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Agenda item 6

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

**Proposal to establish a fuel measure under MARPOL Annex VI to reduce Black Carbon emissions from international shipping impacting the Arctic with global climate and health consequences**

**Submitted by Denmark, France, Germany and Solomon Islands**

**SUMMARY**

*Executive summary:* This document contains a proposal to establish a fuel measure under MARPOL Annex VI to reduce Black Carbon emissions from international shipping impacting the Arctic with global climate and health consequences. The requirement would apply to all ships operating [above 60°N].

*Strategic direction, if applicable:* 3

*Output:* 3.3

*Action to be taken:* Paragraph 8

*Related documents:* MEPC 82/5/2; MEPC 81/5/5, MEPC 81/5/8; PPR 12/6/1; PPR 6/20/Add.1 and resolution MEPC.342(77)

**Introduction**

1 At MEPC 82, the Committee invited interested Member States and international organizations to submit comments and proposals to PPR 12 regarding the concept of "polar fuels" to reduce Black Carbon (BC) emissions from international shipping impacting the Arctic with global climate and health consequences. At PPR 12, the Sub-Committee discussed the concept of polar fuels as a category of fuels resulting in a reduction of Black Carbon emissions and once again reiterated the invitation for concrete proposals to its next session. At MEPC 83, the Committee acknowledged the ongoing work to reduce the impact of Black Carbon emissions from shipping on the Arctic and extended the target completion year for output 3.3 to 2027, to allow additional time to further develop a polar fuel regulation.

## Background

2 BC has a climate impact of over 1,600 times that of CO<sub>2</sub> on a 20-year global warming potential (GWP) basis and over 450 times that of CO<sub>2</sub> on a 100-year GWP, and accounts for one fifth of international shipping's CO<sub>2</sub> equivalent emissions. Reducing BC emissions will help in avoiding climate tipping points, building resilience and delivering clean air. The most significant effects of BC emissions are on sensitive cryosphere ecosystems. The Arctic Council recognizes that Arctic States generate only 10% of BC emissions globally, but are responsible for 30% of the BC warming impact in the Arctic.\* The retreat of Arctic sea ice is contributing to the loss of the polar albedo effect and impacts Arctic Indigenous communities and ecosystems, while melting of polar land ice is expected under present conditions to approximately double the rate of sea level rise globally, putting large areas with human habitation under risk. BC fuels the feedback loop driving Arctic amplification with broader effects disrupting monsoons and contributing to aridification with global consequences.

3 Solutions exist to cut emissions, with near-immediate benefits as BC has an estimated lifetime of just one to two weeks. For these reasons, the fuel measure should be implemented as soon as possible. Accordingly, this document is submitted for the Sub-Committee's consideration.

## Proposal

4 The co-sponsors agree that there are several factors that have an influence on the formation of BC emissions, such as the condition of a ship's engine and its components, fuel pumps and injectors, type, H/C ratio, temperature and viscosity of injected fuel, etc. Thus, there are several corresponding control measures that could be utilized to reduce emissions of BC from international shipping, such as good engine maintenance, use of cleaner fuels, installation of diesel particulate filters (DPF), etc. The *Simplified compilation of identified candidate measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping*, developed by the Correspondence Group on investigation of appropriate control measures to reduce the impact on the Arctic of emissions of Black Carbon emissions from international shipping established at PPR 5, can be found in annex 9 to document PPR 6/20. Until now, there has been only an adoption of recommendatory guidance on best practice on BC measures to reduce the impact from BC on the Arctic as set out in resolution MEPC.393(82) on the *Guidance on best practice on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping*.

5 There is an understanding within IMO about the need to identify a category of fuels that would contribute to a significant reduction of BC emissions in the Arctic compared with the residual fuels (as defined in ISO 8217). The concept of "polar fuels" has been discussed and broadly supported at PPR 11, PPR 12 and MEPC 82. The co-sponsors therefore suggest focusing on the fuel element as a first and easy to implement measure since other measures might require a more complex regulatory approach and more time. The "polar fuels" concept should not stop the ongoing discussion of emissions factors for BC, the development of reduction technologies and further regulation.

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\* See: Arctic Council (2019). Expert Group on Black Carbon and Methane - Summary of Progress and Recommendations 2019. 88 pp  
<https://oaarchive.arctic-council.org/server/api/core/bitstreams/50c0522a-5755-469b-9154-ccbfc88d5de/content>

6 This proposal introduces a mandatory fuel measure to reduce BC emissions from international shipping impacting the Arctic with global climate and health consequences. This fuel measure would be mandatory for all ships to which MARPOL Annex VI applies, while operating in "wider Arctic Waters".

#### **Implementation of the polar fuel measure**

7 As set forth in the annex to this document, the co-sponsors propose to amend MARPOL Annex VI to require ships to use fuels that reduce BC emissions from international shipping on the Arctic. The language of the mandatory regulation should include:

- .1 definition of "wider Arctic Waters" in MARPOL Annex VI, chapter 1 (General), regulation 2 (Definitions);
- .2 definition of "Black Carbon" in MARPOL Annex VI, chapter 1 (General), regulation 2 (Definitions); and
- .3 new paragraphs in MARPOL Annex VI, chapter 3, in a new regulation 18A (Arctic fuel oil use to reduce Black Carbon), detailing requirements for fuel used on board ships operating in the Arctic.

#### **Action required of the Sub-committee**

8 The Sub-Committee is invited to consider the information provided in this document, in particular the proposal to amend MARPOL Annex VI presented in the annex to this document and take action as appropriate.

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## ANNEX

### PROPOSED AMENDMENTS TO MARPOL ANNEX VI

New additions are shown as underlined text, while deletions are highlighted using strikethrough.

Chapter 1 of MARPOL Annex VI is proposed to be amended as follows:

#### Chapter 1 – General

#### Regulation 2 – Definitions

1 For the purpose of this Annex:

.34 *Wider Arctic Waters* [includes all maritime waters above 60°N, excluding the Baltic Sea.]

.35 *Black Carbon* is a distinct type of carbonaceous material, formed only in flames during combustion of carbon-based fuels. It is distinguishable from other forms of carbon and carbon compounds contained in atmospheric aerosol because it has a unique combination of the following physical properties:

.1 strongly absorbs visible light with a mass absorption cross section of at least 5 m<sup>2</sup>g<sup>-1</sup> at a wavelength of 550 nm;

.2 is refractory; that is, retains its basic form at very high temperatures, with vaporization temperature near 4,000 K;

.3 is insoluble in water, in organic solvents including methanol and acetone, and in other components of atmospheric aerosol; and

.4 exists as an aggregate of small carbon spherules."

A new stand-alone regulation 18A is proposed to be added to chapter 3. Chapter 3 of MARPOL Annex VI is to be amended as follows:

#### Regulation 18A

#### Arctic fuel oil use to reduce Black Carbon

1 Fuel oil as used by a marine diesel engine within wider Arctic Waters, as tested in accordance with a standard acceptable to the Organization, shall meet the following requirements:

.1 density shall not exceed 890 kg/m<sup>3</sup> at 15°C;

.2 viscosity shall not exceed 6,000 mm<sup>2</sup>/s at 40°C or be lower than 2,000 mm<sup>2</sup>/s at 40°C; and

.3 carbon residue content by mass; micro method on the 10% volume distillation residue; maximum of 0.30% as measured by ISO 10370.

2 Those ships using separate fuel oils to comply with paragraph 1 of this regulation and entering or leaving the wider Arctic Waters shall carry a written procedure showing how the fuel oil changeover is to be done, allowing sufficient time for the fuel oil service system to be fully flushed of all fuel oils exceeding the applicable content specified in paragraph 1 of this regulation prior to entry into the wider Arctic Waters. The volume of fuel oils referred to in paragraph 1 of this regulation in each tank as well as the date, time and position of the ship when any fuel oil changeover operation is completed prior to the entry into the wider Arctic Waters or commenced after exit from that area shall be recorded in a logbook or electronic record book<sup>1</sup> as prescribed by the Administration.

### **In-use and onboard fuel oil sampling and testing**

3 If the competent authority of a Party requires the in-use or onboard sample to be analysed, it shall be done in accordance with the verification procedure set forth in appendix VI to this Annex to determine whether the fuel oil being used or carried for use on board meets the requirements in paragraph 1 of this regulation. The in-use sample shall be drawn taking into account the guidelines developed by the Organization.<sup>2</sup> The onboard sample shall be drawn taking into account the guidelines developed by the Organization.<sup>3</sup>

4 The sample shall be sealed by the representative of the competent authority with a unique means of identification installed in the presence of the ship's representative. The ship shall be given the option of retaining a duplicate sample.

5 The competent authority of a Party shall, as appropriate, utilize the sampling point(s) which is(are) fitted or designated for the purpose of taking representative sample(s) of the fuel oil being used on board in order to verify that the fuel oil complies with this regulation. Taking fuel oil samples by the competent authority of the Party shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

### **Proposed amendments to regulations 18.9.2, 18.9.5 and 18.9.6**

"9 Parties undertake to ensure that appropriate authorities designated by them:

(...)

.2 require local suppliers to provide the bunker delivery note and, if applicable, the MARPOL delivered sample as required by this regulation, certified by the fuel oil supplier that the fuel oil meets the requirements of regulations 14 ~~and~~, 18 and 18A of this Annex;

(...)

.5 inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulation 14 ~~or~~, 18 or 18A of this Annex; and

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<sup>1</sup> Refer to *Guidelines for the use of electronic record books under MARPOL* (resolution MEPC.312(74)).

<sup>2</sup> Refer to the *2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel oil used on board ships* (MEPC.1/Circ.864/Rev.1).

<sup>3</sup> Refer to the *2020 Guidelines for on board sampling of fuel oil intended to be used or carried for use on board a ship* (MEPC.1/Circ.889).

- .6 inform the Organization for circulation to Parties and Member States of the Organization of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations ~~14 or 18~~ 18 or 18A of this Annex."

### **Proposed amendments to Appendix V**

#### **Information to be included in the bunker delivery note (regulation 18.5)**

- 1 Name and IMO number of receiving ship
- 2 Port
- 3 Date of commencement of delivery
- 4 Name, address and telephone number of marine fuel oil supplier
- 5 Product name(s)
- 6 Quantity in metric tonnes
- 7 Density at 15°C (kg/m<sup>3</sup>)<sup>i</sup>
- 8 Sulphur content (% m/m)<sup>ii</sup>
- 9 The flashpoint (°C) specified in accordance with standards acceptable to the Organization<sup>iii</sup>, or a statement that the flashpoint has been measured at or above 70°C
- 10 Viscosity mm<sup>2</sup>/s at 40°C
- 11 Carbon residue content by mass (Micro method on the 10% volume distillation residue) % m/m
- 12 A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 18.3 of this Annex and that the sulphur content of the fuel oil supplied does not exceed:

(...)

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