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(1) OVERVIEW OF KEY DEVELOPMENTS OF VESSEL SOURCE POLLUTION

This was another busy year for states and the international shipping community to work on marine environmental protection in the context of marine pollution from vessels. The developments on this issue happened under the auspice of the International Maritime Organization (IMO)—particularly, its Marine Environment Protection Committee (MEPC). This period covered two important MEPC sessions—that is, the eighty-first and eighty-second sessions, held on 18–22 March and 30 September–4 October, respectively. Each session took place in both in-person and hybrid capabilities mode. The reach of MEPC works for vessel source pollution has become much wider in scope due to different pressing demands and circumstances surrounding the shipping industry. In this report, the meetings concentrated on the works relating to: (i) the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL), as modified by the 1978 Protocol; (ii) Energy Efficiency, Climate Change and Greenhouse Gas (GHG) Emissions; (iii) the 2004 International Convention for the Control and Management of Ship's Ballast Water and Sediments (BWM Convention); and (iv) Other Developments Relating to Vessel Source Pollution.

(2) 1973 INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, AS MODIFIED BY THE PROTOCOL 1978 (MARPOL CONVENTION)

Developments under the MARPOL Convention mainly involved regulations concerning air pollution from ships. At the eighty-first MEPC session, amendments and guidelines were adopted concerning MARPOL Annex VI. The amendment to MARPOL Annex VI was adopted by Resolution MEPC.385(81) on Amendment to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol 1978 relating thereto: Amendments to MARPOL Annex VI. Also, the Guidelines as required by Regulation 13.2.2 of MARPOL Annex VI in respect of Non-Identical Replacement Engines not Required to Meet the Tier III Limit were adopted by Resolution MEPC.386(81).

In the former, the amendment concerns '[l]ow-flashpoint fuels and other fuel oil-related issues, marine diesel engine replacing a steam system, accessibility of data and inclusion of data on transport work, and enhanced granularity in the IMO Ship Fuel Consumption Database (IMO DCS).' Of significance from this resolution is the amendment to Regulation 13 of MARPOL Annex VI. It deals with two situations: first, 'the major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine or the installation of an additional marine diesel engine' and, second, engine replacement only. Under this amendment, the replacement of a marine diesel engine includes 'the installation of a marine diesel engine replacing a steam system' (MEPC.385(81), Annex, para 3). Other amendments include revisions to definitions of fuel oil, fuel oil availability and quality, definition of gas fuel, and collection and reporting of ship fuel consumption data on sharing such information with the Secretary-General of the IMO. This amendment is expected to enter into force on 1 August 2025.

The amendments to MARPOL Annex VI above led to another development at the same session. This was the adoption of the Guidelines as Required by Regulation 13.2.2 of MARPOL Annex VI in Respect of Non-Identical Replacement Engines not Required to Meet the Tier III Limit' by Resolution MEPC.386(81). This guideline supports the above amendment in the case of the replacement engine and it provides the standards referred to in Regulation 13 of MARPOL Annex VI applicable to such activity, especially for 'non-identical replacement engines not required to meet the Tier III limit' (MEPC.386(81), Annex).

Also adopted at the eighty-first session was the Amendment to the 1973 International Convention for the Prevention of Pollution from Ships as amended by the Protocol of 1987 relating thereto: Amendments to Protocol I of MARPOL by resolution MEPC.384(81). This is an amendment to the reporting procedures for the loss of containers involving harmful substances. From this amendment, the report of the loss of freight container(s) containing harmful substances shall 'be made in accordance with the requirements on danger messages as provided for in regulations V/31 and V/32 of the International Convention for the Safety of Life at Sea, 1974.' The expected entry into force of this amendment is 1 January 2026.

Important developments continued during the eighty-second session of the MEPC. The first was an amendment to MARPOL Annex VI by resolution MEPC.392(82) on the Designation of the Canadian Arctic and the Norwegian Sea as Emission Control Areas for Nitrogen Oxides, Sulphur Oxides, and Particulate Matter, as appropriate. From 1 March 2026, the designated Canadian waters under Appendix II of this Annex and designated Norwegian waters under Regulation 13.9.4 of MARPOL Annex II will be Emission Control Areas for Nitrogen Oxides, Sulphur Oxides, and Particulate Matter. In addition, three draft amendments were considered at this session, but have not been adopted by the MEPC. These include draft amendments to MARPOL Annex VI on: (i) the use of multiple engine operational profiles for a marine diesel engine including clarifying engine test cycles and clarification of entries in data reporting required by Regulations 27 and 28; (ii) the nitrogen oxide technical code 2008 on use of multiple engine operational profiles for a marine diesel engine including clarifying engine test cycle; and (iii) the nitrogen oxide technical code 2008 on certification of an engine subject to substantial modification or being certified to a tier to which the engine was not certified at the time of its installation.

The eighty-second session further adopted two guidances concerning black carbon: (i) Guidance on Best Practices on Recommendatory Goal-based Control Measures to Reduce the Impact on the Arctic of Black Carbon Emissions from International Shipping and (ii) Guidelines on Recommendatory Black Carbon Emission Measurement, Monitoring and Reporting, by Resolutions MEPC.393(82) and MEPC.394(82), respectively. The

former recommends to all ships to ‘assist ship operators/companies in their efforts to reduce black carbon emissions from their ships operating in or near the Arctic in measurable and concrete ways’ (MEPC.393(82), Annex at para 1), whereas the latter provides ‘recommendations for the measurement, monitoring, and reporting of Black Carbon emissions data from marine diesel engines or exhaust gas treatment systems.’ It aims to ‘enhance the development of recommendations and regulations to reduce the impact on the Arctic of Black Carbon emissions’ (MEPC.394(82), Annex at para 1). It should be noted that all developments in this section also contribute to tackling climate change and GHG emissions, which will be discussed in the section below.

(3) ENERGY EFFICIENCY, CLIMATE CHANGE, AND GHG EMISSIONS

Closely related to the amendment to MARPOL Annex VI are issues concerning Energy Efficiency, Climate change, and GHG Emissions. Continuing from work since 2023, there have been developments in these areas and they will be discussed in turn.

In regard to Energy Efficiency activities, there were developments on the Ship Energy Efficiency Management Plan (SEEMP), carbon intensity, and Energy Efficiency Existing Ship Index (EEXI). First, this was an amendment to the Guidelines for the Ship Energy Efficiency Management Plan (SEEMP Guidelines). These guidelines were first adopted at the seventy-eighth session of the MEPC to assist states in preparing SEEMP as required by Regulation 26 of MARPOL Annex VI and reduce the carbon intensity of international shipping. It was amended at the eighty-first session of the MEPC (MEPC.388(81)) introducing, *inter alia*, consumer types and methods for determining fuel oil consumption per customer type to the guideline. At the eighty-second session, the 2024 Guidelines for the Development of a Ship Energy Efficiency Management Plan (MEPC.395(82)) were adopted, which further enhances granularity in the IMO Ship Fuel Consumption Database. To further enhance energy efficiency in international shipping, an amendment was made to the 2022 Guidelines for Administration Verification of Ship Fuel Oil Consumption Data and Operational Carbon Intensity (MEPC.348(78)). This was done by resolution MEPC.389(81), to revise a part of the verification of the reported data procedure that clarified including ‘other data’ to be a part of an additional document for the assessment of the Data Collection Plan. The new table of the collected data summaries is now introduced in Appendix 2 of the Guidelines.

In addition, the 2021 Guidelines on the Shaft/engine Power Limitation System to Comply with the EEXI Requirements and Use of a Power Reserve (MEPC.335(76)) was amended by resolution MEPC.390(81). The guidelines aim to provide technical and operational conditions that the Overridable Shaft Power Limitation system and the Overridable Engine Power Limitation system ‘should satisfy in complying with the EEXI requirements and in using a power reserve for existing ships.’ The amendment was made to the technical requirements—that is, the main arrangements of these two systems. It also clarifies paragraph 3.3 of the guidelines to distinguish the use of the power from the precautionary unlimiting of a shaft or engine power limitation system.

For climate change and GHG emissions, in addition to what was illustrated in the above section, the MEPC also adopted the 2024 Guidelines on Life Cycle GHG Intensity of Marine Fuels (2024 LCA Guidelines) (MEPC.391(81)) at its eighty-first session. This will replace the 2023 version adopted by resolution MEPC.376(80) at the previous session. It addresses the life cycle assessment of ship fuels from the production to the end use by a ship. The 2024 LCA Guidelines cover life cycle fuel calculation for ‘well-to-tank (WtT),

tank-to-wake (TtW), and well-to-wake (WtW) GHG intensity and sustainability themes/aspects related to marine fuels/energy carriers (for example, electricity for shore power) used for ship propulsion and power generation onboard' (MEPC.391(81), para 2). The assessment also includes important GHGs including carbon dioxide, methane, and nitrous oxide. Ten different sustainability aspects are now incorporated into the fuel life cycle assessment under the guidelines.

(4) 2004 INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIP'S BALLAST WATER AND SEDIMENTS (BWM CONVENTION)

Developments concerning the BWM Convention during the eighty-first session of the MEPC led to the adoption of two resolutions: (i) the Interim Guidance on the Application of the BWM Convention to Ships operating in Challenging Water Quality Conditions (MEPC.387(81)) (Interim Guidance) and (ii) Amendment to Regulations A-1 and B-2 of the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004 (Awaiting Certification). There were also adoptions of two guidances on ballast water management at the eighty-second session.

The adoption of the Interim Guidance was in response to the need to ensure that ballast water management systems (BWMS) operate effectively where, in certain global ports and locations, challenging water quality (CWQ) may render BWMS inoperable. This issue was raised before MEPC at its seventy-first session and the Ballast Water Review Group (BWRG) had two chances to document principles to be taken into account when dealing with this issue (MEPC 77/WP.10, Annex 2; and MEPC 79/WP.6, Annex 4). At the eighty-first session, the BWRG tasked with reviewing this issue took into account submissions from various stakeholders—states and non-state—providing information on various aspects of BWMS, and finally allowed MEPC to adopt such Interim Guidance.

Under the Interim Guidance, it was developed during the Experience Building Phase (EBP) under the BWM Convention (MEPC.290(71)) to improve the BWMS performance and reliability through recommending steps for restoring or maintaining effective BWMS operation in CWQ. According to the Guidance, CWQ refers to 'ambient uptake water having quality parameters (including but not limited to high total suspended solids, or turbidity) that cause a properly installed, maintained and operated type-approved BWMS to be temporarily inoperable due to an operational limitation or an inability to meet operational demand.' Temperature and salinity, however, are not included as parameters to define CWQ (MEPC.387(81), Annex, para 16).

This Interim Guidance applies to: (i) ships subject to the ballast water performance standard under Regulation B-3 of the BWM Convention; (ii) administrations approving BWMPs in accordance with Regulation B-1 and applying Articles 13 and 14 of the BWM Convention; (iii) port states tacking violations (Article 8) and performing inspection of ships (Article 9) under the BWM Convention; and (iv) BWMS manufacturers defining troubleshooting procedures in the Operations, Maintenance and Safety Manual in accordance with paragraph 4.8 of the BWMS Code (MEPC.387(81), Annex, para 15).

The Interim Guidance lays down principles for effective BWMS, such as the inclusion of BWMS in CWQ in ships' Ballast Water Management Plan (BWMP) having warnings and alarms to protect BWMS equipment and/or the ship when operational demand for BWMS in CWQ cannot be met and such operation should be based on the performance and self-monitoring functions of the BWMS. Four stakeholders are advised under this document. First, the Interim Guidance is directed to ships operating in CWQ with nine steps to be

performed. It also guides Administrations in relating BWMP and CWQ and port state control officers for ships encountering CWQ. This allows administrations to ensure that ships are prepared for CWQ situations by having approved BWMPs and procedures for such encounters. Also, it helps port state control officers in the determination of compliance in regard to having consulted the ship's approved BWMP and Ballast Water Record Book. Lastly, it provides guidance for BWMS manufacturers for participation in the pre-planning process for ships operating in CWQ, through the self-monitoring system of the BWMS records allowing the crew to appreciate the level of challenge that occurred to the BWMS.

Another important development during this eighty-first session was the adoption of an amendment to Regulations A-1 and B-2 of the BWM Convention (MEPC.383(81)). It should be noted that this amendment is pending certification. This amendment concerns the use of electric record books. It introduces, in Regulation A-1, a definition of electronic record books as 'a device or system, approved by the administration, used to electronically record the entries for each ballast water operation as required under this Convention in lieu of a hard copy record book.' It requires that the electronic record book used for ballast water management purposes 'be approved by the Administration taking into account the guidelines developed by the Organization' (MEPC.383(81), Annex 1, 2).

At the latest session—the eighty-second session—the MEPC endorsed two important instruments for ballast water management. The first is the 2024 Guidance for Administrations on the Type Approval Process for Ballast Water Management Systems (BWM.2/Circ.43/Rev.2 2024) and the second is the 2024 Guidance on Ballast Water Record-Keeping and Reporting (BWM.2/Circ.80/Rev.1 2024). The former is a revision to the Guidance that was adopted in 2010 and revised in 2013 and 2018. It brings support to 'harmonised evaluation by Administrations of modifications to a ballast water management system with existing type approval' (BWM.2/Circ.43/Rev.2 2024) para 4)). The latter aims, according to the MEPC, at 'bringing clarity to the record-keeping and reporting process under the BWM Convention' through various guidances, including those on 'completing the Ballast Water Record Book, an updated example ballast water reporting form and an example form for voluntary tank-by-tank logging of ballast water operations' (BWM.2/Circ.80/Rev.1 2024, para 1).

(5) OTHER DEVELOPMENTS RELATING TO VESSEL SOURCE POLLUTION

Other interesting developments relating to vessel source pollution concerned the designation of a Particularly Sensitive Sea Area (PSSA) protection of the marine environment from underwater noise pollution. This will be briefly mentioned in turn. First, for the designation of a PSSA, MEPC adopted resolution MEPC.392(82) designating the Nusa Penida Islands and Gili Matra Islands in Lombok Strait as a PSSA. A PSSA is a form of marine protected area under the 2005 Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (PSSAs) (IMO A 982(24)). As a result of such designation, associated protective measures have now been established in such areas as the traffic separation scheme at the Lombok Strait. This highlights the importance of the Lombok Strait both from an economic aspect and in regard to environmental sensitivity, which requires careful management in terms of international shipping passing through the area.

For the protection of the marine environment from underwater noise pollution, the MEPC approved the Action plan for the reduction of underwater noise from commercial shipping (Report of the Marine Environment Protection Committee on its eighty-second session (MEPC 82/17), Annex 8). As the work on underwater noise pollution is still

developing, the action plan, according to the MEPC, is treated as a ‘dynamic document to be reviewed and revised as necessary, depending on progress made.’ The action plan aims to guide the ongoing works of the IMO on the issue. It offers a ‘mechanism to identify specific outcomes and indicative actions to achieve these outcomes, in a way that is meaningful and measurable’ (ibid, para 9.15).

On the same occasion, the MEPC also approved the Guidance on the EBP for the Revised Guidelines for the Reduction of Underwater Radiated Noise from Shipping to Address Adverse Impacts on Marine Life (MEPC.1/Circ.906/Rev.1) (ibid, Annex 9). This revised guideline addresses the EBP of underwater noise pollution and aims to gather information on ‘lessons learned and best practices’ in the application and the uptake of guidelines ‘by ship designers, builders, owners, and operators to reduce the underwater radiated noise’ (Annex 9, 1). Key areas where the experience building phase is urgently needed include, *inter alia*, design and technical noise reduction approaches, evaluation and monitoring, underwater radiated noise management planning, and so on.

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