14

Enforcement of Existing IMO Regulations

This part of the book (Part III) will attempt to clarify to what extent the conclusions in the previous part (Part II) are applicable to other existing environmental International Maritime Organization (IMO) regulations (this chapter) and proposed future regulatory measures on greenhouse gases (GHGs) relating to the IMO's GHG Strategy (chapter 15).

One of the conclusions reached in Part II was that port States, in accordance with article 218(1) of UNCLOS,[1] have extraterritorial jurisdiction over emissions (discharge) violations committed by foreign ships outside the State's own territory. This includes the discharge of sulphur emissions on the high seas, thereby giving port States jurisdiction over infringements of regulation 14.1.3 of MARPOL Annex VI.[2] Port States can also assert jurisdiction over violations of the 0.1% or 0.5 % sulphur limits that occur inside the waters of another (coastal) State pursuant to article 218(2)–(4) of UNCLOS, if so agreed with that State. A coastal States also has jurisdiction over such violations in internal and territorial waters and in the EEZ, provided the foreign ship calls into a port in the coastal State (see article 220(1)). Flag States have, according to article 217 of UNCLOS, jurisdiction over such violations pertaining to ships flying their flags.

The conclusions in Part II also explain that article 228(1), which determines whether a coastal State or port State is able to eliminate a flag State's primary jurisdiction, consists of a main rule and two exceptions. The flag State must fulfil three conditions for invoking the main rule that allows it to suspend any legal proceedings instituted by a coastal State or port State. These conditions are (i) bringing corresponding charges; (ii) within six months of the date on which proceedings were first instituted; and (iii) subsequently informing the coastal or port State of the outcome of these charges. A flag State's request for suspension can be denied, however, even when it meets all three conditions, if one of two exceptions applies.

[1] United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.

[2] International Convention for the Prevention of Pollution from Ships (adopted on 11 February 1973, as modified by the Protocol of 17 February 1978, entered into force 2 October 1983) 1340 UNTS 61 (MARPOL), Annex VI, IMO Publication: IMO-520E.

The first exception enables a coastal State to deny a flag State's request for suspension if the violation resulted in major damage to the coastal State. However, this exception is not deemed applicable to enforcement of MARPOL Annex VI. The second exception is of relevance to port State (and in principle coastal State) enforcement of emission regulations, as it involves a flag State's repeated disregard of its enforcement obligations, for example its article 217 obligations to effectively enforce and inform the IMO and all States thereof.

The following sections examine the applicability of these conclusions and others[3] when enforcing different relevant IMO conventions,[4] including the regulations covering emissions besides sulphur under MARPOL Annex VI, such as ozone-depleting substances (ODSs), nitrogen oxide (NOx), particular matter (PM), volatile organic compounds (VOCs) and carbon dioxide (CO_2), and also MARPOL Annexes I–V, the BWM Convention,[5] the AFS Convention,[6] the London Convention (including certain interfaces with the Nairobi Convention),[7] the Hong Kong Convention[8] and the Intervention Convention.[9] Infringements of these IMO rules might not offer a shipowner the same economic gains as not complying with the sulphur limits in regulation 14 of Annex VI. Nevertheless, the legal basis for enforcing the relevant IMO regulations should still be examined, as the motivation for non-compliance is in part irrelevant when applying the enforcement and safeguarding provisions of sections 6 and 7 of part XII of UNCLOS.

I. MARPOL Annex VI

MARPOL Annex VI regulates, as well as sulphur (SOx) in regulation 14, ODSs in regulation 12, NOx in regulation 13, VOCs in regulation 15, emissions from incinerators in regulation 16 and 'energy efficiency' in regulations 19–23, this last

[3] These other conclusions of Part II include the extended right for coastal States to invoke art 220(5)–(6) relating to the stopping, investigating, detaining and prosecuting of a foreign ship transiting the EEZ. The right for coastal States to exercise such jurisdiction in an international strait in accordance with art 233 and art 42(1)(b) and to invoke the first exception in art 228(1) are also examined.

[4] The term 'relevant IMO conventions' is used in this context to underline that not all of the IMO's environmental legislative measures are discussed in this chapter, but merely those conventions that, in the view of this author, are the most relevant to discuss.

[5] The International Convention for the control and management of ship's ballast water and sediments (adopted 13 February 2004, entered into force 8 September 2017) ('the BWM Convention').

[6] The International Convention on the Control of Harmful Anti-fouling Systems on Ships (adopted 5 October 2001, entered into force 17 September 2008) ('the Anti-fouling Convention' or 'AFS Convention').

[7] Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 13 November 1972, entered into force 30 August 1975) 1046 UNTS 120 ('the London Convention'); the Nairobi International Convention on the Removal of Wrecks (adopted 18 May 2007, entered into force 14 April 2015) ('the Nairobi Convention').

[8] The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (adopted 15 May 2009, not yet entered into force) ('the Hong Kong Convention').

[9] The Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (adopted 29 November 1969, entered into force 6 May 1975) 970 UNTS 211 ('the Intervention Convention').

pertaining to reducing emissions of CO_2. Each regulation is given a brief introduction in the following subsections, succeeded by consideration of whether the conclusions set out in Part II of this book are applicable when enforcing that regulation.

It may not come as a surprise, however, to learn that these regulations, to a considerable extent, can be directly enforced in accordance with the specific enforcement principles examined in Part II, as these also regulate emissions from ships. It is therefore principally the differences in enforcement that are highlighted.

A. Ozone-depleting Substances: Regulation 12

Regulation 12.2 of MARPOL Annex VI bans the deliberate discharge of ODSs, which, as the name suggests, is a common term used for a category of harmful substances that can destroy the ozone layer. This includes gases such as freon, chlorofluorocarbon (CFC) and hydrochlorofluorocarbons (HCFCs), which can comprise substances such as 'halons', 'methyl bromide', 'carbon tetrachloride', 'hydrobromofluorocarbons' and 'methyl chloroform'.[10] Such substances were often found in different equipment on board, being predominantly used for refrigeration or for extinguishing fires.[11]

International legislation for the protection of the ozone layer has been in place since the 1980s, inter alia in the form of the Vienna Convention for the Protection of the Ozone Layer (1985)[12] and the successive Montreal Protocol (1987).[13] These rules have a particular focus on CFC gases, because these are considered the most harmful as they can remain in the atmosphere for over 50 years (perhaps up to 100 years in the upper stratosphere), after which time they break down and emit their chlorine content, which serves as a catalyst in the decomposition of the ozone layer, leading to increased UV radiation. The global warming potential of CFC gases is also greater than that of HCFC gases.[14] The regulation of ODSs in MARPOL Annex VI therefore distinguishes between HCFCs and *other* ODSs, which includes CFC. Regulation 12.3.1 banned the use of other (non-HCFC) ODSs on ships constructed on or after 19 May 2005, whereas regulation 12.3.2 bans HCFC substances on ships constructed on or after 1 January 2020.[15]

[10] See at https://www.esrl.noaa.gov/gmd/hats/publictn/elkins/cfcs.html.

[11] See at http://apps.sepa.org.uk/spripa/Pages/SubstanceInformation.aspx?pid=119.

[12] The Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) 1513 UNTS 323.

[13] The Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 16 September 1987, entered into force 1 January 1989) 1522 UNTS 3, was adopted as a protocol to the Vienna Convention for the Protection of the Ozone Layer.

[14] World Meteorological Organization, *Scientific Assessments of Ozone Depleting Substances: 2010 – Global Ozone Research and Monitoring Project, Report No 52*, National Oceanic and Atmospheric Administration (NOAA) et al (March 2011), xvi–xviii.

[15] It is noted that reg 12.3.1.2 and reg 12.3.2.2 specify other compliance dates with regard to the contractual delivery dates of the equipment in question.

Regulation 2.16 defines ODSs by referring to their definition in article 1(4) of the Montreal Protocol. Regulation 12.5 stipulates that ships must keep a list of any ODS on board; and if these are part of a system that can be recharged, the ship must keep an 'Ozone-depleting Substance record book', logging all replenishments, repairs or discharges of these systems (see also regulations 12.6 and 12.7). This record book is one of the documents that the ship must be able to present during an initial Port State Control (PSC) inspection (document control), as described in chapter 4.

As noted in chapter 10, regulation 12.7.3 includes an important reference to the 'discharge of ozone-depleting substances to the atmosphere', supporting an inference that the term 'discharge' in article 218(1) of UNCLOS should be interpreted as including emissions. It therefore comes as little or no surprise that the conclusion reached in Part II applies to enforcement of regulation 12 of MARPOL Annex VI. Any release of ODSs in violation of regulation 12 can be enforced by port States outside their territory pursuant to article 218(1) and by coastal States inside their territory according to article 220(1), both conditional upon the foreign ship's subsequently calling into port (or at an offshore terminal) and the flag State's not having primary jurisdiction in accordance with article 228(1).

It could be argued that discussing enforcement of regulation 12 is outdated, as the most harmful ODSs have been banned from use by the Montreal Protocol and MARPOL Annex VI. However, a study in 2018, made by the Canadian Research Institute NOAA, showed a disturbing development. Despite international regulations, a global rise in emissions of the harmful CFC substance Trichlorofluoromethane, also referred to as 'CFC-11', had been registered.[16] This substance, CFC-11, can exist for up to 45 years in the atmosphere after being released, and has the greatest ozone-depleting potential of all ODSs, as well as being one of the ODSs that contribute most to global warming.[17] Ensuring effective enforcement of regulation 12 of MARPOL Annex VI through UNCLOS might therefore still be a relevant focal point in coming years to counter such adverse developments.

B. Nitrogen Oxide: Regulation 13

Nitrogen oxide (NOx) is covered by regulation 13 of MARPOL Annex VI and the accompanying 'NOx Technical Code'. It is a gas that is produced during combustion of fuels and subsequently emitted to the atmosphere. NOx gases can, like sulphur, lead to reduced respiratory functions and may increase the risk of infections in the lungs.[18]

The NOx rules differ from the SOx rules, as regulation 13 only applies to ships built after a certain date with diesel engines having a power output above

[16] Available at https://www.eurekalert.org/pub_releases/2018-05/uoca-nfr051618.php.
[17] See World Meteorological Organization Report, n 14, Q.18, Table Q7-1.
[18] See at https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects.

130 kilowatts. Regulations 13.3–13.5 set different regulatory steps (tiers) for those ships, with regard to which requirements they must meet. The applicable 'Tier' depends on the time of construction of the engine. The most demanding Tier (Tier III), as stipulated in regulation 13.5.3, applies only in Nitrogen Oxide Emission Control Areas (NECAs), described in chapter 2. Areas off the US and Canadian East and West coasts, as well as in the Caribbean and around Hawaii, have since 2016 been designated as NECAs (see regulation 13.6).[19] In addition, the IMO agreed under MEPC 70 in October of 2016 that the Baltic and the North Sea will be designated as NECAs from 1 January 2021.[20]

The ships that are covered by the regulation must, according to regulation 13.8, carry an Engine International Air Pollution Prevention Certificate (EIAPP Certificate) and a so-called 'Technical File', which shows the ship's compliance with the applicable requirements. The EIAPP Certificate must be presented during a PSC, along with the Technical File and other required documents proving compliance with regulation 13.[21]

Whether the enforcement paradigm set out in Part II of this book applies to enforcement of regulation 13 must depend on whether a violation of these rules can result in a 'discharge' of emissions. The provision undoubtedly has a fixed focus on engine performance, size, output and other similar matters, which could indicate that any violation would fall outside the scope of article 218, etc. On the other hand, regulation 13 of Annex VI uses the engine parameters and requirements to ensure that the ship emits (discharges) NOx below a certain calculated limit specified in Tiers I–III, pursuant to regulations 13.3–13.6.

This author would therefore argue that a violation of regulation 13 of MARPOL Annex VI, for example if a ship were to sail in a NECA without meeting the Tier III limits, would constitute a discharge violation that could be proved quite effectively.

If a ship does not operate in accordance with its EIAPP Certificate and Technical File, this will be a strong indication that the engine emits (discharges) more NOx than the certified value. Authorities should be able to prove a ship's non-compliance, for example if it applied a setting outside the range allowed, or used a non-compliant engine component. Further, if an engine has been operating in Tier II inside a NECA – where it should have been operating in

[19] See at http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Emission-Control-Areas-(ECAs)-designated-under-regulation-13-of-MARPOL-Annex-VI-(NOx-emission-control).aspx.

[20] See at https://worldmaritimenews.com/archives/205936/imo-designates-north-sea-baltic-sea-as-neca/.

[21] See IMO, 'Guidelines for port State control under the revised MARPOL Annex VI', adopted by Resolution MEPC.181(59) of 17 July 2009, point 2.1.1, which states that the an initial PSC (document) inspection should include 'the Engine International Air Pollution Prevention Certificate (EIAPP Certificate) including its Supplement, for each applicable marine diesel engine' (2.1.1.2), 'the Technical File for each applicable diesel engine' (2.1.1.3) and 'the method used for demonstrating NOx compliance' (2.1.1.4), for example 'the record book of diesel engine parameters for each diesel engine' (2.1.1.4.1).

Tier III mode – it would constitute a clear case that the ship has discharged excess amounts of NOx.

Coastal States can thus take measures against such a violation in accordance with article 220(1) of UNCLOS; and port States may act in accordance with article 218(1), provided article 228(1) allows for this.

C. Particulate Matter: Regulation 14

Particulate matter (PM) can be extremely harmful to human health depending on the size of the particles, fine PM particles being the most harmful as they can easily penetrate the human respiratory and capillary systems through the lungs when inhaled.[22] A distinction is therefore often made between 'dust' (size PM10[23]), 'fine particulate matter' (size PM 2.5[24]) and 'ultra-fine particulate matter' (size PM 1[25]).

Particulate matter is, along with SOx, also released during the combustion of fossil fuels.[26]

It is noted that the heading of regulation 14 reads 'Sulphur Oxides (SOx) and particulate matter', despite the fact that the provision contains no further reference to PM.

Although PM is very harmful to human health, regulation 14 includes no limit on PM or other regulation thereof, thus making it impossible to take action against any 'violation' as there are no rules to violate. Consequently, there is no *delictum sui generis* (criminal act) against which enforcement measures can be taken under part XII of UNCLOS.

D. Volatile Organic Compounds: Regulation 15

The release of VOCs is controlled in accordance with regulation 15 of MARPOL Annex VI.

In general, VOCs are substances that have a low boiling point and which therefore easily evaporate. The term 'volatile organic compound' is not defined in Annex VI, but the EU's VOC Directive defines VOCs as being

> any organic compound having at 293,15 K a vapour pressure of 0,01 kPa or more, or having a corresponding volatility under the particular conditions of use. For the purpose of this Directive, the fraction of creosote which exceeds this value of vapour pressure at 293,15 K shall be considered as a VOC …[27]

[22] See at https://www.health.ny.gov/environmental/indoors/air/pmq_a.htm.
[23] 'PM10' refers to PM that has a diameter of 10 micrometres (μm) or less.
[24] 'PM 2.5' refers to PM that has a diameter of 2.5 μm or less.
[25] 'PM 1' refers to PM that has a diameter of 1 μm or less.
[26] http://www.valleyair.org/air_quality_plans/AQ_plans_PM_definition.htm.
[27] Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations [1999] OJ L085/1, art 2(17).

Many VOC substances can cause respiratory diseases, allergic skin reactions and headaches, but can also cause damage to the liver, kidneys and the central nervous system. Some are also assumed to be potentially fatal to humans and animals, as they are carcinogens, including the substance benzene (C_6H_6).[28]

Regulation 15.1 of Annex VI stipulates that the requirements of the provision only apply to tankers, as it covers those VOCs that can be generated from carrying liquid cargo (oil) in cargo spaces on board, and the chances of these VOCs being released during the loading and unloading of the cargo.[29]

Regulation 15.5 requires tankers to have equipment on board that can collect VOC gases and deliver them to a facility in a port that is officially approved (see regulation 15.3) to receive such VOC emissions.

It is also, pursuant to regulation 15.6, the responsibility of tankers to have a 'VOC management plan' on board. This plan must prove that the ship meets the IMO regulations and guidelines[30] for VOC handling. This includes, according to regulations 15.6.1–15.6.4, having a written procedure to minimise VOC emissions, and having a designated person (crew member) on board who is responsible for ensuring compliance with these requirements. The required information must be provided in a language the master and the responsible crew members understand, and a copy must be kept in English, Spanish or French. This VOC management plan must be ready for presentation during the initial part of a PSC. It must be approved by the authorities of the ship's flag State (see regulation 15.6).

A violation of regulation 15 could, in principle, result in VOCs' being released into the atmosphere on the high seas. However, given the content of the provision, and the practical and technical aspects of VOCs' being potentially released in port during loading or unloading, it is more likely that a violation of regulation 15 would be considered committed while the ship is in port or at an offshore terminal.[31]

A port State would therefore have normal 'PSC jurisdiction', pursuant to article 226 of UNCLOS, over a violation of regulation 15, whether relating to a faulty or missing VOC management plan or to faulty or missing technical equipment that results in the discharge of VOCs into the atmosphere. Any violation may be met with fines and/or detention, as described in chapter 4.

[28] See at https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality.

[29] Many tankers use inert gas to secure cargo tanks. When the inert gas is discharged, it can simultaneously result in the discharge of VOCs.

[30] See, eg, MSC/Circ.585 of 16 April 1992 on 'Standards for vapour emission control systems', available at https://www.transportstyrelsen.se/globalassets/global/sjofart/dokument/imo_dokument/msc/msc_circ_585.pdf.

[31] A possible exception to this could be ship-to-ship (STS) transfers that result in the release of VOCs in an EEZ or on the high seas. In this situation, the application of art 218(1) and art 220(1) of UNCLOS could become relevant, *if* the discharge violation can be proved, which might be difficult. Also, STS transfers are often not performed on the high seas but in designated/approved areas by a coastal State outside shipping lanes and routes, so that it is the use of art 220 that is most likely.

The port State also has, according to article 230 of UNCLOS, an unrestricted right to sanction any violations that result in a measurable release of VOCs while the ship is in port, as the offence is committed in internal waters over which the port State has unrestricted territorial jurisdiction (see article 2(1) of UNCLOS).

E. Ship Incinerators: Regulation 16

Regulation 16 of MARPOL Annex VI contains rules about burning (incinerating) materials, fabrics, etc a on board ships. The scope of the provision can be divided in to two parts, with regulations 16.1–16.4 applying to *all* ships and regulations 16.6–16.9 solely applying to ships built after 1 January 2000 or to ships that had an incinerator installed after that date.[32]

Regulation 16.1 states that all burning of materials, etc on board a ship may only be done in an incinerator designed for this purpose.

Regulation 16.2 lists several substances that may not be incinerated, not even in an approved incinerator. This list includes residues and materials from transporting MARPOL Annexes I–III substances, substances containing polychlorinated biphenyls (PCBs), waste containing heavy metals (provided it is more than just *traces* of heavy metals), refined petroleum products containing *halogens*, and sewage residue and oil residues, in so far as these are not produced on board during the operation of the ship.

Regulation 16.3 also prohibits the incineration of polyvinyl chloride (PVC) materials, unless this is done in an incineration system approved for this purpose by the IMO.[33]

Regulation 16.4 allows for incineration of sewage and oil sludge in the main or auxiliary engines or boilers if this was generated as part of the normal operation of the ship and the incineration occurs outside ports, harbours and estuaries.

Regulation 16.5 clarifies any situations where the rules of this provision and those of the London Convention (and its 1996 Protocol) overlap when disposing of waste. In such cases, the (*lex specialis*) provisions of the London Convention prevail over regulation 16 of Annex VI. Regulation 16.5.2 also underlines that nothing in the regulation must be considered an obstacle to the continued development of technical solutions that ensure the correct disposal (incineration, etc) of waste.

Regulation 16.6.1 specifies that incinerators that are on board ships that are built after 1 January 2000 or which are installed on any ship after that date, must meet the exact specifications set out in Appendix 4 to MARPOL Annex VI.[34]

[32] Reg 16.5 refers to overlaps with the London Convention and future technological developments.

[33] This requires that a 'Type Approval Certificate' be issued in accordance with the guidelines for this. For more details, see Resolutions MEPC.59(33), MEPC.76(40) or MEPC.244(66).

[34] Reg 16.9 also sets specific requirements for how quickly these systems must achieve a minimum temperature of 850º, depending on whether it is a continuous-feed type incinerator or a batch-loaded type incinerator. In the latter case, the incinerator should achieve a temperature of 600º within 5 minutes, after which it must be able to stabilise at 850º.

This must be certified by the flag State. Regulation 16.6.2 contains an exception to this for ships that only undertake domestic voyages in waters under the sovereignty of the flag State.

Ships covered by regulation 16.6 must also, pursuant to regulation 16.7, have an Operating Manual on board, issued by the manufacturer of the incinerator, which details how the incineration system is operated. The crew members who use the system must familiarise themselves with the Manual and undergo training to operate the system (see regulation 16.8).

It must be noted, in terms of applying the conclusions set out in Part II, that most of the requirements of this provision are of a technical nature, relating to the construction, approval and application of such incineration systems. Nonetheless, violations of regulations 16.2 and 16.3 could provide grounds for a port State to assert jurisdiction in accordance with article 218(1) of UNCLOS, and a coastal State in accordance with article 220(1), for instance if a ship incinerates PCB or PVC materials whilst sailing on the high seas or in an EEZ, subsequently going into port in a port State or coastal State. Coastal States would also, pursuant to article 220(1) and article 2(1) of UNCLOS, have unrestricted jurisdiction over violations of regulation 16.4 that occur within ports, harbours and estuaries.

F. EEDI/SEEMP (CO_2): Regulations 19–23

As mentioned in previous chapters, the international community has increasingly focused on air pollution over recent decades. This includes the IMO, as seen with the adoption of MARPOL Annex VI in 1997, which, inter alia, regulates emissions of ODSs, NOx, SOx and VOCs.

This was followed by a strong focus on emissions of GHGs, which include gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).[35] These GHGs contribute to global warming and climate change.

The IMO has initiated three major GHG studies since the start of the new millennium, in 2000, 2009 and 2014, to establish to what extent shipping contributes to the release of GHGs on a global scale. These studies have showed that although shipping is the form of transport that emits the lowest amount of GHGs compared to the quantity of goods transported over long distances, shipping still overall contributes a large quantity of manmade GHGs to the atmosphere, particularly CO_2. The IMO therefore often refers to the reduction of CO_2 emissions as a proxy for reducing the overall contribution of GHGs from shipping.

The IMO has estimated that shipping accounts for 2.2% of the total release of CO_2 emissions on a global scale, where ships of 5,000 GT and above account for 85% of this emissions factor.[36] It was therefore decided at MEPC62 in July of 2011,

[35] The term 'greenhouse gases' can also cover ODS gases such as CFC and HCFC gases covered by reg 12 of Annex VI.

[36] See at http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Default.aspx.

following the IMO's second GHG study, to amend MARPOL Annex VI by inserting a new chapter in the Annex (chapter 4), containing regulations 19–23, which seek to reduce CO_2 emissions from shipping.[37]

The rules in chapter 4 introduced a mandatory performance-based system that sets requirements for the minimum energy efficiency of new ships of 400 GT or above (see regulation 19.1), unless the flag State postpones the entry into force of chapter 4, which it can do for up to four years, or as regards ships that, within their working life, only sail in waters under the jurisdiction of the flag State (see regulation 19.2.1). Also exempt are ships using non-mechanical propulsion or platforms (see regulation 19.2.2).

A special index, the Energy Efficiency Design Index (EEDI), found in regulations 20 and 21, lays down the minimum energy efficiency levels that new ships must meet, depending on their type, size, etc. The regulations do not specify how these levels are to be achieved, which allows shipowners and shipbuilders to choose the ship designs, engines, materials, equipment, etc they deem appropriate, provided the EEDI requirements are met.

Regulation 20 differentiates between 'new builds' meeting the specific EEDI targets, described as 'attained EEDI',[38] new ships that have undergone a major conversion and existing ships that have undergone a major conversion.

Regulation 21 refers to 'required EEDI' and includes two tables (Table 1 and Table 2) specifying the EEDI requirements in the form of three phases, which aim to ensure the continued reduction of CO_2 from new ships, according to ship type.[39] The first phase entailed a 5–10% reduction from 1 January 2015 to 31 December 2019; phase two a 15-20% reduction from 1 January 2020 to 31 December 2024; and phase three a 30% reduction by January 2025.[40]

Regulation 22.1 requires all ships, including existing ships, to develop, implement and carry on board a ship-specific Ship Energy Efficiency Management Plan (SEEMP) that determines how the ship can be operated in the most energy-efficient way. To that end an Energy Efficiency Operational Indicator (EEOI) has been developed to enable shipowners to monitor the efficiency performance of its fleet over a specific period of time. The EEOI can therefore measure the fuel efficiency of a ship in operation.

The SEEMP must, as stated in regulation 22.3, follow the IMO guidelines for developing a SEEMP, that is, Resolution MEPC.282(70), 'Guidelines for the Development of a Ship Energy Efficiency Management Plan (SEEMP)'. These Guidelines, inter alia, refer to the ship's improving and optimising certain administrative and

[37] See Resolution MEPC.203(62).

[38] See MEPC.245(66), 'Guidelines on the method of calculation of the Attained EEDI for New Ships' (4 April 2014).

[39] There are, in principle, four phases, as there was a 'phase 0' from 1 January 2013 to 31 December 2014, which set the baseline for the calculated reductions.

[40] The IMO's GHG Strategy, described in ch 15, may result in phase 3 being moved forward and a new phase 4 adopted with even higher reduction targets.

operational parameters, such as voyage planning, weather routing, 'Just in Time Arrival' at port, speed, shaft power, ship handling, trim, ballast, hull, propulsion systems, waste heat recovery, fleet management, cargo handling, energy management, fuel type, trade and sailing areas.[41]

Regulation 22.2 stipulates that all ships of 5,000 GT or above must have a SEEMP that also contains a methodology describing how the ship will calculate and collect data on the its energy consumption and subsequent (CO_2) emissions. This is related to MEPC Resolution MEPC.278(70), adopted on 28 October 2016, which amended chapter 4 of MARPOL Annex VI by implementing regulation 22.A.[42] This regulation links to the IMO's 'Data collection system for fuel oil consumption of ships' ('data collection system'), which was briefly mentioned in chapter 4 of this book on PSC.

The data that are collected in accordance with regulation 22.2 must, at the end of each year, be processed and submitted to the flag State within three months of the year's end, in accordance with regulations 22.A.2 and 22.A.3.[43] The ship must keep these data for one year (see regulation 22.A.8).

The flag State must review the submitted data and confirm their validity in accordance with regulation 22.A.7.

Once the flag State has received the data and confirmed their validity under regulation 22.A, it must issue a *Statement of Compliance* related to fuel oil consumption to the ship within five months from the beginning of the year, pursuant to regulation 6.6 – 6.7 of MARPOL Annex VI.

The flag State is required to report these data to the IMO pursuant to regulation 22.A.9. More precisely, the data must be entered into IMO's data collection system. The IMO generates an annual report, based on these reported data, which is forwarded to MEPC and which contains an analysis of the results submitted (see regulations 22.A.10–22.A.12).[44]

Regulation 23 of MARPOL Annex VI requires flag States that are party to Annex VI to cooperate with the IMO, international bodies and other States, including developing States, to create and promote technology relating to improvement of the energy efficiency of ships.

[41] See point 5 on 'Guidance on best practices for fuel-efficient operations of ship' of Resolution MEPC.282(70), 'Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)'.

[42] http://www.imo.org/en/MediaCentre/PressBriefings/Pages/04MARPOLamendments.aspx.

[43] Reg. 22.A.1 stipulates that the data collection obligation described in regulation 22.2 cf. 22.A began 1 January 2019.

[44] It should be noted that the European Union (EU) has adopted a Regulation that, inter alia, demands that all ships of more than 5,000 GT flying the flag of an EU Member State and sailing to, from or between EU ports must undertake separate reporting of such data, including information on departures, arrivals, fuel quantity, distance travelled, time at sea, cargo, etc, pursuant to arts 8–9 of the Regulation. See Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC [2015] OJ L123/55 ('the MRV Regulation').

The common denominator of these chapter 4 regulations is thus *energy efficiency*. The EEDI ensures that new ships will be *designed* to meet an energy-efficiency target, and the SEEMP seeks to guarantee that all ships are *operated* in the most energy-efficient way. These optimisations of a ship's energy usage will lead to ships' using less fuel and thereby releasing less GHG, including CO_2. The IMO has calculated that these regulations could reduce CO_2 emissions by up to 75%.[45]

This also reduces the fuel costs of shipowners and should, in principle, result in a win–win scenario for the owners and the environment alike. However, compliance is not a given, as complying with the EEDI and SEEMP requirements can involve significant expenditure for some shipowners. If an owner chooses to employ ship designs, constructions or operations that are cheap but energy-ineffective, this may yield higher short-term profits.

Determining how regulations 19–23 of Annex VI can be enforced in accordance with part XII of UNCLOS is a challenge. Violations of these regulations may result in excessive discharges of CO_2 emissions compared to the emissions that could be achieved if ships were to fulfil the requirements. That being said, the causal link between a violation of the regulations of chapter 4 of Annex VI and establishing that this resulted in a quantifiable discharge of illegal CO_2 emissions, for example whilst sailing on the high seas, is not strong enough.[46] Violations of the regulations in chapter 4 of Annex VI are therefore best found and enforced during PSC, when inspecting documentation and the ship in accordance with regulation 10.3 of MARPOL Annex VI. Pursuant to article 226(1)(a)(ii) of UNCLOS, a port State has jurisdiction over such violations found during a PSC, also recalling that the principle of 'no more favourable treatment' (NMFT) applies in accordance with article 5(4) and article 1(2) of the MARPOL Convention.

It is noted that the *statement of compliance* the flag State issues each year must be considered a document covered by article 217(3) of UNCLOS. Any failure by the flag State to issue such a statement – or, even more relevant, if such a statement is issued on false grounds, for example where no data or data showing non-compliance were submitted and a statement is still issued – is a violation of article 217(3).

It should finally be noted that the IMO has sought to reduce GHG emissions from shipping further by adopting, in 2018, a GHG Strategy that sets certain fixed reduction goals for GHG (CO_2). This GHG Strategy, including its reduction goals and proposed regulatory (candidate) measures for achieving them, is discussed in detail in chapter 15, including in the context of enforcement through part XII of UNCLOS. Part IV of this book examines whether it is conceivable that some of

[45] This is reiterated in para 9 of the Preamble to the MRV Regulation.

[46] It should be noted that the aforementioned EU MRV Regulation (n 44) includes a reference in art 9 to the CO_2 emissions' being calculated for each ship and for each leg of a voyage, in accordance with the methods specified in Annex 1 to the Regulation. It could be argued that if this approach were adopted by the IMO, it would allow a port State or coastal State to prove that a ship had discharged an excess, and therefore illegal, amount of CO_2 emissions whilst sailing on the high seas or in the waters of the State, thereby allowing them to invoke art 218(1) or art 220(1) of UNCLOS respectively.

these proposed (short-, mid- and long-term) candidate measures on GHG could, in future, be perceived as representing norms of a *jus cogens* character, given the extremely adverse effects of GHGs.

II. Annexes I–V of the MARPOL Convention

As noted in chapter 1 of this book, the MARPOL Convention contains six Annexes. Annex VI on air pollution has been analysed at length; this section will therefore focus on enforcement of the other five Annexes. These are:

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

The Annexes are briefly examined individually, with regard to how violations of them can be subject to enforcement in accordance with the provisions of part XII of UNCLOS.

A. MARPOL Annex I: Regulations for the Prevention of Pollution by Oil

MARPOL Annex I specifies what obligations certain ships, in particular oil tankers, must meet when sailing with oil on board for combustion or as cargo.

All ships are, unless exempt, covered by the provisions of Annex I pursuant to regulation 2.1.[47]

All oil tankers above 150 GT and all other ships above 400 GT must carry an Oil Record Book Part I in accordance with regulation 17.1. All oil tankers above 150 GT must also carry an Oil Record Book Part II, as stated in regulation 36.1.

Oil tankers must also have segregated ballast water tanks and double hulls, in accordance with regulations 18–30 of Annex I. They must also possess an International Oil Pollution Prevention Certificate pursuant to regulations 6–10. All certificates and Oil Record Books must be presented during a PSC (see regulations 17.6 and 36.7).

[47] Not all the technical, construction, administrative and operational requirements found in MARPOL Annex I will be set out in full here.

Regulation 38 of Annex I also requires ports, terminals, yards, etc to have equipment and facilities (*reception facilities*) that can receive oil and oily residues.

As a starting point, regulations 15.1 and 34.1 prohibit oil from being discharged into the sea, except for in situations of force majeure (regulation 4) or in the conditions specified in regulation 15.2 and regulations 34.1.1–34.1.2 and 34.1.4–34.1.6.

As discussed in chapter 3 of this book, MARPOL Annex I also allows for the designation of 'Special Areas' where strict regulations apply, including a prohibition on the discharge of oil in any form (see regulations 15.3 and 34.1.3 and regulation 1.11). These Special Areas include the Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea, the Gulf of Aden, Gulf areas,[48] North West European waters, Oman, the Arabian Sea, southern South African waters and Antarctica.[49]

The MEPC adopted Resolution 189(60) in 2010, which implemented a new chapter (chapter 9) in MARPOL Annex I, containing regulation 43. This provision prohibits the use and carriage of oil, both as cargo and fuel, in the area around Antarctica,[50] provided the oil in question meets the characteristics specified in regulation 43:

1. crude oils having a density at 15'C higher than 900 kg 1m3;
2. oils, other than crude oils, having a density al 15'C higher than 900 kg/m3 or a kinematic viscosity at 50'C higher than 180 mm'/s; or
3. bitumen, tar and their emulsions …

These definitions describe oil types that can have a very harmful impact on the fragile marine environment in polar regions.

There have therefore also been discussions in the IMO on whether similar requirements should be established in the Artic.[51] It was decided at the sixth meeting of the Pollution, Prevention and Response (PPR) Subcommittee in February 2019 to forward such a regulation for discussion, acceptance and approval at MEPC level.[52]

Any kind of violation of MARPOL Annex I that leads to a discharge of oil in to the sea is covered by the conclusions in Part II of this book, including allowing a port State to assert extraterritorial jurisdiction over such violations pursuant to article 218(1) of UNCLOS. For example, for violations of regulation 15.1 of Annex I, which directly provides that 'discharge into the sea of oil or oily mixtures from ships shall be prohibited', or for infringements of regulations 15.3 and 34.1.3 pertaining to any discharge within a Special Area.

[48] The term 'Gulf areas' is a reference to the Arabian Gulf, being the sea north-east of the rhumb line between Ras al Hadd (22° 30' N, 059° 48' E) and Ras al Fasteh (25° 04' N, 061° 25' E).

[49] See also MEPC.1/Circ.778/Rev.2 of 6 April 2017 and http://www.imo.org/en/OurWork/Environment/SpecialAreasUnderMARPOL/Pages/Default.aspx.

[50] Emergency situations are exempt, including when participating in a rescue operation. Regulation 43.2 states that ships that have previously used or transported these oils are *not* required to 'flush' their tanks and piping systems before they sail into the waters of Antarctica.

[51] This work was often described within the IMO as the work on 'HFO in the Arctic'.

[52] See at https://www.highnorthnews.com/en/imo-inches-forward-ban-heavy-fuel-oil-arctic.

It will be recalled from chapter 10 that the term 'discharge' in article 218 of UNCLOS includes, besides emissions, the 'usual' applications of the term; applications that fall within the definition of 'discharge' in article 2(3)(a) of the MARPOL Convention, including 'escape', 'disposal', 'leaking', spilling', 'pumping' and 'emptying', thereby also covering the discharge of oil into the sea. Coastal States can therefore also assert jurisdiction over such violations pursuant to article 220(1).

However, several of the conclusions set out in Part II may be different when it comes to taking enforcement measures against (discharge) violations of MARPOL Annex I. Article 220(5)–(6), which refer to discharges that cause (or threaten to cause) significant and major damage to a coastal State, will become relevant when enforcing violations of MARPOL Annex I, as one specific violation of that Annex, unlike a violation of Annex VI, can result in specific, tangible damage to a coastal State. A coastal State could thus, in accordance with article 220(5)–(6), stop, investigate, detain and prosecute a foreign ship transiting the EEZ if the ship has violated MARPOL Annex I. This was also explicitly established in the *Bosporus Queen case*, discussed in chapters 5 and 9.[53]

It will be recalled that the European Court of Justice noted in the *Bosporus Queen* that even though the Baltic Sea is deemed a Special Area in accordance with MARPOL Annex I, a violation of this regulation does not automatically result in major damage pursuant to article 220(6) but it can influence that overall assessment.[54]

If a violation of Annex I does result in major damage, it will also enable a coastal State to invoke the *first exception* in article 228(1) of UNCLOS. The coastal State's article 220 jurisdiction would consequently automatically extinguish the article 217 jurisdiction of the flag State, as described in chapter 11.

Finally, coastal States would also have jurisdiction, according to article 233 and article 42(1)(b) of UNCLOS, to stop, investigate and prosecute foreign ships that infringe MARPOL Annex I while making *transit passage* in an international strait, provided the infringement caused (or threatened to cause) major damage to the marine environment of the strait.

It should also be noted, regarding coastal State enforcement of regulation 43 of MAPROL Annex I (the special requirements for Antarctica), that Antarctica, in international law, is regarded as being *terra nullis*, that is land over which no State can claim sovereignty, and it can only be used for peaceful purposes.[55] The waters off Antarctica should therefore be considered *res communis* (high seas that belong to humanity).[56] It is thus only logical to assume that violations of regulation 43 of Annex 1 should predominantly be enforced by port States

[53] Case C-15/17 *Bosphorus Queen Shipping Ltd Corp v Rajavartiolaitos*, ECLI:EU:C:2018:557.

[54] ibid, paras 107–08. The same conclusion is reached in Advocate General Wahl's Opinion in the case. Advisory Opinion of Advocate General Wahl, delivered on 28 February 2018, paras 106–08.

[55] This principle is repeated in art 1 of the Antarctic Treaty (adopted 1 December 1959, entered into force June 23 1961) 402 UNTS 71.

[56] CC Joyner, *Antarctica and the Law of the Sea* (Martinus Nijhoff Publishers, 1992) ch 3, 'Jurisdiction Offshore Antarctica'.

in accordance with article 218(1) of UNCLOS and, obviously, flag States according to article 217. Any overlapping jurisdiction between these States is settled in accordance with article 228(1), but only through application of the *main rule* and possibly the *second exception*, as the *first exception* relates to coastal State jurisdiction.

The same conclusion might not apply if a similar prohibition is adopted regarding the Arctic, as different States have sovereign rights in that area, thereby also having the right to exercise a coastal State's territorial jurisdiction in Arctic waters pursuant to article 220 of the Convention. These (coastal) States would likely also be able to adopt national environmental legislation in these ice-covered areas according to article 234, as described in chapter 3.

B. MARPOL Annex II: Regulations for the Prevention of Pollution by Noxious Liquid Substances in Bulk

MARPOL Annex II imposes, in much the same way as Annex I does for tankers transporting oil, requirements for tankers transporting *noxious liquid substances in bulk*, such as the transport of harmful chemicals. The rules and regulations in Annex II are therefore only briefly examined here.

Regulation 1.16.1 of MARPOL Annex II defines a 'chemical tanker' as a ship that sails with substances covered by chapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk ('the IBC Code').[57]

Regulation 6 of Annex II refers to harmful substances, chemicals, etc that are classified as category 'X', 'Y' or 'Z' substances, or as 'other substances' according to chapter 18 of the IBC Code.

Regulation 13.1.1 contains the main rule – that all discharges of substances listed as category X, Y and Z substances are prohibited.

In regulation 13.8, MARPOL Annex II designates Special Areas in which strict requirements apply. This includes a complete prohibition on discharging harmful substances (chemicals) into the sea pursuant to regulation 13.8.2. Antarctica is such an Area.[58]

A ship (tanker) must, in accordance with regulations 8–9 of Annex II, be certified to sail with such substances, this being documented by an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk. This certificate must be presented as part of an initial PSC.

Regulation 18 requires that ports, terminals and shipyards have adequate facilities for receiving such harmful substances.

[57] The International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (adopted 5 December 1985, entered into force 1 July 1986) ('the IBC Code').

[58] See MEPC.1/Circ.778/Rev.2 of 6 April 2017 and http://www.imo.org/en/OurWork/Environment/SpecialAreasUnderMARPOL/Pages/Default.aspx.

The conclusions in Part II of this book apply to enforcement of MARPOL Annex II, with the same expanded jurisdiction as described regarding enforcement of MARPOL Annex I, including allowing coastal States to invoke article 220(5)–(6) and the *first exception* in article 228(1), as a violation of MARPOL Annex II can result in tangible and serious (major) pollution of a coastal State. This also applies with regard to article 233 of UNCLOS, as article 42(1)(b) refers to noxious substances being released into a strait.

Finally, the same principles apply to enforcement of MARPOL Annex II in Antarctica as described in connection with Annex I.

C. MARPOL Annex III: Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form

In contrast to Annexes I and II, MARPOL Annex III deals with ships transporting harmful substances in packaged form and not in liquid form.

Regulation 1.1 defines such harmful substances as those covered by the International Maritime Dangerous Goods Code ('the IMDG Code').[59] The reference to the harmful substances' being transported in *packaged form* encompasses substances transported in portable tanks, containers, barrels, road or train tank wagons, etc.

Annex III stipulates that such cargo must be packed in a secure manner (regulation 3), have labels affixed specifying the content and hazard it represents (regulation 4) and must be secured on board (regulation 6.)

Regulation 5 requires ships to adhere to the requirements for documentation (list, manifest or stowage plan) set out in the IMDG Code.

Regulation 8.1 provides that packages containing harmful substances must not be *wilfully* thrown overboard, and regulation 8.2 establishes that such packages must not have any leaks, etc that *unintentionally* might pollute the marine environment.

Compliance with these requirements of Annex III can be ensured as part of a PSC (see regulation 9).

Discussing enforcement of MARPOL Annex III can involve walking a tightrope between violations of regulations 8.1 and 8.2, when deciding which provision of part XII of UNCLOS applies. If regulation 8.2 is infringed, for example if a 'package' (barrel, etc) leaks its content into the sea, it must be considered a discharge, as article 2(3)(a) of the MARPOL Convention defines the term 'discharge' to cover, inter alia, 'leaking' and 'spilling'. Violations of regulations 8.2 of MARPOL Annex III

[59] Maritime Solid Bulk Cargoes Code (adopted 4 December 2008, entered into force 1 January 2011) ('the IMSBC Code').

can therefore be enforced in accordance with the enforcement principles discussed in Part II. The conclusion regarding enforcement of MARPOL Annexes I and II, that coastal States can invoke articles 220(5)–(6), 233[60] and the *first exception* in article 228(1), also applies if the leaked substance is so harmful that it potentially can (or did) cause major damage to a costal State.

However, the same does not apply to enforcement of regulation 8.1, as that provision concerns packages that are *deliberately* thrown overboard. This cannot be considered a discharge but is *dumping*, in accordance with the definition thereof in article 1(1)(5)(i) of UNCLOS, which states that 'dumping' includes, inter alia, 'any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea'.

It will also be recalled from chapter 10 that article 2(3)(b) of the MARPOL Convention provides that the term 'discharge' does not include dumping.

Violations of regulation 8.1 of Annex III can therefore not be enforced on the high seas in accordance with article 218 of UNCLOS. Such violations are instead covered by article 216, which was briefly discussed in chapter 9.

Violations of regulation 8.1 of MARPOL Annex III *can* be enforced by coastal States in accordance with article 216(1)(a), by flag States pursuant to article 216(1)(b) and by port States in accordance with article 216(1)(c). Article 216(1)(c) does note, however, unlike article 218, provide a port State with any extraterritorial jurisdiction to enforce outside its own waters (ports).

D. MARPOL Annex IV: Regulations for the Prevention of Pollution by Sewage from Ships

MARPOL Annex IV regulates discharges of waste water (sewage) from ships over 400 GT engaged in international voyages, or from ships that are certified to carry more than 15 passengers (see regulation 2). Regulation 1.3 defines what is covered by the Annex, which includes drainage from toilets, medical facilities, etc.

It should be noted that water that has been used for bathing, washing dishes, washing clothes, etc – often referred to as 'grey water' – is not covered by Annex IV. It has, however, been discussed at IMO level whether such regulation of grey water should be adopted. The following conclusions of this subsection pertaining to enforcement of MARPOL Annex IV would therefore also apply to any future regulation of grey water discharges.[61]

Ships that are covered by Annex IV must, in accordance with regulation 9, have systems and installations on board for treating such sewage, as it is illegal to discharge untreated sewage pursuant to regulation 11.1, with certain exceptions applying that are codified in regulations 11.1.1 and 11.1.2.

[60] Art 42(1)(b) of UNCLOS refers to the discharge of oil and noxious substances into a strait, which encompasses a violation of reg. 8.2 of MARPOL Annex III but not violations of reg. 8.1.

[61] See at https://gcaptain.com/addressing-grey-water-pollution-ships/.

A ship's compliance with the requirements of Annex IV is, according to regulations 4–8, to be certified in the form of an International Sewage Pollution Prevention Certificate, which must be presented during PSC. This certificate is issued by the flag State. Regulation 12 requires ports, etc to have facilities to receive such sewage waste.

Annex IV also allows for the designation of Special Areas, where particularly strict discharge requirements apply to discharges from passenger ships (see regulation 11.3). The Baltic Sea has been designated as such a Special Annex IV Area.[62]

Any deliberate or unintentional 'discharge' of sewage in violation of Annex IV is an infringement that is covered by the conclusions set out in Part II of this book, allowing for articles 218(1) and 220(1) to be used. It must, however, be questionable whether a coastal State can invoke articles 220(5)–(6) and 228(1) (first exception) in response to such violations, as the potential damage caused by the infringement is not likely to be severe enough to cause *major damage* to a coastal State. It is not relevant to discuss the application of article 233, as article 42(1)(b) only refers to the discharge of oil and noxious substances into a strait, which does not encompass MARPOL Annex IV.

E. MARPOL Annex V: Regulations for the Prevention of Pollution by Garbage from Ships

MARPOL Annex V stipulates how ships may, and may not, dispose of waste generated on board.[63]

'Waste' means garbage, residues and leftover products originating from the normal operations of a ship, including kitchen waste, plastic from food or beverage products (plastic bottles, candy wrappers), etc. For example following the definition in regulation 1.9 of Annex V.

According to regulation 2, Annex V applies to all ships, unless otherwise stated.

Regulation 3 prohibits, as a main rule, any disposal of waste from a ship into the sea, but certain exceptions apply in accordance with regulations 4 and 7, depending on the type of waste and where the ship is sailing. For example, food products and leftovers can be ground down, and the result may be disposed of into the sea if the ship is the required minimum distance from any coast/coastal State (see regulation 4.1).

All vessels of 400 GT or more and all ships certified to carry more than 15 passengers must, in accordance with regulation 10 of Annex V, also have a 'Garbage Record Book'. This record book must be presented during PSC in accordance with regulation 9.

[62] See MEPC.1/Circ.778/Rev.2 of 6 April 2017 and http://www.imo.org/en/OurWork/Environment/SpecialAreasUnderMARPOL/Pages/Default.aspx.

[63] See also Resolution MEPC.219(63), 'Guidelines for the implementation of MARPOL Annex V'; and Resolution MEPC.220(63), 'Guidelines for the development of garbage management plans'.

Ports and terminals must, under regulation 8, maintain adequate reception facilities for such waste.

Special Areas can also be designated in accordance with MARPOL Annex V pursuant to regulation 6, in which strict requirements for the disposal of waste apply.[64] The Mediterranean Sea, the Baltic Sea, the North Sea, the Black Sea, the Red Sea, the outer Caribbean area, Antarctica and the 'Gulf areas' are all Special Areas.[65]

The need for effective enforcement of MARPOL Annex V has become very apparent within recent years due to repeated reports of enormous and ever-growing floating islands of plastic in the world's oceans,[66] for instance in parts of the North Pacific[67] and in the Caribbean.[68] This pollution can by itself lead to fish or mammals consuming it or getting caught in it. This waste can also dissolve into very small particles, which may be consumed and absorbed by even smaller fish, which can have toxic consequences for the marine environment, including the health of humans and animals if those contaminated fish enter the food chain.

The disposal of waste, including plastic in oceans, is also a subject that has repeatedly been addressed at the IMO under the heading 'marine litter'. The MEPC adopted an 'IMO Action Plan' in 2018, to address and combat marine litter in the oceans.[69] The Action Plan is due to be completed by 2025.

When looking in to enforcement of Annex V, a distinction must be made depending on whether the term '*disposal* of waste' can be characterised as involving *discharge* or *dumping*. Two arguments indicate that disposal should be viewed as being a discharge within the realm of part XII of UNCLOS. First, article 2(3)(a) of the MARPOL Convention defines 'discharge' as also being a form of 'disposal', which also applies to the Annexes to the Convention pursuant to article 1(2). Second, although article 1(1)(5)(a)(i) of UNCLOS defines 'dumping' as 'any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea' – which could indicate that disposal of waste amounts to dumping – article 1(5)(b)(i)–(ii) go on to state that dumping does *not* include (i) 'the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels' and (ii) 'placement of matter for a purpose other than the mere disposal thereof'. Disposal of waste that is generated on board as part of the *normal operations* of a ship, which includes food waste, empty plastic bags, plastic bottles, etc, is therefore not considered dumping, also because this waste is not placed onboard with the sole purpose of being disposed/dumped.

[64] See MEPC.1/Circ.778/Rev.2 of 6 April 2017 and http://www.imo.org/en/OurWork/Environment/SpecialAreasUnderMARPOL/Pages/Default.aspx.

[65] For the meaning of 'the Gulf areas', see n 49 above.

[66] http://www.imo.org/en/MediaCentre/HotTopics/marinelitter/Pages/default.aspx.

[67] https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/.

[68] http://www.independent.co.uk/environment/un-ocean-plastic-waste-resolution-us-china-india-reject-pollution-sea-united-nations-environment-a8095541.html.

[69] http://www.imo.org/en/MediaCentre/HotTopics/marinelitter/Pages/default.aspx.

Therefore, given the positive demarcation of the term 'discharge' in article 2(3)(a) of the MARPOL Convention and the negative demarcation of the term 'dumping' in article 1(1)(5)(a)(i)–(ii) of UNCLOS, it can be concluded that 'disposal of waste' covered by Annex V can be regarded as a 'discharge'.

The conclusions set out in Part II of this book therefore apply to enforcement of Annex V, giving port States extraterritorial jurisdiction over MARPOL Annex V violations outside their own territory, for example on the high seas, pursuant to article 218(1) of UNCLOS. Coastal States have jurisdiction over all infringements of Annex V within their territory, including in the EEZ, pursuant to article 220(1) of UNCLOS. Both articles are conditional on the violating ship's subsequently calling voluntarily into port in the port State or coastal State.

Section II.D stated that it was considered questionable whether a violation of MARPOL Annex IV (sewage) would allow a coastal State to assert the wider jurisdictional basis found in article 220(5)–(6) and invoke the first exception in article 228(1).[70] Pertaining to enforcement of MARPOL Annex V, there can be little or no doubt that *one* violation of Annex V, as a main rule, cannot result in potential significant or major damage to the coastal State. It is, as was concluded in Part II (chapter 9) regarding enforcement of the sulphur regulations of Annex VI, the accumulated amount of plastic waste, etc in the oceans that inflicts the required damaging effect.

However, a possible exception to this main rule could perhaps be envisaged if *one* ship were to dispose of such substantial amounts of waste at *one* time that it might result in *major damage*, allowing the coastal State, in accordance with articles 220(5)–(6) and 228(1), to stop, investigate and detain the ship in the EEZ and deny the flag State its request for suspension of legal proceedings instituted by the coastal State.[71] It must to this end be recalled, however, that the disposed of waste must originate in normal operations on board, meaning that if waste is taken on board *as* waste, with the purpose of its being dumped during the voyage, then that is *dumping*, covered by the London Convention and article 216 of UNCLOS.

III. The Ballast Water Management Convention

The IMO's Convention for the Control and Management of Ships' Ballast Water and Sediments, is often referred to as the 'Ballast Water Management Convention' or simply the 'BWM Convention'.[72] It seeks to regulate the discharge of ballast water from ships.

[70] It is not relevant to discuss the application of art 233, as art 42(1)(b) only refers to the discharge of oil and noxious substances in to a strait, which does not encompass MARPOL Annex IV.

[71] Art 233 is not relevant to this discussion, as art 42(1)(b) only refers to the discharge of oil and noxious substances.

[72] See n 5 above.

Some ships have ballast tanks that they fill with seawater to stabilise the vessel during a voyage. The amount of ballast water needed is assessed depending on the ship's cargo (weight), voyage plan, weather conditions, etc.

This seawater in the ballast water tanks is logically referred to as *ballast water*. The ship can discharge the ballast water back into the sea when needed, but this discharge may occur in regions far away from the sea where the ballast water was originally taken in.

The biodiversity, ecology and marine biology of different sea areas may not be the same, different sediments (containing biological organisms) and species existing in each of them. Some of these organisms and species (including their eggs) can be very invasive and harmful when introduced into a new marine environment. An example of such an invasive species is the Chinese wool-handed crab, which, as the name suggests, originates in the South China Sea, but today is found in a number of European waters, including in Denmark.[73]

The BWM Convention seeks, as laid down in article 2(1), 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'. The BWM Convention regulates, in short, a ship's discharge of ballast water through two standards: D-1 and D-2. Those standards are incorporated into the Annex to the Convention, which 'forms an integral part of this Convention' pursuant to article 2(2). This provision also states that, 'Unless expressly provided otherwise, a reference to this Convention constitutes at the same time a reference to the Annex.'

The first standard, the *D-1 Standard* (regulation D-1) provides, pursuant to regulation B-4.1, that all ships covered by the regulation may only discharge ballast water on the high seas or in areas over 50 nautical miles (nm) from any coast, in waters with a depth over 200 metres or, pursuant to regulation B-4.2, in specified areas designated for the discharge of ballast water.

Ships covered by the second standard, the *D-2 Standard* (regulation D-2), must ensure, pursuant to regulation B-5 and regulation B-3.3, that the ship 'treats' the ballast water before discharging it, which means that the ballast water is cleansed of any sediments, etc.

There are several different technologies that can be applied to meet the D-2 Standard, including systems that expose the ballast water to UV-lighting, which kills off organisms living in the water. All ships covered by the regulation must meet the D-2 Standard from 8 September 2024, pursuant to regulation B-3.8.[74]

[73] The Chinese wool-handed crab has, for example, been observed in streams near the city of Aunslev and in Nyborg Fjord, see https://www.fyens.dk/indland/Frygtet-kinesisk-krabbe-fundet-i-oestfynsk-aa/artikel/2158594 and https://www.tv2fyn.dk/artikel/uoensket-uldhaandskrabbe-har-indtaget-nyborg-fjord.

[74] Reg B-3, including reg B-3.8, and the entry into force in 2024 were amendments to the Annex of the BWM Convention made by Resolution MEPC.297(72) on Amendments to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, adopted on 13 April 2018.

Those ships must also have a 'Ballast water management plan' (regulation B-1) and a 'Ballast water record book' (regulation B-2), plus an *International Ballast Water Management Certificate* (regulation E-2–E-5), which must be presented during a PSC, as stated in article 9(1).

As the BWM Convention relates to the *discharge* of ballast water, the different principles and conclusions discussed in Part II of this book apply to the enforcement of this Convention, including on the high seas, as the D-2 Standard also will prohibit discharges of untreated ballast water in these areas.

Coastal States can, in principle, invoke article 220(5)–(6)and the first exception in article 228(1), as sediments potentially can cause major damage to the ecosystems of a State.[75] But it must nonetheless be considered unlikely that a coastal State will be able to prove that a specific violation of the BWM Convention resulted in specific damage, that is, that a specific invasive species was introduced to the marine environment after a specific ship discharged its ballast water. It may be recalled that the general enforcement principles in articles 218(1) and 220(1) have no such requirement. The mere infringement of the BWM Convention is sufficient to invoke those jurisdictions for port States and coastal States.

It should be noted in this context that article 16 of the Convention explicitly refers to the BWM Convention's respecting the principles of UNCLOS and international law in general.

IV. The Anti-Fouling Systems Convention

'Fouling', in this context, refers to unwanted marine organisms, sediment, animals (algae and molluscs), etc that become attached to a ship's keel below the waterline. This fouling can reduce the aerodynamic function of the hull, thereby increasing its water resistance, thus requiring more engine power to achieve a certain speed, which increases the ship's fuel consumption.

'Anti-fouling system' (AFS) is a term used to describe material, often a special coat of paint or chemicals, that is applied to a ship's keel, which prevents fouling from occurring, or at least makes it more difficult. Article 2(2) of the Convention on the Control of Harmful Anti-fouling Systems on Ships ('the AFS Convention')[76] defines an 'anti-fouling system' as being 'a coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms'.

The AFS Convention regulates which anti-fouling systems can and cannot be used, as some systems (paints, etc) contain substances that are harmful to the marine environment. Such systems can slowly release those substances into the sea while a ship is sailing, thereby poisoning and polluting the marine biodiversity.

[75] It is not relevant to discuss the application of art 233, as art 42(1)(b) only refers to the discharge of oil and noxious substances into a strait.

[76] See n 6 above.

Enforcement of the AFS Convention is therefore covered by the regulatory scope of part XII of UNCLOS.[77] It is worth noting, with regard to this, that article 3(1)(a) of the AFS Convention requires flag States, which are party to the Convention, to ensure that ships under their flags comply with its rules and regulations; while article 3(1)(b) requires participating coastal States to enforce the Convention within their waters, as it refers to ships operating 'under the authority of a party', for example in the territorial sea; likewise for port States within their ports in accordance with article 3(1)(c).

Drawing a parallel with other IMO conventions and article 236 of UNCLOS, the AFS Convention does not apply to State-owned ships (see article 3(2)).

Under article 4(1), flag and coastal States have a duty, in accordance with article 3(1)(a) or (b), to ensure that no ship installs, applies or uses an AFS that does not meet the requirements for such systems set out in Annex 1 to the AFS Convention. Ensuring that ships do not install, apply or use an unlawful AFS during their stay in port pursuant to article 3(1)(c) is explicitly referred to in article 4(1)(b) as the responsibility of port States. The jurisdiction of port States is linked to PSC and the NMFT principle codified in article 3(3).

Article 10 provides that ships must have an International Anti-fouling System Certificate, proving that the ship complies with the AFS Convention. Regulation 1.1. of Annex 4 to the AFS Convention states that this Certificate is required for vessels of 400 GT and above. The Certificate must be presented as part of a PSC (see article 11(1)(a)).

Article 11(1)(b) specifies that is possible for Port State Control Officers (PSCOs), during the initial part of a PSC, to take a sample of the AFS from the ship to ensure that it complies with the Convention. This means that it is not necessary for a PSCO to have *clear grounds* before taking a sample, as the sample is taken as part of the initial PSC inspection and not as part of a detailed PSC. However, article 11(2) refers to more thorough inspections of the AFS where there are clear grounds, that is, as part of a detailed PSC inspection. This can, in accordance with article 11(3), lead to detainment of the ship until such surveys are completed, and possibly until the test results from any survey and/or sampling are returned.

Articles 6–9 of the AFS Convention contain provisions relating to the need for continued scientific research to determine if an AFS is harmful, and whether the use thereof should be banned or restricted. For example, it was discussed at PPR6 in 2019 whether the substance *cybutryne* should be banned.[78]

When determining the applicability of the Part II conclusions to the enforcement of the AFS Convention, it must first be determined what a violation comprises, that is, whether it is a discharge, dumping or something else. The IMO refers to toxic AFSs slowly 'leaching' into the sea from the hull of ships.[79] It must therefore initially be concluded that the term 'dumping', and thus article 216 of

[77] IMO, 'Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization' (LEG/MISC. 8, 30 January 2014) 57.

[78] See at http://www.imo.org/en/MediaCentre/MeetingSummaries/PPR/Pages/PPR-6th-Session.aspx.

[79] See at http://www.imo.org/en/OurWork/Environment/Anti-foulingSystems/Pages/Default.aspx.

UNCLOS, has no relevance pertaining to enforcement of the AFS Convention, as this (the term 'leaching') falls outside the definition in article 1(1)(5)(a)(i)–(ii) of UNCLOS.

Synonyms of 'leach' include, according to the Oxford Electronic Thesaurus, 'discharge' and 'leak'.[80] It can therefore be assumed that a violation of the AFS Convention may, in principle, be enforced in accordance with the different conclusions set out in Part II, including using articles 218(1) and 220(1). However, a coastal State would probably not be able to invoke article 220(5)–(6) and the first exception in article 228(1) of UNCLOS, as the continued, slow release (leaching) of an AFS from a specific (violating) ship's hull into the sea cannot potentially cause specific significant or major damage to the coastal State.[81]

An interesting perspective on anti-fouling has been discussed within the IMO at MEPC level regarding the possible mandatory use of AFSs to avoid 'biofouling'.[82] As mentioned initially, fouling impairs the aerodynamic function of the hull, which increases water resistance, resulting in the need for more engine power and greater fuel consumption. Fouling that is released from the hull can contain invasive species, which, like ballast water, may contaminate a new sea area. It has therefore been discussed whether ships should be required to use AFSs, provided these comply with the AFS Convention. An IMO Guideline was adopted as early as 2011 addressing this issue – MEPC Resolution MEPC.207(62), Guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species.

If such regulations on biofouling were to be adopted, they would, depending on their final wording, probably be enforceable in accordance with the conclusions in Part II of this book, as the result of not complying would be the discharge of more harmful substances into the air (due to increased fuel consumption) and into the sea (due to the continued release of sediment from the hull).

V. The London Convention

The Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[83] is often referred to as 'the London Convention', as it was adopted in London in November 1972.

Article I of the London Convention states that its purpose is to

> prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

[80] See at https://en.oxforddictionaries.com/thesaurus/leach.

[81] It is not relevant to discuss art 233 and art 42(1)(b), as the AFS Convention does not pertain to discharge of oil or noxious substances.

[82] See at http://www.imo.org/en/OurWork/Environment/Biofouling/Pages/default.aspx.

[83] See n 7 above.

The participating parties to the Convention must, in accordance with article II, take steps to prevent illegal dumping.

Article III(1)(a)(i)–(ii) of the London Convention, as previously described, contain a positive definition of what the term 'dumping' includes – a definition almost identical to the definition of 'dumping' in article 1(1)(5)(a)(i)–(ii) of UNCLOS.

Article IV(1)(a) provides that it is the responsibility of all States party to the Convention to prohibit the dumping of any waste and other substances in any form or mode, if these substances or waste are covered by Annex 1 to the London Convention.

The dumping of types of waste or substances listed in Annex 2 to the Convention requires a *prior special permit* from coastal States (see article IV(1)(b)). All other forms of wastes and substances, not covered by Annex 1 or Annex 2, merely require general permission from the coastal State for dumping these, in accordance with article IV(1)(c).

The factors that (coastal) States must consider before granting permission in accordance with article IV(1)(b) or (c) are listed Annex 3 to the Convention. It is a requirement under article VI that a (coastal) State must designate a special authority for issuing such permits.

Article VII requires the participating parties take the necessary steps to ensure compliance with the London Convention. Article VII(1)(a) stipulates that flag States must ensure that the requirements of the Convention are met by ships under their flags. Article VII(1)(b) obliges States to ensure that the requirements of Convention are fulfilled by foreign ships dumping waste and hazardous substances in ports or at offshore terminals. All States must also, in accordance with article VII(1)(c), enforce the provisions of the Convention within their territory.

Situations of *force majeure* may exempt ships from complying with the London Convention (see article V).

Needless to say, violations of the London Convention cannot be considered discharge violations; they are 'dumping violations', and the two terms do not overlap (see, for example, the positive and negative demarcations of the term 'discharge' found article 2(3)(a)–(b) of the MARPOL Convention). Violations of the London Convention are therefore not covered by the different enforcement principles discussed in Part II of this book. Violations are instead covered by article 216 of UNCLOS, which was briefly described in chapter 9 and in section II.C of this chapter regarding enforcement of MARPOL Annex III.

Dumping violations can be made the subject of enforcement measures by coastal States pursuant to article 216(1)(a), by flag States in accordance with to article 216(1)(b) and by port States in accordance with article 216(1)(c).

Article 216(1)(a) of UNLCOS refers to the coastal State's enforcement of international rules on dumping (ie the London Convention) within its territorial sea, EEZ or on the *continental shelf*. It will be recalled from chapter 9 that the clear reference to the *continental shelf*, without any specified restrictions, must allow coastal States that have extended their continental shelf to 350 nm from the baseline, in

accordance with article 76(4)–(8) of UNCLOS,[84] to exercise jurisdiction under article 216(1)(a) over that entire 350 nm area.

A. The London Convention's Interface and Overlap with Other IMO Regulations

It should be noted that the regulations in the London Convention sometimes overlap with other IMO regulations, such as regulation 8.1 of MARPOL Annex III pertaining to the wilful dumping of hazardous substances in packed form into the sea. The London Convention must supersede these other regulations from a *lex specialis* standpoint, which also is provided for in regulation 16.5 of MARPOL Annex VI regarding the use of ship incinerators. This provision specifies that in the event of any overlap between regulation 16 and the London Convention, the latter prevails.

However, sometimes regulations might not directly overlap but merely supplement one another. For example, regarding the applicability of the London Convention and the Nairobi Convention.[85] There can be several interfaces at which these two conventions might overlap, for example where containers are lost at sea, which is a subject that also has been discussed at IMO level.[86] If a container is deliberately dumped at sea then it is covered by the London Convention. If, on the other hand, a container is unintentionally lost at sea, for instance during a storm, then this matter is covered by the Nairobi Convention, as it would be encompassed by the definition of a 'wreck' in article 1(4)(a)–(d) of that Convention, that is:

(a) a sunken or stranded ship; or
(b) any part of a sunken or stranded ship, including any object that is or has been on board such a ship; or
(c) any object that is lost at sea from a ship and that is stranded, sunken or adrift at sea; or
(d) a ship that is about, or may reasonably be expected, to sink or to strand, where effective measures to assist the ship or any property in danger are not already being taken.

A container, or other equipment or cargo on board, would be considered an 'object that has been on board' ((b)), as well as an 'object that is lost at sea from a ship' ((c)).

A coastal State that is party to the Nairobi Convention may, if a wreck (eg a lost container) constitutes a hazard or danger to marine traffic or the environment, require that the wreck be located, pursuant to article 7 of the Convention. It may also require that the wreck be *marked*, in accordance with article 8, if this

[84] See ch 3 for more on art 76 and the delimitation of the continental shelf.
[85] See n 7 above.
[86] See http://www.imo.org/en/MediaCentre/HotTopics/container/Pages/default.aspx.

is necessary. Finally, the wreck can also be required to be *removed* under article 9, if this is crucial for safety and/or for environmental reasons. A shipowner can, in accordance with article 10(1) of the Nairobi Convention, be held liable for the costs that follow the application of the measures listed in articles 7–9.[87]

VI. The Hong Kong Convention on Ship Recycling

The Convention for the Safe and Environmentally Sound Recycling of Ships[88] is often referred to as 'the Hong Kong Convention', as it was adopted at a conference held in Hong Kong from 11–15 May 2009. The Hong Kong Convention has, at this point in time, not yet entered into force, article 17 providing that it will do so two years after the three cumulative conditions in article 17(1)(1)–(3) have been fulfilled.[89]

It is the purpose of the Convention to ensure that ships that are decommissioned are scrapped in a safe, sustainable and environmentally-sound manner. Some ships, particularly larger merchant ships, are often scrapped at a yard or near a beach. The concept of *scrapping* covers ships' being dismantled piece by piece, which can be a dangerous process for the people who do the work as well as for the environment, as the ship could contain chemicals, oils and other residues.

The Hong Kong Convention does not apply to government ships or ships under 500 GT (see article 3(2)–(3)).

Article 4(1) of the Hong Kong Convention requires flag States to ensure that ships flying their flags adhere to its provisions, which, pursuant to article 5, must be demonstrated by the surveying and certification of all ships covered by the regulations. A flag State must maintain a list covering all certified ships and submit this list to the IMO annually in accordance with article 12(4). Chapter 2 of the Annex to the Convention (containing the 'Regulations for safe and environmentally sound recycling of ships') sets out detailed requirements for ships and shipowners.

[87] An interesting overlap could also occur between MARPOL Annex III and the Nairobi Convention if a container containing noxious substances were unintentionally lost at sea, resulting in the contents' leaking/escaping from their packaging. The two regulatory instruments will in this case supplement each other, as this could be considered a violation of reg 8.2 of MARPOL Annex III, incurring legal responsibility in accordance therewith, but also constitute a violation of the Nairobi Convention, which would allow the relevant articles (arts 7–10) to be invoked as regards locating, marking and potentially removing the 'wreck' (container) at the expense of the shipowner.

[88] See n 8 above.

[89] These three conditions require that: (i) 'not less than 15 States 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 16'; (ii) 'the combined merchant fleets of the States mentioned in paragraph 1.1 constitute not less than 40 per cent of the gross tonnage of the world's merchant shipping'; and (iii) 'the combined maximum annual ship recycling volume of the States mentioned in paragraph 1.1 during the preceding 10 years constitutes not less than 3 per cent of the gross tonnage of the combined merchant shipping of the same States'.

Article 4(2) requires all participating States to ensure that any ship recycling yards within their territory, at a minimum, meet the conditions laid down in the Convention, including the specific requirements found in chapter 3 of the Annex.

Article 12(4) and regulation 11.11 of the Annex provide that a ship that has been surveyed and certified by the flag State (or by a classification society) and found to be in compliance must be issued with an International Ready for Recycling Certificate, which the flag State reports to the IMO. This Certificate must be presented during PSCs (see article 8).

It is explicitly stated in article 9(3) that port States may detain or refuse access to ships that do not fulfil the conditions of the Convention, including being able to present an International Ready for Recycling Certificate. A detention may not be longer than necessary, however, following article 11. This is in alignment with the principles of (PSC) detention found in article 219 and article 226(1)(b) and (c) of UNCLOS, as described in chapter 4 of this book. A detention that violates these detention principles in UNCLOS and the Hong Kong Convention can be subject to the expedited judicial procedure of article 292 of part XV of UNCLOS, as described in chapter 12.

Determining *enforcement* of the Hong Kong Convention in accordance with part XII of UNCLOS can be somewhat complicated. First, it must be stated that the conclusion in Part II of this book, relating to enforcement in response to emission violations by port States and coastal States, is not relevant in this context, as ships do not discharge (or dump) any polluting substances if they violate the Hong Kong Convention whilst still in commission (sailing).

When the ships cease to operate and are being dismantled at a yard or on a beach, they likewise cease to be a vessel covered by the enforcement principles of part XII of UNCLOS. Ships, in service, that do not meet the conditions of the Hong Kong Convention are subject to the previously described principles of PSC pursuant to articles 219 and 226 of UNCLOS. Also, the obligation for flag States to survey and certify ships under their flag must be an obligation covered by article 217(2)–(3). If States that are party to the Convention fail to meet the requirements contained in the Convention, for example as a flag State to survey, certify, register and inform the IMO or as a State with a shipwrecking facility within its territory, that State can be held liable according to article 235 and the principles of State responsibility described in chapter 12. However, certain interfaces with the London Convention and the Nairobi Convention should briefly be underlined.

If a vessel is deliberately 'dumped' (sunk) at sea to avoid complying with the Hong Kong Convention, this is not covered by this Convention but is instead a violation of the London Convention, given the definitions of 'dumping' in article 1(1)(5)(i)–(ii) of UNCLOS and article III(1)(a)(i)–(ii) of the London Convention, which (at (ii)) refers to 'any deliberate disposal of vessels, aircraft, platforms or other man-made structures at sea'. This can subsequently be enforced in accordance with article 216 of UNCLOS.

A ship that accidentally sinks at sea is covered by the Nairobi Convention, relating to whether the wreck is to be found, marked and removed. Again, this situation is not covered by the Hong Kong Convention.

VII. The Intervention Convention

Going from studying enforcement of the Hong Kong Convention to examining enforcement of the Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties ('the Intervention Convention'[90]) is like time-travelling through the history of the IMO's environmental legislation. From a convention not yet in force to a convention that was adopted in 1969[91] and which entered into force in 1975.

Embedded in the Convention is also an amending protocol that was adopted as early as 1973, pertaining to a coastal State's right to intervene on the high seas in the event of accidents involving dangerous substances and materials. The regulatory scope of the Intervention Convention thereby overlaps with MARPOL Annexes I–III regarding harmful substances (oil and chemicals).

The Intervention Convention and the Protocol give coastal States special extra-territorial jurisdiction to take necessary measures on the high seas against foreign ships, to prevent or reduce a substantial risk of pollution of the Coastal State with oil or hazardous substances. See, for example, article I(1) of the intervention Convention.

The scope and jurisdiction of the Intervention Convention is thus limited to situations where a *grave and imminent danger to the coastline* is present and it is a *result of an accident at sea*. The coastal State must also contact the ship's flag State and the shipowner, and consult with experts nominated by the IMO *before* making an intervention, pursuant to article III.

The Convention does not apply to foreign State ships or warships, in accordance with article I(2).

Article V of the Intervention Convention requires that any precautionary measure taken by a coastal State must be proportionate, which includes being necessary and not going beyond the purpose of the intervention. A coastal State can become liable in accordance with article VI if it does not adhere to the requirement for proportionality set out in article V. A coastal State that takes such precautionary measures is also under obligation to inform all relevant parties thereof, including the ship's flag State and the IMO (see article III).

The conclusions set out in Part II do not apply to enforcement of the Intervention Convention as it relates to pollution, or preventing pollution, which stems from an accident (collision, stranding etc) at sea. However, enforcement of the

[90] See n 9 above.

[91] The loss of the tanker *Torrey Canyon* in 1965 prompted the development of the Intervention Convention.

Intervention Convention may be achieved by invoking article 221 of UNCLOS, which, as described in chapter 9, provides coastal States with an extraterritorial jurisdictional basis for enforcing laws and regulations for the protection of the coastal State's coastlines and interests beyond the territorial sea, including on the high seas.

The wide-ranging geographical scope of the article is, as also stated in chapter 9, curtailed by the reference to its covering pollution that is a consequence of a maritime accident, which in article 221(2) of UNCLOS is defined as a 'collision of vessels, stranding or other incident of navigation, or other occurrence on board a vessel or external to it resulting in material damage or imminent threat of material damage to a vessel or cargo'.

Article 221 does not therefore entail any wider jurisdiction for coastal States to enforce MARPOL Annex VI, or IMO regulations in general, on the high seas. But article 221 does provide a specific extraterritorial basis for coastal States to enforce the Intervention Convention outside their territory, including on the high seas.

VIII. Conclusion

This chapter has sought to apply the enforcement principles that were discussed in Part II of the book to enforcement of other relevant environmental IMO regulations, that is, the other regulations of MARPOL Annex VI, MARPOL Annexes I–V, the BWM Convention, the AFS Convention, the London Convention (including its ties to the Nairobi Convention), the Hong Kong Convention and the Intervention Convention.

It must initially be noted that many (or all) of these IMO instruments contain requirements to keep special certificates, etc on board that document compliance with the different regulations. These are certificates that may be presented during the initial part of a PSC. If these mandatory certificates are not presented or if they are incorrect, this can lead to detailed inspections, detention and fines, as described in chapter 4. All these Conventions also codify the principle of NMFT.

These formal requirements are not the focal point, however, when examining whether the conclusions reached in Part II are applicable to violations of the material requirements of these Conventions, including determining whether those violations can be described as *discharge* violations, or *dumping* or something else.

It was recalled that the enforcement principles set out in Part II related to the special port and coastal State jurisdictions pursuant to articles 218(1) and 220(1), and how those jurisdictions are resolved in accordance with article 228(1) when they overlap with a flag State's jurisdiction under article 217. It was then established that MARPOL Annex VI, regulation 12 (ODSs), regulation 13 (NOx), and regulations 16.2 and 16.3 (incineration of PCB or PVC materials) can be enforced in accordance with the conclusions in Part II.

Violations of MARPOL Annexes I–II and regulation 8.2 of Annex III can also be acted upon in accordance with the conclusions reached in Part II, and coastal

States may invoke article 220(5)–(6), article 233 pursuant to article 42(1)(b) and the *first exception* in article 228(1), as a violation of MARPOL Annexes I–III can result in major damage to a coastal State.

Violations of regulations 8.1 of Annex III are dumping violations that are enforced in accordance with article 216 of UNCLOS.

Infringements of MARPOL Annex IV and Annex V can also be the subject of enforcement measures in accordance with the conclusions in Part II, but they do not allow coastal States to invoke article 220(5)–(6) of UNCLOS, nor the first exception in article 228(1), as it is unlikely that the potential damage from one specific violation will result in major damage to a coastal State. Article 233 does not apply, as article 42(1)(b) only refers to the discharge of oil and noxious substances.

Violations of the D-2 Standard of the BWM Convention can be enforced in accordance with the conclusions reached in Part II of this book, but it is doubtful whether a coastal State could prove that major damage had occurred as a result of a specific violation from one specific ship, rendering the application of articles 220(5)–(6)and 228(1) (first exception) very unlikely. The same conclusion applies to enforcement of the AFS Convention.

Violations of the London Convention are considered dumping violations, and therefore enforcement is in accordance with article 216 of UNCLOS and not articles 218 or 220. Where a ship, container, etc is accidentally lost at sea is, however, that is not considered to involve *dumping* and is therefore covered by the Nairobi Convention.

A ship's violation of the Hong Kong Convention is not covered by the Part II enforcement principles, but if a State fails to ensure that ships under its flag or ship recycling facilities on its territory comply with the Convention, it can result in that State's becoming liable in accordance with article 235 of UNCLOS. Ships that are intentionally sunk at sea to avoid compliance with the Hong Kong Convention are covered by the London Convention.

The enforcement principles covered in Part II do not apply to enforcement of the Intervention Convention, but it can be enforced by coastal States in accordance with article 221 of UNCLOS.

This chapter has also sought to highlight some of the issues that are under discussion at IMO (MEPC/PPR) level, and which might result in future regulations on, for example, a ban on HFO in the Arctic, grey water, marine litter (plastics in oceans), biofouling and containers lost at sea.

The IMO is also, as described in section I.F on the enforcement of regulations 19–23 of MARPOL Annex VI, working on creating and adopting new regulations to reduce GHG (CO_2) emissions from ships. This work is being undertaken to achieve the overall GHG reduction goals set out in the IMO's GHG Strategy from 2018.

Several legal candidate measures to meet these reduction goals have been discussed, for example in relation to adopting rules on *speed optimisation*, use of *on-shore power*, use of *alternative fuels,* etc. Each legal measure may present its own

possibilities and challenges for enforcement in accordance with the provisions of part XII of UNCLOS, and in accordance with the conclusions set out in Part II of this book.

The GHG Strategy and the different legal measures, including the potential enforcement of these through UNCLOS, are analysed in further detail in chapter 15.[92]

[92] Part IV (chapters 16–18) of this book examines whether future IMO rules on GHG could be considered legislation that represents international norms of a *jus cogens* character.