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DEVELOPMENT OF A MANDATORY CODE FOR SHIPS OPERATING IN POLAR WATERS

Measures to prevent pollution of polar waters by sewage and grey water

Submitted by Friends of the Earth International (FOEI), the World Wide Fund for Nature (WWF) and Pacific Environment

SUMMARY

Executive summary:	In this document, FOEI, WWF and Pacific Environment propose alternative requirements for the discharge of sewage and grey water in the context of the environmental protection chapter of the draft Polar Code
Strategic direction:	5.2
High-level action:	5.2.1
Planned output:	5.2.1.17
Action to be taken:	Paragraph 13
Related documents:	DE 54/13/8, DE 54/13/9, DE 54/INF 5; DE 55/12/3, DE 55/12/5, DE 55/12/20; DE 56/10/1, DE 56/10/12, DE 56/INF.3, DE 56/WP.4; DE 57/11/1 and DE 57/11/9

Introduction

1 This submission is made in response to document DE 57/11/9 from Denmark, Finland, Iceland, Norway and the United States on proposals related to an environmental chapter of a mandatory Code for ships operating in polar waters (Polar Code) and is submitted in accordance with the provisions of paragraph 6.12.5 of the Committee's Guidelines (MSC-MEPC.1/Circ.4/Rev.2). The co-sponsors[1] welcome document DE 57/11/9 as an initial point of departure for discussion of the environmental protection chapter within the Polar Code and refer to previous submissions to DE which are relevant, in particular in relation to the discharge of sewage, grey water and associated wastes in polar waters (DE 54/13/8 and DE 55/12/20).

[1] The preparation of this document for the IMO's DE Sub-Committee was assisted by the Antarctic and Southern Ocean Coalition (ASOC), an umbrella NGO with expert observer status at the Antarctic Treaty Consultative meetings (ATCM) and meetings of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

2 The co-sponsors support the zero discharge aspiration of the MARPOL Convention through which Parties desire to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances, and believe that the provisions proposed in document DE 57/11/9 addressing sewage wastes and grey water will not appropriately address the threat to polar waters. In this document we propose alternative measures to manage sewage and grey water discharges based on our concerns on the potential impact of these discharges on polar waters.

3 The co-sponsors note paragraph 15.3.7 of annex 1 to document DE 56/WP.4 which refers to the need to avoid discharges of untreated sewage and grey water. Also of relevance are documents DE 55/12/5 (Norway) and DE 55/12/3 (New Zealand) in which controls including banning sewage discharge within a specific distance of land or ice-cover, and Special Area Status under MARPOL Annex IV are proposed.

Impact of sewage and grey water discharges

4 Although formal monitoring of human activities and impacts on polar environments is a standard requirement for land-based operations, there is an absence of information on the extent and impact of sewage pollution from vessels. Document DE 54/13/8 highlighted that polar waters are less tolerant to rapid changes in the nutrient status of the water column or seabed than other marine environments. Degradation of sewage and related discharges into polar waters is affected by a number of environmental factors including solar radiation, water depth, dissolved oxygen content, sea ice, algal blooms, salinity, water currents, temperature, turbidity, stratification and as a result of changes through the polar year[2]. As the amount of sewage discharged increases, environmental factors become less significant and the effective management of sewage and related discharges becomes increasingly important. Furthermore, synergistic problems are likely as water temperatures increases in response to changing climate.

5 Sewage and grey water discharges can be vectors for the introduction of invasive species since these effluents routinely contain enteric bacteria and have the potential to contain parasites and viruses[3]. Treatment can reduce the levels of microorganisms present in these discharges, however, it is not a mandatory requirement even though the deliberate release of non-native organisms is not allowed.

6 To reduce the threat to the marine environment and to wildlife, land-based stations in Antarctica have been improving the treatment of sewage discharged by installing biological treatment plants and UV sterilizers to sterilize effluent before discharge[4], as well as incinerating food scraps and the sludge from treatment processes[5]. While the impact of discharges from research stations is not directly comparable to shipping, the volumes of wastes generated on cruise ships is high and these vessels use similar routes throughout the season. Studies of the impacts of wastes discharged from research stations have led to the conclusion that the disposal of domestic wastes deserves special consideration in

2 Hughes, K.A., 2003. Influence of Seasonal Environmental Variables on the Distribution of Presumptive Fecal Coliforms around an Antarctic Research Station. Appl. Environ. Microbial. 69 (8), 4884 – 4891.

3 Smith, J.J., & Riddle, M., 2009. Sewage disposal and wildlife health on Antarctica. In Kerry, Knowles & Riddle (Eds.) *Health of Antarctic Wildlife: A Challenge for Science and Policy*. Springer, Berlin Heidelberg, pp 271 – 315.

4 http://www.antarctica.gov.au/living-and-working/station-life-and-activities/station-amenties-and-operations/site-services/sewage

5 http://www.antarctica.ac.uk/about_antarctica/environment/waste/index.php; and http://www.sciencedirect.com/science/article/pii/S0025326X04001869

polar marine environments[6]. The co-sponsors believe that this conclusion should be applied to the management of all such wastes in polar waters, including discharges from vessels.

7 Nitrogen and phosphorus (nutrients available in sewage and grey water) are essential for the growth of plants in the marine environment, however, over-enrichment can occur when nutrients are introduced as a result of human activities. Increased nutrients stimulate increased algal growth, and can lead to harmful algal blooms, loss of biodiversity, and disruption of food webs including declines in fish stocks. In cases of severe over-enrichment, hypoxic dead zones can be created[7]. Nutrients from sewage and grey water discharges are directly available for uptake by algae and enhanced levels are likely to occur along shipping routes giving rise to an increased likelihood of localized effects. Even low levels of nutrient inputs can lead to significant changes in the marine ecosystem if one of the nutrients is naturally limited, and small changes in the nutrient status can have consequences for the fluxes and flows of nutrients between the trophic levels within a food web. It is important that natural nutrient balances, which have evolved over long periods of time, are not disrupted. The nutrient load from ships' treated sewage is currently not regulated except in MARPOL Annex IV Special Areas, with the result that sewage discharges from vessels are increasing the nutrient loads in the marine environment[8].

8 Sea ice creates a specialized habitat for the nutrient-dependent phytoplankton at the base of the food web and which are consumed by krill. Krill are a central component of polar food webs and in turn support globally important populations of many of the great whales, seals, penguins and other species[9]. Alterations in the nutrient status of polar waters would result in disruption of the food web, leading to changes in wildlife populations, and could exacerbate ongoing pressure from global climate change.

9 The Arctic Marine Shipping Assessment reported that an average cruise ship can generate 3.8 million litres of wastewater from sinks, showers and laundries in a week[10]. Studies have shown that grey water, which constitutes the largest volume of liquid waste on a cruise ship, can contain a wide variety of polluting substances, including high levels of nutrients nitrogen and phosphorus, faecal coliform bacteria, food wastes, medical and dental wastes[11]. A study of large cruise ships in Alaska found that grey water pollution levels were as high or even exceeded black water for some substances including bacteria, and as a result standards were introduced in Alaskan state waters for the discharge of grey water[12].

10 There is currently no global regulation of the discharge of grey water, however some countries have introduced restrictions within their national jurisdictions; for example, discharge of grey water is not allowed in Canadian Arctic waters under the Arctic Waters

6 Edwards, D.D., McFeters, G.A., & Venkatesan, M. I., 1998. Distribution of *Clostridium perfringens* and Fecal Sterols in a Benthic Coastal Marine Environment Influenced by the Sewage Outfall from McMurdo Station, Antarctica. Appl. Environ. Microbiol., 64 (7), 2596 – 2600.

7 http://www.gpa.unep.org/gpa-pollutant-source-categories/nutrients.html Accessed 14/12/12; Karydis, M., 2009. Eutrophication assessment of coastal waters based on indicators: a literature review. Global NEST Journal, Vol 11, No 4, pp 373 – 390.

8 http://www.cep.unep.org/publications-and-resources/marine-and-coastal-issues-links/nutrients

9 http://www.coolantarctica.com/Antarctica%20fact%20file/wildlife/krill.htm

10 Arctic Council, *Arctic Marine Shipping Assessment2009 Report 5* (April 2009).

11 Congressional Research Service Report for Congress. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues. Claudia Copeland, Updated 18, 2005. http://www.protectyourwaters.net/news/data/CRS-CruiseShipReport.pdf; *see also* US Environmental Protection Agency, Cruise Ship Discharge Assessment Report, section 3 (2008), *available at* http://www.epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf.

12 Eley, W.D., Morehouse, C.H., 2003. Oceans Conference Record (IEEE) 2, p748 – 753; Assessment of Cruise Ship and Ferry Wastewater Impacts in Alaska, 2004. Alaska Department of Environmental Conservation. Commercial Passenger Vessel Environmental Compliance Program. February 9, 2004.

Pollution Prevention Act[13]. Since it would inevitably take a number of years for the IMO to develop a global standard and/or regulation, the co-sponsors propose that mitigation of the risk associated with grey water discharges should be undertaken within the context of the Polar Code in order to provide the necessary environmental protection for polar waters. The polar regions have different ecological characteristics to other areas of the world's oceans, so a global standard for grey water discharges is unlikely to result in a one-size-fits-all approach, and harmonization of grey water discharge standards in polar waters with any future global grey water regulations would be possible.

11 The co-sponsors believe that document DE 57/11/9 does not fully recognize the threat posed to polar waters by the discharge of both sewage wastes and grey water. A precautionary approach would eliminate all discharges of sewage, sludge, and grey water into polar waters, with wastes either incinerated in an appropriate manner[14] or returned to shore for proper disposal, however we propose measures below which leave open the possibility of discharge following treatment in polar waters.

Proposed measures for sewage and grey water discharge in polar waters

12 While the proposals for the discharge of sewage and grey water are combined as the nature of the wastes and the threat they pose is very similar, it is recognized that implementation of provisions for discharge of sewage in polar waters could be achieved via amendment to Annex IV of the MARPOL Convention, however an alternative route would be required for provisions on the discharge of grey water. The absence of regulation of grey water under an IMO instrument is a prime example of a gap in IMO regulation which the Polar Code is intended to address. The co-sponsors urge inclusion of the following measures within the Polar Code to regulate the discharge of sewage and of grey water which can contain faecal coliform bacteria, oil and grease, detergents, nutrients, metals and food waste:

.1 no discharge of untreated sewage or untreated grey water;

.2 designate the Arctic and Antarctic Area as Special Areas for the purposes of MARPOL Annex IV, where generally the discharge of sewage will be prohibited or discharge will be in line with the provisions of an Annex IV Special Area and will meet the standards adopted for total nitrogen and phosphorous levels;

.3 with respect to vessels not covered by Special Area Status in Antarctic and Arctic waters, require the discharge of treated sewage to be beyond a precautionary 25 nm from the nearest land, ice shelf, land fast ice or areas of ice concentration exceeding 10 per cent ice cover, with no discharge allowed in identified marine protected areas[15];

.4 discharge of treated grey water should only take place over a precautionary 25 nm from nearest land, ice shelf, land fast ice or areas of ice concentration exceeding 10 per cent ice cover for cruise vessels, with no discharge in identified marine protected areas.

13 http://www.tc.gc.ca/eng/marinesafety/debs-arctic-environment-discharges-355.htm

14 *See* FOEI et al., Incineration in polar waters, DE 56/10/11 (Dec. 24, 2011).

15 The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is developing a representative network of MPAs throughout the Southern Ocean, and while the process is not complete, planning domains have been identified, some MPA proposals have been developed and one MPA has been adopted at the end of 2012.

.5 discharge of treated sewage or treated grey water which meets total nitrogen and phosphorus level standards would be allowed over 12 nm from the nearest land, ice shelf, land fast ice or areas of ice concentration exceeding 10 per cent ice cover; and

.6 vessels must contain sufficient holding tank capacity for retention of sewage and associated wastes and grey water until an appropriate discharge solution (to shore facilities or beyond 25 nm from nearest land, etc.) is available.

Action requested of the Sub-Committee

13 The Sub-Committee is invited to consider the proposals to mitigate the threat to polar waters from sewage and grey water discharges set out in this document during deliberations on an environmental protection chapter in the Polar Code.