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HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Proposed monitoring of disinfection by-products in BWMS using Active Substances

Submitted by Denmark

SUMMARY

Executive summary:	This document provides suggestions towards a revised standard for ballast water compliance monitoring that aim at providing information on disinfection by-products discharged from ballast water management systems (BWMS) after the issuance of the International Ballast Water Management Certificate.
Strategic direction, if applicable:	1
Output:	1.24
Action to be taken:	Paragraph 13
Related documents:	MEPC 78/4/2; MEPC 81/4/2, MEPC.81/INF.6, MEPC 81/WP.9; resolutions MEPC.169(57), MEPC.290(71) and MEPC.300(72)

Background

1 At its seventy-first session, the Committee adopted the experience-building phase (EBP) associated with the Ballast Water Management Convention (BWMC) through resolution MEPC.290(71), which invited "port States, flag States and other stakeholders to gather, prepare and submit data to the ballast water experience-building phase".

2 This document addresses the monitoring of disinfection by-products (DBPs) generated in ballast water management systems (BWMS) when treating ballast water using Active Substances. The analysis of DBPs is currently mandated only as part of the type approval under the BWMS Code through the Procedure (G9) risk assessment and no Maximum Allowable Discharge Concentrations (MADC) are provided. Chemical analysis data in the ballast water discharge and the estimated concentrations in the receiving environment are provided by applicants and the GESAMP-BWWG in the submissions to the Committee.

Discharge of disinfection by-products to the environment

3 Document MEPC.81/INF.6 (Australia) reports on sampling conducted on a voluntary basis on ships that were intending to discharge treated ballast water in Australian ports. The campaign measured actual concentrations in ballast water from BWMS from ships calling at four Australian ports. For sum parameters of DBPs, trihalogenated methane (THM) and halogenated acetic acid (HAA) "the range of concentrations recorded across the various BWMS were significantly higher than as reported in the relevant type approval documents" and DBP concentrations are described as being of "potential environmental concern". The document calls for an audit of levels of DBPs recorded against the levels reported in the relevant type-approval documents.

4 At recent sessions of the Committee four manufacturers of BWMS using Active Substances have applied for and obtained Final Approvals after re-evaluation of modified versions omitting the previously included filter for removal of >50 µm organisms (MEPC 77/4/4, MEPC 79/4/3 and MEPC 80/4/9 (reports of the forty-first, forty-second and forty-third meetings of the GESAMP-BWWG, respectively)). The risk assessments of these four systems in line with Procedure (G9) showed that the predicted environmental concentrations (PEC) for the filter-less versions in some cases exceed the predicted no-effect concentrations (PNEC). However, after consideration by the GESAMP-BWWG the modified BWMS were recommended for approval by MEPC, and this was subsequently granted by the Committee.

5 The possible unintended consequences of removing filters from BWMS previously relying on this have been addressed by the GESAMP-BWWG in a stocktaking workshop (reported in document MEPC 78/4/2). The Group pointed to three relevant issues to address regarding BWMS modified to filter-less versions, which are:

.1 increased formation of DBPs;

.2 sedimentation inside ballast tanks; and

.3 the ability of the electrolyser to produce and maintain the concentration of the Active Substance.

6 In table 1 the estimated PECs for DBPs in the GESAMP-BWWG harbour scenario are compared between the original version with filter and the new filter-less version in each of the four approved BWMS as given in the GESAMP-BWWG reports to the Committee mentioned in paragraph 4. The environmental concentrations of DBPs were modelled to be between 3 and 299 times higher for filter-less version compared to the same version with a filter.

7 As the estimated DBP concentrations increase, the total load to the environment of DBPs will also increase. In table 1, the additional load of DBP from a BWMS due to the removal of the filter is given. The load is calculated from the PECs for each BWMS version as provided by GESAMP-BWWG and the port basin volume as used in the GESAMP-BWWG standard Commercial Harbour scenario in the MAMPEC model, where PEC is calculated after ballast water discharge into a basin of 5,000 m x 1,000 m x 15 m, i.e. 75,000,000 m^3. In this simplified case, the sum of additional load in the standard port basin from filter-less versions range from approximately 300 kg to 32 ton of DBPs.

Table 1: Ratios and increased loads (kg) to the environment of directly comparable chemical PECs using the MAMPEC model with the standard Commercial Harbour scenario

BWMS	BMWS 1 (MEPC 80/4/9)	BWMS 2 (MEPC 79/4/3)	BWMS 3 (MEPC 80/4/9)	BWMS 4 (MEPC 77/4/4)
Ratio DBPs from filter-less to filter version	3.0	24	299	4.2
The additional DBP load from filter-less version in MAMPEC model (kg)	275	275	32,960	353

8 Two conclusions are drawn from the information presented in document MEPC.81/INF.6 and in paragraphs 3 to 7 of the present submission:

.1 it appears from detailed analysis of ballast water discharges that BWMS utilizing Active Substances in general discharge higher DBP concentrations than expected from the data submitted for type approval (refer to MEPC 81/INF.6); and

.2 it appears that the current trend towards filter-less systems will significantly exacerbate the discharge of DBPs in terms of concentration and load to the environment.

9 The current type approval does not report MADCs for DBPs and very few countries require or conduct monitoring of DBPs or the sum parameters THM and HAA in ballast water discharges. DBP concentrations are therefore not a parameter reported by port State control and any possible deviation from the test results of the type approval are not established.

10 In light of the possible disparity between DBP levels found in the type approval process and during operation, and given that the generation and discharge of DBPs in most environmental policy objectives are subject to reduction where possible, it is found that the DBPs in the current BWMS type approval are under-assessed.

Proposal

11 It is noted in document MEPC 81/WP.9 (Report of the Ballast Water Review Group) that the Ballast Water Review Group is considering sampling and analysis during intermediate and renewal surveys (i.e. twice every five years) and a new requirement in regulation D-2 to establish a maximum allowable discharge concentration (MADC) for BWMS that use Active Substances.

12 It is proposed that the Ballast Water Review Group include consideration and reporting on the issue of DBPs in discharges from BWMS that make use of Active Substances and include sampling and analysis of DBP during intermediate and renewal surveys.

Action requested to the Committee

13 The Committee is invited to consider the discharge of DBPs to the environment described in paragraphs 3 to 10, the proposal to introduce monitoring of DBPs in paragraph 11 and 12, and take action as appropriate.