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THÔNG BÁO KỸ THUẬT TÀU BIỂN
TECHNICAL INFORMATION ON SEA-GOING SHIPS

Ngày 24 tháng 08 năm 2017
Số thông báo: 024TI/17TB

Nội dung: Sổ tay về quản lý nước dằn - Cách thức thực hiện (Manual on Ballast Water Management - How to do it) của Tổ chức Hàng hải quốc tế.

Kính gửi: Các chủ tàu/ công ty quản lý tàu biển
Các đơn vị đăng kiểm tàu biển

Tổ chức Hàng hải quốc tế (IMO) đã xuất bản Sổ tay về quản lý nước dằn - Cách thức thực hiện (Manual on Ballast Water Management - How to do it) đưa ra các khuyến nghị về quá trình phê chuẩn, thực hiện và thi hành Công ước quốc tế về kiểm soát và quản lý nước dằn và cặn nước dằn tàu năm 2004 (Công ước BWM). Sổ tay bao gồm các thông tin hữu ích cho các Chính phủ, quốc gia tàu mang cờ quốc tịch, quốc gia có cảng, các cơ quan chức năng về môi trường, các chủ tàu và các bên khác liên quan đến việc phê chuẩn, thực hiện và thi hành Công ước BWM.

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Nơi nhận:
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- Phòng QP, TB, CN, HTQT;
- Trung tâm VRQC, TH;
- Các chi cục đăng kiểm;
- Lưu TB./.

ANNEX 11

MANUAL ON BALLAST WATER MANAGEMENT – HOW TO DO IT

PREFACE

This manual is published by the International Maritime Organization (IMO) to provide advice on the process of ratification, implementation and enforcement of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (hereafter the Convention).

The manual provides useful practical information to Governments, particularly those of developing countries, Administrations, shipowners, port State control authorities, environmental agencies and other stakeholders on the implications of ratifying, implementing and enforcing the Convention. The aim is to encourage the further ratification and proper implementation and enforcement of the Convention. However, it should be noted that, for legal purposes, the authentic text of the Convention should always be consulted.

It is emphasized that the annex to the Convention is a living document that develops over time, once the Convention enters into force. This manual does not attempt to be fully up to date and the reader is strongly advised to consult any updates of the Convention and relevant guidelines contained in IMO documents and publications.

TABLE OF CONTENTS

ABBREVIATIONS

BWE:	Ballast water exchange
BWMP:	Ballast water management plan
BWMS:	Ballast water management systems
BWRB:	Ballast Water Record Book
COLREG:	Convention on the International Regulations for Preventing Collisions at Sea
DBPS:	Disinfection By-Products
DMEL:	Derived Minimal Effect Levels
DNEL:	Derived No-Effect Levels
FPSOs:	Floating Production Storage and Offloading Units
FSUs:	Floating Storage Units
GISIS:	Global Integrated Shipping Information System
HES:	Human Exposure Scenario
IBWMC:	International Ballast Water Management Certificate
LL:	International Convention on Load Lines
MADC:	Maximum Allowable Discharge Concentration
MARPOL:	International Convention for the Prevention of Pollution from Ships
MEPC:	Marine Environment Protection Committee
MoUs:	Memoranda of Understanding
PBT:	Persistency, Bioaccumulation and Toxicity
PNEC:	Predicted No Effect Concentrations
PSC:	Port State Control
PSCO:	Port State Control Officer
QAPP:	Quality Assurance Project Plan
QMP:	Quality Management Plan
RO:	Recognized Organization
SDL:	System Design Limitations
SMS:	Safety Management System
SRA:	Same Risk Area
SOLAS:	International Convention for the Safety of Life at Sea
UNCLOS:	United Nations Convention on the Law of the Sea

CHAPTER 1 – Introduction: The Ballast Water Management Convention

1.1 Harmful aquatic organisms and pathogens present a major threat to marine ecosystems and shipping has been identified as a significant pathway for introducing species to new environments. The problem has increased with the introduction of steel hulls, allowing ships to use water instead of solid materials as ballast, and in particular over the last few decades as trade and traffic volumes have expanded. The effects of the introduction of non-indigenous species have, in many areas of the world, been devastating. Quantitative data show the rate of bio-invasions is continuing to increase significantly. As the volumes of seaborne trade continue overall to increase, the problem may not yet have reached its peak.

1.2 The Convention aims to prevent, minimize and ultimately eliminate risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens, by establishing standards and procedures for the management and control of ships' ballast water and sediments.

1.3 Under the Convention, ships to which the Convention's provisions apply will be required to manage their ballast water and sediments to a certain standard, according to a ship-specific Ballast Water Management Plan (BWMP). Ships will also have to carry a Ballast Water Record Book (BWRB) and an International Ballast Water Management Certificate (IBWMC). The ballast water management standards will be phased in over a period of time. Initially, ships subject to the Convention's ballast water requirements will be required to exchange ballast water mid-ocean. In due course these ships are required to meet a performance standard that limits the number of organisms in discharged ballast water.

1.4 Parties to the Convention are given the option to take additional measures, which are subject to criteria set out in the Convention and relevant guidelines for its uniform implementation.

1.5 The Convention consists of articles and annexes which include legal requirements, technical standards and regulations for the control and management of ships' ballast water and sediments and there are various resolutions and circulars developed by the Organization relating to it.

PART I: RIGHTS AND OBLIGATIONS

CHAPTER 2 – Structure and components of the Convention

The Convention is a legal instrument composed of various parts (preamble, articles and annex). The preamble conveys agreed principles and the articles bind the contracting Parties with the regulations set out in the annex. The Convention is supplemented by resolutions and circulars that provide technical and procedural guidance which is non-mandatory. These components are described briefly below as they are referred to in this manual.

2.1 Articles of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004

Article 1 – Definitions
Article 2 – General obligations
Article 3 – Application
Article 4 – Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments
Article 5 – Sediment reception facilities
Article 6 – Scientific and technical research and monitoring

Article 7 – Survey and certification
Article 8 – Violations
Article 9 – Inspection of ships
Article 10 – Detection of violations and control of ships
Article 11 – Notification of control actions
Article 12 – Undue delay to ships
Article 13 – Technical assistance, cooperation and regional cooperation
Article 14 – Communication of information
Article 15 – Dispute settlement
Article 16 – Relationship to international law and other agreements
Article 17 – Signature, ratification, acceptance, approval and accession
Article 18 – Entry into force
Article 19 – Amendments
Article 20 – Denunciation
Article 21 – Depositary
Article 22 – Languages

2.2 Annex – Regulations for the control and management of ships' ballast water and sediments

2.2.1 *Section A – General provisions*

This section includes definitions and provisions related to application, exemptions, exceptions and equivalent compliance, as follows:

Regulation A-1 Definitions
Regulation A-2 General applicability
Regulation A-3 Exceptions
Regulation A-4 Exemptions
Regulation A-5 Equivalent compliance

2.2.2 *Section B – Management and control requirements for ships*

This section highlights the requirements for ships to implement the Convention, including the timeline for transitioning to the performance standard and the locations permitted for BWE. This includes having on board and implementing a BWMP approved by the Administration (refer to Guidelines (G4)), maintaining a ballast water record book to log ballast water operations and adopting measures for sediment management (refer to Guidelines (G1)). Regulations include:

Regulation B-1 Ballast water management plan
Regulation B-2 Ballast water record book
Regulation B-3 Ballast water management for ships
Regulation B-4 Ballast water exchange
Regulation B-5 Sediment management for ships
Regulation B-6 Duties of officers and crew

2.2.3 *Section C – Special requirements in certain areas*

This section covers the process relating to additional measures that a Party, individually or jointly with other Parties, may impose on ships to prevent, reduce, or eliminate the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments. Regulations include:

Regulation C-1	Additional measures
Regulation C-2	Warnings concerning ballast water uptake in certain areas and related flag State measures
Regulation C-3	Communication of information

Guidance can be found in Guidelines (G13).

2.2.4 *Section D – Standards for ballast water management*

This section details the standards and requirements for ballast water management. The standards include those for ballast water exchange and for biological performance, related to water quality for discharge. There are also requirements for the approval of BWMS, testing and evaluation of prototype ballast water treatment technologies, and review criteria. Regulations include:

Regulation D-1	Ballast water exchange standard
Regulation D-2	Ballast water performance standard
Regulation D-3	Approval requirements for ballast water management systems
Regulation D-4	Prototype ballast water treatment technologies
Regulation D-5	Review of standards by the Organization

2.2.5 *Section E – Survey and certification requirements for ballast water management*

This section details the requirements for the survey of ships and the issuance of an International Ballast Water Management Certificate. Regulations include:

Regulation E-1	Surveys
Regulation E-2	Issuance or endorsement of a Certificate
Regulation E-3	Issuance or endorsement of a Certificate by another Party
Regulation E-4	Form of the Certificate
Regulation E-5	Duration and validity of the Certificate

2.2.6 *Appendices to the annex*

There are two appendices to the annex to the Convention, containing a model Certificate and ballast water record book, for use by Administrations and other stakeholders.

Appendix I	Form of International Ballast Water Management Certificate
Appendix II	Form of ballast water record book

2.3 Technical guidelines

2.3.1 The following Guidelines relating to the uniform implementation of the Convention have, inter alia, been developed and adopted starting from the 53rd session of the MEPC (MEPC 53) (see also sections 21.1 and 21.2). The Guidelines are kept under review by the MEPC and are updated as new technologies emerge and additional knowledge becomes available.

.1 Guidelines for sediment reception facilities (G1);
.2 Guidelines for ballast water sampling (G2);
.3 Guidelines for ballast water management equivalent compliance (G3);
.4 Guidelines for ballast water management and the development of ballast water management plans (G4);
.5 Guidelines for ballast water reception facilities (G5);

.6 2017 Guidelines for ballast water exchange (G6);
.7 2017 Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7);
.8 2017 Guidelines for approval of ballast water management systems (G8);
.9 Procedure for approval of ballast water management systems that make use of Active Substances (G9);
.10 Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G10);
.11 Guidelines for ballast water exchange design and construction standards (G11);
.12 2012 Guidelines on design and construction to facilitate sediment control on ships (G12);
.13 Guidelines for additional measures regarding ballast water management including emergency situations (G13);
.14 Guidelines on designation of areas for ballast water exchange (G14); and
.15 Guidelines for port State control under the BWM Convention.

2.3.2 In addition to the above, numerous other resolutions and circulars providing further guidance have been developed by the Organization and a list of these is included in chapter 21.

2.4 Actions required

Those concerned with the ratification and implementation of the Convention should study the documents outlined in this chapter. Further study and in-depth understanding will be necessary for those concerned with particular aspects of ratification and implementation. Information on the legal and practical implementation is given in the other chapters of this manual.

CHAPTER 3 – Rights and obligations under the Convention

Many of the articles of the Convention set down definite requirements. These are in addition to the regulations of the annex and some require specific actions by the Parties. Most of the resolutions and circulars adopted and approved by the Organization relevant to the Convention are non-mandatory, however, they provide valuable technical and operational guidance that Parties are encouraged to follow.

3.1 Definitions

3.1.1 Most of the definitions contained in article 1 (Definitions) are straightforward but a number of definitions are worth mentioning, in order to make it quite clear what the Convention does and does not cover.

3.1.2 With respect to the definition of "Administration", this means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of any State, the Administration is the Government of that State. With respect to floating platforms, including floating storage units (FSUs) and floating production storage and offloading units (FPSOs), the Administration is the Government of the coastal State over which exploration and exploitation of the sea-bed is occurring.[1]

[1] In the context of this manual "Administration" simply refers to the appropriate Government authority with responsibility for implementing and/or enforcing the requirements of a legal instrument.

3.1.3 "Ballast water" means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship. It is to be noted that this definition focuses on the function and purpose of the water, hence not all water present in a ship falls under the definition of "ballast water" (e.g. water present in the hopper area of a dredger).

3.1.4 "Ballast water management" means any mechanical, physical, chemical and/or biological process, used either singularly or in combination to remove, render harmless or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments.

3.1.5 "Harmful aquatic organisms and pathogens" means aquatic organisms or pathogens which, if introduced into the sea, including estuaries, or into freshwater courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

3.1.6 "Sediments" means matter settled out of ballast water within a ship.

3.1.7 "Ship" means a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating craft, floating platforms, FSUs and FPSOs.

3.2 General obligations

3.2.1 Under article 2 (General obligations) Parties undertake to give full and complete effect to the provisions of the Convention and the annex in order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. Parties may also take, individually or jointly with other Parties, more stringent measures, consistent with international law. Parties should ensure that ballast water management practices do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

3.2.2 Furthermore, the Parties shall endeavour to cooperate under the auspices of the Organization to address threats and risks to sensitive, vulnerable or threatened marine ecosystems and biodiversity in areas beyond the limits of national jurisdiction in relation to ballast water management and to avoid, as far as practicable, the uptake of ballast water with potentially harmful aquatic organisms and pathogens.

3.3 Application

3.3.1 The Convention applies to:

.1 ships entitled to fly the flag of a Party; and

.2 ships not entitled to fly the flag of a Party but which operate under the authority of a Party.

3.3.2 The Convention does not apply to:

.1 ships not designed or constructed to carry ballast water;

.2 ships of a Party which only operate in waters under the jurisdiction of that Party, unless the Party determines that the discharge of ballast water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent States;

.3 ships of a Party which only operate in waters under the jurisdiction of another Party, subject to the authorization of the latter Party for such exclusion. No Party shall grant authorization if doing so would impair or damage their environment, human health, property or resources, or those of adjacent or other States. Any Party not granting such authorization shall notify the Administration of the ship concerned that this Convention applies to such ship;

.4 ships which only operate in waters under the jurisdiction of one Party and on the high seas, except for ships not granted an authorization pursuant to subparagraph .3 above, unless such Party determines that the discharge of ballast water from such ships would impair their environment, human health, property or resources, or those of adjacent or other States;

.5 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. However, each Party shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with the Convention; and

.6 permanent ballast water in sealed tanks on ships that is not subject to discharge.

3.3.3 With respect to ships of non-Parties to the Convention, Parties shall apply the requirements of the Convention as may be necessary to ensure that no more favourable treatment is given to such ships.

3.3.4 The Organization developed *Guidance on entry or re-entry of ships into exclusive operation within waters under the jurisdiction of a single Party* (BWM.2/Circ.52/Rev.1) and has also approved circulars on the application of the Convention to mobile offshore units and offshore support vessels (BWM.2/Circ.46 and BWM.2/Circ.44).

3.4 Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments

Each Party shall require that ships subject to the Convention comply with its requirements and shall take effective measures to ensure that those ships comply with those requirements. Furthermore, each Party shall develop national policies, strategies or programmes that promote the attainment of the objectives in the Convention for ports and waters under its jurisdiction. This includes creating a national approach to ballast water management by ships that are not subject to the Convention. The objectives of the Convention are set out in its preamble.

3.5 Sediment reception facilities

Under article 5 (Sediment reception facilities) Parties undertake to ensure that ports and terminals where cleaning or repair of ballast tanks occurs have adequate facilities for the reception of sediments. Guidance for sediment reception facilities can be found in the technical Guidelines (G1).

3.6 Scientific and technical research and monitoring

Article 6 (Scientific and technical research and monitoring) calls for Parties individually or jointly to promote and facilitate scientific and technical research on ballast water management and to monitor the effects of ballast water management in waters under their jurisdiction.

3.7 Survey and certification

Article 7 (Survey and certification) requires ships to be surveyed and certified. Other Parties should accept a certificate issued under the authority of a Party to the Convention.

3.8 Violations

The Convention requires Parties to prohibit violations and to establish sanctions under their law and take procedures against offenders. Article 8 (Violations) also requires that Administrations informed of violations shall investigate the matter. National legislation implementing the Convention should reflect these requirements and a maritime Administration is required to fulfil these obligations. The sanctions shall be adequate in severity to discourage violations.

3.9 Inspection of ships

Under article 9 (Inspection of ships) ships may be inspected by PSCOs who can verify that the ship has a valid certificate and BWMP, inspect the BWRB and/or sample the ship's ballast water. A detailed inspection may be carried out if the ship does not carry a valid certificate or there are clear grounds to justify it. In such cases, the Convention states that the Party carrying out the inspection shall take such steps as will ensure that the ship shall not discharge ballast water until it can do so without presenting a threat of harm to the environment, human health, property or resources.

3.10 Detection of violations and control of ships

If a ship is detected to have violated this Convention, the flag State, and/or the port State may take steps to warn, detain or exclude the ship. If the ship poses a threat to the environment, human health, property or resources, the Party in whose water the ship is operating shall prohibit discharges until the threat is removed. Parties to the Convention agree to cooperate in monitoring compliance with the Convention and detecting violations. A Party may also inspect a ship when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party, together with sufficient evidence that a ship is operating or has operated in violation of a provision in the Convention.

3.11 Notification of control actions

If an inspection indicates a violation, the ship shall be notified. A report shall be forwarded to the Administration, including any evidence of the violation. In addition, the RO responsible for the issuance of Certificates shall be notified. The port State authority concerned shall also notify the next port of call about the violation including all relevant information if it did not take necessary steps to prevent the ship from discharging ballast water.

3.12 Undue delay to ships

All possible efforts shall be made to avoid a ship being unduly detained or delayed. Where undue delay does occur, the ship is entitled to compensation for any loss or damage suffered. A competent and efficient maritime Administration is required in order to fulfil this obligation.

3.13 Technical assistance, cooperation and regional cooperation

Under article 13 (Technical assistance, cooperation and regional cooperation) Parties undertake, directly or through the Organization and other international bodies, as appropriate, in respect of the control and management of ships' ballast water and sediments, to provide

support for those Parties which request technical assistance to train personnel; to ensure the availability of relevant technology, equipment and facilities; to initiate joint research and development programmes; and to undertake other action aimed at the effective implementation of the Convention and of guidance developed by the Organization related thereto.

3.14 Communication of information

Parties to the Convention undertake to provide the Organization with information as follows (for circulation, where appropriate, to all Parties):

.1 any requirements and procedures, including laws, regulations and guidelines, for implementation of the Convention;

.2 the availability and location of any reception facilities for the environmentally safe disposal of ballast water and sediments; and

.3 requirements for information from a ship which is unable to comply with the provisions of the Convention.

3.15 Dispute settlement

Parties shall settle any dispute between them concerning the interpretation or application of the Convention using peaceful means of their own choice.

3.16 Relationship to international law and other agreements

Nothing in the Convention shall prejudice the rights and obligations of any State under customary international law as reflected in UNCLOS.

3.17 Signature, ratification, acceptance, approval and accession

The Convention is open for accession by any State. States may become Parties by ratification, acceptance, approval, or by accession.

3.18 Entry into force

Article 18 (Entry into force) provides the conditions and timing of entry-into-force of the Convention, being 12 months after the date on which not less than 30 States, the combined merchant fleets of which constitute not less than 35% of the gross tonnage of the world's merchant shipping, have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with article 17.

3.19 Amendments

Article 19 (Amendments) provides the procedures for amendments. Any Party may propose an amendment to the Convention. Proposed amendments need to be submitted to the Secretary-General of the Organization or to a conference of Parties and follow the procedure described in article 19.2.

3.20 Denunciation

The Convention may be denounced by any Party at any time after the expiry of two years from the date on which it enters into force for that Party. Denunciation shall be effected by written notification to the Depositary, to take effect one year after receipt or such longer period as may be specified in that notification.

3.21 Depositary

The Convention is deposited with the Secretary-General of the Organization.

3.22 Languages

The Convention is established in the Arabic, Chinese, English, French, Russian and Spanish languages.

CHAPTER 4 – Jurisdiction

Jurisdiction refers to the authority of the Contracting Party, exercised as flag State, port State or coastal State. Jurisdiction dictates the legal implementation and enforcement of the Convention's requirements. It is vital to distinguish between the State's competence to prescribe legislation for individual ships (legislative jurisdiction) and its competence to enforce thus prescribed legislation (enforcement jurisdiction). According to article 16 (Relationship to international law and other agreements), States' rights and obligations under international law, as reflected in UNCLOS, shall not be prejudiced by the Convention's provisions.

4.1 Flag State jurisdiction

The rule is that, exceptions applying, a ship on the high seas is subject only to the jurisdiction of its flag State. The flag State must ensure its ships conform to international rules and regulations (such as the Convention), including through a survey and certification process and through appropriate enforcement action in the case of violations. The jurisdiction of the flag State may concurrently hold with the jurisdiction of port States or coastal States, if the ship visits the waters of the latter States.

4.2 Port State jurisdiction

4.2.1 Article 8(2) requires Parties to prohibit violations of the Convention and to establish sanctions for violations within their jurisdiction, including in ports. Port States can exercise enforcement jurisdiction on those ships calling at their ports through the PSC mechanism, which provides a "safety net" with regard to ships that may be in violation of the Convention. The jurisdiction of the port State may include inspection of certificates, inspection to detect violations, detention of ships in violation, etc. The grounds for port State intervention include:

.1 on its own initiative (possibly in the context of regional cooperation);

.2 at the request of the flag State or a coastal State; and

.3 following a complaint or information by crew, trade union or other stakeholder.

4.2.2 Port States may participate in regional agreements to effectively enforce compliance (e.g. MoUs on PSC) and they may have a common enforcement mechanism. Further information can be found in chapter 6 of this manual.

4.3 Coastal State jurisdiction

4.3.1 With respect to legislative jurisdiction, article 8(2) requires Parties to prohibit violations and establish sanctions for violation in their jurisdiction. In the territorial sea, the coastal State

enjoys sovereignty and the power to apply national law, subject to conformity with international law (e.g. the right of innocent passage). In the exclusive economic zone (EEZ), the coastal State has jurisdiction with regards to the protection and preservation of the marine environment. The Convention may be applied consistent with this jurisdiction.

4.3.2 Enforcement jurisdiction of the coastal State varies for different areas (zones) of the sea (see, e.g. UNCLOS article 220).

4.4 Application of the Convention

4.4.1 Article 3 (Application) identifies the ships to which the Convention shall or shall not apply. The Organization developed *Guidance on entry or re-entry of ships into exclusive operation within waters under the jurisdiction of a single Party* (BWM.2/Circ.52) and has also approved guidance on the application of the Convention to mobile offshore units and offshore support vessels (BWM.2/Circ.46 and BWM.2/Circ.44).

4.4.2 All enforcement agencies, whether acting in a port State or coastal State capacity, must be cognizant of the fact that improper action taken by them (such as unduly delaying or detaining a ship) may lead to civil liability.

PART II: MEETING OBLIGATIONS

CHAPTER 5 – Means of meeting obligations

5.1 Participation

5.1.1 Ratification, acceptance, approval or accession to the Convention, and its subsequent implementation, require the participation of a number of stakeholders, including but not limited to:

.1 Government of a State (the political body having power to conclude international agreements)

.2 Administration – legal;

.3 Administration – maritime;

.4 shipowners and operators; and

.5 port authorities.

5.1.2 Each stakeholder should know exactly what its institutional rights, obligations and responsibilities are, including the responsibilities of its staff and the requirements to be imposed on ships and ports.

5.1.3 As previously stated, in the context of this manual, Administration refers to the appropriate Government authority with responsibility for implementing and/or enforcing the requirements of a legal instrument.

5.2 Consultation

When a State is considering ratifying, accepting, approving or acceding to the Convention, the organizations that fall within the stakeholder categories listed in paragraph 5.1 above should be consulted in order to be properly prepared to implement and enforce all of the obligations and requirements.

5.3 Government of a State

5.3.1 The political desire of a State to accept, approve, accede to or ratify the Convention is fundamental. The common principles adopted by Parties and their specific objectives in adhering to it are set out in the preamble of the Convention. Governments may wish to become parties because of:

.1 concerns relating to the environment, human health, property and resources;

.2 concerns over water quality, which affects the population, or sea areas under their jurisdiction;

.3 desire to have uniform enforcement of the Convention;

.4 benefits to their shipowners (worldwide acceptance of ships);

.5 benefits to their ports (means of control of pollution); or

.6 concern for the worldwide environment.

5.3.2 Advice to Governments may come from the public at large, from their own maritime or environmental Administration and from their maritime industry.

5.4 Administration – legal

Once the political desire has been established and a decision made to become a Party, it is necessary to consider the means of ratifying or acceding to and implementing the Convention in domestic law.

5.5 Administration – maritime

The responsible Administration will have by far the greatest administrative task in the implementation of the Convention. It is likely that this body will provide advice to the legal branch and the Government on the one hand, and will advise the shipping industry and port authorities on the other. The maritime Administration also has responsibility for matters including the approval of BWMS, the approval of BWMPs and survey and certification requirements in accordance with relevant guidelines.

5.6 Shipowners and operators

Shipowners will need to select and equip ships for their operational needs and train seafarers, especially their merchant marine officers, in order to meet the requirements of the Convention. This includes ensuring that the BWMP is being executed. An outline of these requirements is given in part IV of this manual (chapters 8 to 12) in line with the respective sections of the annex to the Convention. Further information on duties of the shipowners can be found in chapter 16.

5.7 Port authorities

Port authorities may be requested to provide adequate sediment reception facilities as described in Guidelines (G1) and ballast water reception facilities capable of handling the quality and volume of the discharged water. Guidance on provisions for port reception facilities can be found in Guidelines (G5).

5.8 Obligations

All stakeholders involved with the Convention need to consider and meet their obligations with respect to:

.1 preparation of legislation, including regulations to incorporate and implement the Convention's requirements into their domestic law;

.2 capability for sampling and analysis of ballast water;

.3 adequate science capacity, e.g. to review ballast water risk assessments to address exemptions, additional measures or early warnings;

.4 survey and certification;

.5 inspection;

.6 design and construction requirements;

.7 equipment requirements;

.8 operational requirements;

.9 documentation;

.10 procedures; and

.11 agreements with other Governments.

5.9 Developing a compliance strategy

5.9.1 Why compliance?

Under article 8.2, any violation of its requirements within the jurisdiction of any Party shall be prohibited and sanctions shall be established under the law of that Party. In accordance with this obligation, a Party will need to implement a range of monitoring, compliance and enforcement mechanisms. Enforcement of the Convention should primarily focus on preventing the transfer of harmful aquatic organisms and pathogens and not simply on apprehending and punishing violators. The extent to which education, incentives, monitoring and policing programmes are used by a State to ensure compliance with the Convention depends upon the type of jurisdiction that the State enjoys over a ship (see chapter 4).

5.9.2 Strategies for verifying compliance

5.9.2.1 An effective compliance programme should incorporate all of the following elements:

.1 compliance monitoring through routine inspections, surveys, and/or examinations (including arrangements for sampling and analysis of ballast water);

.2 reporting procedures;

.3 adequate investigations of violations reported or otherwise detected;

.4 a system of adequate sanctions in respect of violations;

.5 education and public awareness programmes; and

.6 cooperation and coordination with other Parties.

5.9.2.2 A compliance programme should be adaptable enough to allow compliance priorities to respond to prevailing circumstances. One or more of its elements may be more salient for a Party depending on key variables, including the state of the national fleet, the type of ships calling at ports of the Party, the emergence of new equipment, procedural Convention standards, the availability of human and technological resources within the Administration and the familiarity of relevant stakeholders with the Convention.

5.9.2.3 In setting priorities for a compliance strategy, the Administration should undertake an exercise to identify which ships have the highest potential for being in violation, or where a violation would be most significant.

5.9.3 Awareness

Any compliance strategy should take into consideration that resources spent on education and prevention are likely to result in increased environmental protection through compliance and will also save resources that might have been spent on prosecution. Education and prevention strategies are necessary to sensitize all potential stakeholders about how they can assist in protecting the marine environment from the transfer of harmful aquatic organisms and pathogens. In this way, they may prove a cost-effective resource for Parties with limited financial or policing resources.

5.9.4 Cooperation and coordination of PSC

Article 10.4, as well as several important resolutions, lay the ground work for the doctrine of cooperation and interchange as a mutual effort of enforcement among Parties to the Convention. Such cooperation is an important tool in fostering clarity and uniformity in implementation and compliance objectives, in collecting evidence and in enforcement procedures. Cooperation may take several forms, such as joint investigations of violations, supplying information about a particular ship, gathering evidence of a violation, and prosecutions. Reciprocal arrangements in respect of investigations and compliance monitoring will be particularly valuable for Parties which are geographically proximate and/or which share common mechanisms for enforcement. Such arrangements can be formally achieved through MoUs on PSC of which nine are in existence worldwide (see figure 1). Proper regional cooperation and exchange of boarding results among participating Administrations are an effective enforcement tool and can also reduce the requirement for individual States to board all ships.

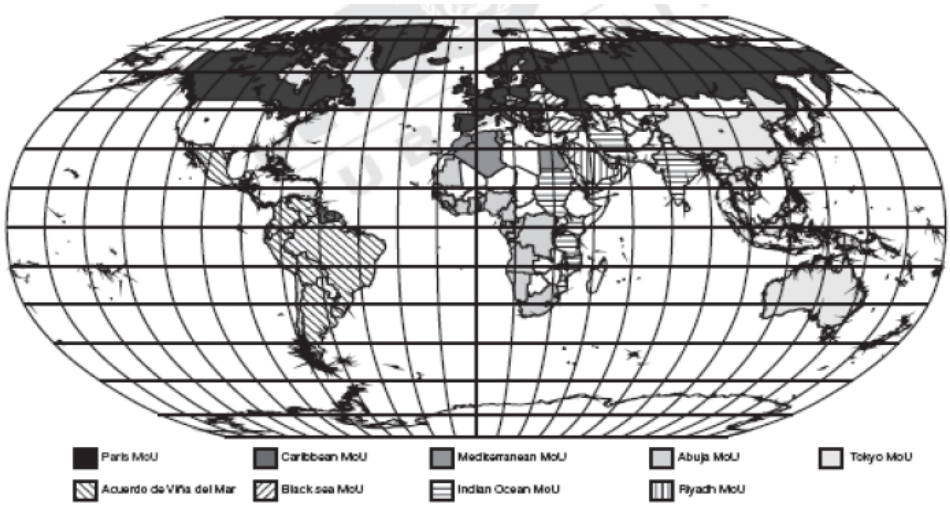

Figure 1: Overview of the nine MoUs on PSC

PART III: LEGAL ASPECTS

CHAPTER 6 – Integrating the Convention in domestic law

6.1 General

It is assumed that every Administration will have a legal department or lawyers, which may be attached to its maritime Administration or to a larger administrative department such as, for example, a Department of Transport. It is further assumed, for the purposes of this manual, that these legal officers will have primary responsibility for the legislation that is necessary to implement the Convention. Whatever the form of the Administration, it must be considered desirable for a single body to be given the overall responsibility for ratification, legislation and implementation. The legal system will vary from State to State, but the principal legal actions necessary for integrating the Convention into national law and implementation are likely to be as outlined in figure 2 and in the following paragraphs.

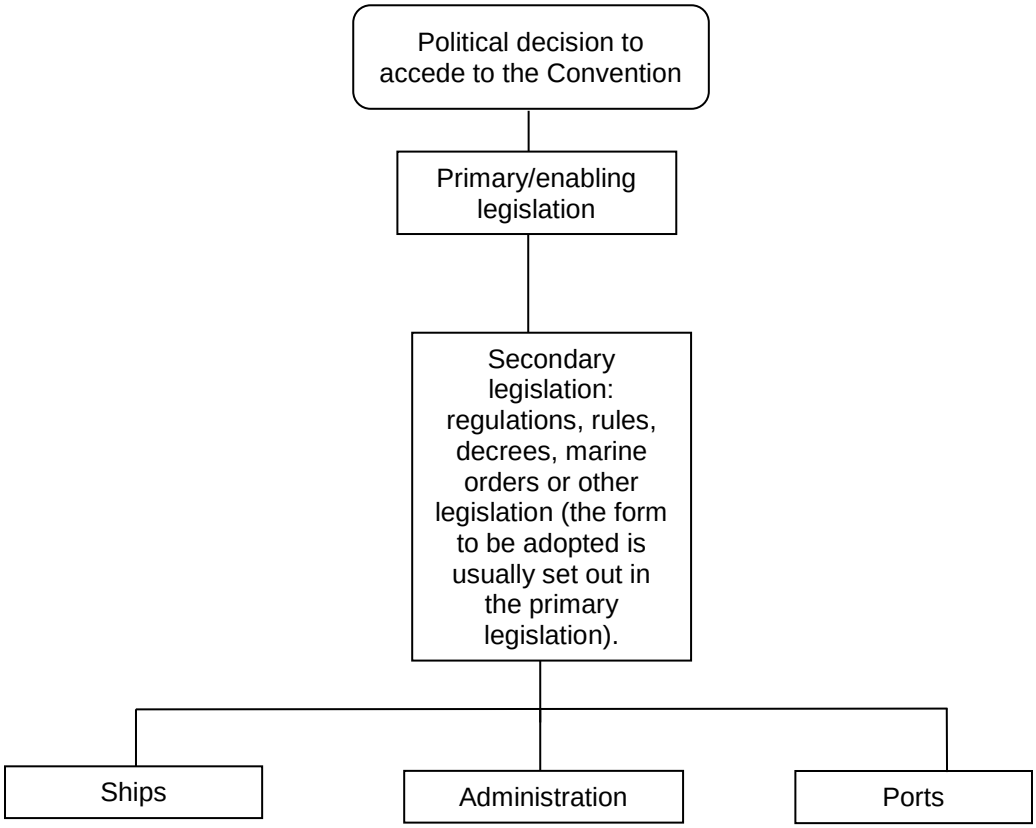

Figure 2: Integrating the Convention in domestic law and implementation

6.2 Parties to the Convention – instrument of accession

6.2.1 States may become Parties to the Convention by:

.1 signature not subject to ratification, acceptance or approval; or

.2 signature subject to ratification, acceptance, or approval, followed by ratification, acceptance or approval; or

.3 accession.

6.2.2 Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General of the Organization. In acceding, Governments indicate their acceptance and approval of the Convention and their readiness to implement its requirements.

6.3 Entry into force

6.3.1 According to article 18 (Entry into force), the Convention shall enter into force 12 months after the date on which not less than 30 States, the combined merchant fleets of which constitute not less than 35% of the gross tonnage of the world's merchant shipping, have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with article 17. The requirements for entry-into-force were met on 8 September 2016 and consequently it entered into force on 8 September 2017.

6.3.2 For States that deposited an instrument of ratification, acceptance, approval or accession in respect of the Convention after the requirements for entry-into-force thereof were met (8 September 2016), but prior to the date of entry in force (8 September 2017), the ratification, acceptance, approval or accession took effect on the date of entry-into-force or three months after the date of deposit of the instrument, whichever was the later date. Any instrument of ratification, acceptance, approval or accession deposited after the date on which the Convention entered into force shall take effect three months after the date of deposit.

6.3.3 After the date on which an amendment to the Convention is deemed to have been accepted under article 19, any instrument of ratification, acceptance, approval or accession deposited shall apply to the Convention as amended.

6.3.4 As the Convention enters into force for a State three months after the deposit of an instrument of accession by that State, the implementing legislation should enter into force no later than at that time. To ensure that this will be the case, the preparation of such legislation should be initiated well in advance of the accession. This timing is obviously particularly important if the implementing legislation is to be adopted by a parliament, congress, etc.

6.4 Implementing the Convention – primary legislation

6.4.1 The Convention, as most IMO conventions, is a non-self-executing treaty which requires implementing legislation. In some legal systems, the Convention may be integrated in the existing legislation covering safety of maritime transport or protection of environment, such as Merchant Shipping Act, Biodiversity Act, Maritime Code, etc. Such legislation will typically need to be amended to incorporate the provisions of the Convention which require legislative action. On some occasions, several pieces of primary legislation will need to be amended.

6.4.2 In other systems, new legislation, specifically for the purpose of implementing the Convention, will be required. It is advisable to look at how other international maritime conventions, such as SOLAS, MARPOL or the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS) have been implemented.

6.4.3 It is important that smooth implementation of amendments to the Convention, especially those which enter into force through the tacit acceptance procedure, and associated resolutions and recommendations be permitted.

6.5 Secondary legislation

6.5.1 As the Convention contains technical regulations, many legal systems would require secondary legislation to supplement, administer, support and enforce the primary legislation. The legal system of some States may permit regulations to be made directly under the primary legislation; others require an "order" approved by their Government or by Parliament (assembly, congress, legislative assembly, etc.) to bring the various parts of secondary legislation into effect.

6.5.2 The regulations that compose the annex to the Convention can, to a large extent, be produced as national regulations with very minor changes. However, due to varying degree of jurisdiction needing to be maintained, some of the regulations may not be straightforward to reproduce in national legislation.

6.5.3 In some systems, the primary legislation authorizes the use of incorporation by reference. Technical regulations may, this way, be incorporated into the domestic law.

This technique can be an efficient way of utilizing already existing technical regulations and standards and avoids the repetition of large volumes of technical material in legislation.

6.6 Communication of information

Pursuant to article 14 (Communication of information), Parties are obliged to report to the Organization any requirements and procedures relating to ballast water management, including their laws, regulations and guidelines on the implementation of the Convention; the availability and location of port reception facilities and requirements for information from a ship which is unable to comply with the provisions of the Convention. This information will be circulated by the Secretariat to all Parties.

CHAPTER 7 – Legal aspects of enforcement

7.1 What are violations?

7.1.1 It is important that legislation implementing the Convention establishes the elements of violations of its requirements to ensure compliance with and enforcement of its provisions.

7.1.2 Establishing what constitutes a violation of the Convention, transforming a violation into a domestic offence, characterizing it and appropriately investigating it are important aspects for Parties implementing and enforcing it. All Parties, in implementing the Convention, are required to apply its requirements so that ships of non-Parties receive no more favourable treatment than ships of Parties (see article 3.3).

7.1.3 The flag State shall ensure that ships flying its flag or operating under its authority are surveyed and certified in accordance with the regulations in the annex to the Convention (article 7 and section E of the annex) to ensure compliance.

7.1.4 Article 8.1 states that any violation of its requirements shall be prohibited and sanctions shall be established under the law of the Administration of the ship concerned, wherever the violation occurs. The Administration shall promptly inform the Party that reported the alleged violation, as well as the Organization, of any action taken. If the Administration has not taken any action within one year after receiving the information, it shall so inform the Party that reported the alleged violation.

7.1.5 Article 8.2 states that any violation of its requirements within the jurisdiction of any Party shall be prohibited and sanctions shall be established under the law of that Party. In case a violation occurs, every Party has an obligation to either cause proceedings to be taken in accordance with its law or to furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.

7.1.6 Violations will be enforced based on the non-observance of the substantive provisions of the law, whether in the primary or secondary legislation and such enforcement will depend on the way these substantive provisions are drafted. It is therefore important that the domestic legislation contains a clear description of obligations applicable to ships and persons under the Convention and corresponding offences for breach of these obligations.

7.1.7 While it is recognized that States have different standards of proof under their individual legal systems, in general States should allow for the reception of a wide variety of credible evidence, including circumstantial evidence, to indicate violations of the Convention. The gathering, presentation and admitting of evidence for violations must be carefully developed by States, where practicable in cooperation with other States, for the effective enforcement of the Convention.

7.1.8 Compared to detecting violations in other international conventions (e.g. MARPOL Annex I), detecting marine organisms which exceed the ballast water performance standard (regulation D-2) may sometimes be less straightforward. Documentary evidence, such as the inspection of the BWRB, the IBWMC or the BWMP, will play a major role in detecting violations of the requirements of the Convention. However, detecting violations of the discharge standard in regulation D-2 will require scientific evidence, gathered primarily through the analysis of a ballast water discharge sample. Further information on BWE and discharge standards (regulations D-1 and D-2) can be found in chapter 11 and on sampling and analysis of ballast water can be found in chapter 13.

7.1.9 The *Guidelines for port State control under the BWM Convention* (resolution MEPC.252(67)) have been developed by the Organization to assist Governments when exercising PSC inspections under the Convention. Further information on these Guidelines can be found in chapter 19.

7.1.10 All possible efforts shall be made to avoid a ship being unduly detained or delayed. Where undue delay does occur, the ship is entitled to compensation for any loss or damage suffered.

7.2 Sanctions

7.2.1 The type of sanctions applicable to varying violations under the Convention is a matter for determination by the individual Party and may be a function of several legal, political and economic circumstances. Moreover, the approach to sanctions in civil law and in common law jurisdictions may also differ. As sanctions can be very effective as a compliance tool, it would be beneficial for States to prescribe sanctions that are in harmony with applicable systems in neighbouring States or territories. Article 8.3 of the Convention requires that the sanctions shall be adequate in severity to discourage violations. This will also help to avoid the perception that some States have less stringent sanctions than others, which may in turn insinuate a "safe haven" to the potential violator. On the other hand, sanctions may take voluntary mitigation efforts and self-reporting into account. Such a progressive system is easier and less expensive to police and preserves prosecutorial assets for larger cases where substantial harm has occurred. The ultimate objective of the Convention which is to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens, should always be borne in mind.

7.2.2 Flag States should adopt sanctions for those activities that defeat the purposes of the Convention, such as falsification of records required. It is to be noted that there are requirements for BWMS to incorporate control and monitoring equipment and to store the operational and performance data for at least 24 months. These data provide vital evidence on the operation and performance of BWMS which can be cross referenced with the BWRB entries and ship log entries to identify potential violations.

7.2.3 Sanctions for these types of violations may be deemed criminal and could thereby serve as an important tool in promoting truthfulness in reporting, monitoring and other regulatory requirements. It is important to note that swift and certain sanctions for violations will have an important deterrent effect. It is also important to note that merely providing for the imposition of sanctions in national legislation will not, on its own, achieve significant benefits. Such sanctions should be supported by effective technical procedures for gathering evidence (such as sampling and analysis of ballast water).

PART IV: IMPLEMENTING THE REGULATIONS

CHAPTER 8 – Implementing Section A (General provisions)

8.1 Definitions

8.1.1 Seven terms are defined in regulation A-1: "anniversary date", "ballast water capacity", "company", "constructed", "major conversion", "from the nearest land" and "Active Substance", which are fundamental for the comprehension of various provisions of the Convention.

8.1.2 With regard to the term "major conversion", the Organization has approved a clarification that a new installation of BWMS should not be treated as a major conversion (BWM.2/Circ.45). It also clarifies what is meant by a "change of ship type" according to regulation A-1.5.2.

8.2 General applicability

8.2.1 Regulation A-2 is a key section that provides functional requirements for the Convention to achieve its goal. It states that, except where expressly provided otherwise, the discharge of ballast water shall only be conducted through ballast water management in accordance with the provisions of the Convention.

8.2.2 More generally, section A of the annex to the Convention deals with the scope of the regulations. When implementing the Convention, a Party first has to define precisely the scope of those regulations. For example, a decision needs to be made as to whether a Government wants to use the Convention as the basis for domestic ballast water requirements, or whether it will take a different approach to satisfying article 4.2.

8.3 Exceptions

8.3.1 Exceptions are circumstances where the requirements of regulation B-3, or any measures adopted by a Party pursuant to article 2.3 and section C, may not apply. Those circumstances are:

.1 the uptake or discharge of ballast water and sediments necessary for the purpose of ensuring the safety of a ship in emergency situations or saving life at sea; or

.2 the accidental discharge or ingress of ballast water and sediments resulting from damage to a ship or its equipment:

.1 provided that all reasonable precautions have been taken before and after the occurrence of the damage or discovery of the damage or discharge for the purpose of preventing or minimizing the discharge; and

.2 unless the owner, Company or officer in charge wilfully or recklessly caused damage; or

.3 the uptake and discharge of ballast water and sediments when being used for the purpose of avoiding or minimizing pollution incidents from the ship; or

.4 the uptake and subsequent discharge on the high seas of the same ballast water and sediments; or

.5 the discharge of ballast water and sediments from a ship at the same location where the whole of that ballast water and those sediments originated and provided that no mixing with unmanaged ballast water and sediments from other areas has occurred. If mixing has occurred, the ballast water taken from other areas is subject to ballast water management in accordance with the Annex to the Convention.

8.3.2 Ships that apply exceptions can only do so when facing the situations listed above. Those ships are otherwise required to comply with all other applicable regulations of the Convention. According to the PSC Guidelines (resolution MEPC.252(67)), the use of exceptions should be recorded in the BWRB, including an appropriate reasoning that the exception was justified.

8.3.3 The first three cases in regulation A-3 are similar to those found in other maritime treaties, whereas the fourth and fifth are specific to ballast water and might raise issues to be addressed, therefore extra attention needs to be paid to them.

8.4 Exemptions

8.4.1 Regulation A-4 affords Parties the possibility, in the waters under their jurisdiction, to grant exemptions to certain ships so that they are not required to apply regulations B-3 (Ballast water management for ships) or C-1 (Additional measures).

8.4.2 While this regulation primarily addresses port State authorities, flag State authorities should be involved to address enquiries raised by port State authorities involved with the request, e.g. updating the BWMP. An exemption can only be granted if all States that may be affected by it agree that the risk assessment demonstrates there is an acceptably low risk to the environment, human health, property and resources.

8.4.3 Therefore, a Party needs to anticipate that work on its exemptions policy should be undertaken sufficiently in advance of the Convention entering into force, in order to be able to provide stakeholders with the necessary information to apply for an exemption.

8.4.4 Exemptions can be granted for a determined period, not exceeding five years, to certain ships and according to certain conditions:

.1 the ship operates exclusively between specified ports or locations;

.2 the ship takes up only ballast water coming from those specified ports or locations; and

.3 a risk assessment should be performed following Guidelines (G7) prior to the exemption request. Administrations may grant exemptions in accordance with regulation A-4 based on the SRA concept subject to consultation and agreement between States that may be affected by such exemptions.

8.4.5 Exemptions are meant to apply to individual ships or groups of similar ships on specified voyages or similar specified voyages and particular attention needs to be paid to short-sea shipping in this specific case. The exemptions are subject to intermediate review, and may need to be withdrawn where the actual risk associated with the voyage has increased substantially since the risk assessment was conducted.

8.4.6 Guidelines (G7) provide assistance in the granting of exemptions, including procedures for consulting on and granting exemptions, and for reviewing and withdrawing them. When being used these need to be adapted to the local conditions which can include both biogeography and biodiversity and these conditions should be used by the Party to define its exemptions policy and to ensure clear internal guidelines are followed in decision-making.

8.4.7 The study of an exemption request and its possible granting procedure can be developed in three stages:

.1 risk assessment (according to Guidelines (G7)) when asking for exemption;

.2 study of this assessment by all the potentially affected States concerned; and

.3 communication of any granted exemption to the Organization.

8.4.8 The Parties may undertake the risk assessment themselves in order to grant exemptions, or require the shipowner or operator to undertake it. In any event, the Party granting an exemption is responsible for evaluating the risk assessment, verifying the data and information used and ensuring the assessment is conducted in a thorough and objective manner in accordance with Guidelines (G7).

8.5 Equivalent compliance

8.5.1 A simplified application of the Convention can be used in relation to certain pleasure and search and rescue craft, in accordance with regulation A-5 and taking into account Guidelines (G3).

8.5.2 Ships should aim to comply with the Convention, but otherwise may achieve equivalent compliance instead. Amongst its provisions, Guidelines (G3) recommend, taking into account the nature of the ship, that ballast water should be exchanged prior to discharge in accordance with regulation B-4, or otherwise managed in accordance with the requirements of the Administration, in order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens to the maximum extent practicable.

CHAPTER 9 – Implementing Section B (Management and control requirements for ships)

9.1 Ballast water management for ships

9.1.1 The Convention requires, inter alia, the development of individual ships' BWMPs, the maintenance of appropriate records and the compliance with certain concentration-based discharge limits which are dependent on the date of construction and ballast-water capacity of the ship in question.

9.1.2 The Convention stipulates two standards for discharged ballast water; the D-1 standard covers BWE while the D-2 standard is a ballast water performance standard. The Convention requires either the D-1 or the D-2 standard after entry into force on 8 September 2017.

9.1.3 As per resolution A.1088(28), the applicable date of compliance with the D-2 standard is that of the first IOPP renewal survey after entry into force of the Convention for all existing ships. Ships constructed after entry into force will be required to meet the D-2 standard on delivery.

9.1.4 Article 4 of the Convention (Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments) calls for Parties to:

.1 require ships to which the Convention applies flying their flag or operating under their authority to comply with the requirements of the Convention and to take effective measures to ensure that those ships comply with those requirements; and

.2 with due regard to their particular conditions and capabilities, to develop national policies, strategies or programmes for ballast water management in ports and waters under their jurisdiction that accord with, and promote, the attainment of the objectives of the Convention.

9.1.5 Compliance with the Convention can be achieved, inter alia, through the following options:

.1 as an interim measure exchange the ballast water as specified by regulation D-1 until regulation D-2 applies for the specific ship;

.2 treat the ballast water by using a type approved ballast water management system to meet the performance standard in regulation D-2; or

.3 implement other methods of ballast water management accepted as alternatives to the requirements described in regulation B-3, paragraphs 1 to 5, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources, and are approved in principle by the MEPC.

9.2 BWMS and other methods

9.2.1 BWMS, treatment methods and technologies have developed rapidly in preparation for the anticipated ratification and subsequent entry into force of the Convention. Current options include:

.1 mechanical treatment, e.g. filtration, separation or destruction;

.2 physical treatment, e.g. ultraviolet light, heat treatment, deoxygenation;

.3 chemical and electrochemical treatment, i.e. making use of Active Substances;

.4 combinations of the above; and

.5 in addition, sediment management, either by separation and return to local uptake water (compliant with the Convention) or by removal for disposal.

9.2.2 Alternative methods of compliance could include discharge of ballast water to an approved reception facility. Ships shall discharge ballast water in accordance with the standards set out in section D of the Convention and in accordance with regulation B-3.

9.2.3 More information on ballast water management options for ships can be found in chapter 17.

9.3 Ballast water exchange

9.3.1 BWE allows for implementation of the Convention by initially requiring ships to carry out an exchange of ballast water taken in port or coastal areas with water from the open sea, defined as 200 nm from the nearest land whenever possible, but in all cases at least 50 nm from the nearest land, and in water at least 200 m in depth. This procedure aims at reducing

the number and viability of organisms discharged in ports or coastal areas following transportation in ballast tanks. Aquatic organisms taken up with ballast water from the open sea are likely to be far fewer in number and less capable of causing a transfer of harmful aquatic organisms and pathogens into the receiving coastal waters, particularly when these receiving waters are fresh.

9.3.2 A ship shall not be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement for distances from the nearest land or water depths. A ship conducting BWE shall not be required to comply with regulation D-1 if the master reasonably decides that such exchange operation would threaten the ship's stability or in general the safety of the ship, its crew, or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition. Further information on BWE methods can be found in chapter 17.

9.3.3 The Convention does not require the use of BWE once a ship is required to comply with the D-2 standard. The BWE standard (regulation D-1) and the ballast water performance standard (regulation D-2) are discussed further in chapter 11.

Designation of areas for BWE

9.3.4 The Organization has developed Guidelines (G14), addressing how States may designate areas, in consultation with adjacent or other States, as appropriate, where ships may conduct BWE. Generally there are four integral steps to follow in designating an area as a BWE area:

.1 identification of the area, considering the legal aspects, navigational constraints, etc.;

.2 risk assessment;

.3 designation of the area, in accordance with national and international laws and obligations; and

.4 communication to the Organization prior to implementation.

9.3.5 The use of designated ballast water exchange areas and any impacts on the aquatic environment, human health, property or resources of the port State or those of other States should be monitored and reviewed on a regular basis.

Ballast water exchange in polar areas

9.3.6 The BWMP for ships entering polar waters needs to take into account the issues related to BWE in cold environments and in particular in polar conditions. Further information can be found in the *Guidelines for ballast water exchange in the Antarctic treaty area* (resolution MEPC.163(56)) and in the Polar Code.

9.4 Sediment management

9.4.1 The Convention does not require ships to dispose of sediments; however, if they wish to do so they would have to do it in compliance with the BWMP.

9.4.2 Aquatic organisms can settle out of ballast water and can continue to exist within the sediments that accumulate within ballast water tanks. These organisms can survive for long periods after the water they were originally in has been discharged. They may thereby be transported from their natural habitat and discharged in another port or area where they may cause harm or damage to the environment, human health, property and resources.

9.4.3 Each Party to the Convention undertakes to ensure that, in ports and terminals designated by that Party where cleaning or repair of ballast tanks occurs, adequate facilities are provided for the reception of sediments. Such reception facilities shall operate without causing undue delay to ships and shall provide for the safe disposal of such sediments that does not impair or damage their environment, human health, property or resources, or those of other States.

9.4.4 Sediment management is essential for any form of ballast water management. Ships will not be able to comply with the Convention if proper disposal of sediments from ballast water management is not carried out on an adequate scale. Ships should, without compromising safety or operational efficiency, be designed and constructed with a view to minimize the uptake and undesirable entrapment of sediments, facilitate removal of sediments and provide safe access to allow for sediment removal and sampling. The Guidelines (G12) provide details on ballast water tanks and how their internal structure should be designed to avoid the accumulation of sediments.

9.4.5 Ships should, during ballasting operations, as far as practicable, make every effort to limit the uptake of ballast water with potential high concentrations of sediments.

9.5 Ballast Water Management Plan

9.5.1 The Convention requires every ship to carry a ship-specific BWMP approved by its flag State or a RO on behalf of the flag State. Regulation B-1 specifies that a BWMP shall:

.1 detail safety procedures for the ship and the crew associated with ballast water management as required by the Convention;

.2 provide a detailed description of the actions to be taken to implement the ballast water management requirements and supplemental ballast water management practices as set forth in the Convention;

.3 detail the procedures for the disposal of sediments, at sea and to shore;

.4 include the procedures for the coordination of shipboard ballast water management that involves discharge to the sea with the authorities of the State into whose waters such discharge will take place;

.5 designate the officer on board in charge of ensuring that the plan is properly implemented;

.6 contain the reporting requirements for ships provided for under the Convention; and

.7 be written in the working language of the ship. If the language used is not English, French or Spanish, a translation into one of these languages shall be included.

9.5.2 In addition to the mandatory aspects of the BWMP listed above, the guidelines also offer more details and provide a standard format for the BWMP. A BWMP should, inter alia, contain:

.1 plans/drawings and a description of the ballast system;

.2 information on ballast water sampling points and sampling procedures;

.3 operational or safety procedures and restrictions;

.4 description of the method(s) used on board for the ballast water management and sediment control, including procedures for the disposal and handling of sediments;

.5 duties of the ballast water management officer;

.6 recording requirements; and

.7 crew training and familiarization.

9.5.3 Pursuant to the Guidance set out in BWM.2/Circ.52, as revised, ships (e.g. mobile offshore units) that need to enter or re-enter into exclusive operation pursuant to article 3.2(b)-(d) should also include a procedure in their approved BWMP for thoroughly cleaning their ballast tanks, piping and equipment.

9.5.4 The BWMP should be reviewed taking into account guidelines developed by the Organization. Any changes would then need to be reapproved by the flag State or RO on behalf of the flag State. The BWMP will be available for review by PSCOs and other authorities in connection with verifying compliance with the Convention's requirements.

9.5.5 The Organization has approved relevant guidance (BWM.2/Circ.40), which recognizes that regulation B-1 requires the BWMP to take into account guidelines developed by the Organization, but does not mandate specific compliance with Guidelines (G4). Although earlier guidance in resolution A.868(20) remains in effect, Guidelines (G4) have effectively superseded it. However, for practical reasons, the MEPC decided that BWMPs approved in accordance with resolution A.868(20) should remain valid until the plan requires revision due to the installation of a BWMS.

9.6 Ballast Water Record Book

9.6.1 The Convention specifies that all ships shall have on board a BWRB, which shall at least contain the information specified in appendix II to the annex to the Convention (see regulation B-2.1). The BWRB may be in an electronic format, or integrated into other record/log book systems. Entries in the BWRB shall be signed by the officer in charge of the operation and each completed page shall be signed by the master.

9.6.2 All ballast water operations shall be fully recorded without delay and the entries in the BWRB should be made as follows:

.1 when ballast water is taken on board;

.2 whenever ballast water is circulated, transferred between tanks or treated for ballast water management purposes;

.3 when ballast water is discharged into the sea;

.4 when ballast water is discharged to a reception facility;

.5 accidental or other exceptional uptake or discharge of ballast water;

.6 additional operational procedure and general remarks;

.7 exemptions; and

.8 exceptions including emergency procedures.

9.6.3 The minimum information to be entered in the BWRB (as detailed in appendix II) includes date/time and location, port or facility of uptake (latitude/longitude), depth if out of port, as well as estimated amount of ballast water uptake or discharge in cubic metres, and whether the BWMP was implemented prior to discharge. The BWRB entries shall be maintained on board the ship for a minimum period of two years after the last entry has been made and thereafter in the Company's control for a minimum period of three years. The BWRB will be available for review by PSCOs and other authorities in connection with verifying compliance with the Convention's requirements.

9.7 Duties of officers and crew

9.7.1 Regulation B-6 states that officers and crew shall be familiar with their duties in the implementation of ballast water management particular to the ship on which they serve and shall, appropriate to their duties, be familiar with the ship's BWMP. Officers and crew engaged in ballast water operations shall be familiarized and trained in the operation of the installed BWMS and their associated duties. In addition to instructions in the general aspects of ballast water management and the requirements of the Convention, ship-specific training should include operational procedures and maintenance of the BWMS and all related safety considerations, as detailed in the BWMP and the BWMS operating manual.

9.7.2 To facilitate the implementation, administration and execution of the BWMP, a qualified and responsible officer shall be designated (regulation B-1.5). The duties of the designated officer should be specified in the BWMP; such duties could include but are not limited to:

.1 having responsibility for proper implementation of the BWMP including familiarization and training of officers and crew with ballast water management related duties;

.2 ensuring that the ballast water management operations follow procedures laid down in the BWMP;

.3 preparing the ballast water declaration/reporting form prior to arrival in port;

.4 providing assistance to crew and officers under port State control and other inspections;

.5 witnessing any sampling of ballast water that may need to be undertaken;

.6 ensuring that sediment management is implemented and carried out in accordance with the BWMP;

.7 monitoring and ensuring that the BWRB is properly kept up to date;

.8 overseeing that other ballast water management and sediment management tasks specified by the BWMP are carried out; and

.9 having operational responsibility during BWE.

9.7.3 More detailed information about the general principles of ballast water management and guidance on the structure and content of BWMP can be found in the Guidelines (G4).

CHAPTER 10 – Implementing Section C (Special requirements in certain areas)

Article 2.3 provides that nothing in the Convention shall be interpreted as preventing a Party from taking more stringent measures consistent with international law. The Convention also provides that special requirements in certain areas may be necessary to prevent, reduce or eliminate the transfer of harmful aquatic organisms and pathogens. These requirements are in addition to the prescriptive measures detailed in Section B. Section C, dealing with these special requirements, includes three regulations:

.1 Regulation C-1 (Additional measures);

.2 Regulation C-2 (Warnings concerning ballast water uptake in certain areas and related flag State measures); and

.3 Regulation C-3 (Communication of information).

Regulations C-1 and C-2, while both working towards the intent of the Convention, are different in focus. Regulation C-1 is focused on ballast water discharge and concerns the process for a Party to establish more stringent measures. Regulation C-2 is focused on ballast water uptake and requests Parties to identify and communicate the timing and location of certain areas where ballast water should not be taken up.

Section C is important to the intent of the Convention. Regulation C-1 sets out the process for a Party to implement its own additional ballast water management requirements. Ensuring that such additional measures are effectively communicated is critical to avoid confusion and ensure compliance. Regulation C-2 encourages Parties to monitor their own waters and inform ship operators when such conditions (e.g. sewage outfalls, tidal conditions, and outbreaks, infestations, or populations of harmful aquatic organisms and pathogens) may exist. It is therefore important that Parties monitor their own waters and effectively inform challenging conditions to ships.

10.1 Additional measures

10.1.1 Regulation C-1 sets out the process for a Party to introduce additional measures that may increase protection of its own waters. These are additional measures beyond the minimum measures required in Section B.

10.1.2 The development and implementation of such measures requires careful consideration. Parties are advised to consider the following as they assess additional measures:

.1 scientific evaluation of the benefits, effectiveness and potential unintended consequences of such additional measures;

.2 practicality of implementing measures that might affect ship operations;

.3 impact of such measures on port logistics; and

.4 method for compliance monitoring and enforcement of such measures.

10.1.3 A Party shall communicate its intention to establish additional measures to the Organization at least six months prior to the projected date of the implementation of the measures. Information is contained in paragraph 3 of Guidelines (G13).

10.1.4 A Party may adopt an additional measure to address an emergency or epidemic situation. In these circumstances the requirement to advise the Organization six months in advance does not apply. However, if such a measure is adopted, the Party should, as soon as possible, notify adjacent and other States that may be affected, the shipping industry in general, and ships operating in areas of concern, and the Organization. Such information should contain:

.1 the precise coordinates of the area;

.2 the need for such additional measures;

.3 a description of the additional measures;

.4 any arrangements that may be provided to facilitate ships' compliance with the additional measures; and

.5 the effective date when the measures apply and when the measure is no longer in effect.

10.2 Warnings concerning ballast water uptake in certain areas and related flag State measures

10.2.1 Regulation C-2 sets out the process for a Party to notify ships of areas within its waters where ballast water should not be taken up, e.g. in order to avoid transporting harmful aquatic organisms and pathogens to other locations. Some warnings might be temporary, while others might need to remain in effect permanently.

10.2.2 A harmful algal bloom is an example where a temporary warning may be required. Such blooms result when sunlight and nutrients encourage the rapid reproduction of algal organisms to very high concentrations. Some blooms result in potentially harmful toxins. Such blooms could have concentrations of organisms that are much higher than BWMS are designed to treat. As a result, a ship taking up ballast water where a harmful algal bloom is occurring, risks transporting that bloom to another location.

10.2.3 A sewage outfall is an example of a location where a permanent warning is appropriate. In such locations, there may regularly occur high levels of pathogens due to high nutrient levels. The result could be either the transport of such pathogens to other locations, or inhibiting the treatment process due to effects such as high levels of dissolved organic carbon.

10.2.4 The Convention provides clear guidance on the process for a Party to introduce and issue such warnings in regulation C-2.

10.3 Practical guidance for ship operators for compliance with regulations C-1 and C-2

10.3.1 Ships must comply with additional measures (regulation C-1) and should observe warnings (regulation C-2) issued by Parties. Such measures and warnings, generally described above, are subject to be issued, changed and expired as needed to provide appropriate protection. As such, ship operators and masters are advised to routinely check through their flag State and other sources, such as the port States where the ship is expected to call.

10.3.2 Guidelines (G13) provide practical guidance in a flowchart (Procedure for introducing additional measures) under regulation C-1 for a Party or Parties to use when determining if measures in addition to those in Section B of the Convention are necessary in order to prevent, reduce or eliminate the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments (see figure 3).

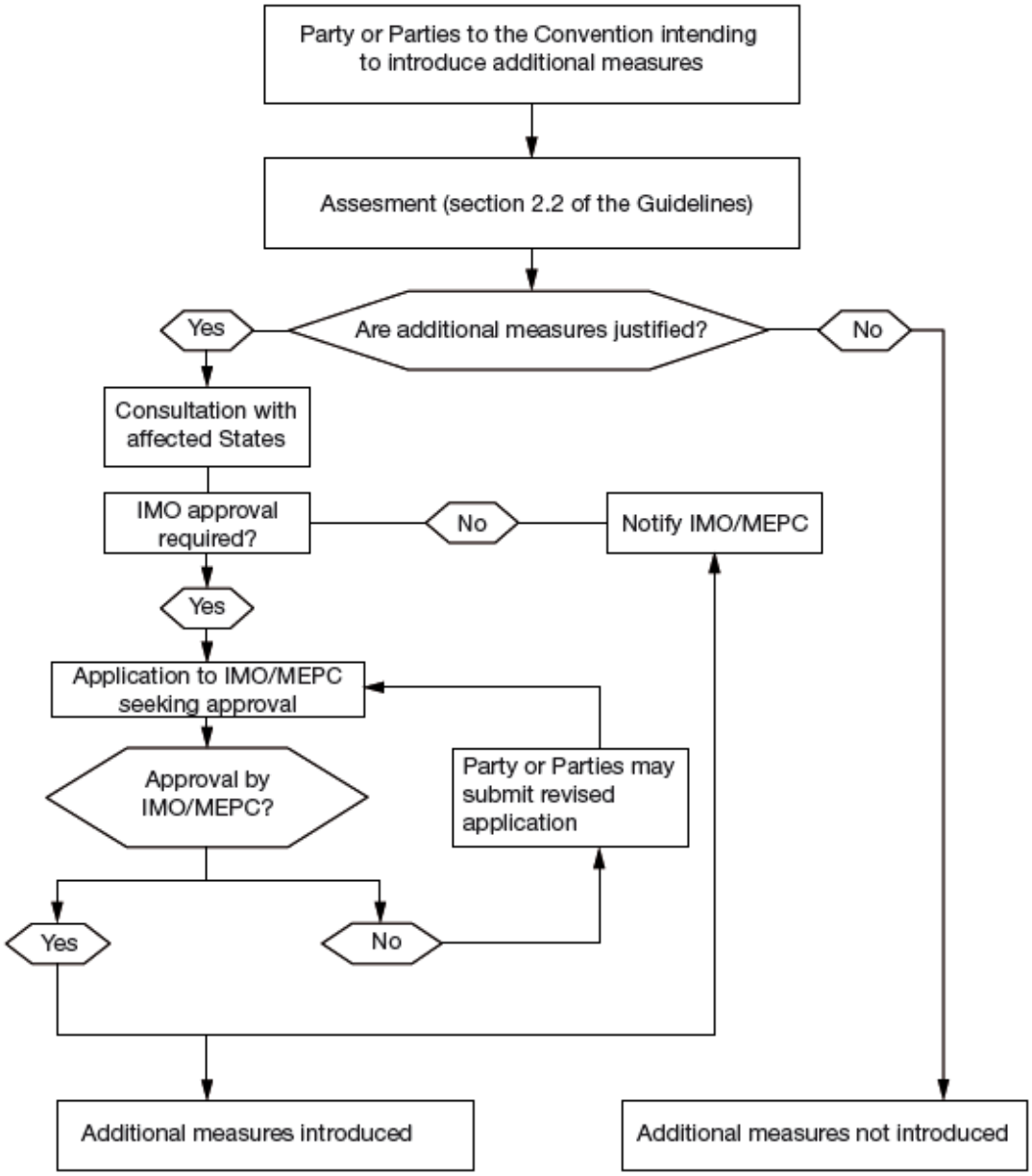

Figure 3: Flow chart – Procedure for introducing additional measures

10.3.3 Crews are advised to familiarize themselves with any requirements for record keeping and reporting associated with any additional measures, as well as any additional water quality discharge requirements (e.g. maximum allowable discharge concentrations of Active Substances, or limitations of marine ballast water discharges to fresh water recipient areas).

CHAPTER 11 – Implementing Section D (Standards for ballast water management)

11.1 BWE standard

11.1.1 The BWE standard is set out in regulation D-1, as follows:

.1 ships performing BWE in accordance with this regulation shall do so with an efficiency of at least 95% volumetric exchange of ballast water; and

.2 for ships exchanging ballast water by the pumping-through method, pumping through three times the volume of each ballast water tank shall be considered to meet the standard described in paragraph 1. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95% volumetric exchange is met.

11.1.2 The conditions under which BWE should take place are discussed in chapters 9 and 17 of this Manual. The BWE procedures are to be included in the BWMP and approved by the flag Administration. Further details regarding BWMPs and ballast water management via the exchange method can be found in the Guidelines (G4) and (G6).

11.1.3 Sampling for compliance verification of BWE can involve checking the ballast water salinity. Additional information regarding sampling and analysis to verify compliance with regulation D-1 can be found in the *Guidance on ballast water sampling and analysis for trial use in according with the BWM Convention and Guidelines* (G2) (BWM.2/Circ.42/Rev.1).

11.1.4 A ship that will operate with BWE should be designed and constructed taking into account considerations set out in the Guidelines (G11) in order to assist compliance with regulation D-1 of the Convention. These Guidelines have been developed to give guidance to shipbuilders, ship designers, owners and operators of ships in designing safe, environmentally acceptable, technically achievable, practicable and cost-effective BWE.

11.2 Ballast water performance standard

11.2.1 Regulation D-2 of the Convention specifies the biological performance standard for ballast water discharge, but does not prescribe the method(s) a ship should use to meet the requirements. The most effective and efficient method to meet the performance standard will vary depending on various factors for each ship. The majority of ships are expected to install an approved BWMS to achieve the performance standard. Therefore, to implement and achieve the ballast water performance standard in regulation D-2, a ship's officer in charge of ballast water management shall follow the appropriate procedures specified in the approved BWMP.

11.2.2 The ballast water performance standards in regulation D-2 are summarized in table 1.

Table 1: Performance standards (regulation D-2)

Organism category	Performance standard
Organisms, size ≥ 50 µm[(a)]	< 10 viable organisms/m^3
Organisms, size ≥ 10 and < 50 µm[(a)]	< 10 viable organisms/mL
Toxicogenic *Vibrio cholerae*	< 1 cfu[(b)]/100 mL
Escherichia coli	< 250 cfu[(b)]/100 mL
Intestinal Enterococci	< 100 cfu[(b)]/100 mL

[(a)] Minimum dimension.

[(b)] cfu: Colony-forming unit.

11.2.3 Information on the approval of BWMS can be found in chapters 13 and 14 of this manual, while information on sampling both for enforcement and for type approval testing can be found in chapter 13. In addition, options available for ships to meet the ballast water performance standard, including ballast water treatment and use of other methods, are discussed in chapter 17.

11.2.4 Should sampling for verification of compliance with regulation D-2 be deemed necessary, additional information can be found in the *Guidance on ballast water sampling and analysis for trial use in according with the BWM Convention and Guidelines* (G2) (BWM.2/Circ.42/Rev.1).

11.3 Approval requirements for BWMS

11.3.1 Regulation D-3 stipulates the basis for BWMS approval and directs Administrations, manufacturers and shipowners to the guidelines and procedures developed for the approval process.

11.3.2 BWMS used in order to comply with the Convention must be approved by the Administration taking into account Guidelines (G8). In addition, BWMS that make use of Active Substances shall be approved by the Organization in accordance with Procedure (G9). Further information on the approval of BWMS can be found in chapters 14 and 15 of this Manual.

11.4 Prototype ballast water treatment technologies

11.4.1 Regulation D-4 contains provisions for the evaluation and testing of promising ballast water treatment technologies. For a ship participating in such a programme approved by the Administration, the ballast water performance standard in regulation D-2 shall not apply until five years from the date on which the ship would otherwise be required to comply or from the date of installation of this technology. Throughout this period, the treatment technology must be operated consistently and as designed.

11.4.2 Details regarding the application of regulation D-4 and a sample statement of compliance for a prototype ballast water treatment technology can be found in Guidelines (G10).

CHAPTER 12 – Implementing Section E (Survey and certification requirements for ballast water management)

Survey and certification guidelines for the purpose of complying with the Convention are provided in the *Interim Survey Guidelines under the Harmonized System of Survey and Certification* (BWM.2/Circ.7), in accordance with regulation E-1 of the Convention. After the Convention enters into force, the interim survey guidelines will be incorporated in the most recent *Survey Guidelines under the Harmonized System of Survey and Certification* (HSSC Guidelines) (at the time of writing resolution A.1053(27), as amended by resolution A.1076(28)). Readers are advised to be familiar with the content of the HSSC Guidelines and keep track of revisions.

12.1 Surveys

12.1.1 Surveys are required for all ships of 400 GT and above, excluding floating platforms, FSUs and FPSOs to which the Convention applies. The Administration shall establish appropriate measures for ships that are not subject to these provisions in order to ensure that appropriate provisions of the Convention are complied with.

12.1.2 Certificates or endorsements are to be issued indicating completion of the survey. Before the ship is put in service an initial survey is required to verify that the BWMP and the ship's structure, equipment, systems, fittings, arrangements and material or processes comply fully with the requirements of the Convention, following which the certificate is issued. Ships are also subject to annual surveys, which must occur within three months before or after each anniversary date. The intermediate survey will take place within three months before or after

the second or third anniversary date, and shall take place on one of the annual surveys as mentioned above. An additional survey, either partial or general, shall be made after any change, replacement or significant repair is made to the system. The survey should ensure that any such change, replacement, or significant repair has been effectively made, so that the ship complies with the requirements of the Convention. All surveys shall be endorsed on the certificate. The certificate must also be renewed at a full renewal survey, at a date specified by the Administration but not exceeding every five years, to verify full compliance (structure, equipment, systems, fittings, arrangements and material or processes) with the applicable requirements of the Convention. These survey requirements are outlined in figure 4.

Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Initial survey*	Annual survey	Annual or intermediate survey	Annual or intermediate survey	Annual survey	Renewal survey

* Before the ship is put in service or before the Certificate is issued for the first time.

Figure 4: Schedule for survey and certification

12.2 Certification

12.2.1 Regulations E-2 to E-5 set out the requirements with regard to the issuance and endorsement of the IBWMC, as well as its form, duration and validity. An outline of the main provisions is given in this section.

Issuance or endorsement of a Certificate

12.2.2 An IBWMC shall be issued, either by the Administration or by any person or organization duly authorized by it, after successful completion of an initial or renewal survey, in accordance with regulation E-1. In every case, the Administration assumes full responsibility for the Certificate. The Certificate shall be endorsed, again either by the Administration or by any person or organization duly authorized by it, after successful completion of an annual or intermediate survey.

12.2.3 A Certificate issued under the authority of a Party shall be accepted by other Parties as having the same validity as a Certificate issued by them. Moreover, at the request of the Administration, a ship may be surveyed and a Certificate issued or endorsed, by or under the authority of another Party. A Certificate so issued shall have the same force and receive the same recognition as a Certificate issued by the Administration.

12.2.4 With respect to ships of non-Parties, Parties shall apply the requirements of the Convention as may be necessary to ensure that no more favourable treatment is given to such ships. An IBWMC cannot be issued to a ship flying the flag of a State which is not a Party. Ships flying the flag of a non-Party may be issued with a statement or certificate of compliance with the Convention.

12.2.5 The full requirements for the issuance or endorsement of a Certificate are set out in regulations E-2 and E-3.

12.2.6 Appendix I to the annex to the Convention contains the form of the Certificate, which is to be followed when drawing up a Certificate. Regulation E-4 sets out the language requirements for the Certificate.

12.2.7 The Organization approved guidance on the issuance of the IBWMC (BWM.2/Circ.40) prior to entry into force of the Convention. It recognizes that it would be impracticable to prepare, review and approve BWMPs and survey and certify all ships of 400 GT and above within the 12-month period between the date when the conditions for entry into force have been satisfied and the actual entry-into-force date of the Convention. In light of this, the guidance sets out a process for issuing certificates prior to entry into force of the Convention.

Duration and validity of the Certificate

12.2.8 A Certificate shall be issued for a period not exceeding five years. When the renewal survey is completed, the new Certificate shall be valid to a date not exceeding five years from the date of expiry of the existing Certificate. Paragraphs 1 to 7 of regulation E-5 set out in detail the provisions regarding the duration and validity of the Certificate and the conditions and circumstances under which the validity may be extended, but in no case for a period longer than three months. Moreover, regulation E-5.8 addresses the case where an annual survey may be completed prior to three months before the anniversary date.

12.2.9 In certain cases a Certificate shall cease to be valid. This is addressed in detail in regulation E-5.9; a summary of such cases is as follows:

.1 if the ship's relevant structure, equipment, systems, fittings, arrangements and material are changed, replaced or significantly repaired and the Certificate is not endorsed;

.2 upon transfer of the ship to the flag of another State;

.3 if the relevant surveys are not completed within the specified periods; or

.4 if the Certificate is not endorsed in accordance with regulation E-1.1.

12.2.10 In addition, according to the procedure in the *Guidance on entry or re-entry of ships into exclusive operation within waters under the jurisdiction of a single Party* (BWM.2/Circ.52/Rev.1), the Certificate of a ship should be withdrawn if the ship enters or re-enters into exclusive operation pursuant to article 3.2 (b)-(d).

12.3 Recognized Organizations

12.3.1 In practice, the term RO may usually be taken to mean a classification society; however, this does not preclude the use of other organizations and the contents of this paragraph would be relevant were any to be considered. The Administration should decide which organizations it will entrust with the authority to act on its behalf for the Convention purposes. These are likely to be the same as those authorized to act under other conventions, but they may be reduced or added to as necessary. Much will depend on the size of the flag fleet, the presence or otherwise of a national classification society which can meet its needs and the classification societies normally used by ships coming onto the State's register. It is essential that ROs are clearly aware of the extent of delegation permitted. The Administration should give guidance in a written agreement stating whether the ROs are to survey to the full requirements of the Convention. Clear instructions should be issued:

.1 laying down the action to be taken in the event of temporary non-compliance with the Convention;

.2 on the interpretation of regulations;

.3 on the issuance of exemptions where this is left to the discretion of the Administration;

.4 on the approval of equipment on behalf of the Administration; and

.5 on the survey of ships not classed, and on the ready provision of information to the Administration when requested.

12.3.2 With these points in mind, an Administration may consider the service an organization is prepared and able to provide.

12.3.3 The general criteria to be met by ROs acting on behalf of a maritime Administration should include the following:

.1 the RO should have sufficient experience and skill in performing technical surveys;

.2 the RO should be represented in all regions where the ships flying the flag of the Administration operate, which requires a minimum number of personnel; and

.3 the RO should be able to fulfil a continuing quality-assurance programme.

12.3.4 MEPC 65 adopted the *Code for Recognized Organizations (RO Code)* (resolution MEPC.237(65)), which took effect on 1 January 2015. Although the RO Code does not apply directly to the BWM Convention, it provides useful information on establishing a relationship with an RO to act on behalf of a flag State in connection with statutory certification and other services, as well as guidelines for flag State oversight.

CHAPTER 13 – Ballast water sampling

To assess whether a ship is in compliance with the BWE standard (regulation D-1) or the ballast water performance standard (regulation D-2) of the Convention, samples may need to be taken and analysed.

Ballast water samples taken will need to be representative of the physical nature (related to regulations D-1 and D-2) and/or the viable organism concentration (related to regulation D-2) of the whole of the ballast water discharge. Ballast water may be many thousands of cubic metres in volume held in several different and often complex shaped tanks. In addition, water and the organisms in it may not be homogeneously distributed in a ballast water tank. Sampling needs to be executed in a way that minimizes the impact on the number of viable organisms present in the water.

To achieve consistency in on board compliance testing of ballast water, uniform protocols for sampling and analysis of ballast water are essential. BWM.2/Circ.42/Rev.1 gives guidance on ballast water sampling and analysis in accordance with the Convention and Guidelines (G2). The purpose of this guidance is to provide general recommendations on methodologies and approaches to sampling and analysis to test for compliance with the standards described in regulations D-1 and D-2, especially during the trial period until methods are agreed upon.

There are two different occasions where the sampling for the ballast water performance standard (regulation D-2) is employed:

.1 sampling for type approval testing of BWMS (BWMS) (land-based and shipboard tests); and

.2 sampling for compliance.

13.1 Sampling for type approval testing of BWMS (land-based and shipboard tests)

13.1.1 Sampling and analysis of ballast water in accordance with Guidelines (G8) is undertaken as part of the type approval process for BWMS during both shipboard and land-based test cycles. Sampling for type approval is generally discharge or uptake sampling rather than in-tank sampling.

13.1.2 Shipboard test cycles are undertaken on an installed BWMS during normal ship ballasting operations. Land-based testing is undertaken under controlled conditions at an approved testing facility. Results are measured against the ballast water performance standard (regulation D-2) and also compared to intake levels for the organisms, which must meet required challenge conditions for a valid test. Validated methods for sample collection, handling, storage and analysis should be used. Sampling for the type approval process should meet the criteria set out in Guidelines (G8) for sample sizes and replication.

13.2 Sampling for compliance

13.2.1 Sampling ballast water for compliance on ships in accordance with Guidelines (G2) may be undertaken for two reasons:

.1 to evaluate levels of viable organisms in ballast water during discharge and/or in ballast tanks; and

.2 to evaluate the physical characteristics of the water (e.g. salinity) during discharge and/or in ballast tanks.

13.2.2 Main aspects of sampling and analysis

13.2.2.1 BWM.2/Circ.42/Rev.1 provides general recommendations on methodologies and approaches for ballast water sampling and sample analysis to test for compliance with the standards described in regulations D-1 and D-2 of the Convention.

13.2.2.2 Sampling and analysis for compliance testing is a complex issue. According to Guidelines (G2), testing for compliance can be performed in two steps. As a first step, prior to a detailed analysis for compliance, an indicative analysis of ballast water discharge may be undertaken to establish whether a ship is potentially in compliance with the Convention.

13.2.2.3 When testing for compliance, the sampling protocol used should result in a representative sample of the whole discharge of the ballast water from any single tank or any combination of tanks being discharged. Representative sampling reflects the relative concentrations and composition of the populations (organisms and/or chemicals) in the volume of interest. Samples should be taken in accordance with the annex, part 1 and/or part 2 of Guidelines (G2).

13.2.2.4 There are four options to address ballast water sampling and sample analysis. Ships' ballast water may be sampled indicatively and in detail. Also, the samples taken may be analysed indicatively and in detail. The indicative options are more likely to be used to confirm gross exceedance of the D-2 standard, whereas the detailed options are more likely to be used to confirm compliance (see table 2).

Table 2: Options of ballast water sampling and analysis of samples

	Sampling	Analysis of a sample
Indicative	A small proportion of the volume of interest can be used to indicate or confirm gross exceedance of the D-2 standard. A larger proportion of the volume of interest may be sampled if required.	An indicative analysis of a ballast water sample means a compliance test that is a relatively quick indirect or direct measurement of a representative sample of the ballast water volume of interest.
Detailed	A large proportion of the volume of interest can be used to indicate and confirm compliance. A smaller proportion of the volume of interest may be sampled if required. Two different potential detailed sampling approaches can therefore be considered: (1) sampling the entire discharge from a vessel during a port visit; (2) collecting a representative sample of the ballast water being discharged during some chosen period of time, e.g. one sample or a sequence of samples.	A detailed analysis of a ballast water sample means a compliance test that is likely to be more complex than indicative analysis and is a direct measurement of a representative sample used to determine the viable organism concentration of a ballast water volume of interest.

13.2.3 Sampling locations

13.2.3.1 Sampling of ballast water may be performed at various locations on board a ship depending on the purpose. Sampling may be undertaken either from the ballast water tanks (via manholes, through sounding pipes, or through air pipes) or directly from the discharge line. In-tank sampling via manholes, sounding and air pipes should only be used in cases where BWE (regulation D-1) is monitored or for regulation D-2 when the treatment of the ballast water is executed during the uptake or in-tank during holding times. In-tank sampling for regulation D-2 must not be performed when ballast water treatment is undertaken or completed on discharge.

13.2.3.2 Obtaining a representative sample directly from a ballast tank when they vary so much in size, shape, complexity and position is challenging. Sampling from a number of different locations, both spatially and with depth and also from different tanks, should be considered. Two or more samples are preferred to single or composite samples. Detailed sampling and analysis for regulation D-2 from manholes, sounding pipes or air pipes is not recommended as it is challenging to obtain sufficient sample sizes and does not give accurate results.

13.2.3.3 The sampling of discharged ballast water, generally to verify compliance with regulation D-2 or for type approval testing of BWMS, should be done via the ballast water discharge pipe as close to the discharge point as possible. Guidelines (G8) require BWMS to have sampling points arranged in order to collect representative samples of the ship's ballast water. Guidelines (G2) recommend that sampling points should have an isokinetic pipe and valve system that allows the taking of a representative sample of ballast water from within the discharge pipe. It is recommended that the position of the sampling point be established using methods such as computational fluid dynamics.

13.2.3.4 Sampling for compliance with the BWE standard (regulation D-1) is a forensic process (i.e. it requires knowledge of source water parameters and comparison with measured parameters) that can be done in-tank or via a discharge sample point. However, it is most likely to be done in-tank prior to the discharge of ballast water.

13.2.4 Experience building phase and trial period for sampling and analysis

13.2.4.1 Ballast water sampling and analysis is still evolving and, as a result, has in some cases not been adequately validated for PSC use. Consequently, the required sampling and analysis methods are not yet integrated into PSC procedures and therefore their use in determining compliance with the Convention cannot yet be assessed.

13.2.4.2 MEPC 65 agreed in principle with recommendations related to a trial period as set out in annex 6 to document BLG 17/18 in order to trial and validate ballast water sampling approaches. The trial period could extend to three years or more as appropriate following entry into force. The results of the trial will be monitored and reviewed by the MEPC and, when appropriate, the trial will be halted or extended. The goal at the end of the trial period will be to have a suite of accepted procedures that can be used for sampling and analysing ballast water in a globally consistent way.

13.2.4.3 The *Guidance for sampling and analysis for trial use in accordance with the BWM Convention and Guidelines* (G2) (BWM.2/Circ.42/Rev.1) provides that port States should refrain from applying criminal sanctions or detaining a ship based on sampling during the trial period agreed by the Organization. This does not prevent the port State from taking preventive measures to protect its environment, human health, property or resources. The port State will retain its right to exercise enforcement jurisdiction, including sanctions and detaining ships, during the trial period if an alleged violation is proven by means other than sampling and analysis.

CHAPTER 14 – Approval of ballast water management systems (Guidelines (G8))

14.1 Regulation D-3 sets out the approval requirements for BWMS. All BWMS used to comply with the Convention must be approved by the Administration of the ship, taking into account guidelines developed by the Organization. In addition, BWMS that make use of Active Substances require the additional approval of the MEPC (see chapter 15).

14.2 MEPC 70 adopted the 2016 Guidelines (G8), aimed primarily at Administrations, or their designated bodies, in order to assess whether BWMS meet the standard described in regulation D-2 of the Convention and the approval of a system is intended to screen-out BWMS that would fail to meet the standard. Approval of a system, however, does not ensure that a given system will work on all ships or in all situations. To satisfy the Convention, a discharge must comply with the D-2 standard throughout the life of the ship.

14.3 BWMS installed on ships on or after 28 October 2020 should be approved taking into account the 2016 Guidelines (G8), while BWMS installed on board ships prior to that date should be approved taking into account either the previous Guidelines (G8) (resolution MEPC.174(58)), but preferably the 2016 Guidelines (G8). Administrations should apply the 2016 Guidelines (G8) not later than 28 October 2018 when approving BWMS, but they are encouraged to start doing so as soon as possible.

14.4 The Convention requires that BWMS used to comply the requirements must be safe in terms of the ship, its equipment and the crew. In addition, the Guidelines (G8) contain a number of technical specifications that BWMS should meet in order to obtain type approval. These include general principles that BWMS should be effective in meeting the D-2 standard and safe for the environment when used during short and long voyages, e.g. regardless of temperature. In addition, the design of BWMS should account for the fact that, regardless of the BWMS technology employed, viable organisms remaining after treatment may reproduce in the interval between treatment and discharge. The technical specifications also address matters such as the robustness of design and construction, safety considerations and the need

for risk mitigation measures with respect to any substances of a dangerous nature, maintenance arrangements, calibration, and the provision of control and monitoring arrangements, including a self-monitoring system to verify correct operation of the system.

14.5 In order to receive type approval, the manufacturer of the BWMS submits information to the type-approving Administration regarding the design, construction, operation and functioning of the BWMS. Following a readiness evaluation by the Administration, the BWMS undergoes tests in accordance with procedures described in Guidelines (G8), with specified challenge conditions (i.e. salinity, organic carbon, suspended solids and number of organisms). These tests include trials of the BWMS at a land-based test facility (where conditions are controlled), shipboard testing (to reflect actual use by ship crews during or after the voyage), environmental testing (to demonstrate the robustness of the equipment), a temperature assessment (to confirm operation at very warm and cold temperatures), and an evaluation of regrowth. During each test, the composition of the treated ballast water (analysed according to sampling and analysis procedures set out in the Guidelines (G8)) is compared to the performance standard described in regulation D-2. Successful fulfilment of the requirements and procedures outlined in the Guidelines (G8) leads to the issuance of a Type Approval Certificate by the Administration.

14.6 In addition to the standard tests identified within Guidelines (G8), the BWMS manufacturer separately identifies the key water quality and operational parameters (known as System Design Limitations (SDL)) that may affect the operation of the BWMS, and makes a claim about the values of these parameters for which the BWMS is designed to operate correctly to meet the D-2 standard. The Administration validates these claims, and then reports them on the Type Approval Certificate for information only. Because BWMS manufacturers may include a margin of error in making claims, this information should not necessarily be interpreted as the exact parameter values beyond which the BWMS is incapable of operation.

14.7 Following type approval, the type approving Administration submits a report to the Organization that includes the results of all tests and evaluations set out in Guidelines (G8). This report is made public by the Organization to provide transparency on the type approval process.

14.8 As noted, BWMS used to comply with the Convention must be approved by the Administration, taking into account Guidelines (G8). This approval may be conveyed on a Type Approval Certificate (which may be based on testing already carried out under supervision by another Administration) and/or issuance of the IBWMC.

CHAPTER 15 – Approval of ballast water management systems using Active Substances (Procedure G9)

15.1 Overview of the *Procedure for approval of ballast water management systems that make use of Active Substances (G9)*

15.1.1 The principles of the approval process are based upon regulations D-3 and D-5 which provide that BWMS should be safe for the ship, its equipment and the crew. As the technologies should not cause more environmental impact than they solve, these systems must also meet the standards of environmental acceptability. For this reason, it is required that BWMS that make use of Active Substances undergo a separate approval procedure additional to that of Guidelines (G8), as described in Procedure (G9) and the associated Methodology for the conduct of work. Procedure (G9) describes not only the technical aspects but also the role and duties of all stakeholders in the process, including manufacturers, Administrations and the Organization.

15.1.2 In support of the evaluation process a special expert group was established to advise the MEPC on the approval of such systems, namely the Ballast Water Working Group of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP-BWWG). GESAMP-BWWG, established in November 2005, reviews all proposals submitted to the Organization for approval of BWMS that make use of Active Substances and reports to the MEPC on whether such proposals present unreasonable risk to the environment, human health, property or resources in accordance with the criteria specified in Procedure (G9). The Group evaluates the appropriateness of the operation or design in order to prevent any unreasonable risks mentioned above caused by the use of a BWMS. However, the Group does not evaluate the biological efficacy of BWMS in accordance with Guidelines (G8). GESAMP-BWWG has also developed a *Methodology for information gathering and conduct of work of the GESAMP-BWWG* (BWM.2/Circ.13, as revised).

15.1.3 Regular updates of information on obtained Basic and Final Approvals are made in accordance with section 8.3 of Procedure (G9). The technical requirements have been revised based on experience with the approval process.

15.2 Applicability

Procedure (G9) applies to the approval of BWMS that make use of Active Substances to comply with the Convention in accordance with regulation D-3.

15.3 Definitions

Active Substances are defined by the Convention as "substances or organisms, including a virus or a fungus that have a general or specific action on or against harmful aquatic organisms and pathogens". Procedure (G9), section 2, should be referred to for additional definitions.

15.4 Procedures for approval and certification

15.4.1 Manufacturers are required to submit information on their technology in a proposal dossier to a national Administration. Administrations should check the quality and completeness in the dossiers against the applicable version of the Methodology (see paragraph 15.1.2) before the official submission of the application for Basic or Final Approval to the Organization. Eventually, approval may be granted by the MEPC based on the independent advice provided by GESAMP-BWWG.

15.4.2 In the process of GESAMP-BWWG reviewing the dossiers submitted by Administrations and reporting its findings to the Organization, they may request additional data from Administrations. The approval scheme is two-staged: Basic Approval has to be granted first, followed by Final Approval. The Group will report its evaluation of the BWMS to the MEPC. In connection with the submission of the application for approval, a fee is paid to the Organization to cover the costs incurred in respect of the scientific services provided by the Group.

15.4.3 The approval scheme for Active Substances or Preparations and BWMS that make use of Active Substances is detailed in figure 5.

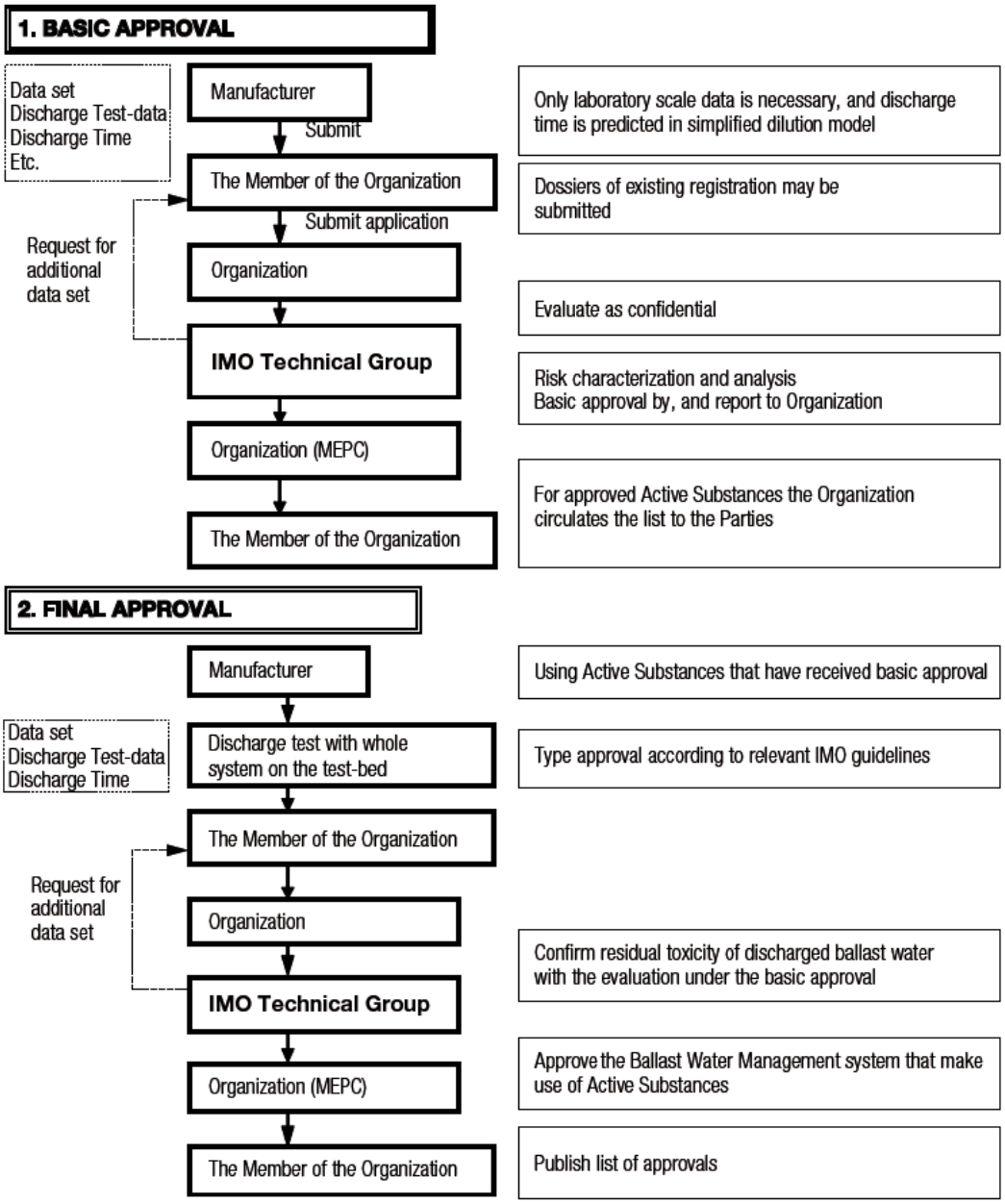

Figure 5: Approval scheme for Active Substances or Preparations and BWMS that make use of Active Substances

15.4.4 Additionally, in paragraph 8.2.1, Procedure (G9) allows that BWMS, which have already been granted Basic Approval, may be used for evaluation of multiple BWMS for Final Approval. The detailed framework of the use can be found in the *Framework for determining when a Basic Approval granted to one ballast water management system may be applied to another system that uses the same Active Substance or Preparation* (BWM.2/Circ.27).

15.5 Summary of Procedure (G9) requirements

15.5.1 Equipment manufacturers should include in their dossiers a chemical identification of chemical compounds, including Active Substances, Preparations and any other Relevant Chemicals, even those generated on board. For BWMS that make use of

Active Substances, for example BWMS using sodium hypochlorite solution, electrolysis, and/or ozonation, special attention is drawn to the formation of disinfection by-products (DBPs) due to possible effects on the environment and human health. The description of chemical compounds should include a dataset which includes physical and chemical properties, mammalian toxicity, environmental fate and effects. Following production of this information, a risk characterization should be described that is based upon information on persistency, bioaccumulation and toxicity (PBT) and specified testing on toxicity of the treated ballast water. The evaluation includes criteria on both human safety and environmental protection.

15.5.2 The requirements for Basic Approval are more general, as theoretical studies, literature data and small-scale testing can fulfil the data and information requirements. For Basic Approval, GESAMP-BWWG reviews the comprehensive proposal, along with any additional data submitted, as well as other relevant information available to the Group, and reports to the Organization.

15.5.3 For Final Approval, more detailed tests and full assessments are required, based on full-scale testing of the BWMS. The application for Final Approval should include tests performed as part of the land-based type approval process using the treated ballast water discharge and must specifically address any concerns identified and recommendations made during the consideration for Basic Approval. Results are based on tests under type approval testing under Guidelines (G8), e.g. full-scale testing. The Final Approval dossier should also confirm the evaluation carried out during Basic Approval of the risks to the ship and personnel, including consideration of the storage, handling and application of the Active Substance (also refer to BWM.2/Circ.20).

15.6 Quality assurance and quality control procedures

The testing body should implement a quality control program during testing in accordance with the recognized international standards that are acceptable to the Administration. In summary, the quality control program should consist of the following:

.1 Quality Management Plan (QMP) that addresses the quality management structure and policies of the testing body; and

.2 Quality Assurance Project Plan (QAPP) which is a project-specific technical document pertaining to the BWMS being tested, the test facility, and other testing implementation details.

15.7 Technical specifications

15.7.1 In Procedure (G9), sections 4 to 7 describe the technical requirements, while more detailed guidance on technical requirements is found in the *Methodology for information gathering and conduct of work of the GESAMP-BWWG* (BWM.2/Circ.13/Rev.3). The Methodology gives thorough guidance on all aspects needed for a complete dataset. The required data contain detailed physical and chemical properties of the Active Substance or Preparation. This includes reactivity towards materials, vapour pressure, and melting and boiling points; as well as data on effects on aquatic plants, invertebrates and fish and other biota. This in turn includes acute and chronic toxicity, endocrine disruption and carcinogenic and mutagenic effects. It should be noted that for certain substances their specific effects on sediment organisms or the bio-magnification, persistence in the food web and potential effects need to be described.

15.7.2 The Methodology additionally outlines the mammalian toxicity data that should be submitted for approval. In summary, the topics include acute toxicity, effects on skin and eye, repeated-dose toxicity, chronic toxicity, developmental and reproductive toxicity, carcinogenicity, mutagenicity/genotoxicity and toxicokinetics.

15.7.3 For compounds that are commonly described in ballast water treatment, data is gathered in a database held by the Organization, available through GISIS. For compounds identified in the database, no other data needs to be added in the proposal, unless it is scientifically justified.

15.7.4 Using these data, a risk characterization is conducted by including a hazard identification. Other elements are dose (what concentrations are expected) and exposure (what is the intensity, frequency and exposure to an agent). All information leads to risk characterization (how does the data lead to a quantification of risks).

15.7.5 Based upon information on persistency, bioaccumulation and toxicity (PBT), the risk for environmental effects is characterized in combination with actual testing on the toxicity of treated ballast water. Environmental concentrations at receiving water would be calculated with the Marine Antifoulant Model for PEC calculation for Ballast Water (MAMPEC-BW 3.0), using the dataset and measurements from the testing. The resulting environmental concentrations are compared to safety thresholds, e.g. predicted no effect concentrations (PNEC). Human exposure scenario (HES) models were developed to compare the exposure to human based thresholds, e.g. Derived No-effect Levels (DNEL) and/or Derived Minimal Effect Levels (DMEL).

15.7.6 As mentioned in section 14.5 above, the requirements for Basic Approval are more general and the data may be derived from theoretical studies, literature data and may include small-scale testing to fulfil data requirements. For Final Approval, toxicity testing is specified in detail and should be derived in combination with ballast water management system efficacy testing for Guidelines (G8) type approval. Following the risk assessment, several risk mitigation or risk management options may be included. For example, specific requirements exist on the methods to monitor the Maximum Allowable Discharge Concentration (MADC) of Active Substances.

15.8 Typical documentation requirements for the approval process

For a submission to the Organization, all data reports and references are included in the actual dossier. For example, this includes full test reports from chemical and toxicological laboratories, data sources and technical information on systems (refer to BWM.2/Circ.37).

15.9 Appendix to Procedure (G9)

The appendix provides Administrations with an approval scheme for BWMS that make use of Active Substances, outlining the Basic and Final Approval process (see figure 5 above).

CHAPTER 16 – Duties of shipowners

16.1 Duties and obligations

16.1.1 The shipowner's and operator's duties and obligations under the Convention include ensuring that ships have the ability at all times to be compliant with the requirements set up in the Convention by implementing a BWMP. These include, but are not limited to, meeting the applicable BWE or performance standards (regulations D-1 or D-2, respectively) and undertaking sediment management, if sediments are to be discharged.

16.1.2 Alternatively, if exceptions or exemptions have been granted to the ship (refer to sections 8.3 and 8.4 of this manual), the shipowner and operator must ensure that they are properly documented and entered into the BWRB. It is to be noted that exceptions are situation specific, hence record keeping and communication is the only way of demonstrating compliance. In contrast, exemptions are required to be granted by the Administration prior to the intended voyage(s).

16.1.3 In order to ensure a proper implementation of the BWMP, an officer on board must be designated in a timely manner and provided with necessary training.

16.1.4 All ships to which the Convention applies must have on board the following:

.1 a ship-specific BWMP approved by the Administration;

.2 a valid IBWMC, if the ship is of 400 GT and above; and

.3 a BWRB.

16.1.5 If the ship has a BWMS, it must be approved in accordance with Guidelines (G8) and, if applicable, Procedure (G9).

16.2 Complying with the Convention

In order to comply with the Convention, the shipowner and operator must ensure that:

.1 all shipboard ballast operations are safely executed in accordance with one of the available options available under the Convention, e.g. in compliance with regulation D-1 or D-2, as applicable; by application of any other approved methods (regulation B-3.7); by participation in a programme approved by the Administration to test and evaluate prototype technologies (regulation D-4); or in accordance with any exception or exemption granted under the Convention (regulations A-3 and A-4);

.2 the on-board BWMS, if applicable, is fitted with sampling points located in suitable and accessible areas;

.3 a competent officer is assigned for ballast water management and the officer and crew are trained in order to carry out their respective ballast water management duties;

.4 all ballast water and sediment operations are carried out in accordance with the ship's BWMP with due regard to the safety of the ship, its cargo and crew;

.5 the BWMS, if installed, is operated and maintained in accordance with the manufacturer's instructions and provided with sufficient spares and consumables, as required;

.6 the BWRB is correctly maintained and kept up to date at all times; and

.7 the BWRB entries shall be maintained on board the ship for a minimum period of two years after the last entry has been made and thereafter in the Company's control for a minimum period of three years.

16.3 Training of the crew

16.3.1 Shipowners must ensure, in accordance with regulation B-6 (Duties of officers and crew), that the officers and crew are properly trained and competent to carry out their assigned ballast water management duties and functions.

16.3.2 The training of the crew may include, but not be limited to, the following:

.1 introduction to ballast water management;

.2 familiarization with the ship's BWMP and assigned duties;

.3 emergency procedures, including exposure to chemicals, if used;

.4 operation and maintenance of the ship's BWMS, if fitted; and

.5 making entries and record keeping in the ship's BWRB.

16.3.3 Officers and crew involved in the shipboard ballast operations and the operation and maintenance of the BWMS have to be competent in their specific assigned duties.

16.3.4 Ideally the training and familiarisation for the Convention and associated tasks should be included in the Company's Safety Management System (SMS). The detailed framework for managing the risks incurred by the use of chemicals (i.e. Active Substances and Preparations) can be found in BWM.2/Circ.27.

CHAPTER 17 – Ballast water management options available for ships

The Convention defines two ballast water management standards:

.1 regulation D-1 specifies the BWE standard; and

.2 regulation D-2 specifies the ballast water performance standard.

17.1 Ballast water exchange

17.1.1 BWE aims at reducing the number and viability of organisms discharged at ports and in coastal waters following transportation in ballast tanks. BWE has to meet the BWE standard as per regulation D-1 described in chapter 10.

17.1.2 Three methods of BWE are detailed in Guidelines (G6):

.1 sequential method – a ballast tank is first emptied and then refilled with replacement ballast water to achieve at least a 95% volumetric exchange;

.2 flow-through method – replacement ballast water is pumped into a ballast tank allowing water to flow through overflow or other arrangements. At least three times the tank volume of each tank shall be considered to meet the standard; and

.3 dilution method – replacement ballast water is filled (pumped) through the top of the ballast tank with simultaneous discharge from the bottom at the same flow rate and maintaining a constant level in the tank throughout the ballast exchange operation. At least three times the tank volume is to be pumped through the tank.

17.1.3 The designation of areas for BWE is discussed in chapter 8 of this Manual.

17.2 Ballast water treatment

17.2.1 Once subject to it, pursuant to regulation B-3, a ship shall be required to meet the performance standard of regulation D-2. The most common approach is the installation of a shipboard BWMS.

17.2.2 There are different BWMS available and in development. Generally these technologies can be categorized into three types based on their primary mechanism: mechanical, physical and chemical.

17.2.1 Mechanical treatment

17.2.1.1 Mechanical treatment can be done, for example, by filtration, cyclonic separation and electro-mechanical separation. Mechanical treatment is generally only done at intake and is not influenced by the length of the voyage.

17.2.1.2 Screen and disk filters can be used at ballast water intake to reduce sediment and organisms. Mesh sizes of these filter screens vary and the smaller the mesh size the more will be filtered prior to intake. Filters with a mesh size of 50 µm or less are commonly applied in BWMS to contribute to achieving the standard described in regulation D-2.

17.2.1.3 Most filters are self-cleaning with back flushing cycles. Waste water from the back flush is discharged directly overboard. Together with the resistance of the filter this self-cleaning procedure will form pressure drops and affect the flow rate negatively.

17.2.1.4 Cyclonic separation uses centrifugal forces to separate solid particles from water. However, this is only possible with particles having a specific gravity higher than that of water. Electro-mechanical separation works with a flocculent injection that attaches to the sediment and organisms. Solid particles are then removed by filtration and magnetic separation.

17.2.1.5 Mechanical treatment is often used in conjunction with physical and/or chemical treatment methods (see below).

17.2.2 Physical treatment

17.2.2.1 Physical treatment can be done, for example, by ultraviolet irradiation (UV), de-oxygenation, cavitation and ultrasound.

17.2.2.2 UV is used to eliminate or damage organisms (phytoplankton, zooplankton, human pathogens and bacteria) to such extent that they are not able to reproduce. The effectiveness is dependent on the turbidity and the transmittance rate in water. Most BWMS that use UV irradiation combine it with prior mechanical treatment. Often UV treatment is performed at intake and discharge of ballast water.

17.2.2.3 Removing dissolved oxygen in the ballast water is called de-oxygenation and affects aerobic organisms (i.e. those that require oxygen). Oxygen is replaced by inert gases (often nitrogen). Although de-oxygenation can be positive in order to prevent corrosion, it is important to use inert gas, which does not react chemically, to avoid any oxidative or hydrolytic effects. De-oxygenation may require a longer tank holding time, which should be considered when having a fleet employed on short voyages.

17.2.2.4 In the shipping industry, cavitation normally negatively affects materials and should be prevented. However, if controlled, the cavitation method can be used in order to damage membranes of organisms, ensuring that they are not able to reproduce when discharged into the environment. Care should be taken to protect against the possible effects of hydrodynamic forces and ultrasonic oscillations on materials and the environment, including humans. This treatment can be applied on long and short voyages and is often combined with another physical treatment method.

17.2.3 Chemical treatment

17.2.3.1 Ballast water can be chemically treated by administering chemicals (Active Substances) or Preparations, or by producing Active Substances on board (see chapter 14 for more information). Care should be taken when using disinfectant Active Substances; they can kill living organisms in the water but also affect humans. Commonly used Active Substances are sodium hypochlorite, ozone and hydrogen peroxide, which are expressed as TRO. Sodium hypochlorite can also be generated on board by using an electrolytic cell and having enough salinity in the ballast water. Active Substances should be depleted or be neutralized before discharging into the environment. The MADC of the concentrations of the Active Substances and neutralizing agents, if any, are to be listed in the Type Approval Certificate of the BWMS.

17.2.3.2 Classification societies normally impose strict installation guidelines in cases of BWMS that make use of chemical treatment and/or could emit dangerous gases/liquids.

17.2.4 Combinations of treatment techniques

Treatment technologies can be combined and differ in rate of application, holding time, power consumption and effects on other ship equipment or structures. A combination of different treatments can reduce the limitations of an individual technology. Therefore, many BWMSs use a combination of two or more technologies, e.g. filtration combined with UV, filtration combined with chemical injection/ electro-chlorination, etc.

17.3 Discharge to a reception facility

17.3.1 The Organization has developed Guidelines (G5) addressing the issue. The availability of ballast water reception facilities in ports to receive, process and redistribute ballast water is an important tool in implementing the Convention. Shore facilities would be responsible for and capable of managing the ballast water to meet the required standards. Discharging to a shore facility could also facilitate sediment management under the Convention. Many ports lack the necessary infrastructure to accommodate the intake or supply of ballast water to and from the ship. A floating reception facility (e.g. BWTBoat) is a ballast water reception facility as described in regulation B-3.6 and Guidelines (G5) and does not need approval in accordance with regulation B-3.7 to receive ballast water.

17.3.2 Ballasting and deballasting activities are running in parallel with the ships' loading and unloading operations. Any disturbance in the flow of ballast water will immediately affect these operations. Finally, the flow in ballast water is not in an equilibrium for each port or region, which implies a net in- or outflow to/from certain regions in the world. Nevertheless, for certain areas or ports shore facilities could be a feasible option, in particular in environmentally sensitive areas.

17.3.3 There are other factors such as engineering, operational and logistics affecting the feasibility of using a shore facility or a floating facility. The above issues must be carefully considered before proceeding, along with paying due attention to the differences in regulatory considerations.

17.4 Other methods

Other methods of ballast water management may also be accepted, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources and are approved in principle by the MEPC. The Organization has developed guidance with regard to the criteria to be used for such evaluations, which can be found in the *Procedure for approving other methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention* (resolution MEPC.206(62)).

17.5 Application of the Convention to offshore support vessels

17.5.1 The Organization has agreed on common procedures for application of the Convention to OSVs as set out in BWM.2/Circ.44. Operationally, these vessels differ from the operational models associated with deep-sea trading ships by being designed to operate in near-coastal waters characterized by carrying materials to facilities and vessels working in offshore energy fields.

17.5.2 The purpose of these procedures is to provide options available for complying with the requirements of the Convention.

17.6 Application of the Convention to mobile offshore units

17.6.1 The Organization has agreed on common procedures for application of the Convention to mobile offshore units as set out in BWM.2/Circ.46. The procedures are divided into operations at the location of operation and during transit to other areas.

17.6.2 BWM.2/Circ.52/Rev.1 provides guidance on entry or re-entry into exclusive operation pursuant to articles 3.2(b)-(d), which will assist Administrations with respect to situations including ships (e.g. mobile offshore units) that may be assigned to extended operations in waters under the jurisdiction of a single Party following an international voyage or voyages. This Guidance sets out a process for ceasing application of the Convention to a ship in such circumstances.

17.7 Application of the Convention to hopper dredgers

The Organization has agreed on the applicability of the Convention to hopper dredgers as set out in BWM.2/Circ.32. Hoppers are not considered to be ballast tanks because the hopper wall forms part of the ship's hull, therefore water in the hopper is considered as outboard water.

PART V: TECHNICAL ASPECTS OF ENFORCEMENT

CHAPTER 18 – Non-compliance detection and response

After entry into force of the Convention, there will be two standards enforced for ships depending on the applicability regime. Detection of non-compliance will be based on the applicable exchange or performance standards (regulation D-1 or D-2, respectively) and the method of achieving the respective standards.

Non-compliance with regulation D-1 (BWE standard) may be difficult to detect without conducting a salinity check of the discharge sample. If some other method (regulation B-3.7) is used by a ship then the detection may not be possible without discharge sample analysis. However, such other methods may entail key performance indicators that provide a fair assessment of possible compliance.

The technological advancements in the field of detection and monitoring pave the way for indicative analysis of ballast water discharges. These direct or indirect monitoring tools may be useful in identifying gross exceedance of the D-2 standards.

18.1 Detection

A BWMS approved in accordance with Guidelines (G8) will include a continuous self-monitoring function during the period in which the BWMS is in operation that should record the proper functioning or failure of the BWMS. When risk of non-compliance is envisaged,

the ballast water may not be safe to discharge and the port of call should be notified. Prevention should always be the first aim. If the situation is beyond the stage of prevention then contingency planning becomes an actual need. Such contingency measures are to be identified and included in the approved BWMP. Further guidance can be found in Guidelines (G4).

18.2 Response – contingency measures

18.2.1 Contingency measures to meet the challenges of either polluted (with residual Active Substances) or not at all (or not adequately) disinfected ballast water are best placed on shore and preferably in the port of call.

18.2.2 The Organization's guidance for emergency situations (BWM.2/Circ.17), although specifically targeted at a risk of release of harmful organisms and pathogens, nevertheless contains several items that also apply for pollution. An emergency response should take into account the nature of the pollution (what chemicals and/or contaminants and at which expected quantities), the natural characteristics of the area of release and the contingency capacity of the country or region likely to be affected. In order to minimize damage and to enable rapid normalization of the operation of ports and ships, industry cooperation will be needed at the time of the emergency. Although this is perceived as a rather complex operation, in practice, such measures are likely to be simple and may only be identifiable for situations where ballast water discharges from certain ships need to be prevented.

18.2.3 If polluted, contaminated or ineffectively treated ballast water is accidentally or intentionally released, then ways to mitigate the damage have to be identified. Again the characteristics of the contamination and of the area(s) affected are crucial, together with knowledge of the contingency preparedness in the area. A risk assessment may be needed. It is also needed to notify all stakeholders of an emergency situation; according to BWM.2/Circ.17, this should be the responsibility of an appointed (lead) agency overseeing the emergency situation and procedures.

18.2.4 As to mitigation measures, much can be learnt from pollution response knowledge from other sources of pollution in dissolved form, such as dissolved chemicals. It is unlikely that pollution resulting from ballast water operations will be in solid or oily form; hence techniques to contain such sources of pollution (such as booms around the spill or discharge) will not be applicable.

18.2.5 Support from shore-based contingency measures, such as initiatives facilitated by ports, should strongly be encouraged. If such shore-based facilities are not available, as an interim measure, the port State should identify locations where BWE can take place. Identification of such exchange areas need to be conducted with a comprehensive risk assessment.

CHAPTER 19 – Guidance for Port State Control

19.1 PSC refers to the inspection of foreign ships in national ports of a Party to verify that the condition of the ship and its equipment comply with the requirements of the national/ international regulations and that the ship is manned and operated in compliance with those rules.

19.2 A ship to which the Convention applies may be subject to inspection for the purpose of determining whether the ship is in compliance with the Convention, in accordance with article 9. Article 8 requires that sanctions be established for violating the Convention, while article 10 of the Convention provides for warnings, detentions and exclusions. Article 10 also sets out control actions that shall be taken by a Party if a ship poses a threat to the environment, human health, property and resources. Article 11 sets out mandatory notifications where a sanction, detention, warning, exclusion or control action has been used.

19.3 Irrespective of the methods applied to manage ballast water (see chapter 17), the discharged water should meet the quality standard as indicated in regulation D-1 for BWE or D-2 for ballast water performance, as applicable. It is the obligation of PSC or other designated authorities to ensure adequate control and, when required, inspection of the BWRB and management practices.

19.4 The Organization developed *Guidelines for port State control under the BWM Convention* (resolution MEPC.252(67)) intended to be used to verify compliance with the requirements; these guidelines are not intended to limit the rights the port State has in verifying compliance with the Convention. The PSC inspection can be described as a four-stage process:

.1 the first stage, the "initial inspection", should focus on documentation and ensuring that an officer has been nominated for ballast water management on board the ship and to be responsible for the BWMS, and that the officer has been trained and knows how to operate it;

.2 the second stage – the "more detailed inspection" where the operation of the BWMS is checked and the PSCO clarifies whether the BWMS has been operated adequately according to the BWMP and the self-monitored operational indicators verified during type approval procedures. Undertaking a detailed inspection is dependent on the conditions of article 9.2 of the Convention;

.3 the third stage – sampling is envisaged to occur during this stage of PSC which relies on indicative analysis, to identify whether the ship is meeting the ballast water management performance standard described in regulation D-2, or whether detailed analysis is necessary to ascertain compliance; and

.4 the fourth stage, if necessary, incorporates detailed analysis to verify compliance with the D-2 standard.

19.5 If a ship is found to be in violation of the Convention, the PSCO may take steps to warn, detain or exclude the ship or grant such a ship permission to leave in order to discharge ballast water elsewhere (such as a designated BWE area) or to undertake repairs. In exercising his/her functions, the PSCO should use professional judgement to determine whether to detain the ship until any noted deficiencies are corrected or to permit the ship to sail with deficiencies, which do not pose an unreasonable threat of harm to the marine environment.

PART VI: ORGANIZATION

CHAPTER 20 – Training of personnel

20.1 Consideration of training requirements for personnel

20.1.1 The need for training of personnel for the purpose of implementing the Convention depends on several factors and will need to be assessed by each State. This is a matter for the marine Administration and the environmental protection authorities, its national shipping industry and other stakeholders to explore.

20.1.2 The following points need to be considered:

.1 Are the Administration's own staff sufficiently conversant with the Convention and relevant guidelines?

.2 Are the staff of the maritime Administration technically competent to fulfil their obligations?

.3 Do more appropriately qualified staff need to be recruited and trained?

.4 Are the national shipowners conversant with the Convention?

.5 What training do ships' masters and crew need?

20.1.3 In exploring the possibilities for training, the following options may be considered:

.1 cooperation with other, more experienced, maritime Administrations;

.2 raising the technical competence of the Administration staff to an adequate standard by training or recruitment or both;

.3 organizing national seminars/courses or regional training schemes for surveyors, inspectors, administrators, lawyers, shipowners, masters and crew, possibly through the Organization's Integrated Technical Cooperation Programme, and taking also advantage of the available training materials developed by e.g. the GloBallast Partnerships project and the e-CME ballast water compliance monitoring and enforcement project of the World Maritime University;

.4 taking advantage of learning opportunities at the World Maritime University, especially for those capable of benefiting and subsequently returning to responsible positions in the maritime Administration and shipping industry;

.5 including the Convention in the curriculum for seafarers' courses and examinations for certificates; and

.6 requesting shipowners to arrange training for senior ship officers to ensure that they are aware of the on-board procedures and legislation.

20.2 Administration personnel

20.2.1 A training programme is necessary to make administrative and inspection personnel knowledgeable about the requirements of the Convention and also to make flag State surveyors suitably trained in surveying ships for technical compliance with ballast water management. Inspection personnel must also be made knowledgeable about ballast water stripping operations. Further, it is of the utmost importance that all involved stay informed on any amendments to the various guidelines and guidance documents.

20.2.2 In most cases consideration should be given to conveying this information in the national language. It is recommended however to provide adequate information to local instructors in the first instance. Combined training activities, in which experienced instructors initially work in parallel with local instructors, teaching courses for administrative and inspection personnel, may be beneficial. Such training should concentrate both on the content of the Convention in general and on practical surveying procedures.

20.2.3 The timing for such training must be adjusted to suit the planned entry into force of the requirements in the acceding State, so that sufficient time is given for thorough introduction to the practical requirements, but also that the content of the instructions is not forgotten while the actual implementation is still being prepared. When the schedule for the accession and implementation of the Convention has been decided, such training should be initiated. It may be necessary to engage outside instructors to cover both theoretical and practical aspects of inspection.

20.3 Ships' officers

In addition to general awareness on the protection of the marine environment, ships' officers need instructions about the requirements and regulations of the Convention as a whole and instructions regarding the handling and operation of the equipment being installed on board ships in particular. For experienced officers this additional information could be given in relatively short courses.

20.4 Main topics to form part of a ballast water management training programme

.1 articles and regulations of the Convention;

.2 guidelines accompanying the Convention;

.3 BWMP development, implementation and operation;

.4 ballast water management safety procedures;

.5 safety procedures for BWE operations, if applicable;

.6 ballast water management techniques and methodologies;

.7 how to operate and maintain a BWMS;

.8 national and regional requirements;

.9 BWRB keeping;

.10 safety procedures for sediment control and handling; and

.11 handling, storage and preparation of chemicals and Active Substances.

The training procedures should cover crew familiarization and training of relief crews, and the training should be fully documented and correspond to the training requirements specified in the BWMP. More detailed information concerning crew training provisions can be found in Part B of Guidelines (G4).

CHAPTER 21 – Guidelines, circulars and other IMO instruments relevant to the Convention

A number of the regulations contained in the annex of the Convention require procedures, equipment, etc., to be based on guidelines developed by the Organization. Some of these guidelines exist as separate publications. A complete up-to-date list of resolutions and BWM circulars can be found on the IMO website (www.imo.org).

21.1 Guidelines for the uniform implementation of the Convention

.1 *Guidelines for sediment reception facilities (G1)* (resolution MEPC.152(55))

.2 *Guidelines for ballast water sampling (G2)* (resolution MEPC.173(58))

.3 *Guidelines for ballast water management equivalent compliance (G3)* (resolution MEPC.123(53))

.4 *Guidelines for ballast water management and development of ballast water management plans (G4)* (resolution MEPC.127(53))

.5 *Guidelines for ballast water reception facilities (G5)* (resolution MEPC.153(55))

.6 *2017 Guidelines for ballast water exchange (G6)* (resolution MEPC.288(71), superseding resolution MEPC.124(53))

.7 *2017 Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7*) (resolution MEPC.289(71), superseding resolution MEPC.162(56))

.8 *2016 Guidelines for approval of ballast water management systems (G8)* (resolution MEPC.279(70), superseding resolution MEPC.174(58))

.9 *Procedure for approval of ballast water management systems that make use of Active Substances (G9)* (resolution MEPC.169(57))

.10 *Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G10)* (resolution MEPC.140(54))

.11 *Guidelines for ballast water exchange design and construction standards (G11)* (resolution MEPC.149(55))

.12 *2012 Guidelines on design and construction to facilitate sediment control on ships (G12)* (resolution MEPC.209(63))

.13 *Guidelines for additional measures regarding ballast water management including emergency situations (G13)* (resolution MEPC.161(56))

.14 *Guidelines on designation of areas for ballast water exchange (G14)* (resolution MEPC.151(55))

21.2 Other Guidelines related to the implementation of the Convention

.1 *The experience-building phase associated with the BWM Convention* (resolution MEPC.290(71))

.2 *Guidelines for port State control under the BWM Convention* (resolution MEPC.252(67))

.3 *Information reporting on type approved ballast water management systems* (resolution MEPC.228(65))

.4 *Procedure for approving other methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention* (resolution MEPC.206(62))

.5 *Guidelines for ballast water exchange in the Antarctic treaty area* (resolution MEPC.163(56))

.6 *Application of the international convention for the control and management of ships' ballast water and sediments, 2004* (resolution A.1088(28))

21.3 Circulars related to the implementation of the Convention

.1 *Application of the Convention to ships operating in sea areas where ballast water exchange in accordance with regulations B-4.1 and D-1 is not possible* (BWM.2/Circ.63)

.2 *Guidance on contingency measures under the BWM Convention* (BWM.2/Circ.62)

.3 *Guidance on methodologies that may be used for enumerating viable organisms for type approval of ballast water management systems* (BWM.2/Circ.61)

.4 *Guidance on entry or re-entry of ships into exclusive operation within waters under the jurisdiction of a single Party* (BWM.2/Circ.52/Rev.1)

.5 *Application of the BWM Convention to Mobile Offshore Units* (BWM.2/Circ.46)

.6 *Clarification of "major conversion" as defined in regulation A-1.5 of the BWM Convention* (circular BWM.2/Circ.45)

.7 *Options for ballast water management for Offshore Support Vessels in accordance with the BWM Convention* (BWM.2/Circ.44)

.8 *Amendments to the Guidance for Administrations on the type approval process for ballast water management systems in accordance with Guidelines (G8)* (BWM.2/Circ.28) (BWM.2/Circ.43)

.9 *Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)* (BWM.2/Circ.42/Rev.1)

.10 *Issuance of Ballast Water Management Certificates prior to entry into force of the BWM Convention and Ballast Water Management Plans* approved according to resolution A.868(20) (BWM.2/Circ.40)

.11 Information that should be made available in proposals for approval of ballast water management systems in accordance with the *Procedure for approval of ballast water management systems that make use of Active Substances (G9)* (BWM.2/Circ.37)

.12 *Guidance on scaling of ballast water management systems* (BWM.2/Circ.33)

.13 *Applicability of the Ballast Water Management Convention to hopper dredgers* (BWM.2/Circ.32)

.14 *Framework for determining when a Basic Approval granted to one ballast water management system may be applied to another system that uses the same Active Substance or Preparation* (BWM.2/Circ.27)

.15 *Engineering Questionnaire on Ballast Water Management Systems* (BWM.2/Circ.21)

.16 *Guidance to ensure safe handling and storage of chemicals and preparations used to treat ballast water and the development of safety procedures for risks to the ship and crew resulting from the treatment process* (BWM.2/Circ.20)

.17 *Guidance document on arrangements for responding to emergency situations involving ballast water operations* (BWM.2/Circ.17)

.18 *Methodology for information gathering and conduct of work of the GESAMP-BWWG* (BWM.2/Circ.13, as revised)

.19 *Harmonized implementation of the Guidelines for approval of Ballast Water Management Systems (G8)* (BWM.2/Circ.8)

.20 *Interim Survey Guidelines for the purpose of the International Convention for the Control and Management of Ships' Ballast Water and Sediments under the Harmonized System of Survey and Certification* (resolution A.948(23)) (BWM.2/Circ.7).

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