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REDUCTION OF THE IMPACT ON THE ARCTIC OF BLACK CARBON EMISSIONS FROM INTERNATIONAL SHIPPING

Polar Fuels under MARPOL Annex VI as a means to reduce the impact of ship Black Carbon Emissions on the Arctic

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SUMMARY

Executive summary:	This submission supports defining polar fuels for use in the Arctic based on fuel characteristics and including new fuels with comparable low black carbon emissions, recognising that use of these fuels will reduce the impact on the Arctic of black carbon emissions from international shipping. A regulatory measure will ensure compliance and the delivery of significant black carbon emission reductions.
Strategic direction, if applicable:	3
Output:	3.3
Action to be taken:	Paragraph 15
Related documents:	PPR 12 report, PPR 12/6, PPR 12/6/1, PPR 12/WP.4, MEPC 83/17

Introduction

1 Interested Member States and international organisations have been invited to submit concrete proposals to PPR 13 on the “polar fuels” concept in the context of the work to reduce the impact on the Arctic of black carbon (BC) from international shipping (MEPC 83/17, paragraph 5.14).

2 Following agreement on a definition of BC and on ways to measure onboard ship BC emissions, subsequent IMO discussion on potential Arctic BC abatement approaches clearly recognised the important role of engine type, maintenance, size, and engine load in determining ship BC emissions levels as well as the use of cleaner fuels. This led to two Resolutions (MEPC.393(82), MEPC.394(82)) being adopted at MEPC 82 encouraging ships operating in and near the Arctic to measure their BC emissions, set individual ship BC reduction targets, work to achieve them, and share results with administrations for further examination by the IMO. While encouraging Arctic shipping to pursue these recommendations,

the co-sponsors recognise that such measurements and targets will take time to implement, as will collating individual ship experiences and then for the IMO to draw conclusions. The process will also depend on ship owners and operators agreeing to undertake such additional operational tasks on a voluntary and consistent basis.

3 Previously in 2021, resolution MEPC.342(77) acknowledged that fuel quality also plays a determining role in ship BC emissions and recommended that ships operating in and near the Arctic switch voluntarily to cleaner distillate fuels or other cleaner alternative fuels or methods of propulsion that are safe for ships.

4 The extent of uptake of such calls for voluntary action is not clear. A switch away from residual fuels to cleaner distillate fuels inevitably involves additional fuel costs which discourages first movers to act and potentially puts them at a competitive disadvantage. These costs, if passed on to Arctic communities and Indigenous Peoples in the region, would also lead to social and economic harms. A regulatory measure to address black carbon emissions would apply to all ships, and compliance would not be voluntary, thus ensuring a level playing field and a degree of certainty for cost mitigation at the community level.

5. Both PPR 11 and more substantively PPR 12 discussed the concept of polar fuels, recognising that their use by ships operating in and near the Arctic would reduce the impact of BC emissions in that region. MEPC 83 acknowledged the call for delegations to submit concrete proposals on the issue and allowed additional time for further development of the "polar fuels" concept by extending the target completion year for Output 3.3 to 2027.

Development of the concept of polar fuels

6 Discussion at PPR 12 focussed on the particular fuel characteristics of polar fuels that would lead to across-the-board BC reductions albeit varying by ship and engine size, engine type and operating conditions. In PPR 12/6/1, ISO identified four fuel quality characteristics that would distinguish cleaner distillate fuels from marine residual fuels. The characteristics are:

i) density: maximum 890 kg/m3 as measured by ISO 3675 or ISO 12185;
ii) viscosity: maximum 6,000 mm2/s as measured by ISO 3104;
iii) carbon residue content by mass – micro method on the 10% volume distillation residue: maximum 0.30% as measured by ISO 10370 - this characteristic being included to restrict the "sooting propensity" of the fuel; and
iv) cetane index or cetane number minima.

7 PPR 12/6/1 notes that when discussing polar fuels, the characteristics of more refined distillates would, along with regulatory sulphur and flashpoint requirements, be independent of any grade or edition of ISO 8217. Since PPR 12, informal exchanges between interested stakeholders have noted that the inclusion of the cetane number or index characteristic as proposed in PPR 12/6/1 is not essential.

8 The widely accepted view for road, non-road, diesel locomotive, inland shipping and indeed for residual marine fuels, is that cleaner distillate fuels significantly improve combustion and lead to significant reductions in emitted pollutants. The use of residual rather than distillate fuels in transport modes in Europe and North America is now limited to the maritime sector.

9 Distillate fuels DMA and DMZ, and other fuels with comparable BC reducing capabilities will meet the characteristics used to define polar fuels. A switch from residual fuels to distillate fuels in the Arctic is similar to the ECA fuel switch requirement that is an everyday occurrence implemented without operational problems. These fuels are also widely available. The characteristics of new fuels such as low/zero carbon fuels that also reduce ship BC

emissions would be considered suitable for use in the Arctic and can also be considered part of the polar fuels concept.

Fuel use by ships operating in the Arctic

10 Annex I Regulation 43A of MARPOL will prohibit the carriage and use of residual fuels in the Polar Code's Arctic waters from July 2029. An ICCT study showed that 1866 vessels operated in these waters in 2021. 51% (442kt) of all fuel burn there was residual fuel, with 91% being consumed by ships of 5000GT and above, with 413kt of BC emitted. All ships operating in these Arctic Polar Code waters from July 2029 will need to operate on distillates or other non-residual marine fuels. The same ICCT 2021 study showed that 8577 vessels operated in all Arctic waters north of 59ºN and emitted a total of 1,5kt of BC. So that some two-thirds of BC emissions were emitted by ships operating in the wider Arctic outside of Arctic Polar Code waters.

11 In these heavily trafficked waters of the Arctic Atlantic, i.e., the waters north of latitude 59ºN and outside the Polar Code boundary, just over 61% of fuel use was distillate with many of the ships being small fishing vessels. BC emitted from ships using distillate fuels will already be lower than emissions from ships using residual fuels. Based on the 2021 ICCT study, a polar fuel measure focussed on ships burning residual fuels in these North Atlantic non-Polar Code waters would have impacted 818kt of residual fuel use. Of which 641kt (78%) was emitted by ships 5000GT and over. This 818 kt of residuals is almost exactly twice the residual fuel use in Arctic Polar Code waters in 2021.

Residual fuels and pour point

12 A separate issue of spills of residual fuels with a high pour point was also addressed in PPR 12/6/1 and discussed in the PPR 12 WG, where ISO noted that DMA / DMZ distillates have pour points at or around 0^0C. A switch away from residuals to polar fuels in these non Polar Code waters not included in the full HFO ban from mid 2029 would thus extend this important co-benefit to the most heavily trafficked of Arctic sea areas.

13 The co-sponsors support the need for action on Arctic polar fuels to enable the IMO to meet its commitment to address the impact of BC emissions from international shipping on the Arctic. The output to address BC emissions was undertaken in recognition that BC, the light absorbing fraction of particulate matter is damaging to human health and a powerful short lived climate forcer, especially when deposited directly on ice and snow. BC emissions from international shipping in and near the Arctic pose a direct danger to the fragile Arctic and global climate as well as to the health, well being and livelihoods of local communities

Conclusions

14 In summary:

- the characteristics of density, viscosity and carbon residue content by mass can be used to define fuels that will have lower black carbon emissions and are therefore suitable for use in the Arctic and considered "polar fuels" and alternative fuels with similarly low black carbon emissions can also be considered to be suitable for use in the Arctic;

- concerns around the high pour point of widely used residual fuel blends can be addressed by defining polar fuels on these characteristics;

- switching between residual fuels and distillate fuels already happens on a regular basis as ships enter and leave emission control areas without creating problems provided existing guidance is followed;

- Annex I Regulation 43A will prohibit the carriage and use of residual fuels in the Polar Code's Arctic waters from July 2029, so a concrete proposal to address the impact of black carbon emissions on the Arctic needs to address emissions from ships operating in and near to the Arctic;

- a regulation requiring international shipping in the wider Arctic to operate to the same cleaner fuel requirements with improved combustion performance, lower BC emissions and a sound precedent in other transport sectors should be developed.

Action required of the Sub-committee

15 The sub-committee is invited to consider the information contained in this submission during further consideration of the polar fuel concept.