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WORK PROGRAMME OF THE COMMITTEE AND SUBSIDIARY BODIES

Proposal for a new output concerning a review of the 2014 *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* (MEPC.1/Circ.833) and identification of next steps

Submitted by Australia, Canada and United States

SUMMARY

Executive summary:	Recalling the International Maritime Organization's (IMO) past work on underwater vessel noise, IMO's Strategic Plan and advances in research and technology, this document proposes a new output on the agenda of MEPC to undertake a review of the 2014 *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* (MEPC.1/Circ.833) and identify next steps
Strategic directions, if applicable:	1, 2, 3, 4 and 6
Output:	Not applicable
Action to be taken:	Paragraph 42
Related documents:	MEPC 58/19; MEPC 66/17, MEPC 66/21; MEPC.1/Circ.833; resolution A.1110(30); MEPC 71/16/5; MEPC 72/16/5; MEPC 73/18/4, MEPC 73/INF.23; MEPC 74/17/2, MEPC 74/INF.28 and MEPC 74/INF.36

Introduction

1 Commercial shipping traffic following established routes often transects or comes in proximity to sensitive marine habitat. For example, parts of the Salish Sea on the West Coast of Canada and the United States, the Great Barrier Reef in Australia, Pelagos Sanctuary in the Mediterranean Sea and Dondra Head in Sri Lanka are home to important ecosystems and endangered species that are negatively affected by underwater radiated noise from commercial shipping traffic. Measures can, and have, been taken in these localized areas to reduce underwater noise from individual vessels. However, projected growth in the commercial

shipping sector, with its increasingly larger vessels and operations that encompass wide-ranging geographic areas, is expected to be significant in the coming years. Therefore, mitigation strategies at the international level are required to effectively reduce a potentially corresponding increase of underwater vessel noise across the entire ocean basin.

2 In 2008, the United States requested that underwater vessel noise be included as a high priority work item on the agenda of MEPC. The request was successful and, as a result of those efforts and the subsequent work, MEPC later approved the *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* (MEPC.1/Circ.833) in 2014 (2014 Guidelines). The 2014 Guidelines recognize two opportunities for mitigating the adverse effects of underwater noise: routeing and operations, as well as ship design and maintenance. At that time, MEPC also invited Member States interested in further work on the topic to submit proposals for new outputs at a future session.

3 Since that time, there has been growing international attention on the issue of underwater vessel noise within various scientific, political and public forums. Many of these efforts have been summarized in previous submissions to MEPC, specifically MEPC 71[1] through MEPC 74.[2] The submissions have highlighted recent quiet ship technology trials, complementary international action, growing scientific evidence of the impact of noise on marine ecosystems, and the need for further collaboration and action by the international community to reduce underwater vessel noise.

4 With the projected increase in global shipping, technological advances, increased scientific evidence of the impact on the marine environment, recent international focus on sustainable oceans and the blue economy, and the potential co-benefits between greenhouse gas (GHG) emission reductions, improved energy efficiency and noise reduction, it is an opportune time to advance work on this topic.

IMO's objectives

5 Advancing international coordination and collaboration on actions to reduce underwater vessel noise align with IMO's mission, vision, and strategic directions, as articulated in IMO's current *Strategic Plan for the Organization for the six-year period 2018 to 2023* (resolution A.1110(30)).

6 IMO's mission is to "promote safe, secure and environmentally sound, efficient and sustainable shipping through cooperation". The vision speaks to IMO upholding the 2030 Agenda for Sustainable Development, reviewing IMO instruments and addressing emerging issues, as follows:

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1 MEPC 71/16/5 (2017), Collaboration to reduce underwater noise from marine shipping, submitted by Canada; MEPC 72/16/5 (2018), Reducing underwater noise utilizing ship design and operational measures, submitted by Canada; MEPC 73/18/4 (2018), Furthering international efforts to reduce the adverse impacts of underwater noise from commercial ships, submitted by Canada and New Zealand; MEPC 73/INF.23 (2018), Scientific support for underwater noise effects on marine species and the importance of mitigation, submitted by Canada; MEPC 73/INF.26 (2018), Information related to OSPAR Commission's work on underwater noise, submitted by OSPAR Commission.

2 MEPC 74/17/2 (2019), Advancing international collaboration for quiet ship design and technologies to protect the marine environment, submitted by Canada and France; MEPC 74/INF.28 (2019), Ship underwater radiated noise technical report and matrix, submitted by Canada; MEPC 74/INF.36 (2019), Quieting ships to protect the marine environment workshop summary report, submitted by Canada; MEPC 74/17/3 (2019), Comments on document MEPC 74/17/2 on "Advancing international collaboration for quiet ship design and technologies to protect the marine environment", submitted by FOEI, WWF, IFAW, Pacific Environment and CSC; MEPC 74/INF.14 (2019), Mitigating the adverse impacts of anthropogenic noise from shipping traffic, submitted by the UN Environment Convention on the Conservation of Migratory Species of Wild Animals (CMS).

.1 IMO will uphold its leadership role as the global regulator of shipping, promote greater recognition of the sector's importance and enable the advancement of shipping, whilst addressing the challenges of continued developments in technology and world trade; and the need to meet the 2030 Agenda for Sustainable Development.

.2 To achieve this, IMO will focus on the review, development and implementation of and compliance with IMO instruments in its pursuit to proactively identify, analyse and address emerging issues and support Member States in their implementation of the 2030 Agenda for Sustainable Development.

7 IMO's vision is realized through its seven strategic directions (SDs). Five of these seven identified areas of focus would be addressed via a review of the 2014 Guidelines, including SD 1 (Improve implementation of IMO instruments, in particular, the 2014 Guidelines on underwater noise), SD 2 (Integrate new technologies, specifically those that quiet vessels), SD 3 (Respond to climate change by improving efficiency of vessels), SD 4 (Engage in ocean governance), and SD 6 (Ensure regulatory effectiveness, specifically the effectiveness of the IMO guidelines).

8 Further, IMO has selected "Sustainable shipping for a sustainable planet" as its theme for 2020. In assessing and mitigating underwater vessel noise in the marine environment, IMO would demonstrate its leadership role as the global regulator of shipping and further address a challenge that affects the maritime community and marine environment directly.

Need

9 Measurements taken over the last fifty years indicate an increase in anthropogenic noise emissions into the marine environment, with the largest contributor being commercial shipping. While high intensity and impulsive noise sources, such as seismic testing and pile driving, are thought to pose the greatest risk of acute injury, lower levels of continuous chronic noise, of which commercial shipping is the primary contributor, have been recognized to cause serious behavioural and physiological impacts on marine mammals and other marine life.[3] An increasing number of studies have demonstrated that underwater noise emitted from commercial vessels is a stressor for marine species and ecosystems, including various marine mammals, fish and invertebrates. The noise emitted by commercial ships is higher in energy than recreational vessels and is generally below 1,000 Hertz (Hz) or 1 kHz, which is the same broadband low-frequency ranges that have been identified as critically important for many whale and fish species.

10 The acoustic overlap between vessels and marine species can cause the masking or cancelling of acoustic communication between individuals, permanent or temporary hearing loss, increased stress levels, and impacts on foraging, navigation and behaviour.[4] Underwater vessel noise can also lead to lasting impacts at the population level, including reduction in population size, total biomass, catch rates and changes in spatial distribution.

11 Marine environments provide the world with a number of invaluable resources that support biodiversity and economic growth. The species themselves provide ecosystem stability, a source of food, financial means for those that harvest them, medicines and scientific breakthroughs to those that study them, and opportunities for tourism and recreational activities.

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3 Brandon L. Southall, James J. Finneran, Colleen Reichmuth, Paul E. Nachtigall, Darlene R. Ketten, Ann E. Bowles, William T. Ellison, Douglas P. Nowacek, and Peter L. Tyack (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125.

4 MEPC 73/INF.23 (2018), submitted by Canada.

12 Measures can, and have, been taken in localized areas to reduce underwater noise from vessels. For example, Canada instituted both voluntary and mandatory measures to combat underwater vessel noise impacting the Southern Resident killer whale in the Salish Sea (British Columbia, Canada). Furthermore, a collaborative case study conducted by Maersk and Scripps Institute of Oceanography[5] and literature reviews conducted by Hemmera[6] and Vard Marine Inc.[7] have identified ship design and retrofit features that reduce underwater vessel noise.

13 Addressing underwater vessel noise and its impacts is increasingly the subject of international and regional initiatives, including the United Nations Open-ended Informal Consultative Process; the Convention on Biological Diversity; the International Whaling Commission; the European Union (EU) through the Marine Strategy Framework Directive (MSFD) and associated research projects (e.g. the Achieve QUieter Oceans (AQUO) and the Practical Implementation of AQUO (PIAQUO) initiatives); the Agreement for the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)[8] through resolutions 2.16 and 4.17; the Arctic Council through the Working Group on the Protection of the Arctic Marine Environment; the Society of Naval Architects and Marine Engineers (SNAME) Panel EC-14; as well as the International Quiet Ocean Experiment (IQOE) and its various projects. Additionally, under the EU MSFD, many countries are beginning to research the acoustic footprint of vessels in their own waters, with the United Kingdom (UK) recently publishing their first UK-wide map of vessel noise in the marine environment.[9] The HELCOM Baltic Sea Action Plan (BSAP) has also developed a priority list of noise sensitive species in the Baltic Sea, as well as identified and mapped noise sensitive areas derived from biological data.[10]

14 In the coming years, significant growth is projected in the commercial shipping sector. If left unrestricted, there is a strong likelihood that underwater noise will continue to escalate in both intensity and geographic scope. Therefore, mitigation strategies at the international level, coordinated by a single international entity, are needed to further pool resources and create joint and cooperative initiatives to effectively mitigate underwater vessel noise across the entire ocean basin.

15 As noted above, while MEPC has looked at the issue of vessel noise in the marine environment previously, with the increase in global shipping, advances in technology, increased scientific evidence of the impact on the marine environment, and recent international focus on sustainable oceans and the blue economy, it is an opportune time for IMO to increase its involvement in this issue, to promote action and coordination for efficiency of resources and synergies in the international community.

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5 The joint study was conducted by container shipping company Maersk and the Marine Physical Laboratory at the Scripps Institution of Oceanography. Further information can be found in document MEPC 72/16/5.

6 Hemmera, *Vessel Quieting Design, Technology, and Maintenance Options for Potential Inclusion in EcoAction Program, 2016*, available at https://www.portvancouver.com/wp-content/uploads/2017/01/Vessel-Quieting.pdf

7 Vard (2019). Ship underwater radiated noise - Report and Matrix. Prepared for Transport Canada.

8 Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area, available at https://www.cms.int/sites/default/files/instrument/Anglais_Text%20of%20the%20Agreement%20English.pdf

9 Whiteley, D. BBC. Published March 4, 2019. CEFAS Scientists create first UK map of shipping 'noise'. Available at https://www.bbc.com/news/uk-england-suffolk-47375006

10 HELCOM. (2016). Noise sensitivity of animals in the Baltic Sea. Document to HOD 51-2016, available at: https://portal.helcom.fi/meetings/HOD%2051-2016-400/MeetingDocuments/6-6%20Noise%20Sensitivity%20of%20Animals%20in%20the%20Baltic%20Sea.pdf

Analysis of the issue

16 A key element of managing vessel noise is prevention through early intervention. In other words, building new ships with quieter design specifications based on proven technologies and up-to-date information and research is essential. While underwater noise has previously been addressed at IMO, the resulting 2014 Guidelines have not been uniformly adopted and incorporated by Member States and industry.

17 In order to understand the uptake and awareness of the 2014 Guidelines by the international shipping community, a steering committee comprised of World Wildlife Fund Canada (WWF), Chamber of Shipping of America and Transport Canada oversaw a study by Environics Research and the World Maritime University in 2019. Though the study had a small sample size, a general awareness of the 2014 Guidelines among participants was found along with an indication that the 2014 Guidelines were not being used widely to make changes to ship design to reduce underwater vessel noise. The non-regulatory/non-mandatory nature of the tool, a lack of measurement specification and data demonstrating the impacts of underwater vessel noise, and scepticism about the feasibility of changes were identified as the key barriers to the uptake of the 2014 Guidelines and consideration of mitigation technologies for vessels. The needs to build awareness of the issue, invest in measurement, initiate trials of new technology, disseminate research on impacts and introduce regulatory/financial incentives were identified as possible solutions.

18 Recent studies and events demonstrate that international progress is being made to find solutions to underwater vessel noise and the collective international knowledge has demonstrably improved since the 2014 Guidelines were set. Although more research is needed to further understand and quantify the relationship between fuel efficiency and noise reduction, there are potential dual benefits that may prove to be a powerful economic incentive for ship owners and operators who can reduce operating expenses with quieter ship designs.

19 IMO is the recognized entity for issues pertaining to international shipping, and is the appropriate forum to set global strategies to address the issue of underwater vessel noise, taking into account the long lifespan of ships, the requirement for uniform measures (e.g. ship design), navigational safety, environmental issues (e.g. climate change), and continued challenges in securing vessel noise measurements and noise reduction targets.

20 It is proposed that a new work output is required to protect the marine environment and resources and reduce underwater vessel noise through a review of the 2014 Guidelines and the identification of next steps.

21 By reviewing the 2014 Guidelines, there will be an opportunity to increase awareness of the issue among Member States and industry, and to address identified gaps and/or areas for improvement. Specifically, a new work output could allow for the:

.1 integration of new and advancing technologies or vessel design solutions, specifically those that overlap with Energy Efficiency Design Index (EEDI) and GHG reduction priorities;

.2 measurement of existing ship noise profiles via Member State participation in a programme (voluntary or otherwise) following ISO or international standards and a database for these measurements;

.3 identification of areas of collaboration for classification societies;

.4 development of a programme to focus on capacity-building and engagement with developing countries and Member States to advance cooperation and progress on underwater noise reduction; and

.5 development of a programme of follow-up actions (e.g. identification and execution of next steps), which may include policy measures, as appropriate.

22 A review of the 2014 Guidelines based on the above considerations is a *practical* way to advance action on this issue, as well as achieve IMO's strategic directions 1, 2, 3, 4 and 6, by collecting information and making informed recommendations for future action.

23 This work output is also *feasible* and could be readily achieved through the combined efforts of this Committee and the Sub-Committee on Ship Design and Construction (SDC). Research and information/data collection has been ongoing and Member States have developed state and regional-level initiatives to reduce underwater noise that will inform a review of the 2014 Guidelines.

24 Reviewing and updating (as required) the 2014 Guidelines is *proportional* to the risks posed by the projected growth in the commercial shipping sector and risks to marine ecosystem health, and aligns with IMO's mission and vision. Managing the risks of underwater vessel noise to the marine environment is an important part of ensuring sustainable shipping, and the 2014 Guidelines are IMO's primary instrument to manage noise, making a review a fitting task.

Analysis of implications

25 The proposal does not have immediate cost or administrative implications on the maritime industry, although there is a possibility of future administrative requirements should the Guidelines be amended. However, at this early stage, the future outcomes cannot be determined and would require the approval of the Committee.

26 A completed checklist for identifying administrative requirements and burdens is set out in annex 1 to this document.

Benefits

27 Since the 2014 Guidelines were approved, there have been significant advances in technologies that either directly or indirectly reduce the underwater noise output of a vessel. Generally, the indirect reductions originate from designs that were intended to reduce greenhouse gas emissions or increase energy efficiency, but have been recognized to reduce propeller cavitation and/or hull friction and thus noise. There have also been advances in underwater noise measurement standardization. At present, five IACS class societies have published underwater noise-related notations. Most of these notations use ISO/PAS 17208-1:2012 - Part 1 to make in-service noise measurements.

28 The mandatory EEDI for new ships aims at promoting the use of more energy-efficient (less polluting) equipment and engines. As the reference level for emissions is tightened incrementally every five years, the EEDI is expected to stimulate continued innovation and technical development of all the components influencing the fuel efficiency of a ship from its design phase, which could also include innovations in vessel noise reduction. These advances provide an opportunity for IMO to integrate new and advancing technologies, while also reducing vessel emissions and responding to climate change, when developing various instruments related to underwater noise.

29 Reduction of the continuous noise on board vessels would subsequently reduce underwater vessel noise, which has adverse impacts on human health. The 2012 amendments to the International Convention for the Safety of Life at Sea (SOLAS) require ships to be constructed in ways that reduce onboard noise. By minimizing the noise emitted within the vessel, output into the marine environment will be reduced. Thus, there will be co-benefits of reducing the noise levels within the vessel, providing benefits for both humans and marine species.

30 Given that the 2014 Guidelines were approved by MEPC, the Committee and Member States will benefit from a greater understanding of the effectiveness of the Guidelines as an IMO instrument and an opportunity to build on this previous work and undertake next steps to reduce the impact of commercial vessel noise on the marine environment.

31 A review of the 2014 Guidelines and identification of next steps will align with strategic directions 1, 2, 3, 4 and 6, through collecting information and making informed recommendations for future action. Specific SDs that will be addressed include:

.1 SD 1 (Improve implementation) – as the aforementioned 2019 study by Environics Research and the World Maritime University indicated, there has been limited uptake of the 2014 Guidelines. A work output focusing on review of the Guidelines, which seeks to address barriers to uptake along with verifying content, would improve the overall implementation of the IMO tool.

.2 SD 2 (Integrate new technologies) – as mentioned, the Vard Marine Inc. and Hemmera literature reviews showcase technologies that exist for quieting ships. A work output focusing on review of the Guidelines that includes as an assessment of new technologies not accounted for in the 2014 Guidelines would encourage the integration of new technologies in ship design and retrofits.

.3 SD 3 (Respond to climate change) - as verified through the Vard Marine Inc. literature review, synergies exist between measures that quiet ships as well as those that reduce GHG emissions and improve energy efficiency as per EEDI. A work output focusing on review of the Guidelines with a view to considering the work underway on EEDI and GHG would assist in IMO's response to climate change.

.4 SD 4 (Engage in ocean governance) – as previously mentioned, underwater vessel noise is an international issue requiring the leadership of an international body to establish international solutions. A work output that includes recommendations for next steps to be undertaken at the international level would enhance international ocean governance and coordination.

.5 SD 6 (Ensure regulatory effectiveness) – the 2019 study by Environics Research and the World Maritime University indicated that the 2014 Guidelines were not effective in achieving their intended outcome. A work output that includes a review of the voluntary tool, including uptake, would inform a discussion on the effectiveness of the 2014 Guidelines.

Industry standards

32 Currently, mandatory or global industry standards for the reduction of underwater vessel noise do not exist.

33 A review of the 2014 Guidelines would enable industry experience and effort to be considered alongside that of Member States. It is expected that the review outputs could be incorporated into any future industry guidance and/or standards pending future decisions of this Committee.

Output

34 It is recommended that the Committee task the SDC Sub-Committee with undertaking a review of the 2014 Guidelines, as outlined in the terms of reference in annex 3, with a view to reducing underwater vessel noise by (in no preferential sequence):

.1 identifying barriers to the implementation of the Guidelines in the context of current scientific, economic and environmental factors, and ways to address these barriers;

.2 promoting uptake and identification of new technology and innovations;

.3 raising awareness of scientific evidence of impacts of underwater vessel noise on the marine ecosystem;

.4 considering the work underway on EEDI and GHG and the relationship between energy efficiency technologies with underwater noise emitted from vessels; and

.5 recommending measures to further prevent and reduce underwater radiated noise and encourage action.

35 It is also recommended that the Secretariat engage in discussions with potential donors, such as the Global Environment Facility (GEF), regarding the potential funding of a global underwater noise project, similar to the successful global projects addressing maritime energy efficiency (GloMEEP Project) and marine biofouling (GloFouling Project). Such a project could assist with the implementation of related IMO guidelines, build capacity in developing countries, and spur global efforts to develop a solid scientific understanding of the marine underwater anthropogenic noise issues, while stimulating industry to start adopting best practices to minimize the impact and create new design solutions.

36 It is recommended that the SDC Sub-Committee and the Secretariat report back to the Committee on their progress and provide the opportunity for the Committee to make a decision on next steps.

Human element

37 The completed human element checklist (MSC-MEPC.7/Circ.1) is set out in annex 2 to this document.

Priority/urgency

38 The proposed work output to review the 2014 Guidelines is considered urgent as a review has not been undertaken since adoption in 2014, despite the growing knowledge of the impacts of underwater vessel noise on the marine environment and species (including endangered species), and increasing technological innovation available. Underwater vessel noise continues to increase, along with expectations to demonstrate energy efficiency and reduce greenhouse gas emissions. It would be opportune to address these issues in tandem.

39 The proposed output delivers on IMO's vision, mission and strategic directions in the Strategic Plan. The review and subsequent next steps will contribute to the international work on underwater vessel noise, help support Member State initiatives on the issue, support energy efficiency and greenhouse gas emission reduction efforts by IMO, Member States and the shipping industry, all while simultaneously reducing important impacts on the marine ecosystem.

40 The co-sponsors propose that a new high priority item be added to the biennial agenda and work programme of MEPC, beginning in 2020, with completion of the review by 2022 and consideration of the execution of identified next steps by 2024. Progress reports would be submitted to each intervening session of the Committee.

41 The co-sponsors acknowledge the need for the Council to endorse any new work outputs to be added to the biennium agenda and that work outputs expected to take more than one biennium to complete shall be reviewed at the end of each biennium. As per the timeline presented in this document, the co-sponsors agree that the target completion date for the work output should be the end of 2024, with ongoing progress reports until completion.

Action requested of the Committee

42 The Committee is invited to consider this proposal and take action to approve this urgent work output request to:

.1 undertake a review of the 2014 Guidelines and the identification of next steps, as outlined in paragraphs 34 and 36 and annex 3; and

.2 invite the Secretariat to initiate discussions with potential donors, such as the Global Environment Facility (GEF), regarding the potential funding of a global underwater noise project, as outlined in paragraph 35.

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ANNEX 1

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS

This checklist should be used when preparing the analysis of implications required in submissions of proposals for inclusion of outputs. For the purpose of this analysis, the term "administrative requirement" is defined, in accordance with resolution A.1043(27), as an obligation, arising from a mandatory IMO instrument, to provide or retain information or data.

Instructions:

(A) If the answer to any of the questions below is YES, the Member State proposing an unplanned output should provide supporting details on whether the burdens are likely to involve start-up and/or ongoing cost. The Member State should also give a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?).

(B) If the proposal for the output does not contain such an activity, answer NR (Not required).

(C) For any administrative requirement, full consideration should be given to electronic means of fulfilling the requirement in order to alleviate administrative burdens.

1 Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members, etc.	NR ✓	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
2 Record-keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.	NR ✓	Yes □ Start-up □ Ongoing
Description: An amendment to MARPOL Annex IV might lead to a requirement to record sewage discharges in a record book and the development of a sewage management plan		
3 Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing, etc.	NR ✓	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
4 Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.	NR ✓	Yes □ Start-up □ Ongoing
Description: (if the answer is yes)		
5 Other identified burdens?	Yes	Yes ☑ Start-up □ Ongoing
Description: (if the answer is yes) In the event that owing to the development of the output there is a need to amend the current 2014 Guidelines, there may be administrative requirements. However, this cannot be identified at this stage.		

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ANNEX 2

CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES

Instructions: If the answer to any of the questions below is: (A) **YES**, the preparing body should provide supporting details and/or recommendation for further work. (B) **NO**, the preparing body should make proper justification as to why human element issues were not considered. (C) **NA** (Not Applicable) – the preparing body should make proper justification as to why human element issues were not considered applicable.	
Subject being assessed: A review of the 2014 IMO *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* and development next steps based on the review.	
Responsible body: Marine Environment Protection Committee (MEPC)	
1. Was the human element considered during development or amendment process related to this subject?	☑Yes ❑No ❑NA
2. Has input from seafarers or their proxies been solicited?	☑Yes ❑No ❑NA
3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	☑ Yes ❑No ❑NA
4. Have human element solutions been made as an alternative and/or in conjunction with technical solutions?	☑Yes ❑No ❑NA
5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	
• Administrations?	☑Yes ❑No ❑NA
• Shipowners/managers?	☑Yes ❑No ❑NA
• Seafarers?	☑Yes ❑No ❑NA
• Surveyors?	☑Yes ❑No ❑NA
6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	☑Yes ❑No ❑NA
7. Does the solution address safeguards to avoid single person errors?	❑Yes ❑No ☑NA
8. Does the solution address safeguards to avoid organizational errors?	❑Yes ❑No ☑NA
9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer?	❑Yes ❑No ☑NA
10. Have human element experts been consulted in development of the solution?	❑Yes ❑No ☑NA
11. **HUMAN ELEMENT**: **Has the proposal been assessed against each of the factors below?**	
❑ CREWING. The number of qualified personnel required and available to safely operate, maintain, support and provide training for system.	❑Yes ❑No ☑NA
❑ PERSONNEL. The necessary knowledge, skills, abilities and experience levels that are needed to properly perform job tasks.	❑Yes ❑No ☑NA

❑ TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills and abilities to achieve desired job/task performance.	❑Yes ❑No ☑NA
❑ OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc. to properly manage risks.	❑Yes ❑No ☑NA
❑ WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health and comfort of those on working on board, such as noise, vibration, lighting, climate and other factors that affect crew endurance, fatigue, alertness and morale.	☑Yes ❑No ❑NA
❑ HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury or death in a catastrophic event such as fire, explosion, spill, collision, flooding or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue, and the interface with emergency procedures, systems, facilities and equipment.	❑Yes ❑No ☑NA
❑ HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive and sensory abilities of the user population.	☑Yes ❑No ❑NA

Comments: (1) Justification if answers are NO or Not Applicable. (2) Recommendations for additional human element assessment needed. (3) Key risk management strategies employed. (4) Other comments. (5) Supporting documentation.

The proposal is to review the 2014 *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* and identify next steps. This will not change any setting with regard to human elements, as it is primarily addressing environmental matters, but solutions could result in a reduction of noise for those working on board resulting in an increase in the safety, health and comfort of seafarers.

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ANNEX 3

TERMS OF REFERENCE FOR THE SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION ON THE REVIEW OF THE 2014 GUIDELINES FOR THE REDUCTION OF UNDERWATER NOISE FROM COMMERCIAL SHIPPING TO ADDRESS ADVERSE IMPACTS ON MARINE LIFE (MEPC.1/CIRC.833) AND IDENTIFICATION OF NEXT STEPS

Taking into account document MEPC 75/14 and the comments and decisions made by MEPC 75 in plenary, the Sub-Committee on Ship Design and Construction (SDC) is instructed to:

.1 review the 2014 *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* (MEPC.1/Circ.833) (2014 Guidelines) with a view to:

.1 identifying barriers to uptake and implementation;

.2 identifying measures to further prevent and reduce underwater noise from ships, including options to integrate new and advancing technologies and/or vessel design solutions;

.3 identifying areas that require further assessment and research;

.4 identifying an acceptable means of measuring existing ship noise profiles following ISO or international standards; and

.5 amending the 2014 Guidelines and identifying/developing next steps, if necessary;

.2 develop a proposal for a programme of action and/or next steps to further prevent and reduce underwater radiated noise based on the findings of the review; and

.3 submit an interim report to MEPC 77 and a final report to MEPC 79.

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