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DEVELOPMENT OF MEASURES TO REDUCE RISKS OF USE AND CARRIAGE OF HEAVY FUEL OIL AS FUEL BY SHIPS IN ARCTIC WATERS

Impact assessment of a ban on the use and carriage of heavy fuel oil as fuel by ships operating in the Arctic

Submitted by FOEI, Greenpeace, WWF, Pacific Environment and Clean Shipping Coalition

SUMMARY

Executive summary:	This document demonstrates that most of the impact assessment methodology steps provided for under document MEPC 73/9/2 have been completed and that a significant body of research already exists with respect to the environmental, economic and social impacts of a ban on the use and carriage of HFO as fuel by ships operating in Arctic waters
Strategic direction, if applicable:	6
Output:	6.1
Action to be taken:	Paragraph 34
Related documents:	MEPC 69/20/1; MEPC 70/17/4; MEPC 71/16/4, MEPC 71/14/4; MEPC 72/11/1, MEPC 72/11/5, MEPC 72/INF.14, MEPC 72/16, MEPC 72/17; MEPC 73/9, MEPC 73/9/1, MEPC 73/9/2, MEPC 73/9/3 and MEPC 73/INF.19

Introduction

1 At its seventy-second session, MEPC developed a scope of work for the PPR Sub-Committee to address the development of measures to reduce the risks of use and carriage of heavy fuel oil (HFO) as fuel by ships in Arctic waters, which includes a direction to, "on the basis of an assessment of the impacts, develop a ban on HFO for use and carriage as fuel by ships in Arctic waters, on an appropriate timescale" (MEPC 72/16, paragraphs 11.5 and 11.9.3). In order to expedite the scope of work, MEPC 73 invited Member Governments and international organizations to submit any further proposals on an appropriate impact assessment methodology process and the results of any impact assessments undertaken with respect to a proposed ban on HFO to PPR 6 for consideration and advice to the Committee (MEPC 73/WP.1).

2 This submission refers to the impact assessment methodology presented by Finland in document MEPC 73/9/2, which sets forth the following steps: (i) define the problem; (ii) define policy objectives; (iii) develop policy options; (iv) analyse impacts; and (v) compare policies and recommend one option. In this submission, the co-sponsors demonstrate that most of these steps have been completed by the Arctic Council and MEPC. This submission also establishes that a significant body of research already exists with respect to the environmental, economic and social impacts of a ban for this Sub-Committee to consider, in order to determine how best to implement a ban on the use and carriage of HFO as fuel by ships in Arctic waters.

Step I: defining the problem

3 Despite the clearly defined risks of HFO use in the Arctic, ships continue to use and carry HFO as fuel in Arctic waters when they could use less risky fuels. It was nearly 10 years ago that the Arctic Council's Protection of the Arctic Marine Environment (PAME) Working Group concluded that "the most significant threat from ships to the Arctic marine environment is the release of oil through accidental or illegal discharge".[1] In addition, according to Det Norske Veritas (DNV), using distillates instead of HFO as fuel would achieve significant spill risk reduction.[2] Further risks of continuing to use and carry HFO for use as fuel by ships in Arctic waters, including risks to indigenous food security, have been previously outlined in numerous papers including documents MEPC 69/20/1, MEPC 70/17/4, MEPC 71/16/4, MEPC 71/14/4, MEPC 72/11/1 and MEPC 72/11/5.

Step II: defining policy options

4 At the seventy-second session of MEPC, the proposal to ban HFO use and carriage for onboard use as fuel by ships in Arctic waters was widely supported.[3] In response, MEPC defined a clear policy option in the scope of work for PPR to, "on the basis of an assessment of the impacts, develop a ban on HFO for use and carriage as fuel by ships in Arctic waters on an appropriate timescale".[4]

Step III: development of policy options

5 Given the clear policy option set forth in paragraph 11.9.3 of the "Report of the Marine Environment Protection Committee on its Seventy-Second Session" (MEPC 72/17), the sole policy objective under consideration, with respect to this impact assessment, is how to best implement a ban on HFO for use and carriage as fuel by ships operating in Arctic waters. Information acquired through various impact assessments submitted to the Organization can be used to guide this decision.

1 Arctic Marine Shipping Assessment 2009 Report (AMSA, 2009). Arctic Council, April 2009 (5).

2 Det Norske Veritas, Heavy fuel in the Arctic (Phase 1), Report No./DNV Reg. No.: 2011-0053/ 12RJ7IW-4 Rev 00, 2011-01-18, (2011).

3 MEPC 72/11/1, Proposal to ban heavy fuel oil use and carriage as fuel by ships in Arctic waters (Finland, Germany, Iceland, the Netherlands, New Zealand, Norway, Sweden and the United States).

4 MEPC 72/17, Report of the Marine Environment Protection Committee on its Seventy-Second Session, paragraph 11.9.3, 13 April 2018.

Step IV: analysis of impacts

6 Most of the elements to be included in an impact assessment have already been undertaken by several organizations and relevant forums, including the Arctic Council. As such, the following existing data can and should be used to inform the development of a ban on HFO use and carriage as fuel by ships in Arctic waters, and to reduce the spill risk associated with HFO use and carriage as fuel in the Arctic.

Environmental impacts

7 *Arctic Marine Shipping Assessment 2009 Report (*AMSA, 2009), Arctic Council, April 2009 (5) finds that "the most significant threat from ships to the Arctic marine environment is the release of oil through accidental or illegal discharge…".

8 Det Norske Veritas, *Heavy fuel in the Arctic* (Phase 1), Report No./DNV Reg No.: 2011-0053/ 12RJ7IW-4 Rev 00, 2011-01-18, (2011) concludes that using distillates instead of HFO as fuel would achieve significant spill risk reduction.

9 Det Norske Veritas *HFO in the Arctic – Phase 2*, 2013-1542-16G8ZQC-5/1 (2013) concludes that an incident resulting in an oil spill in the Arctic could be expected approximately every 1.6 years, based on 2012 shipping levels.

10 *HFO Project Phase III(a) Heavy Fuel Oil & Other Fuel Releases from Shipping in the Arctic and Near-Arctic*. This report, prepared by USA, Finland, Russian Federation, Kingdom of Denmark, Norway, Iceland and submitted to the PAME II-2016 meeting (2016), provides examples of previous oil spill incidents involving vessels in ice-covered waters and cold regions to illustrate the range of accidents that responders could face in future oil-in-ice spill events.

11 Arctic Council, *Status on Implementation of the AMSA 2009 Reports*, (2011, 2013, 2015, 2017) notes the Arctic Council's PAME Working Group's work to address the risks associated with the use and carriage of HFO by vessels in the Arctic over several years.

12 Document MEPC 69/20/1 explains why HFO is a threat to the Arctic environment and describes why a spill of HFO in the Arctic would be particularly challenging to address because of its remoteness, weather and seasonal darkness.

13 Document MEPC 70/17/4 describes developments on how to reduce the risks of using HFO in the Arctic, including proposals for mitigating the risks associated with the use and carriage of HFO by vessels in the Arctic from the Arctic Council's PAME shipping expert group.

14 Document MEPC 71/16/4 discusses potential future HFO-fuelled Arctic shipping traffic and compares the costs of using HFO versus alternative fuels.

15 Document MEPC 71/INF.37 summarizes the key findings of Comer et al., *Prevalence of Heavy Fuel Oil and Black Carbon in Arctic shipping, 2015 to 2025*, International Council on Clean Transportation (2017). The study finds that HFO is the most commonly used marine fuel in the Arctic, representing 57% of fuel use and more than 75% of the fuel on board by weight in 2015. General cargo ships consumed the most HFO in the IMO Arctic (using 66,000 t), followed by oil tankers (43,000 t) and cruise ships (25,000 t). Ships use and carry HFO in previously inaccessible parts of the Arctic as sea ice has dwindled. Finally, the 0.5% global fuel sulphur cap will not eliminate HFO use and carriage in the Arctic because of residual fuel blends and the use of scrubbers.

16 Documents MEPC 72/11/2 and MEPC 72/INF.20 summarize the key findings of Comer et al., *Heavy Fuel Oil Use in the IMO Polar Code Arctic Summarized by Ship Type, 2015* International Council on Clean Transportation (2018). The ICCT study finds that in 2015 in the IMO Polar Code Arctic 2,086 ships operated for 2.6 million hours, travelling 10.3 million nautical miles, with 1.1 million tonnes of fuel on board, collectively, at any given time. These ships consumed 436 thousand tonnes of fuel and emitted 193 tonnes of BC. 889 of the 2,089 ships, or 42%, operated on HFO in the IMO Arctic in 2015. HFO represented 57% of fuel use by weight, 76% of fuel carried by weight and 56% of distance-weighted fuel carried. Bulk carriers, fishing vessels and general cargo ships accounted for the greatest number of HFO-fuelled ships in the IMO Polar Code Arctic in 2015. General cargo ships used the most HFO and bulk carriers carried the most HFO on board as fuel.

17 Document MEPC 72/INF.14 provides a summary of all projects relevant to HFO use and carriage in the Arctic that have been completed or are in progress by PAME.

18 Ansell D.V. et al., *A Review of the Problems Posed by Spills of Heavy Fuel Oils*, the International Tanker Owners Pollution Federation Ltd. (2001) concludes that the consequences of HFO spills could be prolonged because of the persistent nature of HFO, and that the threat to marine life and economically sensitive resources could last longer in the event of a HFO spill.

19 Deere-Jones, T., *Ecological, Economic and Social Impacts of Marine/Coastal Spills of Fuel Oils (Refinery Residuals)* (2016) finds that polar and sub-polar HFO spills, by virtue of their remoteness, the extreme weather and sea state conditions, and the relative lack of data (marine environmental, shoreline morphological and historical hydrocarbon baseline), are very difficult to respond to and may cause high levels of environmental and socio-economic impacts.

20 Andrianov, V.V. et al., *Long-Term Environmental Impact of an Oil Spill in the Southern Part of Onega Bay, the White Sea*, *Russian Journal of Marine Biology*, 3 Vol. 42 (2016) documents the long-term effects of HFO on a marine ecosystem and key species of marine mammals.

21 PAME's Phase IV (d)) Report will explore the environmental, economic, technical and practical aspects of the use of HFO by ships in the Arctic of alternative fuels.

Economic impacts

22 Faber et al., *Assessment of Fuel Oil Availability,* CE Delft, commissioned by IMO (2016) finds that most ships that currently operate on HFO are expected to use desulfurized residual fuel or residual fuel blends that comply with the standard instead of switching to more expensive distillate fuel or installing scrubbers.

23 Document MEPC 71/INF.36 summarizes the key findings of Roy & Comer, *Alternatives to Heavy Fuel Oil Use in the Arctic: Economic and Environmental Tradeoffs*, International Council on Clean Transportation (2017), which finds that:

.1 HFO is expected to represent only 7% of the fuel used by ships in the IMO Arctic in 2020, while a large percentage of vessels will operate on residual blends;

.2 the clean-up costs for an HFO spill in 2015 would be $22,441/tonne, $16,831 for 0.5% S residual oil spills and $3,055 for distillate (MGO) spills;

.3 the clean-up costs of residual fuel oil spills are more than seven times those of a distillate spill, and even a relatively small spill of residual fuel, measuring less than 1% of the amount of these fuels carried on ships in the Arctic, outweighs the fuel cost savings of continuing to operate on these fuels in a given year; and

.4 switching the Arctic ships that continue operating on HFO to distillate fuel would cost the Arctic fleet (in 2015 US dollars (USD)) roughly $4.3 million to $5.2 million per annum in 2020 and beyond; similarly, switching from residual blends to distillate would cost (in 2015 USD) $4.5 million to $5.4 million per year, meaning that the entire Arctic fleet could switch to distillate fuels for between $9 million and $11 million per annum, an increase in fleet-wide fuel costs of 4%.

24 Document MEPC 73/9/3 summarizes Nelissen & Tol, *Residuals bunker fuel ban in the IMO Arctic waters*, CE Delft (August 2018), which finds that:

.1 depending on the ship type and size involved and assuming that all bunker fuel carried by a ship was spilled, the estimate clean-up costs would be between $3.4 and $45 million for an LSHFO spill and between $5.3 and $70 million for an HFO spill;

.2 the Arctic fleet's fuel expenditure for its activities within IMO Arctic waters would, depending on the bunker fuel prices, increase by 3% to 18% in 2021 due to the HFO ban;

.3 the average costs for an individual ship would increase by 2% if it used LSHFO in order to comply with the global 2020 sulphur cap; and depending on the scrubber costs, 4% to 15% for a ship that used HFO in combination with a scrubber to comply with the global sulphur cap; and

.4 there would be a 0.2% to 0.5% increase in the average import and export price of goods in Greenland and a 0.2% increase for the costs of food shipped to Iqaluit in North Canada as a result of an HFO ban.

25 Document MEPC 73/9/3 summarizes findings of DeCola et. al., *Phasing Out the Use and Carriage for Use of Heavy Fuel Oil in the Canadian Arctic: Impacts to Northern Communities*, Nuka Research and Planning Group and Northern Economics, commissioned by WWF (2018), including:

.1 the cost per tonne of a HFO spill at between $106,000 and $512,000 per tonne spilled, including shoreline clean-up costs, socio-economic costs and environmental costs, compared with per tonne costs for a distillate spill ranging from $32,000 to $193,000 per tonne;

.2 historical IFO 380 fuel cost data and historic food prices in Nunavut did not indicate a correlation between fuel costs and food prices and that while IFO 380 prices fell nearly 65% from 2014 to 2017, the average cost of select shelf-stable food items in communities increased by about 15%; and

.3 the incremental costs of using more expensive fuel was about $11 (2018 Canadian dollars) per cargo tonne, or about one cent per kilogram of cargo transported and that these estimates would decrease if the price differential between IFO and MGO decreases as predicted.

26 Abbasov et al., *Cost analysis of Arctic HFO ban for Cruise shipping – A case study of the MS Rotterdam operations in the Arctic* (2018) finds that an HFO ban would translate into an average of €7/day (2018) or €5/day (2021) per cruise passenger ticket which is comparable to the cost of small food items sold on board of a luxury cruise ship.

27 Nuka Research and Planning Group, LLC*, Shipping Transitions in Arctic Alaska: The 2020 Sulphur Cap and an Arctic HFO Ban* (August 2018):

.1 describes potential fuel transitions for ships that use HFO and operate in Alaskan Polar Code waters in regards to the 2020 sulphur cap and Arctic HFO ban;

.2 identifies bulk carriers and tankers as the main users of HFO in the Alaska Arctic; and

.3 demonstrates that more than 50% of the bulk carriers using HFO in the region will have an extra five years to comply with an HFO ban if the exemption noted in document MEPC 72/11/1 remains as proposed, providing a tiered approach to a ban and ample time for economic transitions.

28 Vard, Marine Inc., *Arctic Fuel Switching Impact Study* (2016) estimates that once the 2020 global sulphur fuel cap is in place, the cost of derived totals for dry cargo shipped through the Arctic Sealift operations would increase by as little as 1%.

29 Naalakkersuisut-Department of Nature and Environment, *Socioeconomic, Environmental and Climate Impact of a Possible Ban on the Use of HFO,* Version 3 August (2018) notes that a HFO use and carriage ban in the Arctic would cost Greenland $1.3 million (8.1 million Danish Kr). Only $0.2 million (1.19 million Danish Kr) of these costs would be due to increased consumer prices corresponding to an increase of around 0.01% in consumer prices in Greenland).

Social impacts

30 Food security[5] for many Arctic communities has strong social implications. An HFO spill near an Arctic or subarctic community would threaten subsistence and other marine resources, endangering food security, jobs and related revenue from marine-based livelihoods (i.e. fishing) and cultural practices.

[5] Food security is defined by the Alaskan Inuit as: "the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water and air. It allows for all Inuit to obtain, process, store and consume sufficient amounts of healthy and nutritious preferred food – foods physically and spiritually craved and needed from the land, air and water, which provide for families and future generations through the practice of Inuit customs and spirituality, languages, knowledge, policies, management practices and self-governance. It includes the responsibility and ability to pass on knowledge to younger generations, the taste of traditional foods rooted in place and season, knowledge of how to safely obtain and prepare traditional foods for medicinal use, clothing, housing, nutrients and, overall, how to be within one's environment. It means understanding that food is a lifeline and a connection between the past and today's self and cultural identity. Inuit food security is characterized by environmental health and is made up of six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility. This definition holds the understanding that without food sovereignty, food security will not exist." (Inuit Circumpolar Council-Alaska 2015. Alaskan Inuit Food Security Conceptual Framework: How to Assess the Arctic From an Inuit Perspective: Summary Report and Recommendations Report 5. Anchorage, AK.).

31 Many indigenous communities vocalize that the impacts of an HFO spill on food security cannot be quantified. Arctic indigenous organizations and the Government of Greenland have recently considered the threat of HFO and shipping in their ancestral homelands, and in 2018 urged IMO to ban the use and carriage of HFO for use by ships operating in Arctic waters (as noted by the following documents):

.1 Utqiaġvik Declaration (2018), as declared by the Inuit of Alaska, Canada, Greenland, and Chukotka, on the occasion of the thirteenth General Assembly of the Inuit Circumpolar Council (ICC) from 16-19 July 2018 in Utqiaġvik, Alaska, "Direct ICC to advocate for the enforcement of the International Marine Organization Polar Code, other international and national regulations, advance emergency response, and phase out heavy fuel oil (HFO) in order to minimize impacts on marine mammals and fish and to prevent disruption of seasonal hunting, and for safety and environmental protection".

.2 Alaska Federation of Natives (AFN) *Resolution 18-20 Supporting the Phase Out of Heavy Fuel Oil in Arctic Shipping* (2018), "WHEREAS: A HFO spill in the Arctic and Bering Sea would harm subsistence resources, threatening food security, cultural practices, and local economies; …NOW THEREFORE BE IT RESOLVED by the delegates of the 2018 Annual Convention of the Alaska Federation of Natives that AFN strongly supports a phase out on the use and carriage as fuel of heavy fuel oil in Arctic and Bering Sea waters. BE IT FURTHER RESOLVED that AFN urges other stakeholders and decision-makers to work together to strongly urge the international community to develop a phase out on the use and carriage of HFO in the Arctic as quickly as possible."

.3 Nunavut Tunngavik Incorporated Annual General Meeting Resolution #: RSA 18-10-14 Ban on Heavy Fuel Oil (2018), "WHEREAS heavy fuel oil is generally used by transportation and cruise ships traversing the Arctic waters; AND WHEREAS heavy fuel oil, if spilled, is highly poisonous to wildlife and difficult to clean up, and potentially poses a grave threat to the fragile Arctic eco-environment; AND WHEREAS the use of heavy fuel oil is banned in the Antarctic, and the International Maritime Organization (IMO) is moving towards a ban on use of heavy fuel oil in Arctic shipping by 2020; NOW, THEREFORE, BE IT RESOLVED THAT the Members call on the Government of Canada to ban the use, carriage and transportation of heavy fuel oil in the Arctic waters".

.4 Naalakkersuisut (government of Greenland) announced support for a ban on the navigation and transport of HFO in the Arctic (2018), "A very important reason for avoiding HFO in Arctic waters is that shipping accidents, which cause a waste of HFO in the marine environment, can have great environmental and economic consequences".

32 Several reports also detail the social/socio-economic impacts that HFO and crude oil spills have on local fishing and indigenous communities, including:

.1 Brewer, R., *Lessons Learned and Final Thoughts,* Aleutian Life Forum, Dutch Harbor, Alaska (2005), which notes the need to (in light of the disruption to local commercial and subsistence fishing as a result of the Seledang Ayu bunker spill in Alaska):

.1 address concerns about local fishing activities and closed areas, as the community was never fully addressed as to where they could and could not go;

.2 take into account considerations for differences in native and non-native cultural communication;

.3 get health and safety information out to subsistence users quickly and accurately; and

.4 establish baseline data of potentially effected subsistence organisms and explain how and when contamination should no longer be a concern.

.2 Gill, Picou & Ritchie, *The Exxon Valdez and BP Oil Spills: A Comparison of Initial Social and Psychological Impacts* American Behavioral Scientist, 56 (1) 3-23 (2013) notes that numerous papers have documented the empirical research on community and human impacts for the Exxon Valdez oil spill. Human impacts within Alaskan Native villages and commercial fishing communities following the Exxon Valdez spill included high levels of collective trauma, social disruption, economic uncertainty, community conflict and psychological stress. Local residents, including Alaska Natives and commercial fishermen, experienced chronic psychological stress, social disruption and collective trauma.

Step V: comparison of policies and recommendation of one option

33 As described above, MEPC 72 has already set forth a clear policy directive to develop a ban on HFO for use and carriage as fuel by ships in Arctic waters, on the basis of an assessment of the impacts. Given this clear policy direction, and the fact that most of the elements of an impact assessment have already been undertaken, the co-sponsors encourage the Sub-Committee to expedite the scope of work and begin developing a ban on HFO for use and carriage as fuel by ships in Arctic waters to be adopted by 2021.

Action requested of the Sub-Committee

34 The Sub-Committee is invited to note the information provided in paragraphs 1 to 33, and commence the development of a ban on HFO for use and carriage as fuel by ships in Arctic waters without delay.