



GESAMP

Joint Group of Experts on the
Scientific Aspects of Marine
Environmental Protection

GESAMP 42/4/3

7 August 2015

ENGLISH ONLY

42nd session
Agenda item 4

**PLANNING OF GESAMP ACTIVITIES:
REVIEW OF APPLICATIONS FOR 'ACTIVE SUBSTANCES' TO BE USED IN BALLAST
WATER MANAGEMENT SYSTEMS**

Report of the GESAMP Ballast Water Working Group (Working Group 34)

Background and introduction

1 The International Convention for the Control and Management of Ships' Ballast Water and Sediments, (hereafter referred to as the BWM Convention) was adopted at IMO on 13 February 2004, in response to the increasing concern of the international community with regard to the transfer of invasive species in ships' ballast water. To date, 21 July 2015, 44 countries have ratified the BWM Convention, required minimum is 30. These countries represent 32.86% of the required 35% of the world's merchant shipping tonnage required for the Convention to enter into force. Therefore, the second criterion has not yet been met. Still there is hope that the Convention will enter into force soon, possibly during 2016.

2 Within this framework, an approval procedure has been set up for those ballast water management systems which make use of an Active Substance or Preparation to comply with the Convention. The procedure consists of a two-step approach for granting Basic Approval and Final Approval. The approval is granted by the Marine Environment Protection Committee (MEPC) based on the advice provided by the Ballast Water Working Group of the GESAMP (WG 34). There is a third step, the type approval, but that is outside the remit of WG 34.

3 The more general outline, scope and aim of the BWM Convention have been addressed in the report to the GESAMP 35 (see document GESAMP 35/5/1) and will only be referred to here. The Terms of Reference of WG 34 have been added as annex 1 to this report. As the terms of reference of WG 34 have not changed, several parts of this report have been kept unchanged. As for the readability of the report these sections are kept in the report with apologies for the experienced reader.

4 This report focuses on the main activities of WG 34, which consist of the evaluation of several ballast water management systems (hereafter BWMS) and the further development of the Methodology of the Group, which has been accepted as a 'living' document. This means that the Methodology will be a discussion item at (almost) each meeting of the Group and changes and improvements are made, as appropriate (see further below).

'Active Substances'

5 'Active Substances' are defined by the Convention as "substances or organisms, including a virus or a fungus that have a general or specific action on or against harmful aquatic organisms and pathogens" and the approval of BWMS using such substances is described in resolution MEPC.169(57) adopted in 2008. However, not only 'Active Substances' are evaluated by WG 34. Also all other substances considered relevant are taken into account in the evaluation

report. The Procedure for approval of ballast water management systems that make use of Active Substances (G9) contained in resolution MEPC.169(57) under the BWM Convention distinguishes also 'Relevant Chemicals' and 'Other Chemicals'.

6 Therefore, the task of WG 34 is to evaluate the risks for the crew, the ships' safety, the risk for the public at large and the environmental safety of the BWMS. It is furthermore the intention of WG 34 to perform these evaluations in a consequent, consistent and transparent manner, which helps Administrations to prepare a concise dossier containing all the necessary data. The Methodology, as developed by WG 34 in the course of its work process, serves as guidance in the evaluation.

7 WG 34 convened two times since GESAMP 41 to evaluate proposed BWMS. Furthermore the WG will be holding a stocktaking workshop to discuss items related to the Methodology. The stocktaking workshop will be held the week after GESAMP 42 and therefore will have to be reported to GESAMP 43. During the two WG 34 meetings eight BWMS were discussed and evaluated. Of these BWMS, five received a recommendation for Basic Approval and one received a recommendation for Final Approval. One system was denied a recommendation for Basic Approval and one system was denied a recommendation for Final Approval. The control and monitoring of the post-treatment of Active Substances of the system that was denied a recommendation for Basic Approval could not guarantee a safe and successful operation of the system. The working, control and monitoring of the neutralization process could not guarantee a safe and successful operation for the system that was denied Final Approval. During its meeting in May 2015, MEPC agreed with the recommendations of WG 34 in all cases and granted the approvals accordingly. An overview of the BWMS evaluated in these meetings is presented in annex 2 to this report.

8 WG 34 was able to clear the whole stock of BWMS submitted for evaluation before the meeting of MEPC for which the evaluation was requested.

Methodology for information gathering and the conduct of work of WG 34

9 The evaluation Methodology of WG 34 has been determined to be a living document based on increasing experience in the evaluation of BWMS. During five Stocktaking Workshops WG 34 further developed the Methodology by adding 1) quantitative methods for the evaluation of human risk assessment including exposure assessment for professionals and the general public, 2) quantitative assessment of the environmental effects by using a specific ballast water model, MAMPEC 3.0.1 BW and 3) finalization of the second version of the database for 41 specific disinfection by-products (DBP) in which the physico-chemical data, the toxicological data and the environmental fate and effect data are included. For these 41 substances the applicants of BWMS do not have to submit the data mentioned anymore to IMO as the Group is of the opinion that all the sufficient and relevant information is already available. All physico-chemical data has already been included in the MAMPEC BW, version 3.0.1.

10 MEPC endorsed the latest Methodology proposed by WG 34 as revision 3 (BWM.2/Circ.13/Rev.3) during its meeting in May 2015 and decided that the revision will be applied to the future applications for Basic Approval submitted to MEPC from 2017 and onwards, and subsequent submissions for Final Approval of those systems.

11 In 2014, MEPC had started its work to review the Guidelines for approval of ballast water management systems (G8) (resolution MEPC.174(58)), which is used for evaluating biological efficacy and granting type approval by National Administrations. This is the second amendment of Guidelines G8, which may include the changes of test water conditions (salinity, DOC, POC and TSS), tank holding times (less than 5 days may be accepted) and evaluation of efficacy under extreme conditions. Although the purpose of the review is to seek more accuracy on the evaluation of biological efficacy in ballast water treated by BWMS, the test water and treated water will be also used for evaluation in accordance with Procedure (G9). Therefore, there is a need to develop a uniform approach across the Guidelines (G8) and the Methodology in several areas. WG 34 is

currently formally attending the correspondence group for the review of Guidelines (G8) in order to contribute to achieving such a uniform approach.

12 WG 34 will hold its 7th STW from 7 to 10 September 2015 at IMO Headquarters in London, which is one week after GESAMP 42. It is not possible, therefore, to include a meeting report at GESAMP 42. The last version of the agenda is attached to this report as annex 3.

Planning ahead

13 Although the deadline for the submission of proposals for approval of BWMS to MEPC 69 has not yet passed, WG 34 already tentatively scheduled two meetings to accommodate future applications: BWWG 32 from 9 to 13 November 2015 and BWWG 33 from 11 to 15 January 2016. Of course, the number of meetings depends on the number of submissions. Both meetings are foreseen to be held at IMO Headquarters in London.

Acknowledgement

14 WG 34 is very thankful to all the members of GESAMP that took the time to critically review the work of WG 34. The quality of the work has been improved as a result from this peer review process and the comments made were brought to the attention of the consultant involved in the drafting of the reports.

Action requested of GESAMP

15 GESAMP is invited to review this document and comment, as it deems appropriate.

ANNEX 1

TERMS OF REFERENCE FOR THE TECHNICAL GROUP (GESAMP-BWWG/ WG 34)

1 Consideration of development of necessary methodologies and information requirements in accordance with the "Procedure for approval of ballast water management systems that make use of Active Substances (G9)" (adopted by resolution MEPC 169(57)) for consideration by MEPC 65.

2 For Basic Approval, the Group should review the comprehensive proposal submitted by the Member of the Organization along with any additional data submitted as well as other relevant information available to the Group and report to the Organization.

In particular, the Group should undertake:

- .1 scientific evaluation of the data set in the proposal for approval (see paragraphs 4.2, 6.1, 8.1.2.3, 8.1.2.4 of Procedure (G9));
- .2 scientific evaluation of the assessment report contained in the proposal for approval (see paragraph 4.3.1 of Procedure (G9));
- .3 scientific evaluation of the risks to the ship and personnel to include consideration of the storage, handling and application of the Active Substance (see paragraph 6.3 of Procedure (G9));
- .4 scientific evaluation of any further information submitted (see paragraph 8.1.2.6 of Procedure (G9));
- .5 scientific review of the risk characterization and analysis contained in the proposal for approval (see paragraph 5.3 of Procedure (G9));
- .6 scientific recommendations on whether the proposal has demonstrated a potential for unreasonable risk to the environment, human health, property or resources (see paragraph 8.1.2.8 of Procedure (G9)); and
- .7 preparation of a report addressing the above-mentioned aspects for consideration by MEPC (see paragraph 8.1.2.10 of Procedure (G9)).

3 For Final Approval, the Group should review the discharge testing (field) data and confirm that the residual toxicity of the discharge conforms to the evaluation undertaken for Basic Approval and that the previous evaluation of the risks to the ship and personnel including consideration of the storage, handling and application of the Active Substance remains valid. The evaluation will be reported to the MEPC (see paragraph 8.2 of Procedure (G9)).

4 The Group should keep confidential all data, the disclosure of which would undermine protection of the commercial interests of the applicant, including intellectual property.

ANNEX 2

LIST OF BALLAST WATER MANAGEMENT SYSTEMS THAT MAKE USE OF ACTIVE SUBSTANCES IN ACCORDANCE WITH PROCEDURE (G9) SINCE GESAMP 41

Name of the System/Manufacturer	Brief description of the System	Date of Approval	Specifications
<p>1. NK-CI BlueBallast System</p> <p>NK Company Ltd, Republic of Korea</p>	<p>Treatment with the Preparation sodium dichloroisocyanurate dehydrate (NaDCC) which is immediately converted to sodium hypochlorite by dissolving in water.</p>	<p>Basic Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations presented in annex 4 of the report of the GESAMP-BWWG 30 were verified prior to application for Final Approval. The recommendations mainly focus on the control of the Active Substance and the mitigation measures are fully described in the operation manual.</p>
<p>2. ECS-HYCHLOR™ System</p> <p>TEHCROSS Inc., Republic of Korea</p>	<p>Combination of filtration followed by in situ electrolysis of a side stream of the ballast water uptake to produce a concentrated stream of the Active Substance sodium hypochlorite and neutralization of the remaining Active Substance with sodium thiosulfate during discharge. This system requires the storage of chemicals on-board.</p>	<p>Basic Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations presented in annex 5 of the report of the GESAMP-BWWG 30 were verified prior to application for Final Approval. The recommendations mainly focus on the control of the Active Substance and the mitigation measures are fully described in the operation manual.</p>
<p>3. ECS-HYCHEM™ System</p> <p>TEHCROSS Inc., Republic of Korea</p>	<p>Combination of filtration followed by treatment with the Preparation sodium dichloroisocyanurate dehydrate (NaDCC) which is immediately converted to sodium hypochlorite by dissolving in water.</p>	<p>Basic Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations presented in annex 6 of the report of the GESAMP-BWWG 30 were verified prior to application for Final Approval. The recommendations mainly focus on the control of the Active Substance and the mitigation measures</p>

Name of the System/Manufacturer	Brief description of the System	Date of Approval	Specifications
			are fully described in the operation manual.
<p>4. ECS-HYBRID™ System</p> <p>TECHCROSS Inc., Republic of Korea</p>	<p>Combination of filtration, disinfection with UV irradiation and photo-catalytic oxidation to produce in situ short lived Active Substance OH-radical, followed by in situ electrolysis of the ballast water uptake in an electrochemical generator unit to produce the Active Substance sodium hypochlorite.</p>	<p>Basic Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations presented in annex 7 of the report of the GESAMP-BWWG 30 were verified prior to application for Final Approval. The recommendations mainly focus on the control of the Active Substance and the mitigation measures are fully described in the operation manual.</p>
<p>5. ATPS-BLUEsys BWMS</p> <p>Panasonic Environmental Systems & Engineering Co., Ltd., Japan</p>	<p>Disinfection with Active Substance sodium hypochlorite formed by in situ electrolysis, followed by neutralization with sodium thiosulfate. This system requires the storage of the neutraliser on board.</p>	<p>Final Approval, Not Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations provided in annex 4 of the report of the GESAMP-BWWG 31 meeting were fulfilled prior to re-submission for Final Approval. Several recommendations were included with a focus on new tests needed to verify the environmental acceptability of the system.</p>
<p>6. Ecomarine-EC BWMS</p> <p>Ecomarine Technology Research Association, Japan</p>	<p>Filtration, disinfection with Active Substance sodium hypochlorite formed by in situ electrolysis, followed by neutralization with sodium thiosulfate. This system requires the storage of the neutralizer on board.</p>	<p>Final Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations provided in annex 5 of the report of the GESAMP-BWWG 31 meeting were fulfilled prior to issuing a Type Approval Certificate. The recommendations focus on environmental acceptability of the system.</p>
<p>7. Varuna Ballast Water Management System</p>	<p>Combination of sedimentation filtration and disinfection with Active Substance sodium hypochlorite.</p>	<p>Basic Approval, Granted, May 2015</p>	<p>The Flag State Administration was invited to ensure that the recommendations presented in annex 6</p>

Name of the System/Manufacturer	Brief description of the System	Date of Approval	Specifications
Kadalneer Technologies Pte., Ltd, Singapore			of the report of the GESAMP-BWWG 31 were verified prior to submission for Final Approval. The recommendations mainly focus on improvement of QA/QC for the WET tests.
8. ClearBal Ballast Water Management System University of Strathclyde, United Kingdom	Disinfection with a solution of two Active Substances, Brilliant Green (BG) and cetyltrimethyl ammonium bromide (CTAB). A detoxification system is operating on discharge.	Basic Approval, Not Granted, May 2015	The Flag State Administration was invited to ensure that the recommendations provided in annex 7 of the report of the GESAMP-BWWG 31 meeting were fulfilled prior re-submission for Basic Approval. The recommendations focus on the monitoring and control of the MADC of CTAB. At present there is no method available that can be applied on board.

Annex 3

AGENDA

**SEVENTH STOCKTAKING WORKSHOP ON THE ACTIVITY OF THE
GESAMP-BALLAST WATER WORKING GROUP
7-10 September 2015, IMO, London, United Kingdom**

PROVISIONAL AGENDA

(Session commences at 10:00 a.m. on Monday, 7 September 2015)

- 1 Adoption of the agenda
- 2 Introduction and ways of working during the Workshop, including housekeeping and timetable and GESAMP presentation
- 3 Review of the Guidelines for approval of ballast water management systems (G8)
 - .1 Environmental acceptability on use of Active Substances in BWMS
 - .2 Five-days' period for Relevant Chemicals determination under (G9)
 - .3 Five-days' period for eco-toxicity test and WET under (G9)
 - .4 Evaluation on ship safety both by (G8) and (G9)
 - .5 Upgrading BWMS during land-based and shipboard tests recommended by the GESAMP-BWWG
 - .6 Other issues
- 4 Evaluation of new corrosion criteria
- 5 Neutralization of TRO and overdosing of neutralizer
- 6 Assessment of risk mitigation measures (RMM)
- 7 Appropriate detection limits for different Relevant Chemicals
- 8 New BWMS that employ chlorinated potable water as ballast water
- 9 Further quality assessment and finalization of the data in the GESAMP-BWWG Chemicals Database
- 10 Publication of the Methodology as a GESAMP R&S document
- 11 Dissemination of GESAMP-BWWG information
- 12 Previous STW discussion papers - how to structure the existing information
- 13 Emission Scenario Documents
- 14 Amendment of HES ("delivery, loading, mixing": addition of scenarios for solids (dermal contact) and for inhalation; general public: addition of a tier 2 assessment)

- 15 Additional tests with ballast water (Whole effluent testing using in vitro tests targeted at relevant endpoints, e.g. mutagenicity, Ames test or the micronucleus test in saline waters, test system 'Mutatox') – (External expert to be invited)
 - 16 Factors affecting neutralization
 - 17 Mutagenicity and reproductive toxicity (M&R) classification and potential applicability of the dose addition approach for mixtures
 - 18 Reactive or proactive way of evaluating BWMS
 - 19 Any other business and conclusions
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