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PREVENTION AND RESPONSE  
10th session  
Agenda item 17

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## ANY OTHER BUSINESS

### Modelling of discharges to the marine environment from open circuit flue gas scrubbers on ships in the OSPAR Maritime Area

Submitted by the OSPAR Commission

#### SUMMARY

*Executive summary:* This document is submitted to provide information on the OSPAR Commission's activities on discharges from exhaust gas cleaning systems (EGCS) into marine waters.

*Strategic direction, if applicable:* 1

*Output:* 1.23

*Action to be taken:* Paragraph 7

*Related document:* PPR 9/INF.2

#### Introduction

1 The 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) provides the mechanism by which 15 Governments and the European Union cooperate to protect the marine environment of the North-East Atlantic (the OSPAR Maritime Area). The Governments are Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

2 The OSPAR Commission has integrated hazardous substances into its environmental strategy. In this respect, the objective guiding its actions consists in preventing pollution of the OSPAR maritime area by continuously reducing discharges, emissions, and losses of hazardous substances. The OSPAR Environmental Impacts of Human Activities Committee (EIHA(2) 2020) identified exhaust gas cleaning systems as a source of contaminants for the marine environment which required further attention.

3 The OSPAR Commission submitted information to PPR 9 (PPR 9/INF.2) on the OSPAR Commission's activities on discharges from exhaust gas cleaning systems (EGCS) into marine waters. This initial scoping study summarized information provided by a number of Governments on installation of scrubbers, estimates of discharge volumes, national and local regulation and other relevant information.

4 Since the information from the study on volume of discharges was relatively limited, the EIHA Committee agreed in 2021 that a more detailed analysis should be conducted in order to better assess impacts on the OSPAR maritime area.

### **Assessment**

5 The OSPAR Commission has now published the results of the new assessment, "Modelling of discharges to the marine environment from open circuit flue gas scrubbers on ships in the OSPAR Maritime Area" (OSPAR, 2022), prepared for the EIHA Committee by the Finnish Meteorological Institute in cooperation with the Chalmers University of Technology. The full report is available from the OSPAR website [here](#).

6 The main findings in the assessment are:

- .1 The total effluent release volume from Exhaust Gas Cleaning Systems (EGCS) in all OSPAR Regions was about 622 million tonnes in 2020.
- .2 Of this, 99.9% was from open loop EGCS systems.
- .3 OSPAR Region II has the highest discharge volumes of all studies areas, about 47% of the EGCS discharge water is released in the North Sea and the English Channel.
- .4 Most contributing ship types are containerships, Roll-On/Roll-Off cargo ships (RoRo), bulk cargo carriers and crude oil tankers.
- .5 About 47% of the effluent is released from vessels carrying an EU flag.
- .6 Most of the EGCS in the OSPAR Maritime Area are of open loop type, but the share of hybrid systems is larger in the fleet operating in this area than what is observed for the global fleet.
- .7 About 84% of the EGCS effluent in the OSPAR Maritime Area is released inside the 200 nautical mile zones.
- .8 Discharges inside the 12 nautical mile zones are roughly 130 million tonnes, which is about 21% of the total effluent volume.
- .9 Contaminant loads from EGCS in the OSPAR Maritime Area are dominated by open loop discharges, where vanadium (106 tonnes), zinc (87 tonnes) and nickel (35 tonnes) may originate from heavy fuel oil. Chromium (66) may also originate from piping material in the scrubber, which, together with marine growth protection systems, is the hypothesized primary source of zinc copper (22 tonnes) in EGCS open loop discharge water.
- .10 The estimated open loop contaminant loads are in the order of 1,000-10,000 times higher than the closed loop loads. Also in closed loop discharge, vanadium constitutes the largest calculated load (1,213 kg), almost four times the load of Nickel (312 kg). Chromium and zinc from closed loop was 66 kg and 30 kg respectively, while the estimated load of copper was somewhat lower, 5.2 kg.

- .11 The estimated PAH loads in OSPAR Regions I-V are dominated by naphthalene (2.3 tonnes), followed by phenanthrene (1.2 tonnes) and fluorene, acenaphthene, and pyrene in the range 160-390 kg, and fluoranthene and chrysene in the range 70-90 kg (tables 6 and 7). The remaining nine of the EPA 16 PAHs were estimated to be in the range 5-47 kg respectively. The estimated total load of PAHs is close to 2.5 times higher than the mass of EPA 16 PAH, suggesting that, for example, alkylated PAHs should also be considered.
- .12 Comparing modelled loads of cadmium, copper, lead, mercury, and zinc from EGCS discharge to available monitoring data on riverine input in the OSPAR Region shows that the relative contribution from scrubbers is mainly in the order of permilles, but up to 5.2% (copper), 5.8% (cadmium) and 7.4% (mercury) compared to loads from riverine input in Sweden.

**Action requested of the Sub-Committee**

- 7 The Sub-Committee is invited to note the information provided in this document.
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