States. Personnel involved in the handling of sediment should be aware of the possible risk to human health associated with sediment from ships ballast water tanks. Personnel should be adequately trained and be provided with suitable personal protective clothing and equipment.

9.10 Options for residues from anti-fouling systems

487. Residues originating from the removal of anti-fouling systems should be processed carefully, as they might contain biocides. Residual water should be collected for recycling or can be discharged to the sewer, when the process is licensed and the discharge is authorised by the competent authorities. Discharge to the sewer, however, remains problematic as anti-fouling paints may contain toxic chemicals that might destroy the bacterial cleaning processes in waste water treatment plants. Contaminated grit and other paint residues should be kept in sealed containers before being sent for final disposal.

488. All anti-fouling paint residues should be treated as contaminated/toxic residues and should be disposed of in accordance with local environmental and/or waste disposal regulations. Incineration in a specifically designed facility for the disposal of hazardous residues might be a preferred solution.

489. Contaminated sediments should be disposed of into a landfill equipped with an impermeable liner in order to prevent leakage of materials into ground or surface water.

10. Coordination and cooperation

10.1 Introduction

490. The large variety of issues that need to be addressed in order to establish an environmentally sound management of ship-generated wastes and residues, the many different stakeholders from both the private and public sectors that are involved at different levels (international, national and local) and the diverse technological, financial and legal input that needs to be provided, all require a thorough coordination and cooperation process at different levels and at varying moments in time.

491. Throughout the process of implementing a strategy for the environmentally sound management of ship-generated wastes and residues, and during the design of a port reception facility as well as all other processes related to the operation and management of port reception facilities, port and terminal operators need to consult with their users to determine customer needs with respect to the provision of the port reception facility. This will help in determining the appropriate levels of service for each waste stream, actual and potential, and identify ways to improve service and reduce disruptions. Also consultation with governing bodies and authorities is required to ensure that compliance with local and national legislation or regulations is achieved and maintained. Evidence of regular and extensive consultation is necessary.

492. Procedures should include a description of how information will be made available to the public. All the information pertinent to the management of the PRF should be made available to the ships visiting the port and their ship's agents in an easily understood format. There are many ways this can be done including a dedicated internet site or specific brochures or notices to shipping.

493. Especially good alignment of port and ship requirements is important in order to enable a fast and a safe disposal procedure for ship-generated wastes and residues, and to avoid undue delay.

494. This chapter describes guidelines and practices regarding the cooperation and coordination process, in order to enhance the environmentally sound management of ship-generated wastes and residues.

10.2 Coordination and cooperation at the international level

10.2.1 Communication

495. In order to provide efficient PRF services that meet the needs of ships calling at a port without causing undue delay, port authorities should prepare a Port Waste Management Plan and should ensure that relevant information about the reception services available and associated costs are communicated to ship operators well in advance of the ship's arrival.

496. It is useful for ship operating companies to be able to plan the delivery of MARPOL residues/wastes well in advance of the ship's next port call, especially if the port has more stringent requirements that might necessitate additional segregation of waste on board prior to arrival, such as quarantine segregation. Therefore port authorities and/or PRF providers are urged to communicate to their country focal points accurate and up-to-date information about the reception facilities available at the port. This information can then be communicated to the shipping industry via the IMO's PRF Database, accessible through the GISIS website.

10.2.2 The Global Integrated Shipping Information System (GISIS)

497. In order to facilitate the dissemination of information and promote public access to sets of data collection by the IMO Secretariat, the IMO has developed an internet based database on information for shipping: the Global Integrated Shipping Information System (GISIS)⁵⁷. This GISIS-database contains both information open to the general public and a member's⁵⁸ area section with more specific information only accessible to registered IMO users.

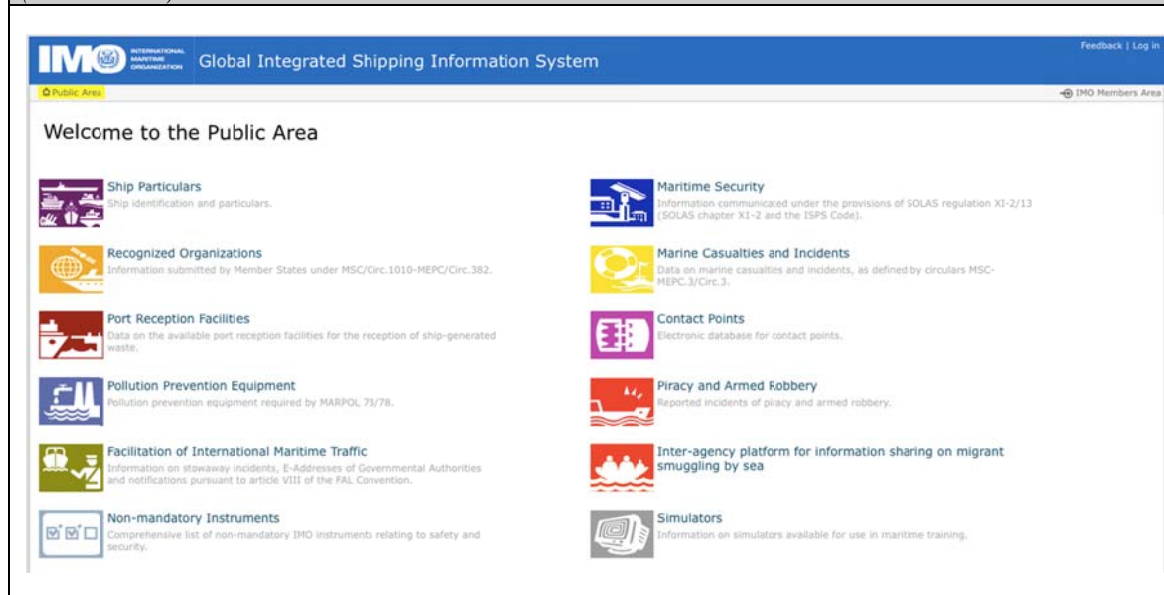
498. Some of the information that can be consulted by the general public is about e.g. ships' particulars, Recognized Organizations (RO's), available Port Reception Facilities in ports worldwide, pollution prevention equipment, reported incidents of piracy and armed robbery, notifications communicated under the provisions of MARPOL Annex VI (prevention of air pollution), information on local regulations, etc.

499. The Members Area section contains information regarding e.g. the status and completeness of information in GISIS received from IMO-members (reporting requirements), electronic database for the implementation of the Condition Assessment Scheme (according to Resolution MEPC.94(46)), information for Port State Control, status of ratification of IMO conventions (incl. global tonnage figures), etc.

⁵⁷ <http://gisis.imo.org/Public/>.

⁵⁸ The management of the rights to access and use of the GISIS electronic reporting facilities is left to the discretion of Member States. For detailed information, reference is made to Circular letter No. 2639 of 8 July 2005.

Screenshot of the GISIS homepage
(Credits: IMO)



500. The Port Reception Facility Database (PRFD) went live to the public on 1 March 2006. The database, which can be a good source of information about the reception facilities available at ports worldwide, provides data on facilities for the reception of all categories of ship-generated waste. While the public is allowed free access (following a simple initial registration) to all the information on a view-only basis, only the respective Member States can update data for reception facilities via a login password. The database aims at improving the rate of reporting alleged inadequacies of reception facilities so that the problem can be tackled more effectively. Governments are, in accordance with article 11(d) of the MARPOL Convention, to communicate to the IMO information on reception facilities available in ports.

501. At a minimum, the information uploaded and made available on the GISIS PRFD should include type of facilities, capacity of the facilities and the contact point. Additional information that would facilitate ships' planning might include contact details for the port authority or harbour master, a link to the port website, a link to the Port Waste Management Plan, and information relating to fees/cost to use facilities. Such additional information might be downloaded electronically as required, and could provide further instruction to ships regarding procedures for using the facilities (including, for example, specific local requirements for quarantine waste).

502. General obligations under each of the MARPOL regulations state that Parties should communicate information on their port reception facilities (list of reception facilities including their location, capacity and available facilities and other characteristics) to the IMO, including all cases where the facilities provided under these regulations are alleged to be inadequate.

503. The PRFD relies on up-to-date information being provided by port States. Port State authorities are encouraged to regularly seek accurate and up-to-date information from reception facility operators and port authorities and to maintain entries on the PRFD. Reception facility operators and port authorities should also be proactive in communicating updated information to port State authorities. This two-way communication will facilitate the dissemination of PRF information to the shipping industry.

504. Shipmasters/owners/operators can use the PRFD on the GISIS website to obtain information on specific port reception facilities. PRF operators are encouraged to maintain and update on regular basis current and accurate information regarding their facilities and to provide such information to authorities so as to ensure the accuracy of information on the PRFD and that current information is available to shipmasters and shipowners/operators. Ships' agents, acting on behalf of owners/operators may also access the public GISIS website for PRF information.

505. IMO Member States are to continue populating the PRFD, which offers to its users the following main services:

- (a) Search for available facilities (by waste category) in a port or a country;
- (b) Obtain contact information of the port state or flag state authorities responsible for handling reports on alleged inadequacies of PRF;
- (c) Identify any reported alleged inadequacies for a given port or over a period of time.

506. If an alleged deficiency in the facilities is identified (by complaint from a ship-owner, master or any other means) the appropriate authority can issue directions to improve the facilities and/or the level of service or take other actions (e.g. civil or criminal proceedings) as required.

10.2.3 Existing international networks on enforcement and compliance

507. In some regions of the world, there are networks dealing with the implementation and enforcement of environmental law, such as the network for Implementation and Enforcement of Environmental Law (IMPEL) in the European Union. This network provides Member States with relevant information and guidance documents regarding environmental inspection and enforcement issues.

508. Other existing networks are:

- (a) The East African Network for Environmental Compliance & Enforcement – EANECE. This network, for instance, released a manual which provides technical and procedural guidance for environmental inspections and investigations within East Africa;
- (b) The International Network for Environmental Compliance and Enforcement (INECE);
- (c) The Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE).

509. They specifically aim at:

- (a) Developing networks for enforcement and compliance cooperation, including on seaport security, environmental prosecutors, compliance training professionals, etc.;
- (b) Strengthening capacity throughout the regulatory cycle to implement and secure compliance with environmental requirements, including training programs on principles of environmental compliance and enforcement, environmental inspections, performance measurement indicators, etc.;
- (c) Raising awareness of the importance of environmental compliance and enforcement, including through conferences, publications, and the website and resource centre.

510. More information on these and other networks can also be found through the website of the Basel Convention (www.basel.int) or through the website of the INECE (www.inece.org).

10.2.4 Cooperation between the IMO and the Parties to the Basel Convention

511. Through successive decisions, the Conference of the Parties to the Basel Convention has underlined the importance of close cooperation between the Basel Convention and the IMO, in order to deal with common concerns as efficient as possible and by a holistic approach. An overview of the decisions taken within the framework of the Basel Convention (COP and OEWG) related to MARPOL and the cooperation with IMO is given in Annex 3 to this guidance manual.

10.3 Coordination and cooperation at the regional level

10.3.1 The European Sustainable Shipping Forum (ESSF)

512. In 2013 the European Commission established the European Sustainable Shipping Forum (ESSF). The main goal of the ESSF is to assist the European Commission in implementing the European Union's activities and programmes aimed at fostering sustainable maritime transport. The ESSF shall provide a platform for structural dialogue, exchange of technical knowledge, cooperation, and coordination between Member States, and relevant maritime transport stakeholders.

513. In 2015 a new expert Sub-Group on Port Reception Facilities has been established in order to facilitate the work of the Commission to improve the implementation of the operation of the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, and to discuss and provide feedback to the Commission on PRF related issues.

514. Initially the PRF Sub-group was established to advise the European Commission on issues related to the implementation and operation of Directive 2000/59/EC, as well as on the need and scope of a possible revision of the Directive. Its work is to include sharing of expertise and best practices, such as the development and monitoring of the waste reception and handling plans and the implementation and enforcement of the different requirements. In addition, the work of the PRF Sub-group can serve as basis for the future revision of the Directive, and as such can provide direct input to the impact assessment for such a revision

10.3.2 The requirement of cooperation within the framework of Directive 2000/59/EC

515. According to Article 12.1 (b) of the EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, EU Member States are required to designate appropriate authorities or bodies for performing functions under this Directive. Furthermore, according to 12(c) of the same Article, Member States have

to make a provision for cooperation between their relevant authorities and commercial organisations to ensure the effective implementation of the Directive.

516. According to the EMSA 2012 Horizontal Assessment report in general, with only very few exceptions, all Member States had designated authorities to carry out all the different functions under the Directive. The implementation schemes in EU Member States involved from two to eight⁵⁹ different governmental institutions performing the key functions. Although numerous ministries were at least somehow involved in many cases, most often the Ministry responsible for (maritime) transport and/or the Ministry for Environment with executive agencies in their domain (e.g. the maritime and environment authorities) were engaged. The involved authorities often had regional and local layers. Some of the designated bodies represented private-public partnerships. The port authorities had often been allocated an important role in the implementation and formed the main cooperation and partnership for the authorities.

517. The inspections noticed that there was seldom any cross border cooperation, especially for situations where a vessel had sailed without delivering its waste and there is the obligation to inform the next port of call.

10.4 Coordination and cooperation at the national level: consultation of stakeholders

518. When determining the appropriate level of service for the collection, storage and treatment of ship-generated wastes and residues, it is important to consult port users to assess their needs. Extensive consultation will also identify ways to improve practices.

519. The method of consultation can differ, and may depend on the size and type of the port, the way local stakeholders are organized through associations, and take into account the port's institutional framework. Consultation can be done in the form of meetings, or through an official consultation procedure where the draft plan is made public and every interested party can submit their comments within a certain timeframe. To guard that the stakeholders' consultation process is ensured and transparent, it can be useful that the procedures for public consultation of a port waste management plan are implemented in national and/or local environmental regulations.

Case Study: El Salvador

"Information exchange, monitoring and control mechanisms":

The Maritime Port Authority AMP coordinates the activities for the compliance to the MARPOL Convention and is managing the creation of an Inter-institutional Committee for the follow-up on this, which considers, among others, the aspects of information exchange, monitoring and operation control, so that only wastes, for which there are local alternatives for their management and an environmental permit in force, may be discharged.

Participating institutions, in their scope of competencies, are responsible for the following:

- (a) To see to it that the type and quantities of wastes, which are discharged in ports, correspond to those generated within the normal operations of the ships, and to those that may benefit from a local alternative for their management and an environmental permit in force.
- (b) To see to it that the maximum quantities of releases and wastes that may be collected in ports by the authorised Port Reception Facility supplier, are undertaken in conformity with established collection mechanisms.
- (c) To maintain adequate facilities to guarantee the supply of the different MARPOL port services.
- (d) To check and control inside port facilities that authorised suppliers of Port Reception Facilities offer, so that they may be compliant with the requirements.

For the information exchange and the control of waste discharge operations, the AMP is responsible for registering all corresponding information (by means of a database) for exchanging with authorities that participate in MARPOL procedures.

⁵⁹ In the case of federal structures.

Annex 1. Overview of case studies received

Case studies have been received by¹:

Colombia
El Salvador
Hungary
Malaysia
Montenegro
Russian Federation
South Africa
United States of America

The case studies are published on the Basel Convention website:
<http://www.basel.int/Implementation/LegalMatters/Ships/tabid/2405/Default.aspx>

¹ In alphabetical order.

Annex 2. Summary of restrictions to the discharge of garbage into the sea under regulations 4, 5, and 6 of MARPOL Annex V

Note: this table is intended as a summary reference. The provisions in MARPOL Annex V prevail.

Garbage type ¹	All ships except platforms ⁴		Offshore platforms located more than 12 nm from nearest land and ships when alongside or within 500 metres of such platforms ⁴ Regulation 5
	Outside special areas Regulation 4 (Distances are from the nearest land)	Within special areas Regulation 6 (Distances are from nearest land or nearest ice-shelf)	
Food waste comminuted or ground ²	≥3 nm, en route and as far as practicable	≥12 nm, en route and as far as practicable ³	Discharge permitted
Food waste not comminuted or ground	≥12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5,6} not contained in washwater	≥ 12 nm, en route and as far as practicable	Discharge prohibited	Discharge prohibited
Cargo residues ^{5,6} contained in washwater		≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2)	
Cleaning agents and additives ⁶ contained in cargo hold washwater	Discharge permitted	≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2)	Discharge prohibited
Cleaning agents and additives ⁶ in deck and external surfaces washwater		Discharge permitted	
Animal Carcasses (should be split or otherwise treated to ensure the carcasses will sink immediately)	Must be en route and as far from the nearest land as possible. Should be >100 nm and maximum water depth	Discharge prohibited	Discharge prohibited
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	Discharge prohibited	Discharge prohibited	Discharge prohibited

- 1 When garbage is mixed with or contaminated by other harmful substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply.
- 2 Comminuted or ground food wastes must be able to pass through a screen with mesh no larger than 25 mm.
- 3 The discharge of introduced avian products in the Antarctic area is not permitted unless incinerated, autoclaved or otherwise treated to be made sterile.
- 4 Offshore platforms located 12 nm from nearest land and associated ships include all fixed or floating platforms engaged in exploration or exploitation or associated processing of seabed mineral resources, and all ships alongside or within 500 m of such platforms.
- 5 Cargo residues means only those cargo residues that cannot be recovered using commonly available methods for unloading.
- 6 These substances must not be harmful to the marine environment.

Annex 3. Overview of decisions taken within the framework of the Basel Convention related to MARPOL and the cooperation with the IMO

Overview

1. Decision VIII/9 (COP 8, Nairobi, 27 November – 1 December 2005, UNEP/CHW.8/16)
2. Decision VIII/10 (COP 8, Nairobi, 27 November – 1 December 2005, UNEP/CHW.8/16)
3. Decision OEWG-VI/18 (OEWG 6, Geneva, 3–7 September 2007, UNEP/CHW/OEWG/6/29)
4. Decision IX/12 (COP 9, Bali, 23–27 June 2008, reflected in document UNEP/CHW.9/39)
5. Decision OEWG-VII/13 (OEWG 7, Geneva, 10–14 May 2010, UNEP/CHW/OEWG/7/21)
6. Decision BC-10/16 (COP 10, Cartagena de Indias, Colombia, 17–21 October 2011, UNEP/CHW.10/28)
7. Decision BC-11/17 (COP 11, Geneva, 28 April – 10 May 2013, UNEP/CHW/11/24):
8. Decision BC-12/16 (COP 12, Geneva, 4 – 15 May 2015, UNEP/CHW/12/27)

1. Decision VIII/9 on cooperation between the Basel Convention and the International Maritime Organization

The Conference of the Parties,

Bearing in mind recent events that resulted in harm to human health and the environment,

Mindful of the need to reinforce the cooperation between the Basel Convention and the International Maritime Organization with regard to the latter's regulations on prevention of pollution from ships,

1. *Requests* Parties and invites the secretariat of the International Maritime Organization to provide information and views to the Secretariat of the Basel Convention on:

- (a) The respective competencies of the Basel Convention and the International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 related thereto (MARPOL 73/78) in respect of hazardous wastes and other wastes;
- (b) Any gaps between those instruments;
- (c) Any option for addressing those gaps;

2. *Requests* the Secretariat to compile information received and add any relevant supplementary elements for submission to and consideration by the Open-ended Working Group at its next session.

2. Decision VIII/10 on Work programme of the Open-ended Working Group for 2007–2008, annex (extract)

VI. Cooperation and coordination			
Topics	Activities	Decisions at COP8	Priority
B. Cooperation between the Basel Convention and the IMO	Consider information on the respective competencies of the Basel Convention and MARPOL 73/78 in respect of hazardous wastes and other wastes, any gaps between those instruments and any options for addressing those gaps.	VIII/9	High

3. Decision OEWG-VI/18 on cooperation between the Basel Convention and the International Maritime Organization

The Open-ended Working Group,

1. *Encourages* Parties and others, in response to the invitation issued by the Conference of the Parties at its eighth meeting in decision VIII/9, to coordinate at the national level between their International Maritime Organization and Basel Convention representatives and to submit to the Secretariat, by 31 January 2008, information and views on:

- (a) The respective competencies of the Basel Convention and the International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 related thereto (MARPOL 73/78) in respect of hazardous wastes and other wastes;
- (b) Any gaps between those instruments;
- (c) Any options for addressing those gaps; and
- (d) Any other relevant information;

2. *Requests* the Secretariat to compile the information received for consideration by the Conference of the Parties at its next meeting;
3. *Requests* the Secretariat to place the information received on the website of the Basel Convention, as it is received;
4. *Requests* the Secretariat to forward the information received to the secretariat of the International Maritime Organization for its response.

Observation: It should be noted that, following this decision, additional comments have been received from Columbia, Norway and the IMO

4. **Decision IX/12 cooperation between the Basel Convention and the International Maritime Organization**

The Conference of the Parties,

Recalling its decision VIII/9 which, among other things, invited information and views on the respective competencies of the Basel Convention and the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 related thereto (MARPOL 73/78),

1. *Reiterates* its invitation to Parties to the Basel Convention and others to continue to provide information and views to the Secretariat on:
 - (a) The respective competencies of the Basel Convention and MARPOL 73/78 in respect of hazardous wastes and other wastes and harmful substances;
 - (b) Any gaps between those instruments;
 - (c) Any options for addressing those gaps, if any; and
 - (d) Any other relevant information;
2. *Requests* the Secretariat to compile any information received in response to paragraph 1 of the present decision for consideration by the Open-ended Working Group at its next session and to place such information on the website of the Basel Convention as it is received;
3. *Requests* the Open-ended Working Group to consider the information provided in response to paragraph 1 of the present decision, to develop specific recommendations on options that might exist for addressing any gaps between the Basel Convention and MARPOL 73/78 in respect of hazardous and other wastes and to transmit such recommendations to the Conference of the Parties for its consideration at its tenth meeting;
4. *Requests* the Secretariat to keep the International Maritime Organization informed, as appropriate, of any developments on the subject of the present decision arising in the context of the Basel Convention;
5. *Encourages* the Secretariat of the Basel Convention to continue to strengthen its cooperation with the Secretariat of the International Maritime Organization in relation to MARPOL 73/78 and other relevant International Maritime Organization instruments and activities;
6. *Encourages* Parties to organize internal coordination between their International Maritime Organization and Basel Convention representatives and to participate actively in any consideration of industrial production processes on board ships at sea or any consideration of the respective competencies of the Basel Convention and MARPOL 73/78;
7. *Requests* the Secretariat to monitor any consideration by the Marine Environment Protection Committee of the International Maritime Organization on industrial production processes on board ships at sea, or any consideration of the respective competencies of the Basel Convention and MARPOL 73/78, and to report thereon to the Open-ended Working Group at its next session and the Conference of the Parties at its tenth meeting.

5. **Decision OEWG-VII/13 on cooperation between the Basel Convention and the International Maritime Organization**

The Open-ended Working Group,

1. *Requests* the Secretariat, within available resources, to provide a legal analysis of the application of the Basel Convention to hazardous wastes and other wastes generated on board ships and to publish such analysis on the website of the Basel Convention by 31 March 2011 and invites Parties to submit comments on it by 30 June 2011;
2. *Invites* the Secretariat of the International Maritime Organization to submit to the Basel Convention Secretariat any further comments, views or information that it may have on:
 - (a) The respective competencies of the Basel Convention and the 1978 Protocol to the 1973 International Convention for the Prevention of Pollution from Ships in respect of hazardous wastes and other wastes and harmful substances;

- (b) Any gaps between those instruments;
 - (c) Any options for addressing those gaps, if any, such as may exist under other legal instruments of the International Maritime Organization;
 - (d) Any other relevant information;
3. *Requests* the Secretariat to cooperate closely with the Secretariat of the International Maritime Organization on the issue referred to in paragraph 2 above and to publish any information received pursuant to paragraph 2 above on the website of the Basel Convention for possible further comments by Parties and others;
 4. *Also requests* the Secretariat to report on the implementation of the present decision to the Conference of the Parties at its tenth meeting.

Observation: It should be noted that, following this decision, additional comments have been received from the IMO

6. **Decision BC-10/16 on cooperation between the Basel Convention and the International Maritime Organization**

The Conference of the Parties,

1. *Takes note* of the information provided on cooperation between the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the International Maritime Organization and expresses its appreciation to the International Maritime Organization, parties and others that have submitted information and views to the Secretariat on the relationship between the Basel Convention and the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997¹;
2. *Also takes note* of the revised legal analysis of the application of the Basel Convention to hazardous and other wastes generated on board ships²;
3. *Invites* Parties and others to submit further comments on the legal analysis to the Secretariat by 15 March 2012;
4. *Also invites* Parties to consider serving as lead country for further developing the legal analysis by 15 March 2012;
5. *Requests* the lead country, if one is identified, or the Secretariat, subject to the availability of voluntary funding, to prepare a revised version of the legal analysis, taking into account the comments received, by 30 April 2012 for publication on the Basel Convention website and consideration by the Open-ended Working Group at its eighth session;
6. *Acknowledges* the need to improve the sea-land interface to achieve the environmentally sound management of hazardous and other wastes generated on board ships;
7. *Requests* the Secretariat to strengthen its cooperation with the International Maritime Organization, through its secretariat, in relation to the minimization of the generation of hazardous and other wastes on board ships and to the environmentally sound management of such wastes generated on board ships once offloaded from ships;
8. *Acknowledges* the importance of assessing how far the current Basel Convention technical guidelines cover wastes covered by the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997;
9. *Invites* any party willing to do so to undertake the assessment mentioned in the preceding paragraph, or to provide funds to enable the Secretariat to undertake such an assessment, in close consultation with the International Maritime Organization;
10. *Requests* the Secretariat, subject to the availability of resources, to develop a guidance manual, in cooperation with the International Maritime Organization, on how to improve the sea-land interface to ensure that wastes falling within the scope of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997, once offloaded from a ship, are managed in an environmentally sound manner;

¹ UNEP/CHW.9/INF/22 and UNEP/CHW.10/INF/15.

² UNEP/CHW.10/INF/16, Annex I.

11. *Also requests* the Secretariat to keep the International Maritime Organization informed, as appropriate, of any developments on the subject of the present decision arising in the context of the Basel Convention;
12. *Further requests* the Secretariat to monitor any consideration by the Marine Environment Protection Committee and Maritime Safety Committee of the International Maritime Organization of issues of relevance to the Basel Convention, such as those related to the generation of hazardous and other wastes on board ships and the relationship between the Basel Convention and relevant conventions of the International Maritime Organization (e.g., the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997, and the International Convention for the Safety of Life at Sea) and to report thereon to the Open-ended Working Group at its eighth session;
13. *Requests* the Secretariat to continue its cooperation with the International Organization for Standardization with the objective of including the Basel Convention requirements of waste minimization and environmentally sound management in the international standard on port reception facilities being developed by the International Organization for Standardization;
14. *Urges* parties to make every effort to ensure cooperation at the national level between the shipping industry, maritime authorities, port authorities and environmental authorities, as well as between their representatives to the International Maritime Organization and the Basel Convention, to ensure the environmentally sound management of hazardous and other wastes generated on board ships;
15. *Requests* the Secretariat to report on the implementation of the present decision to the Conference of the Parties at its eleventh meeting and to prepare a draft decision thereon for consideration at that meeting.

7. **Decision BC-11/17 on cooperation between the Basel Convention and the International Maritime Organization**

The Conference of the Parties,

1. *Welcomes* the information contained in the note by the Secretariat on cooperation between the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the International Maritime Organization³;
2. *Expresses* its appreciation to the secretariat of the International Maritime Organization for its cooperation with the Secretariat, including in the framework of the development of the successive iterations of the legal analysis on the application of the Basel Convention to hazardous and other wastes generated on board ships;
3. *Takes note* of the revised legal analysis of the application of the Basel Convention to hazardous wastes and other wastes generated on board ships and *takes note* of the conclusions therein⁴;
4. *Requests* the Secretariat:
 - (a) To keep the International Maritime Organization informed of any developments on the subject of the present decision arising in the context of the Basel Convention and to monitor any consideration by the Marine Environment Protection Committee and Maritime Safety Committee of the International Maritime Organization of issues of relevance to the Basel Convention;
 - (b) To continue, as appropriate, to cooperate with the International Maritime Organization to improve the effectiveness of the Basel Convention in these matters;
 - (c) To continue, as appropriate, its cooperation with the International Organization for Standardization;
5. *Reiterates* the invitation to parties contained in decision BC-10/16 to undertake an assessment on how far the current Basel Convention technical guidelines cover wastes covered by the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997, or to provide funds to enable the Secretariat to undertake such an assessment, in close consultation with the International Maritime Organization;
6. *Also reiterates* the request to the Secretariat contained in decision BC-10/16 in respect of the development of a guidance manual, in cooperation with the International Maritime Organization, on how to improve the sea-land interface to ensure that wastes falling within the scope of the International Convention

³ UNEP/CHW.11/17.

⁴ UNEP/CHW.11/INF/22.

for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997, once offloaded from a ship, are managed in an environmentally sound manner, subject to the availability of resources;

7. *Requests* the Secretariat to report on the implementation of the present decision to the Conference of the Parties at its twelfth meeting.

8. **Decision BC-12/16 on cooperation between the Basel Convention and the International Maritime Organization**

The Conference of the Parties,

1. *Takes note* of the information contained in the note by the Secretariat on cooperation between the Basel Convention and the International Maritime Organization;⁵

2. *Takes note with appreciation* of the assessment, prepared by the Public Waste Agency of Flanders, on how far the current Basel Convention technical guidelines address wastes covered by the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997,⁶ and encourages parties and others to use it;

3. *Requests* the Secretariat to transmit the assessment referred to in paragraph 2 above to the International Maritime Organization;

4. *Requests* the Secretariat:

(a) To prepare a first draft of the guidance manual on how to improve the sea-land interface, taking into account the revised version of the *IMO Comprehensive Manual on Port Reception Facilities*,⁷ and to make it available on the Convention website by 31 December 2015;

(b) To invite parties and others to comment on the draft guidance manual by 31 March 2016;

(c) To submit a revised draft guidance manual, taking into account the comments received, to the Open-ended Working Group for consideration at its tenth meeting;

(d) To keep the International Maritime Organization informed of any developments on the subject of the present decision arising in the context of the Basel Convention and to monitor any consideration by the Marine Environment Protection Committee and the Maritime Safety Committee of the International Maritime Organization of issues of relevance to the Basel Convention;

(e) To continue, as appropriate, its cooperation with the International Organization for Standardization;

5. *Requests* the Open-ended Working Group at its tenth meeting to finalize the guidance manual on how to improve the sea-land interface for consideration by the Conference of the Parties at its thirteenth meeting;

6. *Requests* the Secretariat to report on the implementation of the present decision to the Conference of the Parties at its thirteenth meeting.

⁵ UNEP/CHW.12/18.

⁶ UNEP/CHW.12/INF/29/Rev.1.

⁷ International Maritime Organization, MEPC 67/11.

Annex 4. IMO guidance for the development of ship garbage management plans

Guidance provided by the 2012 Guidelines for the development of garbage management plans (resolution MEPC.220(63))

These guidelines were specifically developed to assist the shipowner/operator in the implementation of regulation 10.2 of the revised MARPOL Annex V.

To achieve cost-effective and environmentally sound results, many garbage management planners use a combination of complementary techniques to manage garbage, such as:

- (a) Reduction at source;
- (b) Reusing or recycling;
- (c) Onboard processing (treatment);
- (d) Discharge into the sea in those limited situations where it is permitted; and
- (e) Discharge to a port reception facility.

When requisitioning stores and provisions, shipping companies should encourage their suppliers to remove/reduce all packaging at an early stage, to limit the generation of garbage onboard ships. When garbage is generated on board, procedures should be defined to enable the crew to sort the material that can be reused onboard the ship or recycled at a port reception facility.

Ship's garbage is made up of distinct components, which might be regulated differently taking into account differing international, national, regional and/or local waste management requirements. Each component of the garbage therefore should be evaluated separately to determine its best management practice.

Matters that should be addressed in the garbage management plan are:

- (a) Designated person in charge of the plan;
- (b) Procedures for collecting garbage:
 - (i) Identify suitable receptacles for collection and separation¹;
 - (ii) Identify locations of receptacles;
 - (iii) Describe the process of how garbage is transported from the source of generation to the collection/separation stations;
 - (iv) Describe how garbage is to be handled between primary collection/separation stations and other handling methods;
 - (v) Describe the training/education programmes to facilitate collection of garbage and sorting of reusable/recyclable material.
- (c) Procedures for processing garbage:
 - (i) Identify responsible personnel;
 - (ii) Identify available processing devices/capacities;
 - (iii) Identify locations of processing devices/stations;
 - (iv) Identify the categories of garbage that are to be processed;
 - (v) Describe how reused/recyclable material is to be handled between primary processing stations and the storage/transfer stations;
 - (vi) Describe processing procedures used for reception facilities, storage and discharge into the sea (when permitted);
 - (vii) Describe training/education programmes to facilitate processing of garbage and reuse/recycling;

¹ Separation of garbage is considered part of the collection process. Separation may take place at the source or at a separate designated station.

-
- (viii) Identify standard operating procedures for the operation and maintenance of the garbage management equipment.
 - (d) Procedures for storing garbage or reusable/recyclable material:
 - (i) Identify locations, the intended use and the capacities of available storage stations for each category of garbage or reusable/recyclable material;
 - (ii) Describe the condition of how the garbage will be stored (e.g. “food – frozen”, “paper – compacted and should remain dry”);
 - (iii) Describe how garbage, incl. Reusable/recyclable material, is to be handled between storage locations and discharge;
 - (iv) Describe the training/education programmes to facilitate the storing of garbage and options for reuse/recycling.
 - (e) Procedures for discharging of garbage:
 - (i) Describe the ship’s procedures to ensure and demonstrate compliance with the requirements of the revised marpol annex v for the discharge of garbage.

Annex 5. Special Areas according to MARPOL

Special Areas	Amendments adopted to the MARPOL Annex	Entry into force of the amendments	More stringent measures in effect from
MARPOL Annex I: Oil			
Mediterranean Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Baltic Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Black Sea	2 Nov 1973	2 Oct 1983	2 Oct 1983
Red Sea	2 Nov 1973	2 Oct 1983	*
"Gulfs" area	2 Nov 1973	2 Oct 1983	1 Aug 2008 (resolution MEPC.168(56))
Gulf of Aden	1 Dec 1987 (resolution MEPC.29(25))	1 Apr 1989	*
MARPOL Annex I: Oil (cont'd)			
Antarctic area	16 Nov 1990 (resolution MEPC.42(30))	17 Mar 1992	17 Mar 1992
North West European waters	25 Sept 1997 (resolution MEPC.75(40))	1 Feb 1999	1 Aug 1999 (resolution MEPC.77(41))
Oman area of the Arabian Sea	15 Oct 2004 (resolution MEPC.117(52))	1 Jan 2007	*
Southern South African waters	13 Oct 2006 (resolution MEPC.154(55))	1 Mar 2008	1 Aug 2008 (resolution MEPC.167(56))
MARPOL Annex II: Noxious Liquid Substances			
Antarctic area	30 Oct 1992 (resolution MEPC.57(33))	1 Jul 1994	1 Jul 1994
MARPOL Annex IV: Sewage			
Baltic Sea	15 July 2011 (resolution MEPC.200(62))	1 January 2013	1 Jun 2019 (resolution MEPC.275(69))
MARPOL Annex V: Garbage			
Mediterranean Sea	2 Nov 1973	31 Dec 1988	1 May 2009 (resolution MEPC.172(57))
Baltic Sea	2 Nov 1973	31 Dec 1988	1 Oct 1989 (resolution MEPC.31(26))
Black Sea	2 Nov 1973	31 Dec 1988	*
Red Sea	2 Nov 1973	31 Dec 1988	*
"Gulfs" area	2 Nov 1973	31 Dec 1988	1 Aug 2008 (resolution MEPC.168(56))
North Sea	17 Oct 1989 (resolution MEPC.36(28))	18 Feb 1991	18 Feb 1991 (resolution MEPC.37(28))
Antarctic area (south of latitude 60 degrees south)	16 Nov 1990 (resolution MEPC.42(30))	17 Mar 1992	17 Mar 1992
Wider Caribbean region including the Gulf of	4 July 1991 (resolution	4 Apr 1993	1 May 2011 (resolution MEPC.191(60))

Special Areas	Amendments adopted to the MARPOL Annex	Entry into force of the amendments	More stringent measures in effect from
Mexico and the Caribbean Sea	MEPC.48(31))		
MARPOL Annex VI: Air pollution (Emission Control Areas)			
Baltic Sea (SO _x)	26 Sept 1997	19 May 2005	19 May 2006
North Sea (SO _x)	22 Jul 2005 (resolution MEPC.132(53))	22 Nov 2006	22 Nov 2007
North American (SO _x , and NO _x and PM)	26 Mar 2010 (resolution MEPC.190(60))	1 Aug 2011	1 Aug 2012
United States Caribbean Sea (SO _x , NO _x and PM)	15 Jul 2011 (resolution MEPC.202(62))	1 Jan 2013	1 Jan 2014

* The Special Area requirements for these areas have not taken effect because of lack of notifications from MARPOL Parties whose coastlines border the relevant Special Areas on the existence of adequate port reception facilities (regulations 38.6 of MARPOL Annex I and 5(4) of MARPOL Annex V).

** In accordance with the decision of MEPC 69, the discharge requirements for Special Areas in regulation 11.3 of MARPOL Annex IV for the Baltic Sea Special Area shall take effect:

- (a) On 1 June 2019, for new passenger ships;
- (b) On 1 June 2021, for existing passenger ships other than those specified in .3; and
- (c) On 1 June 2023, for existing passenger ships en route directly to or from a port located outside the special area and to or from a port located east of longitude 28°10' E within the special area that do not make any other port calls within the special area.

Annex 6. Article 8 of Directive 2000/59/EC on fees for ship-generated waste

1. Member States shall ensure that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of the waste, shall be covered through the collection of a fee from ships.
2. The cost recovery systems for using port reception facilities shall provide no incentive for ships to discharge their waste into the sea. To this end the following principles shall apply to ships other than fishing vessels and recreational craft authorized to carry no more than 12 passengers:
 - (a) All ships calling at a port of a Member State shall contribute significantly to the costs referred to in paragraph 1, irrespective of actual use of the facilities. Arrangements to this effect may include incorporation of the fee in the port dues or a separate standard waste fee. The fees may be differentiated with respect to, inter alia, the category, type and size of the ship;
 - (b) The part of the costs which is not covered by the fee referred to in subparagraph (a), if any, shall be covered on the basis of the types and quantities of ship-generated waste actually delivered by the ship;
 - (c) Fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.
3. In order to ensure that the fees are fair, transparent, non-discriminatory and reflect the costs of the facilities and services made available and, where appropriate, used, the amount of the fees and the basis on which they have been calculated should be made clear for the port users.
4. The Commission shall, within three years of the date referred to in Article 16(1), submit a report to the European Parliament and to the Council, evaluating the impact of the variety of cost recovery systems adopted in accordance with paragraph 2 on the marine environment and waste flow patterns. This report shall be drawn up in liaison with the competent authorities of the Member States and representatives of ports.
5. The Commission shall, if necessary in the light of this evaluation, submit a proposal to amend this Directive by the introduction of a system involving the payment of an appropriate percentage, of no less than one third, of the costs referred to in paragraph 1 by all ships calling at a port of a Member State irrespective of actual use of the facilities, or an alternative system with equivalent effects.

Annex 7. Financing possibilities: contact details

Generally, four main groups of multilateral institutions can be identified:

- World Bank;
- Regional development banks;
- Institutions of the European Union; and
- Institutions of the United Nations.

World Bank

The World Bank is the world's largest international financing institution, which aims at increasing the standard of living in developing countries. The World Bank consists of four organizations:

- International Bank for Reconstruction and Development (IBRD);
- International Development Association (IDA);
- International Finance Corporation (IFC);
- Multilateral Investment Guarantee Agency (MIGA).

The IBRD and the IDA are the most commonly known divisions of the World Bank. They focus on the public sector. The IDA supplies soft loans for the least-developed countries.

The protection of the environment is one of the World Bank's objectives. Therefore the World Bank offers grants for technical assistance and field survey. Loans are given for investment projects. For possible investments in port reception facilities the IBRD and the IDA are to be contacted.

World Bank coordinates:

World Bank/IFC
1818 H Street, NW
Washington, DC 20433
USA
Internet site: <http://www.worldbank.org/>

Regional development banks

The following regional development banks can be distinguished:

- African Development Bank (AFDC);
- Asian Development Bank (ADB);
- Inter-American Development Bank (IADB); and
- European Bank for Reconstruction and Development (EBRD).

These banks are organized in a way comparable to the World Bank. The difference is that the regional banks focus on a specific region. Most regional banks provide financial means to specific projects, but the banks also provide programmes and multi-project loans. Specific programmes on financing port reception facilities are not available. The regional development bank in question has to be contacted to investigate the funding possibilities.

African Development Bank (AFDC) co-ordinates

African Development Bank
01 P.O.B. 1387
7è étage, Immeuble CRRAE UMOA plateau
Abidjan 01
Côte d'Ivoire
Internet site: www.afdb.org

Asian Development Bank (ADB) co-ordinates

Asian Development Bank

6 ADB Avenue, Mandaluyong City 1550
Philippines
Internet site: <http://www.asiandevbank.org/>

Inter-American Development Bank (IADB) co-ordinates

Inter-American Development Bank
1300 New York Avenue, NW
Washington, DC 20577
USA
Internet site: <http://www.iadb.org/>

European Bank for Reconstruction and Development (EBRD) co-ordinates

European Bank for Reconstruction and Development
1 Exchange Square
London EC1A 3EH
United Kingdom
Internet site: <http://www.ebrd.com/>

Institutions of the European Union (EU)

The EU finances through various programmes several projects in Africa, Asia, Latin America, Central and Eastern Europe and the CIS (Commonwealth of Independent States) countries. Besides that, the EU also finances projects in its own community. Protection of the environment and sustainable development are important objectives of the EU programmes.

The duration of the programmes in which the EU finances a country is five years. Most of the programmes are grants given for technical assistance. Only the European Development Fund (EDF), which is the main instrument for providing Community development aid in the African, Caribbean and Pacific (ACP) countries and the overseas countries and territories (OCTs), provides grants for investments.

European Development Fund (EDF)

Directorate-General VIII
Building G-12, Rue de Genève 12
Wetstraat 200
1049 Brussels
Belgium
Internet site: http://ec.europa.eu/europeaid/how/finance/edf_en.htm

European Investment Bank (EIB)

98-100 Boulevard Konrad Adenauer
2950 Luxembourg
Internet site: <http://www.eib.org/>

United Nations Development Programme

For the purpose of this manual it should be noted that the United Nations (UN) consists of a large number of institutions. The headquarters of the UN are situated in New York, USA. The central and also largest UN organization for development cooperation is the United Nations Development Programme (UNDP). Through a network of field offices and resident representatives in over 134 developing countries, the UNDP offers financial and technical support for projects in the field of agriculture, industry, trade, education, energy, transport, communication, healthcare and housing. As already mentioned, the UNDP is, together with the World Bank and the UN Environment Programme (UNEP), one of the managing partners of the Global Environmental Facility (GEF). A description of the aims of the GEF is mentioned above. The GEF offers funding possibilities for projects like the establishment of port reception facilities.

For further information on the UNDP and addresses of the country offices, reference can be made to the website of the UNDP: <http://www.undp.org/>.

Annex 8. Overview of practical “to do’s” for stakeholders

This section has been developed in order to provide a non-exhaustive overview of possible practical measures, to be taken by different stakeholders, during the process of developing, maintaining and improving a strategy aiming at the environmental sound management of ship-generated wastes and residues.

For reasons of clarity and consistency with this manual, the measures are classified using the same order as the corresponding chapters in this guidance manual.

No.	Practical measure	Stakeholder	Corresponding section in the manual (when applicable)
Chapter 3: legal and policy framework			
1	Prepare overview of current national legal and regulatory framework, including involved authorities	All competent authorities	
2	Assess possible gaps in current national legal and regulatory framework, also taking into account impact of possible Special Area	All stakeholders	3.2.1.2
3	Ensure full implementation (legally and in practice) of all international regulations in national/local laws (taking into consideration commitments to international conventions)	Competent national/local authorities	3.2 / 3.3 / 3.4
4	Identify which processes and/or concerns need to be regulated, including the applicable schemes for licensing and permitting	Competent authorities, ports	
Chapter 5: developing a strategy and planning for the environmentally sound management of ship-generated waste delivered at ports			
5	Identify which authorities are responsible in order to develop a strategy for ship-generated wastes, incl. targeting	All stakeholders	5.2.2
6	Embed the management of ship-generated wastes in a general waste strategy	All competent authorities	5.2.2
7	Define clear targets for waste minimization, reuse and recycling, taking into account elements of circular economy	Assigned competent authority	
8	Assess whether current level of technology is sufficient to reach targets	Competent authorities, ports, waste industry (maritime, port and waste)	Chapters 6, 8 and 9
9	Ensure stakeholder consultation process	Competent authority	
10	Collect relevant data and information regarding potential delivery of ship-generated wastes in all ports	All stakeholders	5.3.1
11	Assess relevant data and information, in order to identify shortcomings and suggest improvements (administrative, operational and infrastructure)	All stakeholders	
12	Consider investment and operational costs, and assess possible means of financing	All stakeholders	
Chapter 6: requirements at the sea-land interface for ensuring the environmentally sound management of ship-generated wastes			
13	Assess adequacy of existing port reception facilities, and identify possible areas for improvement	Ports, industry	6.2.1
14	Ensure availability of adequate port reception facilities	Competent national/local authority, waste industry	6.2
15	Identify possible means of cooperation between ports on a regional scale	Competent authority, ports	5.2.2 / 6.2.1
16	Develop port waste management plans	Ports	6.3.1

No.	Practical measure	Stakeholder	Corresponding section in the manual (when applicable)
17	Ensure extensive stakeholder consultation process	Competent authority	6.3.6
18	Install advance notification scheme for ship-generated wastes	Competent authority, ports	6.3.2
19	Assess instalment of fee system for ship-generated wastes, implementing the “polluter pays” principle	Ports	6.3.4
20	Ensure possibility for collection of segregated waste streams	Ports, waste industry	6.3.5
21	Ensure proper communication and dissemination of information regarding availability of port reception facilities	All stakeholders	6.4
Chapter 7: information management and monitoring, enforcement and control			
22	Assess current level of availability and monitoring of information, and identify possibilities for improvement	Competent authorities, ports	7.2.1
23	Install a modern data and information system, able to process and monitor all relevant information and accessible to all relevant stakeholders	Competent authorities, ports	7.2.2
24	Assess current level of enforcement (incl. overview of all authorities involved), and identify possibilities for improvement	All stakeholders	7.3
Chapters 8 and 9: options and processes for the collection, storage, transportation, pre-treatment, reuse, recycling and disposal of hazardous wastes and other wastes from ships			
25	Ensure availability of waste collection and processing technology, able to meet the requirements, standards and targets embedded in the waste strategy	All stakeholders	Chapters 8 and 9
26	Assess possible investment and operational costs, incl. means of financing	Competent authorities, ports, waste industry	
Chapter 10: coordination and cooperation			
27	Ensure updating of information in GISIS PRF Database	Assigned competent authority	3.3.1.1
28	Explore national, regional and international networks of cooperation, and assess possible (increased) participation	All stakeholders	