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**DEVELOPMENT OF A MANDATORY CODE FOR SHIPS OPERATING IN
POLAR WATERS**

Heavy fuel oil use by vessels in Arctic waters

Submitted by Friends of the Earth International (FOEI), the Clean Shipping Coalition (CSC), the International Fund for Animal Welfare (IFAW), World Wide Fund for Nature (WWF) and Pacific Environment

SUMMARY

Executive summary: In this document, FOEI, CSC, IFAW, WWF and Pacific Environment provide supplementary information to support the establishment of a provision in the Polar Code banning the use of heavy fuel oil by vessels in Arctic waters

Strategic direction: 5.2

High-level action: 5.2.1

Planned output: 5.2.1.19

Action to be taken: Paragraph 13

Related documents: DE 53/18/3; DE 54/13/8, DE 54/INF.5; DE 55/12/5, DE 55/12/18; DE 56/10/1, DE 56/10/10, DE 56/INF.3 and DE 56/INF.14

Introduction

1 The co-sponsors of this submission have previously made recommendations concerning an environmental protection chapter within the Polar Code, and have specifically addressed the issue of heavy fuel oil (HFO)¹ use by ships in the Arctic, e.g. documents DE 56/10/10 and DE 56/INF.14.

2 This document, building on past co-sponsor submissions to DE 54 and DE 56, highlights several compelling reasons for prohibiting the use of HFO by vessels in Arctic waters, as defined by the Polar Code. A ban on HFO use is already in force for Antarctic waters.²

¹ The term heavy fuel oil in this document denotes residual marine fuel or mixtures containing predominately residual fuel and some distillate fuel, such as intermediate fuel oil.

² MARPOL Annex I, regulation 43.

Upsurge in Arctic shipping

3 Approximately 3,000 vessels operated in the Arctic in 2004.³ The amount of vessel activity in the region is expected to increase, though, due to a combination of economic factors and sea ice loss engendered by climate change. The rate of growth in Arctic vessel activity of late has been particularly noteworthy. In 2010, four ships transited the Northern Sea Route; two years later 46 ships made the voyage, representing a nearly twelvefold expansion.⁴

4 It should be noted, as well, that a substantial portion of traffic by large vessels in the Arctic continues to use heavy fuel oil, or bunker fuel, which is environmentally destructive when spilled or combusted.⁵ These larger vessels also can hold significant quantities of fuel for propulsion purposes,⁶ and presumably would be travelling with full bunker tanks as fuelling options in the region are limited. We believe, for the following reasons, that HFO use in the Arctic by ships should be prohibited, and that this provision should be included in the International Maritime Organization's Polar Code.⁷

Heavy fuel oil spills

5 First, spills of HFO in marine environments are generally far more detrimental than spills of distillate fuels.⁸ When spilled, lighter, more refined marine fuels naturally disperse and evaporate much more quickly than HFO.⁹ Also, in contrast to HFO, marine distillate fuel usually does not emulsify, resulting in significantly less spill volume.¹⁰ Moreover, HFO is nearly impossible to effectively clean up in icy Arctic waters.¹¹

6 In addition, a recent scientific study found that HFO from the 2007 **Cosco Busan** accident in San Francisco Bay devastated Pacific herring embryos when the oil was exposed to sunlight in the intertidal zone.¹² A prior study on zebrafish had similar results, finding "that bunker oils have a much higher phototoxic potential than crude oil..."¹³ Hence, it is no wonder why the Arctic Council's Arctic Marine Shipping Assessment definitively states: "The most significant threat from ships to the Arctic marine environment is the release of oil through accidental or illegal discharge."¹⁴

³ Arctic Council, Arctic Marine Shipping Assessment 2009 Report, 72 (2009), available at <http://arcticportal.org/en/pame/amsa-2009-report> [hereinafter AMSA].

⁴ 46 vessels through Northern Sea Route, Barents Observer, Nov. 23, 2012, at <http://barentsobserver.com/en/arctic/2012/11/46-vessels-through-northern-sea-route-23-11>.

⁵ Det Norske Veritas (DNV), Report – Heavy fuel in the Arctic (Phase 1), Report for PAME, Report No./DNV Reg. No.: 2011-0053/ 12RJ7IW-4, 30 (2011), available at <http://www.arcticcouncil.org/index.php/en/about/documents/category/26-pame-nuuk-ministerial> (over 84 percent of the large vessels (10,000 gt and above) operating in the Arctic in 2010 used heavy fuel oil) [hereinafter DNV Heavy Fuel Report].

⁶ Panamax containerships, bulk carriers, and tankers can carry 5,600m³, 2,600m³, and 1,700m³ of HFO, respectively. K. Michel and T. Winslow, *Cargo Ship Bunker Tanks: Designing to Mitigate Oil Spillage*, prepared for SNAME conference, Joint California Sections Meeting, 5 (1999), available at <http://www.sname.org/Home/>.

⁷ Moreover, heavy-grade oil carriage restrictions should be considered for certain Arctic waters exhibiting special ecological and cultural characteristics.

⁸ E.g. DNV Heavy Fuel Report, *supra* note 5, at 38-39.

⁹ *Id.*

¹⁰ *Id.*

¹¹ See World Wildlife Fund, *Not so fast: Some progress in spill response, but US still ill-prepared for Arctic offshore development – A review of U.S. Department of the Interior: Minerals Management Service's (MMS) "Arctic Oil Spill response research and development program – a decade of achievement"*, (2009), available at <http://www.worldwildlife.org/what/wherewework/arctic/WWFBinaryitem14712.pdf>.

¹² J. Incardona et al., *Unexpectedly high mortality in Pacific herring embryos exposed to the 2007 Cosco Busan oil spill in San Francisco Bay*, 109 PNAS E51 (2012).

¹³ *Id.*

¹⁴ AMSA, *supra* note 3, at 5.

Disposal of heavy fuel oil sludge

7 Second, banning the use of HFO would also obviate the need to dispose of its considerable waste sludge. This sludge generally constitutes about one to five percent of HFO consumed,¹⁵ and it must be discharged onshore, incinerated, or burned as fuel after further processing.¹⁶ A study found that shipping within the Barents and Norwegian seas alone produces 13,000 metric tons of fuel oil sludge a year.¹⁷ The Arctic Marine Shipping Assessment points out that, while Norway possesses adequate port reception facilities in its Arctic ports to handle various waste streams from ships, the same is not true for other parts of the Arctic region.¹⁸ It further states that the lack of port-side infrastructure and costs associated with offloading waste at port reception facilities provide incentive for illegal waste disposal.¹⁹ The Arctic Marine Shipping Assessment concludes that "[c]onsidering the sheer volume of oily sludge produced in Norwegian waters alone, it would take only a small percentage of the oily sludge produced to be illegally discharged for it to cause environmental damage."²⁰

8 In fact, illegal fuel oil sludge dumping is already a problem – and there is little to indicate that it would not occur in the Arctic. According to the United States National Research Council's report "Oil in the Sea: Inputs, Fates and Effects" (2002), fuel oil sludge comprised nearly 85 percent of all illegally discharged oil from shipping operations, amounting to 255,700 metric tons worldwide in 1999.²¹

9 Due to illegal fuel oil sludge disposal and other reasons, the United Nations Organisation for Economic Co-operation and Development, in a 2003 report, supported transitioning away from the use of bunker fuel by vessels.

"Heavy fuel oil (HFO) sludges are the greatest source of illegal oil discharges from ships. As long as ships' engines run on these extremely "dirty" final products of the refining chain, ships will accumulate sludges that, according to international regulations, can only be disposed of in port reception facilities and/or burned in approved incinerators. *Weaning the maritime sector away from these fuels and towards cleaner sources of energy*, much as what has been done for land transport, would go a long way towards reducing sludge production, oil discharges and, ultimately, the competitive advantage accruing to noncompliant vessels [emphasis added]."

Air emissions impacts from heavy fuel oil use

10 Third, banning HFO in the Arctic would substantially reduce harmful air emissions from vessels operating in the area. Depending on the type of distillate fuel used, reductions in sulfur oxides and particulate matter could exceed 90 percent.²²

¹⁵ *Id.* at 139.

¹⁶ Organisation for Economic Co-operation and Development, Cost Savings Stemming from Non-Compliance with International Environmental Regulations in the Maritime Sector, Maritime Transport Committee, DSTI/DOT/MTC(2002)8/FINAL, 13 (2003), available at <http://www.oecd.org/sti/transport/maritimetransport/2496757.pdf> [hereinafter OECD].

¹⁷ AMSA, *supra* note 3, at 139.

¹⁸ *Id.* at 141.

¹⁹ *Id.*

²⁰ *Id.*

²¹ OECD, *supra* note 16, at 13.

²² See D. Lack et al., *Impact of Fuel Quality Regulation and Speed Reductions on Shipping Emissions: Implications for Climate and Air Quality*, 45 *Environ. Sci. Technol.* 9502 (2011), in United States, *Impact of fuel quality regulation and speed reductions on shipping emissions: Implications for climate and air quality* (Nov. 11, 2011) (submitted to IMO's Bulk Liquids and Gases Sub-Committee and reviewed as BLG 16/INF.5).

11 Finally, using distillate fuel rather than HFO would result in significant reductions in black carbon emissions. A recent paper asserts that black carbon emissions could be reduced by on average 30 percent and possibly up to 80 percent when switching to low-sulfur distillate fuel.²³ Decreasing black carbon levels from Arctic shipping would not only save lives²⁴ and better safeguard human health but also slow regional as well as global warming.²⁵

Operational benefits

12 In addition, using cleaner distillates, such as marine diesel oil or marine gas oil, instead of bunker fuel lessens or avoids the need to process or pre-heat fuel.²⁶

Action requested of the Sub-Committee

13 The Sub-Committee is invited to include a provision in the Polar Code prohibiting the use of heavy fuel oil by vessels in Arctic waters.

²³ D. Lack and J. Corbett, *Black carbon from ships: a review of the effects of ship speed, fuel quality and exhaust gas scrubbing*, 12 *Atmos. Chem. Phys.* 3985 (2012).

²⁴ Clean Shipping Coalition, *Updated study estimating premature mortality above 40 degrees north latitude resulting from primary particulate emissions from international shipping activity* (May 6, 2011) (submitted to IMO's Marine Environment Protection Committee and reviewed as MEPC 62/INF.32).

²⁵ See J. Corbett et al., *Arctic shipping emissions inventories and future scenarios*, 10 *Atmos. Chem. Phys.* 9689 (2010), in Clean Shipping Coalition, *Emissions inventory and analysis of impacts of short-lived climate forcing aerosols from international shipping activity in the Arctic*, (Dec. 10, 2010) (submitted to IMO's Bulk Liquids and Gases Sub-Committee and reviewed as BLG 15/INF.5).

²⁶ DNV Heavy Fuel Report, *supra* note 5, at 8.