INTERNATIONAL MARITIME ORGANIZATION

E

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE
2nd session
Agenda item 21

PPR 2/21
16 February 2015
Original: ENGLISH

REPORT TO THE MARINE ENVIRONMENT PROTECTION COMMITTEE

Section		Page
1	GENERAL	4
2	DECISIONS OF OTHER IMO BODIES	4
3	EVALUATION OF SAFETY AND POLLUTION HAZARDS OF LIQUID CHEMICALS AND PREPARATION OF CONSEQUENTIAL AMENDMENTS TO THE IBC CODE TAKING INTO ACCOUNT THE RECOMMENDATIONS OF GESAMP/EHS	9
4	CODE FOR THE TRANSPORT AND HANDLING OF LIMITED AMOUNTS OF HAZARDOUS AND NOXIOUS LIQUID SUBSTANCES IN BULK ON OFFSHORE SUPPORT VESSELS	15
5	GUIDELINES FOR PORT STATE CONTROL UNDER THE 2004 BWM CONVENTION INCLUDING GUIDANCE ON BALLAST WATER SAMPLING AND ANALYSIS	17
6	PRODUCTION OF A MANUAL ENTITLED "BALLAST WATER MANAGEMENT – HOW TO DO IT"	19
7	IMPROVED AND NEW TECHNOLOGIES APPROVED FOR BALLAST WATER MANAGEMENT SYSTEMS AND REDUCTION OF ATMOSPHERIC POLLUTION	20
8	CONSIDERATION OF THE IMPACT ON THE ARCTIC OF EMISSIONS OF BLACK CARBON FROM INTERNATIONAL SHIPPING	21
9	REVISED GUIDELINES FOR THE INVENTORY OF HAZARDOUS MATERIALS	24
10	GUIDANCE FOR INTERNATIONAL offers OF ASSISTANCE IN RESPONSE TO A MARINE OIL POLLUTION INCIDENT	26
11	REVISED SECTION II OF THE MANUAL ON OIL POLLUTION-CONTINGENCY PLANNING	27

Section		Page
12	GUIDE ON OIL SPILL RESPONSE IN Ice AND SNOW CONDITIONS	28
13	UPDATED IMO DISPERSANT GUIDELINES	29
14	UPDATED OPRC MODEL TRAINING COURSES	30
15	UNIFIED INTERPRETATION PERTAINING TO PROVISIONS OF IMO ENVIRONMENT-RELATED CONVENTIONS	30
16	GUIDELINES PERTAINING TO EQUIVALENT METHODS SET FORTH IN REGULATION 4 OF MARPOL ANNEX VI AND NOT COVERED BY OTHER GUIDELINES	32
17	GUIDELINES AS CALLED FOR UNDER PARAGRAPH 2.2.5.6 OF THE REVISED NO_X TECHNICAL CODE 2008 (NO_X-REDUCING DEVICES)	32
18	BIENNIAL AGENDA and PROVISIONAL AGENDA FOR PPR 3	34
19	ELECTION OF CHAIRMAN AND VICE-CHAIRMAN FOR 2016	35
20	ANY OTHER BUSINESS	35
21	ACTION REQUESTED OF THE COMMITTEES	35

LIST OF ANNEXES

ANNEX 1	DRAFT MEPC RESOLUTION ON AMENDMENTS TO THE 2009 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS (RESOLUTION MEPC.184(59))
ANNEX 2	DRAFT AMENDMENTS TO THE NO_X TECHNICAL CODE 2008
ANNEX 3	DRAFT MEPC CIRCULAR ON GUIDANCE ON THE APPLICATION OF REGULATION 13 OF MARPOL ANNEX VI TIER III REQUIREMENTS TO DUAL FUEL AND GAS-FUELLED ENGINES
ANNEX 4	EVALUATION OF PRODUCTS – LIST 1 OF THE MEPC.2/CIRCULAR – CARRIAGE REQUIREMENTS FOR USED COOKING OIL
ANNEX 5	EVALUATION OF TRADE-NAMED MIXTURES – LIST 3 OF THE MEPC.2/CIRCULAR – CARRIAGE REQUIREMENTS FOR WAKSOL 911 A, WAKSOL 911 B AND EC 6671A
ANNEX 6	CARGO TANK CLEANING ADDITIVES EVALUATED AND FOUND TO MEET THE REQUIREMENTS OF REGULATION 13.5.2 OF MARPOL ANNEX II
ANNEX 7	DRAFT AMENDMENTS TO MARPOL ANNEX II
ANNEX 8	DRAFT UNIFIED INTERPRETATION OF SOLAS REGULATION II-2/16.3.3

ANNEX 9 DRAFT UNIFIED INTERPRETATION OF THE IBC CODE

ANNEX 10 DRAFT MEPC CIRCULAR ON REVISED PPR PRODUCT DATA REPORTING FORM AND RELATED GUIDANCE NOTES

ANNEX 11 DRAFT BWM CIRCULAR ON GUIDANCE ON BALLAST WATER SAMPLING AND ANALYSIS FOR TRIAL USE IN ACCORDANCE WITH THE BWM CONVENTION AND GUIDELINES (G2)

ANNEX 12 DRAFT MEPC RESOLUTION ON 2015 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS

ANNEX 13 DRAFT GUIDELINES ON INTERNATIONAL OFFERS OF ASSISTANCE IN RESPONSE TO A MARINE OIL POLLUTION INCIDENT

ANNEX 14 PART III OF THE DRAFT GUIDELINES FOR THE USE OF DISPERSANTS FOR COMBATING OIL POLLUTION AT SEA

ANNEX 15 DRAFT MEPC RESOLUTION ON AMENDMENTS TO THE 2011 GUIDELINES ADDRESSING ADDITIONAL ASPECTS TO THE NO_X TECHNICAL CODE 2008 WITH REGARD TO PARTICULAR REQUIREMENTS RELATED TO MARINE DIESEL ENGINES FITTED WITH SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEMS (RESOLUTION MEPC.198(62))

ANNEX 16 DRAFT MEPC CIRCULAR ON GUIDANCE FOR ISSUING A REVISED CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT METERS INTENDED FOR MONITORING THE DISCHARGE OF OIL-CONTAMINATED WATER FROM THE CARGO TANK AREAS OF OIL TANKERS

ANNEX 17 BIENNIAL STATUS REPORT

ANNEX 18 PROPOSED BIENNIAL AGENDA FOR THE 2016-2017 BIENNIUM

ANNEX 19 PROPOSED PROVISIONAL AGENDA FOR PPR 3

ANNEX 20 STATEMENTS BY DELEGATIONS

1 GENERAL

1.1 The Sub-Committee on Pollution Prevention and Response (PPR) held its second session from 19 to 23 January 2015 under the chairmanship of Mr. Sveinung Oftedal (Norway). The Vice-Chairman, Dr. Flavio Fernandes (Brazil), was also present.

1.2 The session was attended by delegations from Member Governments and observers from international organizations and non-governmental organizations in consultative status as listed in document PPR 2/INF.1.

Opening address

1.3 The Secretary-General welcomed participants and delivered his opening address, the full text of which can be downloaded from the IMO website at the following link: http://www.imo.org/MediaCentre/SecretaryGeneral/Secretary-GeneralsSpeechesToMeetings/Pages/PPR-2-opening.aspx

Chairman's remarks

1.4 In responding, the Chairman thanked the Secretary-General for his words of guidance and encouragement and assured him that his advice and requests would be given every consideration in the deliberations of the Sub-Committee.

Statements by delegations

1.5 Statements, the full text of which are set out in annex 20, were made by the delegations of:

.1 Greece and Italy, relating to the search and rescue operation for the ro-ro passenger ship **Norman Atlantic,** which caught fire on its route from the port of Patras to Ancona;

.2 the Bahamas, relating to the sinking of the bulk carrier **Bulk Jupiter** off the coast of Viet Nam; and

.3 Cyprus and Poland, relating to the sinking of the cement carrier **Cemfjord** off the coast of the United Kingdom.

1.6 The Sub-Committee expressed its condolences to the families and friends of all those who lost their lives in the above-mentioned accidents.

Adoption of the agenda and related matters

1.7 The Sub-Committee adopted the agenda (PPR 2/1/Rev.1) and agreed to be guided in its work, in general, by the annotations contained in document PPR 2/1/1 (Secretariat) and the proposed arrangements for the session set out in document PPR 2/1/2 (Chairman). The agenda, as adopted, together with the list of documents considered under each agenda item, is set out in document PPR 2/INF.7.

2 DECISIONS OF OTHER IMO BODIES

2.1 The Sub-Committee noted the outcome of MEPC 66, MEPC 67, MSC 93 and MSC 94 relevant to the work of the Sub-Committee, as reported in documents PPR 2/2 and PPR 2/2/1 (Secretariat), and took them into account in its deliberations when dealing with the relevant agenda items.

Matters concerning prevention of air pollution

2.2 The Sub-Committee noted, in particular, that MEPC 67 had instructed it to develop amendments to MARPOL Annex VI and the NO_X Technical Code concerning the use of dual fuel engines as a Tier III NO_X control strategy, testing of gas-fuelled engines, and information to be included in the bunker delivery note, as well as amendments to the *2009 Guidelines for exhaust gas cleaning systems*, and took action as described in the following paragraphs.

Guidelines for exhaust gas cleaning systems (EGCS)

2.3 The Sub-Committee recalled that PPR 1, having considered documents PPR 1/9/2 (Japan) and PPR 1/9/3 (Norway), had noted the discussion of the Working Group on Prevention of air pollution from ships in respect of future amendments *to* the *2009 Guidelines for exhaust gas cleaning systems* (resolution MEPC.184(59)) (EGCS Guidelines), including the draft text prepared by the group for further consideration at this session, as set out in annex 3 to document PPR 1/WP.5.

2.4 The Sub-Committee also recalled that MEPC 66, having noted document MEPC 66/INF.31 (IMarEST), providing information on a study undertaken by University College London regarding linking laboratory-measured pH recovery with a theoretical pH recovery mathematical model, had agreed to forward this document to PPR 2 for further consideration.

2.5 The Sub-Committee further recalled that MEPC 67 had considered document MEPC 67/4/22 (Austria et al.), proposing a calculation-based methodology for verification of washwater discharge criteria for pH for exhaust gas cleaning systems, and had referred the document to it for detailed consideration.

2.6 The Sub-Committee also had for its consideration the following documents:

.1 PPR 2/2/3 (Austria et al.), in relation to document MEPC 67/4/22, reiterating their proposal to use a calculation-based methodology for verification of washwater discharge criteria for pH for exhaust gas cleaning systems, as set out in section 10.1.2.1 (ii) of the EGCS Guidelines, as a feasible alternative to the use of actual measurements; and pointing out that the guidelines should be amended to provide clarity about the testing of systems that cannot be tested at a higher load, or tested "at rest in harbour";

.2 PPR 2/2/5 (Norway), providing comments on document PPR 2/2/3, expressing the view that further guidance is needed when using a calculation-based methodology; and proposing draft new text for section 10.1.2.2 of the EGCS Guidelines; and

.3 PPR 2/2/4 (Japan), supporting the draft amendments to section 6 of the EGCS Guidelines regarding the measurement method for CO_2 and SO_2, prepared at PPR 1; providing the results of experiments on measurement of CO_2; and proposing editorial modifications to the draft amendments to section 6.9 of the guidelines.

2.7 In the ensuing discussion, the Sub-Committee noted the general support for the use of the calculation-based methodology for verification of washwater discharge pH limits for exhaust gas cleaning systems.

2.8 Following consideration, the Sub-Committee instructed the Working Group on Prevention of air pollution from ships, established under agenda item 8, to finalize the draft amendments to the EGCS Guidelines, taking into account documents PPR 1/WP.5 (annex 3), MEPC 66/INF.31, MEPC 67/4/22, PPR 2/2/3, PPR 2/2/4 and PPR 2/2/5.

Amendments to the bunker delivery note to permit the supply of fuel oil not in compliance with regulation 14 of MARPOL Annex VI

2.9 The Sub-Committee recalled that MEPC 67, having considered document MEPC 67/12/7 (Austria et al.), proposing to insert an additional sentence in appendix V (Information to be included in the bunker delivery note) of MARPOL Annex VI, taking into account the "equivalent" provisions set forth in regulation 4 of MARPOL Annex VI, had instructed PPR 2 to consider and prepare relevant draft amendments to appendix V to MARPOL Annex VI.

2.10 The Sub-Committee considered document PPR 2/2/2 (IMarEST), providing comments on document MEPC 67/12/7 and expressing concern that the proposed draft sentence might result in additional complexity; proposing draft amendments to appendix V of MARPOL Annex VI which could provide a single form of the declaration applicable to all fuel oil supplied and cover the actual sulphur content of the fuel oil; and suggesting draft consequential amendments to regulations 18.3.2.1, 18.9.2, 18.9.5, 18.9.6 and 18.11 of MARPOL Annex VI.

2.11 In the ensuing discussion, the delegation of China, supporting, in principle, the contents of documents MEPC 67/12/7 and PPR 2/2/2, indicated its intention to provide an alternative text, based on the above-mentioned two documents, for consideration by the working group.

2.12 Following consideration, the Sub-Committee instructed the Working Group on Prevention of air pollution from ships, established under agenda item 8, to prepare draft amendments to appendix V of MARPOL Annex VI, including possible consequential amendments to regulation 18 of MARPOL Annex VI, taking into account documents MEPC 67/12/7 and PPR 2/2/2.

2.13 The Sub-Committee also considered document PPR 2/2/7 (IBIA), providing comments on document PPR 2/2/2 regarding the suggestion to amend appendix VI of MARPOL Annex VI, pointing out a conflict between the fuel verification procedure set forth in appendix VI of MARPOL Annex VI and ISO standard 4259 for the interpretation of sulphur test results, and suggesting to conduct a review of the fuel verification procedure of MARPOL Annex VI to align it with ISO standard 4259.

2.14 Following discussion, the Sub-Committee agreed that the work suggested in document PPR 2/2/7 constituted a new output and invited interested Member Governments to submit a proposal for such a new output to MEPC, in accordance with the Committees' Guidelines, for consideration.

Engines fuelled solely by gaseous fuels

2.15 The Sub-Committee recalled that MEPC 67 had adopted amendments to MARPOL Annex VI regarding engines solely fuelled by gaseous fuels, and having considered document MEPC 67/7/5 (Norway et al.), proposing draft amendments to the NO_X Technical Code 2008 to facilitate the testing of gas-fuelled engines, which contained further modifications to amendments adopted by resolution MEPC.251(66), had instructed PPR 2 to consider the document.

2.16 Following consideration, the Sub-Committee instructed the Working Group on Prevention of air pollution from ships, established under agenda item 8, to consider document MEPC 67/7/5 and prepare draft amendments to the NO_X Technical Code 2008, as appropriate.

Use of dual fuel engines as a Tier III NO_X control strategy

2.17 The Sub-Committee recalled that MEPC 67, having considered document MEPC 67/7/6 (United States), pointing out that neither MARPOL Annex VI nor the NO_X Technical Code 2008 contain a definition of "dual fuel"; providing information on the use of dual-fuel engines as a Tier III NO_X emission control strategy; and proposing draft amendments to MARPOL Annex VI and the Code, which include modifications to amendments adopted by resolution MEPC.251(66), had instructed PPR 2 to prepare draft amendments to MARPOL Annex VI and the NO_X Technical Code 2008, as appropriate.

2.18 The Sub-Committee considered document PPR 2/2/6 (IMarEST), providing comments on document MEPC 67/7/6 and expressing the view that the term "dual fuel" used in MARPOL Annex VI and the NO_X Technical Code 2008 does not need to be formally defined, in the understanding that regulation 13 of MARPOL Annex VI and associated parts of the NO_X Technical Code 2008 do not specify the means of compliance.

2.19 In the ensuing discussion, it was pointed out that consideration should also be given to ships equipped with dual fuel engines, for the situation immediately following building or before and after dry docking when the ship is in a "gas free" condition and the intended first gas bunkering port is either inside or outside an ECA designated for NO_X emission control. It was also pointed out that the Organization should be consistent with its decisions and allow multiple certification, as a matter of principle, within MARPOL Annex VI in its entirety, as opposed to the view of the working group at MEPC 67 in respect of EEDI certification (MEPC 67/WP.12, paragraph 28).

2.20 Following consideration, the Sub-Committee instructed the Working Group on Prevention of air pollution from ships, established under agenda item 8, to consider documents MEPC 67/7/6 and PPR 2/2/6 and prepare draft amendments to MARPOL Annex VI and the NO_X Technical Code 2008, as appropriate.

Instructions to the Working Group on Prevention of air pollution from ships

2.21 Consequently, the Sub-Committee agreed to the following additional terms of reference for the Working Group on Prevention of air pollution from ships, established under agenda item 8:

.1 finalize draft amendments to the *2009 Guidelines for exhaust gas cleaning systems* (resolution MEPC.184(59)), taking into account documents PPR 1/WP.5 (annex 3), MEPC 66/INF.31, MEPC 67/4/22, PPR 2/2/3, PPR 2/2/4 and PPR 2/2/5;

.2 prepare draft amendments to appendix V of MARPOL Annex VI, taking into account documents MEPC 67/12/7 and PPR 2/2/2;

.3 consider document MEPC 67/7/5 and prepare draft amendments to the NO_X Technical Code 2008, as appropriate; and

.4 consider documents MEPC 67/7/6 and PPR 2/2/6 and prepare draft amendments to MARPOL Annex VI and the NO_X Technical Code 2008, as appropriate.

Report of the working group

2.22 Having considered the relevant parts of the report of the working group (PPR 2/WP.5, paragraphs 4 to 32), the Sub-Committee took action as described in the following paragraphs.

Amendments to the 2009 Guidelines for exhaust gas cleaning systems

2.23 The Sub-Committee agreed to the draft MEPC resolution on amendments to the *2009 Guidelines for exhaust gas cleaning systems* (resolution MEPC.184(59)), as set out in annex 1, for submission to MEPC 68, with a view to adoption.

Bunker delivery note to permit the supply of fuel oil not in compliance with regulation 14 of MARPOL Annex VI

2.24 The Sub-Committee noted that the group had agreed that the provisions of MARPOL Annex VI should be amended to clarify that fuel oils, other than those meeting the sulphur limit values set out in regulation 14, can continue to be supplied to a ship for use with an equivalent method allowed under regulation 4 of MARPOL Annex VI.

2.25 The Sub-Committee also noted that the group, following extensive deliberation, while having recognized that draft amendments to appendix V (Bunker delivery note declaration) of MARPOL Annex VI were required, had not been able to agree on the text of such draft amendments.

Dual fuel engines and engines fuelled solely by gaseous fuels

2.26 The Sub-Committee agreed to draft amendments to the NO_X Technical Code 2008, concerning testing of gas-fuelled engines and dual fuel engines for NO_X Tier III strategy, as set out in annex 2, for submission to MEPC 68, with a view to approval and subsequent adoption.

2.27 The Sub-Committee considered the draft MEPC circular on *Guidance on the application of regulation 13 of MARPOL Annex VI Tier III requirements to dual fuel and gas-fuelled engines*, in particular paragraphs 7, 8 and 9, which the working group had left in square brackets, for decision by the Sub-Committee.

2.28 In the course of the discussion, the Sub-Committee noted that:

.1 with regard to paragraph 7 of the draft guidance, a slight majority of the delegations that spoke supported to keep this paragraph;

.2 with regard to the two options for paragraph 8 (8 and 8*bis*) of the draft guidance, a clear majority of the delegations that spoke supported paragraph 8*bis* and some delegations suggested further modifications to paragraph 8 and 8*bis*; and

.3 with regard to paragraph 9 of the draft guidance, some delegations expressed the view that this paragraph was not fully discussed in the working group and clarification was needed, otherwise it should be deleted.

2.29 Following the discussion, the Sub-Committee agreed, in principle, to the draft MEPC circular on *Guidance on the application of regulation 13 of MARPOL Annex VI Tier III requirements to dual fuel and gas-fuelled engines,* as set out in annex 3, and invited MEPC 68 to consider and decide on the square brackets, taking into account the views expressed in paragraph 2.28, with a view to approval.

2.30 In this connection, the Sub-Committee, having noted the intention of the delegation of the United States to submit a commenting document on this matter to MEPC 68, invited interested Member Governments and international organizations to continue working on the draft guidance and submit their comments and proposals to that meeting.

3 EVALUATION OF SAFETY AND POLLUTION HAZARDS OF LIQUID CHEMICALS AND PREPARATION OF CONSEQUENTIAL AMENDMENTS TO THE IBC CODE TAKING INTO ACCOUNT THE RECOMMENDATIONS OF GESAMP/EHS

Evaluation of products

3.1 The Sub-Committee agreed to refer documents PPR 2/3/2 (Belgium et al.), PPR 2/3/3 (Norway), PPR 2/3/5 and PPR 2/3/6 (South Africa) related to the evaluation of products directly to the ESPH Working Group, having noted that these pertained to routine tasks of the group.

3.2 The Sub-Committee noted the withdrawal by Norway of document PPR 2/3/9 and its intention to submit data to the GESAMP/EHS Working Group to revise the substance's GESAMP Hazard Profile (GHP) and to resubmit the document, based on the revised GHP, to ESPH 21.

Report of ESPH 20

3.3 The Sub-Committee recalled that the twentieth session of the ESPH Working Group had taken place from 29 September to 3 October 2014 and the report of that session was circulated as document PPR 2/3.

3.4 Having considered the report of the ESPH Working Group, the Sub-Committee approved it in general and, in particular:

.1 agreed to the evaluation of new products and their inclusion in list 1 of the MEPC.2/Circular on the *Provisional categorization of liquid substances in accordance with MARPOL Annex II and the IBC Code,* with validity for all countries and no expiry date;

.2 concurred with the results of the evaluation of cleaning additives;

.3 concurred with the amendments to the information contained in MEPC.2/Circ.20, circulated on 17 December 2014;

.4 agreed to the evaluation of trade-named mixtures presenting safety hazards and their consequential inclusion in list 3 of the MEPC.2/Circular, with validity for all countries and no expiry date;

.5 noted the standard draft template developed for the submission of list 3 products and the Excel tool for automation of mixture calculations, which will be made available on the IMO website;

.6 concurred with the proposed modifications to the issue date of the MEPC.2/Circular and to the expiry dates of tripartite agreements (i.e. issue date of 1 December and expiry dates for tripartite agreements of 31 December), and agreed that these changes would be implemented in December 2015, subject to endorsement by MEPC 68;

.7 noted the outcome of the GESAMP/EHS 50 meeting, in particular the finalization of the work on the revision of GESAMP Reports and Studies No. 64, which has recently been published by IMO;

.8 noted the progress made on the revision of the *Guidelines for the provisional assessment of liquid substances transported in bulk* (MEPC.1/Circ.512) and that this work would continue at this session;

.9 agreed to defer a decision with regard to the group's recommendation to require full GESAMP hazard profiles for components of mixtures and to include this new requirement in the revision of MEPC.1/Circ.512, *Guidelines for the provisional assessment of liquid substances transported in bulk,* until consideration of a commenting document submitted by the United Kingdom (PPR 2/3/10) (see paragraph 3.5 to 3.8);

.10 noted the progress made on the revision of chapters 17, 18 and 21 of the IBC Code and the proposed changes to the products set out in chapters 17 and 18 of the Code;

.11 noted the discussions of the group with regard to petrochemical mixtures submitted to it for assessment under MARPOL Annex II, but which are technically MARPOL Annex I substances, and invited interested Member Governments and international organizations to submit comments and proposals to MEPC 68, with a view to seeking the guidance of the Committee on how such products should be addressed by the ESPH Working Group;

.12 approved the proposed future planned output of the ESPH Working Group and noted that ESPH 21 is scheduled to take place from 26 to 30 October 2015; and

.13 noted that MEPC 67 and MSC 94 had approved, subsequently endorsed by C 113, the holding of an intersessional meeting of the ESPH Working Group in 2016.

Assessment of mixture-only products carried out under the provisions of MEPC.1/Circ.512

3.5 The Sub-Committee considered document PPR 2/3/10 (United Kingdom) providing comments on the report of ESPH 20 with regard to newly proposed procedures requiring full GESAMP hazard profiles for components of mixtures, which had been agreed at ESPH 20 (see paragraph 3.4.9).

3.6 The Sub-Committee noted, in particular, that the decision taken by ESPH 20 to apply the new procedure requiring full GESAMP hazard profiles for components of mixtures at that session (see paragraph 9.1.9 of document PPR 2/3) had resulted in three trade-named mixtures being rejected for inclusion in list 3 of the MEPC.2/Circular, in spite of

having met all the stated requirements set out in the *Guidelines for the provisional assessment of liquid substances transported in bulk* (MEPC.1/Circ.512).

3.7 In this respect, the Sub-Committee also considered the concerns raised by the United Kingdom in its document (PPR 2/3/10) with regard to the additional burden on industry that the proposed new procedure would create, based on the additional technical information requirements and the associated financial costs.

3.8 Having discussed the matter, taking into account the various points raised, the Sub-Committee:

.1 instructed the ESPH Working Group to re-evaluate the three trade-named products rejected at ESPH 20, based on the existing procedure, as set out in MEPC.1/Circ.512, with a view to their approval and inclusion in the MEPC.2/Circular for all countries, without an expiry date;

.2 with respect to action item 9 of the report of the ESPH Working Group (see paragraph 3.4.9), instructed the group to further consider its proposal for requiring full GESAMP hazard profiles for components of mixtures within the context of its work on the revision of MEPC.1/Circ.512, being cognizant of the implications for industry, and to take these matters into account when proposing timelines for implementation of any new proposed assessment procedures; and

.3 reminded the group that any proposed changes to existing procedures could only take effect once they had been approved by the respective parent bodies, i.e. the PPR Sub-Committee and MEPC.

Revision of chapter 21 of the IBC Code

3.9 The Sub-Committee considered document PPR 2/3/8 (Germany) providing comments on the revision of chapter 21 of the IBC Code and highlighting, in particular, a number of inconsistencies and discrepancies in the revised chapter 21 of the IBC Code, in relation to the current chapter 21; the recently revised GESAMP Hazard Evaluation Procedure; and the Globally Harmonized System of Classification and Labeling of Chemicals.

3.10 The Sub-Committee, having considered the issues raised, agreed to refer the document to the ESPH Working Group to take it into account as part of its ongoing work on the revision of chapter 21 of the IBC Code.

Review of products requiring oxygen-dependent inhibitors

3.11 The Sub-Committee recalled that PPR 1 had agreed on a draft MSC-MEPC circular providing guidance on the use of oxygen-dependant inhibitors, which was approved by MEPC 66 and MSC 93 and issued as MSC-MEPC.2/Circ.14. It further recalled that it had also agreed to retain the item related to oxygen-dependant inhibitors on the agenda of the ESPH Working Group for one more session, to allow for the consideration of any additional information from industry concerning identified safety concerns.

3.12 The Sub-Committee considered document PPR 2/3/4 (CEFIC and DGAC) proposing unified interpretations of SOLAS and the IBC Code to address certain safety concerns with respect to the carriage of products requiring oxygen-dependent inhibitors that had arisen as a result of recent amendments to SOLAS.

3.13 The Sub-Committee agreed in principle to the proposal for unified interpretations pertaining to SOLAS and the IBC Code to resolve the identified safety concerns for inhibitors requiring greater than 5% oxygen in the vapour space to be effective, which is currently prohibited under SOLAS, further to the recent amendments to SOLAS chapter II-2. Having noted the draft interpretations included in the annex to the document, the Sub-Committee agreed to refer them to the ESPH Working Group for review and any editorial corrections and/or revisions, as appropriate.

Safe carriage of contaminated bulk liquids

3.14 The Sub-Committee considered document PPR 2/3/7 (Norway) proposing the establishment of minimum carriage requirements, in accordance with the IBC Code, for the safe back loading of contaminated liquids on offshore support vessels (OSVs), in connection with the Sub-Committee's ongoing work on the development of a new Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code).

3.15 Having concurred with the proposal in principle and having noted that information contained in draft chapter 16 of the OSV Chemical Code (PPR 2/4/1) may be of relevance to this proposal, the Sub-Committee agreed to refer the matter to the ESPH Working Group for further consideration and requested it to report back to the Sub-Committee with the results of its discussions, taking into consideration documents PPR 2/3/7 and PPR 2/4/1.

Revision of the Guidelines for the provisional assessment of liquid substances transported in bulk (MEPC.1/Circ.512)

3.16 The Sub-Committee considered document PPR 2/3/1 (Secretariat) setting out a draft MEPC circular containing a revised PPR Product Data Reporting Form and related guidance notes, as agreed at ESPH 20, based on the work undertaken on the revision of the *Guidelines for the provisional assessment of liquid substances transported in bulk* (MEPC.1/Circ.512).

3.17 Having concurred with the proposal by ESPH 20 that the PPR Product Data Reporting Form be extracted from the aforementioned guidelines and issued as a stand-alone circular, the Sub-Committee referred the draft circular to the ESPH Working Group for a final review and any editorial corrections and/or revisions, as appropriate.

Information on incidents related to the discharge of high-viscosity and persistent floating products along German coasts

3.18 The Sub-Committee recalled that PPR 1 had discussed issues related to the discharge of high-viscosity products and had agreed to keep this matter in abeyance, pending clarification of High-level Action Plan (HLAP) output 7.2.2.1 by MEPC 66.

3.19 The Sub-Committee noted that, further to this, MEPC 66 had amended HLAP output 7.2.2.1 such that it would be confined to amendments to the IBC Code going forward and would no longer extend to amendments to MARPOL Annex II, which would henceforth need to be considered directly by the Committee. As a consequence, any amendment to MARPOL Annex II to address issues related to the discharge of high-viscosity products would need to be submitted to MEPC as a proposal for a new output, in accordance with the Committees' Guidelines.

3.20 The Sub-Committee noted the contents of document PPR 2/INF.4 (Germany), providing information on incidents involving high-viscosity products along the German coast.

Establishment of the ESPH Working Group

3.21 The Sub-Committee established the Working Group on Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and instructed it, taking into account the report of ESPH 20 (PPR 2/3) and the comments and decisions made in plenary, to:

.1 consider issues relating to the evaluation of products, taking into account documents PPR 2/3/2, PPR 2/3/3, PPR 2/3/5 and PPR 2/3/6;

.2 reconsider the evaluation of three products that had been rejected for approval at ESPH 20, using the existing procedure, as set out in MEPC.1/Circ. 512, with a view to their inclusion in list 3 of the MEPC.2/Circular;

.3 conduct an evaluation of cleaning additives;

.4 progress its work on the review of the safety criteria guidelines in chapter 21 of the IBC Code and of the products lists set out in chapters 17 and 18, taking into account the issues identified in document PPR 2/3/8 (Germany);

.5 continue its work on the revision of the *Guidelines for the provisional assessment of liquid substances transported in bulk* (MEPC.1/Circ.512) and, as part of this work, give further consideration to the proposal for requiring full GESAMP hazard profiles for components of mixtures, taking into account the potential implications for industry, and associated timelines for implementation;

.6 review the text of the proposed unified interpretations related to oxygen-dependent inhibitors as set out in document PPR 2/3/4, making any editorial corrections and/or revisions, as appropriate, and prepare a finalized draft text, together with the associated draft MEPC circular, for the Sub-Committee's consideration;

.7 consider the development of minimum carriage requirements for contaminated bulk liquids carried on OSVs and advise the Sub-Committee accordingly, taking into account documents PPR 2/3/7 and PPR 2/4/1;

.8 undertake a final review of the revised draft MEPC circular containing the revised PPR Product Data Reporting Form and related guidance, as set out in document PPR 2/3/1; and

.9 prepare the future planned output and agenda for ESPH 21.

Report of the ESPH Working Group

3.22 Having considered the report of the ESPH Working Group (PPR 2/WP.3), the Sub-Committee approved it in general and took action as described in the following paragraphs.

Evaluation of products

3.23 The Sub-Committee agreed to the establishment of a generic entry for Used cooking oil in list 1 of the MEPC.2/Circular, with validity for all countries, without an expiry date, as set out in annex 4, subject to endorsement by MEPC 68.

3.24 The Sub-Committee also agreed to the evaluation of trade-named mixtures presenting safety hazards and their inclusion in list 3 of the MEPC.2/Circular with validity for all countries, without an expiry date, as set out in annex 5, subject to endorsement by MEPC 68.

Evaluation of cleaning additives

3.25 The Sub-Committee concurred with the evaluation of cleaning additives found to meet the requirements of regulation 13.5.2 of MARPOL Annex II, as set out in annex 6, subject to endorsement by MEPC 68.

Review of the MEPC.2/Circular

3.26 The Sub-Committee noted that the tripartite agreements for 19 products would reach their expiry dates in December 2015 and invited Member States to take action as appropriate, to avoid any delay in the carriage of these products beyond their expiry dates.

3.27 In this connection, the Sub-Committee reconfirmed that for products submitted for inclusion in the MEPC.2/Circular, all necessary data must be made available in order for the group to undertake an evaluation and assign carriage requirements. Should there be any deficiencies in the information provided, the Sub-Committee confirmed that such products were to be rejected, until the full complement of required data had been submitted.

3.28 The Sub-Committee also recognized that for some products, where safety and pollution considerations were of concern, but for which no data were available, generic profiles could exceptionally be established to ensure their safe carriage, on the basis of a precautionary approach.

Review of chapter 21 of the IBC Code

3.29 The Sub-Committee noted the progress made with regard to the revision of chapter 21 of the IBC Code.

Draft amendments to MARPOL Annex II

3.30 The Sub-Committee agreed to draft consequential amendments to MARPOL Annex II, Appendix I (*Guidelines for the categorization of noxious liquid substances*), as set out in annex 7, which were prepared on the basis of recent revision to the GESAMP Reports and Studies No. 64, for submission to MEPC 68, for consideration with a view to approval and subsequent adoption.

Revision of the Guidelines for the provisional assessment of liquid substances transported in bulk (MEPC.1/Circ.512)

3.31 The Sub-Committee noted the progress made on the revision of the *Guidelines for the provisional assessment of liquid substances transported in bulk* (MEPC.1/Circ.512).

Unified Interpretations for products requiring oxygen-dependent inhibitors (SOLAS and IBC Code)

3.32 The Sub-Committee agreed to a draft unified interpretation of SOLAS regulations II-2/16.3.3.2 and 16.3.3.3 for products requiring oxygen-dependent inhibitors, as set out in annex 8, for submission to MSC 95, with a view to approval as an MSC.1 circular.

3.33 The Sub-Committee also agreed to the draft unified interpretations of paragraph 15.13.5 of the IBC Code for products requiring oxygen-dependent inhibitors, as set out in annex 9, for submission to MEPC 68 and MSC 95, with a view to approval as an MSC-MEPC.5 circular.

Development of minimum carriage requirements for contaminated bulk liquids carried on OSVs

3.34 The Sub-Committee noted the initial discussions of the group with regard to the development of minimum carriage requirements for contaminated bulk liquids carried on OSVs and invited interested delegations to submit any available information on the composition of contaminated backloads, as well as information to assist in developing special requirements under chapter 15 of the IBC Code, to ESPH 21.

Revision of the PPR Product Data Reporting Form and related guidance notes

3.35 The Sub-Committee agreed to the draft MEPC circular on the Revised PPR Product Data Reporting Form and related guidance notes, as set out in annex 10, for submission to MEPC 68, with a view to approval.

Future planned output of the ESPH Working Group

3.36 Taking into account the group's progress and the outcome of its work, the Sub-Committee approved the future planned output of the ESPH Working Group, as set out in annex 8 of document PPR 2/3.

4 CODE FOR THE TRANSPORT AND HANDLING OF LIMITED AMOUNTS OF HAZARDOUS AND NOXIOUS LIQUID SUBSTANCES IN BULK ON OFFSHORE SUPPORT VESSELS

4.1 The Sub-Committee recalled that PPR 1 had established a Working Group on the Development of the Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code), which made significant progress on the development of the draft Code and that, following the consideration of the report of the group, PPR 1 had referred a number of chapters of the draft Code to the SDC and SSE Sub-Committees for advice and input. In this regard, the Sub-Committee noted that the outcome of the two Sub-Committees will only be available at PPR 3 since both meet after PPR 2.

4.2 The Sub-Committee recalled also that PPR 1 had re-established a correspondence group and had instructed it to prepare the remaining part of the draft Code.

Report of the correspondence group

4.3 In considering the report of the correspondence group (PPR 2/4 and PPR 2/INF.2, submitted by Denmark), the Sub-Committee noted that the group had made progress on the remaining part of the draft Code and, in particular, had focused its work on the renumbered chapters 3 (Ship design) and 4 (Special requirements).

4.4 The Sub-Committee also had for its consideration document PPR 2/4/1 (Denmark and Norway), commenting on the report of the correspondence group; providing alternative draft text for chapter 16 (Back loading of contaminated bulk liquids), which was developed on the basis of the industry standard of best practices *Guidelines for Offshore Marine Operations – GOMO*; and suggesting developing minimum carriage requirements for contaminated bulk liquids.

4.5 The Sub-Committee noted the progress made by the correspondence group intersessionally and in the ensuing discussion a number of delegations expressed their general support for the alternative draft text for chapter 16 as contained in document PPR 2/4/1, emphasizing that further work is needed on this chapter, such as refining the definition of "back loading", clarification on the location of testing and the need for an agreement prior to the transporting of back loads.

Instructions to the ESPH Working Group

4.6 Following discussion, the Sub-Committee instructed the ESPH Working Group, established under agenda item 3, to review the draft text of chapter 16, as contained in document PPR 2/4/1, in conjunction with its consideration of document PPR 2/3/7 concerning the development of minimum carriage requirements for contaminated bulk liquids carried on OSVs (see paragraphs 3.14 and 3.15), and advise accordingly.

4.7 The Sub-Committee recalled that, in considering the relevant part of the report of the ESPH Working Group (PPR 2/WP.3, paragraphs 9.1 to 9.8), it had noted that the group had agreed in principle that carriage requirements were needed for contaminated backloads and had undertaken an initial consideration of the proposed requirements in document PPR 2/3/7 (Norway). The Sub-Committee also recalled that it had invited interested Member Governments and international organizations to submit any available information on the composition of contaminated backloads, as well as information to assist in developing special requirements under chapter 15 of the IBC Code, to ESPH 21 (see paragraph 3.34).

Re-establishment of the correspondence group

4.8 The Sub-Committee re-established the Correspondence Group on the Development of the OSV Chemical Code, under the coordination of Denmark[1], and instructed it, taking into account comments and decisions made at PPR 2 and the outcome of SDC 2 and SSE 2 concerning the development of the relevant chapters of the draft Code, to:

.1 finalize the text of the draft OSV Chemical Code, on the basis of document PPR 2/INF.2 and taking into account document PPR 2/4/1; and

.2 submit a written report to PPR 3.

Extension of the target completion year

4.9 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for this output to 2017.

[1] **Coordinator:**
Ms. Clea Henrichsen
Danish Maritime Authority
Regulation, Manning and Certification
Carl Jacobsens Vej 31
2500 Valby
Denmark
Tel.: +45 91376369
Email: cge@dma.dk

5 GUIDELINES FOR PORT STATE CONTROL UNDER THE 2004 BWM CONVENTION INCLUDING GUIDANCE ON BALLAST WATER SAMPLING AND ANALYSIS

5.1 The Sub-Committee, having noted that, since PPR 1, six more States (Georgia, Japan, Jordan, Republic of the Congo, Tonga and Turkey) had acceded to the Ballast Water Management Convention, bringing the number of Contracting Governments to 44, representing 32.86% of the world merchant fleet tonnage, urged the other Member States to consider ratifying or acceding to the Convention at their earliest convenience.

5.2 The delegations of Argentina and Indonesia informed the Sub-Committee of their ongoing preparations for the ratification of the Convention.

5.3 The Sub-Committee noted that the outcome of MEPC 66 and MEPC 67 on ballast water management issues was reported in documents PPR 2/2 and PPR 2/2/1 (Secretariat), respectively.

Draft guidance on self-monitoring of ballast water management systems

5.4 The Sub-Committee considered document PPR 2/5 (Germany and Republic of Korea) containing a proposed new appendix concerning self-monitoring for ballast water management systems to annex 2 of BWM.2/Circ.43 on *Amendments to the Guidance for Administrations on the type approval process for ballast water management systems in accordance with Guidelines (G8)* (BWM.2/Circ.28).

5.5 The majority of delegations supported developing guidance on self-monitoring of ballast water management systems in principle; however, it was noted that further discussion of the proposal in document PPR 2/5 was required.

5.6 The Sub-Committee, having agreed that there is a clear link between the proposal and the *Guidelines on approval of ballast water management systems (G8)*, noted that the Correspondence Group on the Review of Guidelines (G8), established by MEPC 67, is already discussing self-monitoring of ballast water management systems. Consequently, the Sub-Committee agreed that it should await the outcome of MEPC 68 on the consideration of the report of the correspondence group and that, therefore, no further action was necessary at present.

Revision of the Guidance on ballast water sampling and analysis

5.7 The Sub-Committee recalled that MEPC 66, having noted the information provided in document MEPC 66/INF.27 (Germany) on ballast water sampling methods for assessing compliance with the standards of the BWM Convention, had requested Member Governments and international organizations to submit further information and proposals related to ballast water sampling, analysis and contingency measures to the Sub-Committee, with a view to further developing and improving the relevant guidance documents and guidelines.

5.8 The Sub-Committee had for its consideration the following documents:

.1 PPR 2/5/1 and PPR 2/INF.3 (Japan) on a new indicative analysis method, containing a proposal to amend the *Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)* (BWM.2/Circ.42); and

.2 PPR 2/INF.6 (United States) on progress made in the development of tools for assessing compliance of ships' ballast water discharges with regulation D-2 of the BWM Convention.

5.9 Having considered the proposal in document PPR 2/5/1, the Sub-Committee agreed to the proposed amendments to the Guidance set out in BWM.2/Circ.42, noting that the new indicative analysis method developed by Japan and the methods currently described in the Guidance may still need further assessment during the trial period. Consequently, the Sub-Committee requested the Secretariat to prepare a draft revision of the Guidance, for submission to MEPC 68 for consideration, with a view to approval. The draft BWM circular on the Revised Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2), as prepared by the Secretariat, is set out in annex 11.

5.10 The Sub-Committee noted the information contained in documents PPR 2/INF.3 and PPR 2/INF.6 and reiterated its invitation to Member Governments and international organizations to submit further information and proposals related to ballast water sampling, analysis and contingency measures to future sessions, with a view to further developing and improving the relevant guidance documents and guidelines.

Exemptions and exceptions under regulations A-3 and A-4 of the BWM Convention

5.11 The Sub-Committee recalled that MEPC 67 had considered documents MEPC 67/2/12 and MEPC 67/INF.23 (Denmark and INTERFERRY), addressing issues concerning regulations A-3 (Exceptions) and A-4 (Exemptions) of the BWM Convention and the associated *Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7)* (resolution MEPC.167(56)), and had forwarded the documents to PPR 2 for further consideration.

5.12 The Sub-Committee considered document PPR 2/5/2 (Finland and Estonia), providing comments on documents MEPC 67/2/12 and MEPC 67/INF.23 and Guidelines (G7); presenting information about the joint HELCOM and OSPAR Harmonized Procedure to ensure that exemptions under regulation A-4 of the BWM Convention are granted in a consistent manner; and introducing the work presently carried out by HELCOM regarding the harmonized implementation of the BWM Convention.

5.13 The Sub-Committee further considered document PPR 2/5/3 (Croatia et al.), providing comments on document MEPC 67/2/12 and proposing to develop practical criteria for the risk assessment under the exemptions in accordance with regulation A-4, in order to provide clear guidance for Administrations.

5.14 In the ensuing discussion, the following views were expressed:

.1 the harmonized procedure on exemptions developed by HELCOM and OSPAR is a good example of regional cooperation that other regions may use as a model;

.2 regulations A-3 on exceptions and A-4 on exemptions are two separate issues that should not be confused and should be addressed separately;

.3 a definition may be needed for the concept of "same location" provided in regulation A-3;

.4 the new term "same risk area" proposed in document PPR 2/5/3 merits further consideration; and

.5 a new guidance document or a revision of Guidelines (G7) may be an appropriate way forward, but concrete proposals are needed.

5.15 Following discussion, the Sub-Committee, having agreed that further discussion on regulations A-3 and A-4 and Guidelines (G7) was needed with a view to clarifying their application in the context of exceptions and exemptions under the BWM Convention, invited MEPC 68 to consider the views expressed and advise on any follow-up actions deemed appropriate.

6 PRODUCTION OF A MANUAL ENTITLED "BALLAST WATER MANAGEMENT – HOW TO DO IT"

6.1 The Sub-Committee recalled that PPR 1 had noted with appreciation the offer of the observer from IMarEST to support, through access to its network of experts, the Organization in the production of a manual entitled "Ballast Water Management: How to do it" and had requested the Secretariat to act as the focal point and to initiate the development of the manual, in consultation with those delegations wishing to contribute to the work.

6.2 The Sub-Committee had for its consideration document PPR 2/6 (IMarEST), containing the draft of the manual, and noted that IMarEST had engaged with the Secretariat, its expert members and representatives of France, the Netherlands, the Republic of Korea and Singapore to develop this draft.

6.3 The Sub-Committee expressed its appreciation to IMarEST for providing the draft of the manual and to France, the Netherlands, the Republic of Korea and Singapore, as well as the Secretariat, for their contribution to its development.

6.4 Following brief consideration, the Sub-Committee invited IMarEST and the Secretariat to continue with the development of the manual and Member Governments and international organizations to continue supporting this activity[2], with a view to submission of the final version of the manual to PPR 3 for consideration, making sure to incorporate all the latest relevant decisions made by IMO bodies.

Extension of the target completion year

6.5 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2017.

[2] **Contact details:**
Dr. Bev MacKenzie
Technical & Policy Director
IMarEST
Aldgate House, 33 Aldgate High Street
London, EC3N 1EN, United Kingdom
Tel: +44 (0) 20 7382 2628
Fax: +44 (0) 20 7382 2670
Email: bev.mackenzie@imarest.org

7 IMPROVED AND NEW TECHNOLOGIES APPROVED FOR BALLAST WATER MANAGEMENT SYSTEMS AND REDUCTION OF ATMOSPHERIC POLLUTION

7.1 The Sub-Committee recalled that PPR 1, having noted that no submissions had been received under this agenda item at that session, had invited Member Governments and international organizations to submit information on improved and new technologies approved for ballast water management systems and reduction of atmospheric pollution to this session, with a view to promoting and encouraging the use of the best available environmental technology, not entailing excessive costs in shipping, in line with the goal of sustainable development.

Maritime application of batteries and qualification of new and emerging technologies

7.2 The Sub-Committee considered the following documents:

.1 PPR 2/7 (Norway), providing an introduction to the maritime application of batteries, potential challenges with their use and interfaces towards existing regulations; and

.2 PPR 2/7/1 (Norway), presenting some ideas on how to structure the process of qualifying new and emerging technologies, including the application of the Technology Qualification (TQ) process.

7.3 In the ensuing discussion, a number of delegations expressed their appreciation for the two submitted documents and were of the view that the issue of maritime application of batteries (PPR 2/7) and the ideas concerning rationally addressing the introduction of new technologies related to the implementation of various environmental regulations (PPR 2/7/1) would merit further consideration by the Organization.

7.4 Consequently, the Sub-Committee noted the information provided by Norway and invited interested delegations to submit any relevant proposals for new outputs to the Committee, in accordance with the Committees' Guidelines, if they wish to further pursue the issues raised in the above-mentioned two documents.

Technologies to reduce NO_X emissions to meet the Tier III NO_X emission standards

7.5 The Sub-Committee had, for its consideration, the following documents:

.1 PPR 2/7/2 (Russian Federation), containing a proposal to consider pending issues of technology to reduce nitrogen oxide emissions to meet the Tier III NO_X emission standards, including the establishment of a correspondence group; and

.2 PPR 2/7/3 (Canada et al.), commenting on document PPR 2/7/2; challenging the points made; disagreeing with the proposal for the establishment of a correspondence group; and arguing that the submission was not in keeping with the purpose of the agenda item.

7.6 In introducing its submission, the delegation of the Russian Federation clarified that it did not intend to reopen the discussion on the effective date of the Tier III NO_X emission standards that had been concluded at MEPC 66, but to address how best to implement what had been agreed at that session.

7.7 In the ensuing discussion, some delegations expressed their support for the proposal by the Russian Federation to establish a correspondence group to study the potential operational and environmental effects of NO_X reducing technologies, sharing the concerns expressed in document PPR 2/7/2. However, the majority of delegations aligned themselves with the views expressed in document PPR 2/7/3 and did not support the views expressed by the Russian Federation and the establishment of a correspondence group as proposed in document PPR 2/7/2.

7.8 The observer from CESA, supported by the delegation of the Cook Islands, stated that the problems, perceived or real, concerning new technologies are not specific to NO_X emissions and that all technologies, whether new or old, have limitations and industry can supply the best available technology, which may not be optimal. They also stated that, in order to ensure that industry can continue to supply new and improved technologies, the first movers that develop technologies should not be penalised and should also be assured that their initiative will not be in vain and that decisions to introduce new requirements will not be postponed.

7.9 The Sub-Committee, having noted that the review of the status of technological developments in accordance with regulation 13.10 of the revised MARPOL Annex VI had been completed by the Committee at MEPC 66, did not agree to the proposal to establish a correspondence group, and invited interested Member Governments and international organizations to provide relevant information on technological developments to implement the Tier III NO_X emission standards to future sessions of the Sub-Committee.

8 CONSIDERATION OF THE IMPACT ON THE ARCTIC OF EMISSIONS OF BLACK CARBON FROM INTERNATIONAL SHIPPING

8.1 The Sub-Committee recalled that MEPC 67, following the consideration of the outcome of PPR 1 on this agenda item, together with commenting documents received, had referred documents MEPC 67/12/4 (EUROMOT), MEPC 67/12/6 (Norway), MEPC 67/12/8 and MEPC 67/INF.31 (CSC) to PPR 2 and had instructed it to further consider the matter, under the same terms of reference as given to PPR 1 (MEPC 62/24, paragraph 4.20). In this context, MEPC 67 instructed the Sub-Committee to make a clear recommendation for a single definition of Black Carbon to a future session of the Committee, explaining as part of that recommendation why the Committee should consider the recommended definition, as opposed to any other.

8.2 In addition, the Sub-Committee had for its consideration the following documents submitted to this session:

.1 PPR 2/8 (Canada), proposing the consideration of the general Bond et al. definition, as originally published, which is measurement method-neutral and based on the physical properties of Black Carbon; the development of performance criteria for measurement methods to ensure consistency and comparability of results; and the testing of measurement methods in real-world conditions in order to determine those most suited to international shipping;

.2 PPR 2/8/1 (CSC), reiterating, in alignment with documents MEPC 67/12/8 and PPR 2/INF.5, that the scientific consensus definition by Bond et al., with terminology subsequently defined by Petzold et al., is the most appropriate definition for IMO to adopt; and ranking measurement methods in order of measurement precision; and

.3 PPR 2/INF.5 (Canada), providing a summary of the proceedings of a two-day technical workshop on marine Black Carbon emissions held in Canada in September 2014.

8.3 In the ensuing discussion, the following comments were, inter alia, made:

.1 the linkage of a definition to a measurement method has so far hindered agreement on a definition and hence the Bond et al. definition, which is measurement method-neutral, could provide a simple, practical and pragmatic way forward;

.2 PPR 2 should continue its deliberations based on the outcome of PPR 1, i.e. a definition should be based on light absorption and be either light-absorbing carbon (LAC) or equivalent Black Carbon (eBC), and hence no new definition (e.g. Bond et al.) should be forwarded to the working group, as another definition for consideration would cause further divergence of opinion;

.3 it is apparent that there are diverging expectations for the use of the definition, and, therefore, discussions on the purpose should focus on the measurement task, for example: Where should Black Carbon be measured, on the Arctic ice or at the ship exhaust? When should measurements be made? Which boundary conditions need to be considered? How should the measurement results be used?;

.4 it is premature to decide on a measurement method for Black Carbon and further consideration is required; the proposed tier approach to measurement set out in document PPR 2/8/1 was a possible approach; and the development of a standardized protocol would lead to more robust measurement methods;

.5 the proposed Bond et al. definition favours more complex measurement methods that could only be applied in a laboratory setting, requiring specialist operators, and this could be a barrier to future implementation;

.6 document PPR 1/8/5 provides a useful assessment of the advantages and disadvantages of several measurement methods as well as possible control measures;

.7 a ministerial session of the Arctic Council in April 2015 is expected to adopt a framework document that incorporates an action plan to reduce Black Carbon and methane from all sources. This plan includes, as one of its tasks, the preparation of an inventory of Black Carbon emissions with the aim of identifying specific sources;

.8 no compelling need for additional measures for the control of Black Carbon from international shipping has been demonstrated. According to Bond et al. referenced in document PPR 2/8, the uncertainty in the total climate-forcing estimate of Black Carbon is approximately +/- 100%; measured mass concentrations can differ depending on methods used by up to 80%, due to the influence of other chemical components; and aircraft and shipping emissions present only minor contributions to emitted mass; and

.9 more scientific research is required to ensure that policy making for international shipping is evidence-based. This includes improving scientific understanding of Black Carbon formation processes, physical and chemical properties, transmission pathways and impacts of Black Carbon on the environment.

Establishment of the Working Group on Prevention of air pollution from ships

8.4 Following consideration, the Sub-Committee established the Working Group on Prevention of air pollution from ships and instructed it, taking into account the documents submitted to this session, related documents referred from MEPC 67, documents submitted to PPR 1 under this agenda item and the comments made in plenary, to:

.1 make a clear recommendation for a single definition of Black Carbon, identifying as part of that recommendation why this should be considered the recommended definition, as opposed to any other;

.2 identify appropriate methods for measuring Black Carbon emissions from international shipping; and

.3 consider possible control measures to reduce the impact of Black Carbon emissions from international shipping, but only after having finalized a definition and identified appropriate measurement methods for Black Carbon.

Report of the working group

8.5 Having considered the part of the report of the working group (PPR 2/WP.5, paragraphs 35 to 47) as follows: dealing with this agenda item, the Sub-Committee approved it in general and in particular:

.1 noted the Bond et al. definition for Black Carbon (PPR 2/WP.5, paragraph 37) as follows:

> "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 it strongly absorbs visible light with a mass absorption cross section of at least 5 m^2g^{-1} at a wavelength of 550 nm;
>
> .2 it is refractory; that is, it retains its basic form at very high temperatures, with vaporization temperature near 4000 K;
>
> .3 it is insoluble in water, in organic solvents including methanol and acetone, and in other components of atmospheric aerosol; and
>
> .4 it exists as an aggregate of small carbon spherules."

and concurred with the group's view that the definition should be recommended to MEPC for approval as the definition of Black Carbon for international shipping, for the primary reason that this definition is measurement method-neutral, and further is widely supported by the scientific community;

.2 noted that there is a need for Black Carbon measurement studies to gain experience with the application of the definition and measurement methods, in order to enable a comparison of the measurement methods and assess the scale of possible variation in the data collected;

.3 noted that measurement results gathered from different measurement methodologies should be reported as set out in reference Petzold et al., providing guidance on recommended terminologies and related measurement technologies, e.g. FSN, MAAP, PAS, LII, and instruments for Black Carbon according to the Bond et al. definition;

.4 noted that the comparison of the data collected would require an approach for the interpretation of the results to be agreed;

.5 noted that the Committee may need to consider a protocol for any voluntary measurement studies to collect data, but that, however, at this stage the focus should be on using the agreed definition to support data collection to identify the most appropriate measurement method(s) for Black Carbon emissions from international shipping; and

.6 noted that because of the need for measurement studies to identify the most appropriate measurement methods for Black Carbon emissions from international shipping, it was not possible at this stage to consider possible control measures to reduce the impact on the Arctic of emissions of Black Carbon from international shipping.

8.6 With regard to paragraph 8.5.1 above, the delegation of China, supported by the delegations of India and the Russian Federation, expressed the view that the Bond et al. definition was not widely supported by the wider scientific community and hence not appropriate as a definition for international shipping.

8.7 With regard to paragraph 8.5.2 above, following a proposal by the Chairman, the Sub-Committee invited interested Member Governments and international organizations to initiate, on a voluntary basis, Black Carbon measurement studies to collect data.

Extension of the target completion year

8.8 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2017.

9 REVISED GUIDELINES FOR THE INVENTORY OF HAZARDOUS MATERIALS

9.1 The Sub-Committee, having noted that three States, i.e. the Republic of the Congo, France and Norway, had ratified or acceded to the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (Hong Kong Convention) so far, urged Member States to ratify or accede to the Convention at their earliest convenience.

9.2 The Sub-Committee recalled that MEPC 66 had re-established the Correspondence Group on Ship Recycling and had instructed it to finalize the development of threshold values, exemptions and bulk listings applicable to the materials to be listed in Inventories of Hazardous Materials; to prepare relevant amendments to the *2011 Guidelines for the Development of the Inventory of Hazardous Materials* (resolution MEPC.197(62)) accordingly; and to submit a report to MEPC 67.

9.3 The Sub-Committee also recalled that, due to time constraints, MEPC 67 had decided to refer matters concerning ship recycling and all documents submitted to the session to PPR 2, and had added the item "Revised guidelines for the Inventory of Hazardous Materials" to the provisional agenda of PPR 2.

Report of the intersessional correspondence group and comments thereon

9.4 The Sub-Committee had for its consideration the following documents:

.1 MEPC 67/3 and MPEC 67/INF.8 (United States), providing the report of the correspondence group on ship recycling, which contains a summary of the progress made by the group as well as the outstanding issues still to be discussed;

.2 MEPC 67/3/1 (China), proposing to add a definition of "Detection Limit" (D.L.), namely the minimum detectable value of the appropriate chemical variable, and to set D.L. for asbestos as 1%, below which a material containing asbestos should be judged as having no presence of asbestos;

.3 MEPC 67/3/2 (China), explaining why it is recommended to set D.L. for asbestos at 1%, based on a comparison study of three asbestos detection technologies, from the perspective of detection technology and capability;

.4 MEPC 67/3/3 (Secretariat of the Basel, Rotterdam and Stockholm Conventions), pointing out that the footnotes for polybrominated biphenyls (PBB) and polychlorinated naphthalenes (PCN) are incorrect as a low persist organic pollutant (POP) content is yet to be established for those POPs under the Stockholm Convention, and proposing to amend the footnotes for polychlorinated biphenyls (PCB), PBB and PCN accordingly;

.5 MEPC 67/3/4 (Japan), proposing an amendment to the footnote for the asbestos threshold value so as to avoid retroactive application of 0.1% to existing ships, and expressing concerns about setting 50 mg/kg as the threshold value for PBBs; and

.6 PPR 2/WP.4 (Secretariat), providing advice on threshold values for radioactive substances on ships, developed by an IMO-IAEA joint consultancy group.

9.5 Following a brief discussion, the Sub-Committee referred the documents listed in paragraph 9.4 to the Working Group on Recycling of Ships for further consideration.

Calculation of recycling capacity for meeting the entry into force conditions of the Hong Kong Convention

9.6 The Sub-Committee noted the information provided by the Secretariat (MEPC 67/INF.2/Rev.1) on the calculation of recycling capacity for meeting the entry into force conditions of the Hong Kong Convention.

Establishment of the Working Group on Recycling of Ships

9.7 The Sub-Committee established the Working Group on Recycling of Ships and instructed it, taking into consideration comments and proposals made in plenary, to prepare the final text of the revised Guidelines for the development of the Inventory of Hazardous Materials as well as the text of the draft requisite MEPC resolution, using the report of the correspondence group (MEPC 67/3 and MEPC 67/INF.8) and document PPR 2/WP.4 as the basis and taking into account documents MEPC 67/3/1, MEPC 67/3/2, MEPC 67/3/3 and MEPC 67/3/4.

Report of the Working Group

9.8 Having considered the report of the Working Group (PPR 2/WP.7), the Sub-Committee approved it in general and took action as described in the following paragraphs.

9.9 In considering the draft amendments to the *Guidelines for the development of the Inventory of Hazardous Materials* prepared by the Group, the Sub-Committee noted concerns expressed by the observer from IACS with regard to a possible inconsistency between the proposed changes to the Form of Material Declaration in appendix 6 of the Guidelines and the provisions in SOLAS regulation II-1/3-5 (New installation of materials containing asbestos) and the related Guidelines developed by the MSC, and its intention to carefully review the relevant provisions in the Guidelines before MEPC 68.

9.10 Subsequently, the Sub-Committee agreed to the draft amendments to the Guidelines and the associated draft MEPC resolution for the adoption, and requested the Secretariat to prepare the complete text of the *2015 Guidelines for the development of the Inventory of Hazardous Materials*, to be included in the report of the Sub-Committee, for submission to MEPC 68 for adoption. The final draft of the 2015 Guidelines, together with an associated draft MEPC resolution for their adoption, as prepared by the Secretariat, is set out in annex 12.

Completion of the work on the output

9.11 The Sub-Committee invited MEPC 68 to note that the work on this planned output had been completed.

10 GUIDANCE FOR INTERNATIONAL OFFERS OF ASSISTANCE IN RESPONSE TO A MARINE OIL POLLUTION INCIDENT

10.1 The Sub-Committee recalled that PPR 1 had established an intersessional correspondence group under the overall coordination of France, which had been instructed, inter alia, to finalize the draft Guidance for international offers of assistance. The United States, as alternate contact of the correspondence group, coordinated this particular work.

Report of the correspondence group

10.2 In considering the report of the correspondence group (PPR 2/10, submitted by France and the United States), the Sub-Committee noted the significant progress made by the group in finalizing the draft Guidance in advance of PPR 2, and extended its appreciation to both the United States, acting as the coordinator of this work, and the group as a whole.

Establishment of a Drafting Group on OPRC related manuals, guidelines and guidance

10.3 Subsequently, the Sub-Committee established a Drafting Group on OPRC related manuals, guidelines and guidance and instructed it to finalize the Guidance on international offers of assistance, on the basis of the report of the correspondence group (PPR 2/10).

Report of the drafting group

10.4 Having considered the relevant part of the report of the drafting group (PPR 2/WP.6, paragraphs 4 to 8), the Sub-Committee approved it in general and took action as indicated hereunder.

10.5 In considering the final draft of the guidelines prepared by the group, the Sub-Committee concurred with the recommendation to amend the title of the guidelines to read "Guidelines for international offers of assistance in response to a marine oil pollution incident", with a view to clearly defining the subject of the guidelines.

10.6 Following consideration, the Sub-Committee agreed to the *Draft guidelines on international offers of assistance in response to a marine oil pollution incident*, as set out in annex 13, for submission to MEPC 68, with a view to approval and subsequent publication.

10.7 In this connection, the Sub-Committee invited MEPC 68 to authorize the Secretariat, when preparing the final text of the Guidelines, to make any editorial corrections that may be identified, as appropriate.

Completion of the work on the output

10.8 The Sub-Committee invited MEPC 68 to note that the work on this planned output had been completed.

11 REVISED SECTION II OF THE MANUAL ON OIL POLLUTION–CONTINGENCY PLANNING

11.1 The Sub-Committee recalled that MEPC 65 had considered and approved the proposed revision of section II of the Manual on Oil Pollution – Contingency Planning; and that OPRC-HNS TG 16 had invited interested delegations to submit comments on the manual to PPR 2.

11.2 The Sub-Committee had for its consideration document PPR 2/11 (Regional Activity Centre/Regional Marine Pollution Emergency Information and Training Centre (RAC/REMPEITC-Caribe)), containing an update on the revision of the manual, and noted its proposal to establish an intersessional correspondence group to progress the work.

11.3 With a view to expediting the work on the revision of the manual, the Sub-Committee instructed the Drafting Group on OPRC related manuals, guidelines and guidance, established under agenda item 10, to consider the possibility of incorporating this work in the tasks of the correspondence group proposed to be established under agenda item 13.

11.4 Having considered the relevant part of the report of the drafting group (PPR 2/WP.6, paragraphs 15 and 17), the Sub-Committee instructed the Correspondence Group on OPRC-HNS related manuals, guidelines and guidance (see paragraph 13.7), to prepare a final draft of section II of the Manual on Oil Pollution – Contingency Planning, and submit it to PPR 3 for consideration.

Extension of the target completion year

11.5 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2016.

12 GUIDE ON OIL SPILL RESPONSE IN ICE AND SNOW CONDITIONS

12.1 The Sub-Committee recalled that PPR 1 had noted the timetable and revised table of contents for the guide on oil spill response in ice and snow conditions, and further noted that Canada and Norway had contracted a consultant to progress its development, in consultation with a group of experts comprised of the participants of TG 15 who had offered support.

12.2 The Sub-Committee had for its consideration document PPR 2/12 (Norway), containing an update on the work carried out, as well as a second draft of the guide, and noted the information provided by Norway on the current status of the guide following its consideration at the Arctic Council's Emergency Prevention, Preparedness and Response Working Group (EPPR WG) meeting in December 2014, where further amendments had been proposed. The Sub-Committee noted that, after submission of the document, the draft guide had been further amended, taking into account the outcome of the EPPR WG. The delegation of Norway, when introducing the document, suggested that the finalization of the guide could be carried out by a correspondence group.

12.3 The Sub-Committee, having noted the significant progress made in the development of the guide, expressed its appreciation to Norway for leading this work.

12.4 In commenting on the draft guide, the delegation of Finland highlighted its view that the local environmental conditions were the most important aspect to be considered when choosing a response strategy to an oil spill. They stated that in the Baltic Sea area, mechanical recovery is the preferred response strategy, and that due to the limited water exchange in the Baltic Sea and the sensitivity of its marine environment, the use of dispersant is restricted. Furthermore, they expressed concerns on the risks to public health surrounding the use of in situ burning near densely populated areas.

12.5 The delegation of the Islamic Republic of Iran proposed that, for consistency, the Caspian Sea should be referred to as the North Caspian Sea throughout the entire draft guide.

12.6 With a view to expediting the work on finalizing the guide, the Sub-Committee instructed the Drafting Group on OPRC related manuals, guidelines and guidance, established under agenda item 10, to consider the possibility of incorporating this work into the tasks of the correspondence group proposed to be established under agenda item 13.

12.7 Having considered the relevant part of the report of the Drafting Group on OPRC related manuals, guidelines and guidance (PPR 2/WP.6, paragraph 16), the Sub-Committee concurred with its view that given the advanced status of this guide, there is no need to refer further work to the correspondence group and instead invited interested Member Governments and international organizations to conduct a final review of this guide and submit it to PPR 3 for consideration, with a view to finalization.

Extension of the target completion year

12.8 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2016.

13 UPDATED IMO DISPERSANT GUIDELINES

13.1 The Sub-Committee recalled that PPR 1 had established an intersessional correspondence group under the overall coordination of France, which had been instructed, inter alia, to finalize the update of the Guidelines for the use of dispersants for combating oil pollution at sea (IMO Dispersant Guidelines).

13.2 The Sub-Committee had for its consideration document PPR 2/13 (France) containing an update on the revision of the IMO Dispersant Guidelines, which are comprised of four separate parts addressing different aspects of dispersant use. The Sub-Committee noted the progress made by the correspondence group, in particular with regard to the revision of Part III of the guidelines, and the minor amendments made to Parts I and II, which had been approved, in principle, by MEPC 65.

Instructions to the Drafting Group on OPRC related manuals, guidelines and guidance

13.3 Following the presentation of document PPR 2/13, the Sub-Committee instructed the Drafting Group on OPRC related manuals, guidelines and guidance, established under agenda item 10, to consider the draft Part III of the guidelines and prepare draft terms of reference for a correspondence group to further develop and finalize Part IV.

Report of the drafting group

13.4 Having considered the relevant part of the report of the drafting group (PPR 2/WP.6, paragraphs 9 to 12 and 14 to 17), the Sub-Committee took action as indicated hereunder.

IMO Dispersant Guidelines

13.5 The Sub-Committee agreed to the draft of Part III of the *Guidelines for the use of dispersants for combating oil pollution at sea*, as set out in annex 14, for submission to MEPC 68, with a view to approval and subsequent publication, together with Parts I and II, which had already been approved by MEPC 65.

13.6 In this connection, the Sub-Committee invited MEPC 68 to authorize the Secretariat, when preparing the final text of the guidelines for publication, to make any editorial corrections that may be identified, as appropriate.

Establishment of a correspondence group

13.7 The Sub-Committee re-established the Correspondence Group on OPRC-HNS related manuals, guidelines and guidance, under the coordination of the United States[3], and instructed it to:

.1 develop a final draft of part IV of the *Guidelines for the use of dispersants for combating oil pollution at sea* (IMO Dispersant Guidelines), taking into account the proposed content of the Guidelines in annex 3 of document PPR 2/WP.6;

[3] **Coordinator:**
Mr. Scott Lundgren
Technical Advisor/Deputy
Office of Incident Management and Preparedness
United States Coast Guard, Department of Homeland Security
Tel: +1 202-372-2240
Email: scott.r.lundgren@uscg.mil

.2 prepare a final draft of section II of the Manual on Oil Pollution – Contingency Planning;

.3 submit a written report to PPR 3, with a finalized draft of section II of the Manual on Oil Pollution – Contingency Planning, and report on the progress made on the development of part IV of the IMO Dispersant Guidelines; and

.4 submit a written report to PPR 4, with a finalized version of part IV of the IMO Dispersant Guidelines.

Extension of the target completion year

13.8 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2017.

14 UPDATED OPRC MODEL TRAINING COURSES

14.1 The Sub-Committee recalled that PPR 1 had noted the progress made on the revision of the OPRC Model Training Courses.

14.2 The Sub-Committee considered document PPR 2/14 (Secretariat), providing a further update on the progress of the revision process, and requested the Secretariat to continue with the work to complete the training course materials for submission of the final draft to PPR 3 for consideration and submission to MEPC 70, with a view to approval and subsequent publication.

Extension of the target completion year

14.3 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2016.

15 UNIFIED INTERPRETATION PERTAINING TO PROVISIONS OF IMO ENVIRONMENT-RELATED CONVENTIONS

Unified interpretation of resolution MEPC.198(62)

15.1 The Sub-Committee considered document PPR 2/15 (IACS), containing a copy of its Unified Interpretation MPC105 on the *2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) Systems* (resolution MEPC.198(62)) related to the calculation of gaseous emissions, and proposing that calculation of gaseous emissions specified in paragraph 5.2.1 (test procedures for scheme A) of the guidelines should be applied to both scheme A and scheme B.

15.2 Following consideration, the Sub-Committee supported the proposal and, having agreed that relevant amendments to the aforementioned Guidelines should be developed, instructed the Working Group on Prevention of air pollution from ships, established under agenda item 8, to prepare such draft amendments, taking into account document PPR 2/15.

15.3 Having considered the relevant part of the report of the working group (PPR 2/WP.5, paragraphs 33 and 34), the Sub-Committee agreed to the draft MEPC resolution on *Amendments to the 2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with*

Selective Catalytic Reduction (SCR) Systems (resolution MEPC.198(62)), as set out in annex 15, for submission to MEPC 68, with a view to adoption.

Clarification of resolution MEPC.240(65)

15.4 The Sub-Committee had for its consideration document PPR 2/15/2 (IACS), seeking clarification regarding the need to issue the new Form of Type Approval Certificate for Oil Discharge Monitoring Equipment (ODME) not intended for monitoring of bio-fuel blends, in accordance with resolution MEPC.240(65) on *2013 Amendments to the Revised Guidelines and specifications for oil discharge monitoring and control systems for oil tankers* (resolution MEPC.108(49)).

15.5 Following consideration, the Sub-Committee, having agreed that the matter raised by IACS should be clarified by means of an MEPC circular, instructed the ESPH Working Group, established under agenda item 3, to further consider document PPR 2/15/2 and prepare a draft MEPC circular on Guidance for issuing revised certificates of type approval for oil content meters.

15.6 Having considered the relevant part of the report of the working group (PPR 2/WP.3, paragraphs 10.1 and 10.2), the Sub-Committee agreed to the draft MEPC circular on *Guidance for issuing a revised Certificate of Type Approval for oil content meters intended for monitoring the discharge of oil-contaminated water from the cargo tank areas of oil tankers*, as set out in annex 16, for submission to MEPC 68, with a view to approval.

Clarification of SOLAS regulation VI/5-2

15.7 The Sub-Committee recalled that PPR 1, having noted that a significant number of questions had been received by Member Governments, international organizations and the Secretariat on the application of new SOLAS regulation VI/5-2 related to the prohibition of the blending of bulk liquid cargoes and production processes during sea voyages, had invited interested Member Governments and international organizations to submit proposals for relevant clarifications to MSC 93.

15.8 The Sub-Committee recalled also that MSC 93, having considered document MSC 93/20/8 (Liberia et al.), proposing to develop guidance on the application of SOLAS regulation VI/5-2, had instructed it to consider the questions contained in paragraph 8 of the aforementioned document and advise MSC 95 accordingly.

15.9 In the ensuing discussion, the Sub-Committee noted that, in the interim period, the co-sponsors had further considered the issue; had reached a better understanding of the new SOLAS regulation VI/5-2; and were of the view that there was no need to seek further guidance on the said regulation. Consequently, the Sub-Committee invited MSC 95 to note the above view.

Draft unified interpretation of MARPOL Annex V relating to the disposal of cooking oils

15.10 The Sub-Committee recalled that PPR 1, having considered documents MEPC 65/7/5 (Marshall Islands) and PPR 1/15 (Italy), concerning the disposal of used cooking oil, invited interested Member Governments and international organizations to submit relevant proposals, including text for a draft unified interpretation to MARPOL Annex V, to PPR 2 for consideration.

15.11 The Sub-Committee had for its consideration document PPR 2/15/1 (Italy), containing a draft unified interpretation to regulation 3.3 of MARPOL Annex V, stating that the disposal of cooking oil can be performed only by discharge to a reception facility or by incineration as described in the Form of Garbage Record Book; and in the case that no reception facility is available, with a view to ensuring the recycling of cooking oil, a fuel blending of filtered cooking oil is also considered an appropriate solution if performed according to technical instructions to be included in the Garbage Management Plan.

15.12 In the ensuing discussion, a number of delegations shared the view expressed in document PPR 2/15/1 that used cooking oil should be discharged to a reception facility or by incineration; however, those delegations did not support incorporating the option of blending used cooking oil with fuel oils in any draft unified interpretation.

15.13 A number of other delegations expressed the view that disposing of cooking oil via a ship's oil residue (sludge tank), as described in document MEPC 65/7/5, is the most pragmatic and environment-friendly solution, without causing an unnecessary burden to the ship and ports, bearing in mind that the amount of used cooking oil on board (other than on passenger ships) is minimal, while some delegations pointed out that blending used cooking oil with fuel oils should also be considered as a practical option.

15.14 The Sub-Committee, having noted that the divergent views expressed prevented it from reaching an agreement on a unified interpretation to MARPOL Annex V on the matter agreed, nevertheless, that the disposal of used cooking oil should comply with the requirements in MARPOL Annex V. Consequently, the Sub-Committee invited MEPC 68 to note this outcome of its consideration on the matter.

16 GUIDELINES PERTAINING TO EQUIVALENT METHODS SET FORTH IN REGULATION 4 OF MARPOL ANNEX VI AND NOT COVERED BY OTHER GUIDELINES

16.1 The Sub-Committee recalled that MEPC 67, having noted that only two sets of guidelines under output 7.3.1.1 (Guidelines related to MARPOL Annex VI and the NO_X Technical Code in accordance with Action Plan endorsed by MEPC 64) remain to be developed, had agreed to split the existing output into two as follows:

.1 Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI and not covered by other guidelines; and

.2 Guidelines as called for under paragraph 2.2.5.6 of the revised NO_X Technical Code 2008 (NO_X-reducing devices) (see agenda item 17),

and had included them in the biennial agenda of the Sub-Committee and in the provisional agenda for this session.

16.2 The Sub-Committee also recalled that BLG 17, having considered the draft *Guidelines on the assessment and approval of equivalent methods as permitted by regulation 4 of MARPOL Annex VI*, developed by a correspondence group (BLG 17/11, annex 3), together with documents BLG 17/11/3 (United States) and BLG 17/11/4 (CSC), had requested MEPC 65 to provide instructions on the following specific issues:

.1 whether equivalent methods can be applied to a group of ships;

.2 the role of the flag State and port States when approval of an alternative compliance method is under consideration; and

.3 whether guidance should be generic or whether it should be applicable to specific alternative compliance methods only, as for example in the case of the *2009 Guidelines for exhaust gas cleaning systems* (resolution MEPC.184(59)).

16.3 The Sub-Committee further recalled that PPR 1, having noted that MEPC 65 had considered the matter and had agreed that sulphur emission-averaging schemes should not be accepted under regulation 4 of MARPOL Annex VI, yet had not addressed those issues on which BLG 17 had sought advice, had requested MEPC 67 to provide clarification to facilitate the further development and finalization of the draft guidelines.

16.4 The Sub-Committee noted that MEPC 67 had considered the aforementioned matters and had agreed the following:

.1 the provisions on equivalents are a matter for Parties to MARPOL Annex VI to interpret and, therefore, Parties that have developed relevant practical information or guidance not already considered and relating to the application of equivalents that may assist port State control officers should be invited to submit this information to a future session of MEPC;

.2 when a new equivalent method is allowed by a Party to MARPOL Annex VI, then specific draft guidance should be developed, as appropriate; and

.3 it was not possible, at that session of the Committee, to conclude the discussion on whether equivalent methods can be applied to a group of ships and the matter had therefore been deferred for further consideration to MEPC 68.

16.5 Having noted that the consideration of whether equivalent methods can be applied to groups of ships had been deferred to MEPC 68, the Sub-Committee agreed to await the outcome of that meeting before considering the matter further.

Extension of target completion year

16.6 In view of the above, the Sub-Committee invited MEPC 68 to extend the target completion year for the output to 2016.

17 GUIDELINES AS CALLED FOR UNDER PARAGRAPH 2.2.5.6 OF THE REVISED NO_X TECHNICAL CODE 2008 (NO_X-REDUCING DEVICES)

17.1 The Sub-Committee recalled that, under the priority list developed by BLG 16 (BLG 16/16, paragraph 8.58), subsequently endorsed by MEPC 64, guidelines as called for under paragraph 2.2.5.6 of the revised NO_X Technical Code 2008 (NO_X-reducing devices) had been listed as category C (low priority).

17.2 The Sub-Committee also recalled that PPR 1, having considered the view of the correspondence group (PPR 1/9) that the said guidelines were not necessary, owing to the fact that such NO_X-reducing devices are not currently under development nor is their development anticipated, had agreed that there was no need to amend the NO_X Technical Code 2008 and that guidelines did not need to be developed at this stage.

17.3 In view of the above and taking into account that no submissions on the matter had been received for two consecutive sessions, the Sub-Committee invited MEPC 68 to delete the output from its biennial agenda.

18 BIENNIAL AGENDA AND PROVISIONAL AGENDA FOR PPR 3

Biennial status report

18.1 The Sub-Committee recalled that MEPC 67 approved the Sub-Committee's revised biennial agenda for 2014-2015 and the provisional agenda for PPR 2, as set out in annex 13 to document MEPC 67/20.

18.2 Taking into account the progress made at this session, the Sub-Committee prepared the biennial status report, as set out in annex 17, for consideration by MEPC 68.

Proposed biennial agenda for the 2016-2017 biennium and provisional agenda for PPR 3

18.3 Taking into account the progress made at this session and the relevant decisions of MEPC 67, the Sub-Committee prepared its proposed biennial agenda for 2016-2017, and the provisional agenda for PPR 3, as set out in annexes 18 and 19, respectively, for consideration by MEPC 68.

Correspondence groups established at the session

18.4 The Sub-Committee recalled that it had established correspondence groups on the following subjects, due to report to PPR 3:

.1 development of the OSV Chemical Code (see paragraph 4.8); and

.2 development of OPRC related manuals, guidelines and guidance (see paragraph 13.7).

Arrangements for the next session

18.5 The Sub-Committee agreed to establish at its next session working/drafting groups on subjects to be selected from the following:

.1 Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code, taking into account recommendations of GESAMP-EHS;

.2 Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels;

.3 *Guidelines for port State control under the 2004 BWM Convention*, including guidance on ballast water sampling and analysis;

.4 Production of a manual entitled "Ballast Water Management – How to do it";

.5 Consideration of the impact on the Arctic of emissions of Black Carbon from international shipping;

6 Revised section II of the Manual on oil pollution contingency planning; Guide on oil spill response in ice and snow conditions; Updated IMO Dispersant Guidelines; Updated OPRC Model Training Courses; and

.7 *Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI* and not covered by other guidelines.

whereby the Chairman, taking into account the submissions received on the respective subjects, would advise the Sub-Committee well in time before PPR 3 on the final selection of the working/drafting groups.

Intersessional meeting

18.6 The Sub-Committee noted that MEPC 67 and MSC 94 had approved the holding of an intersessional meeting of the ESPH Working Group in 2016, which had been subsequently endorsed by C 113.

Date of next session

18.7 The Sub-Committee noted that its third session has been tentatively scheduled to take place from 15 to 19 February 2016.

19 ELECTION OF CHAIRMAN AND VICE-CHAIRMAN FOR 2016

In accordance with the Rules of Procedure of the Marine Environment Protection Committee, the Sub-Committee unanimously re-elected Mr. Sveinung Oftedal (Norway) as Chairman and Dr. Flavio Da Costa Fernandes (Brazil) as Vice-Chairman, both for 2016.

20 ANY OTHER BUSINESS

The Sub-Committee noted that no submissions had been received and no matters had been raised under this agenda item.

21 ACTION REQUESTED OF THE COMMITTEES

21.1 The Marine Environment Protection Committee, at its sixty-eighth session, is invited to:

.1 adopt the draft MEPC resolution on *Amendments to the 2009 Guidelines for exhaust gas cleaning systems* (resolution MEPC.184(59)) (paragraph 2.23 and annex 1);

.2 approve the draft amendments to the NO_X Technical Code 2008, concerning testing of gas-fuelled engines and dual fuel engines for NO_X Tier III strategy, with a view to adoption by MEPC 69 (paragraph 2.26 and annex 2);

.3 consider, decide on the square brackets around paragraphs 7 to 9, and approve the draft MEPC circular on *Guidance on the application of regulation 13 of MARPOL Annex VI Tier III requirements to dual fuel and gas-fuelled engines*, taking into account views expressed in discussions of the Sub-Committee (paragraphs 2.27 to 2.29 and annex 3);

.4 endorse the proposed modifications to the issue date of the MEPC.2/Circular and to the expiry dates of tripartite agreements (i.e. issue date of 1 December and expiry dates for tripartite agreements of 31 December), and agree that these changes would be implemented in December 2015 (paragraph 3.4.6);

.5 endorse the establishment of a generic entry for Used cooking oil in list 1 of the MEPC.2/Circular, with validity for all countries, without an expiry date, (paragraph 3.23 and annex 4);

.6 endorse the evaluation of trade-named mixtures presenting safety hazards and their inclusion in list 3 of the MEPC.2/Circular with validity for all countries, without an expiry date (paragraph 3.24 and annex 5);

.7 endorse the evaluation of cleaning additives for inclusion in annex 10 of the MEPC.2/Circular (paragraph 3.25 and annex 6);

.8 approve the draft consequential amendments to MARPOL Annex II emanating from the revision of Chapter 21 of the IBC Code, with a view to adoption at MEPC 69 (paragraph 3.30 and annex 7);

.9 approve the draft unified interpretations of paragraph 15.13.5 of the IBC Code for products requiring oxygen-dependent inhibitors, subject to concurrent approval by MSC 95 (paragraph 3.33 and annex 9);

.10 approve the draft MEPC circular on the Revised PPR Product Data Reporting Form and related guidance notes (paragraph 3.35 and annex 10);

.11 approve the draft BWM circular on the *Revised Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)* (paragraph 5.9 and annex 11);

.12 note the Sub-Committee's deliberation on the application of regulations A-3 and A-4 and Guidelines (G7) in the context of exceptions and exemptions under the BWM Convention, and advise on any follow-up actions deemed appropriate (paragraph 5.11 to 5.15);

.13 approve the Bond et al. definition as the definition of Black Carbon for international shipping, for the primary reason that this definition is measurement method-neutral, and further is widely supported by the scientific community (paragraph 8.5.1);

.14 note that there is a need for Black Carbon measurement studies to gain experience with the application of the definition and measurement methods, in order to enable a comparison of the measurement methods and assess the scale of possible variation in the data collected; and that the Sub-Committee invited interested Member Governments and international organizations to initiate, on a voluntary basis, Black Carbon measurement studies to collect data (paragraphs 8.5.2 and 8.7);

.15 consider the need for a protocol for any voluntary measurement studies to collect data, focussing on using the agreed definition to support data collection, to identify the most appropriate measurement method(s) for Black Carbon emissions from international shipping (paragraph 8.5.5);

.16 note that it was not possible at this stage to consider possible control measures to reduce the impact on the Arctic of emissions of Black Carbon from international shipping (paragraph 8.5.6);

.17 adopt the draft MEPC resolution on *2015 Guidelines for the development of the Inventory of Hazardous Materials* (paragraph 9.9 and annex 12);

.18 approve the draft *Guidelines on international offers of assistance in response to a marine oil pollution incident* for subsequent publication and authorize the Secretariat, when preparing the final text of the guidelines, to make any editorial corrections that may be identified, as appropriate (paragraphs 10.6 and 10.7 and annex 13);

.19 approve the draft of Part III of the *Guidelines for the use of dispersants for combatting oil pollution at sea*, for publication together with Parts I and II of the guidelines, approved by MEPC 65 for publication, and authorize the Secretariat, when preparing the final text of the guidelines for publication, to make any editorial corrections that may be identified, as appropriate (paragraphs 13.5 and 13.6 and annex 14);

.20 adopt the draft MEPC resolution on *Amendments to the 2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) Systems* (paragraph 15.3 and annex 15);

.21 approve the draft MEPC circular on *Guidance for issuing a revised Certificate of Type Approval for oil content meters intended for monitoring the discharge of oil-contaminated water from the cargo tank areas of oil tankers* (paragraph 15.6 and annex 16);

.22 note that the Sub-Committee did not reach an agreement on a unified interpretation pertaining to MARPOL Annex V concerning the disposal of used cooking oil but agreed, nevertheless, that such disposal should comply with the requirements of MARPOL Annex V (paragraph 15.14);

.23 note the biennial status report of the Sub-Committee for the current biennium (paragraph 18.2 and annex 17); and

.24 approve the proposed biennial agenda of the Sub-Committee for the 2016-2017 biennium and the provisional agenda for PPR 3 (paragraph 18.3 and annexes 18 and 19).

21.2 The Maritime Safety Committee, at its ninety-fifth session, is invited to:

.1 approve the draft unified interpretations of SOLAS regulation II-2/16.3.3 for products requiring oxygen-dependent inhibitors (paragraph 3.32 and annex 8);

.2 approve the draft unified interpretations of paragraph 15.13.5 of the IBC Code for products requiring oxygen-dependent inhibitors, subject to concurrent approval by MEPC 68 (paragraph 3.33 and annex 9); and

.3 note that a better understanding of SOLAS regulation VI/5-2 had been reached and that, therefore, there is no need to develop further guidance on the application of this regulation (paragraph 15.9).

***

ANNEX 1

DRAFT MEPC RESOLUTION

AMENDMENTS TO THE 2009 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS (RESOLUTION MEPC.184(59))

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its fifty-eighth session, the Committee adopted, by resolution MEPC.176(58), a revised MARPOL Annex VI which significantly strengthens the emission limits for sulphur oxides (SO_X),

RECALLING FURTHER that, at its fifty-ninth session, the Committee adopted, by resolution MEPC.184(59), the *2009 Guidelines for exhaust gas cleaning systems* (hereinafter referred to as "2009 EGCS Guidelines"),

NOTING that the revised MARPOL Annex VI entered into force on 1 July 2010,

NOTING ALSO that regulation 4 of revised MARPOL Annex VI allows the use of an alternative compliance method at least as effective in terms of emission reductions as that required by the revised MARPOL Annex VI, including any of the standards set forth in regulation 14, taking into account guidelines developed by the Organization,

RECOGNIZING the need to update the 2009 EGCS Guidelines*,*

HAVING CONSIDERED, at its sixty-eighth session, draft amendments to the *2009 EGCS Guidelines*, prepared by the Sub-Committee on Pollution Prevention and Response, at its second session,

1. ADOPTS the amendments to the *2009 Guidelines for exhaust gas cleaning systems*, as set out in the annex to the present resolution;

2. INVITES Administrations to take the aforementioned amendments into account when allowing the use of an exhaust gas cleaning system in accordance with regulation 4 of the revised MARPOL Annex VI;

3. REQUESTS Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the attention of shipowners, ship operators, shipbuilders, marine diesel engine manufacturers and any other interested groups;

4. AGREES to keep the 2009 EGCS Guidelines, as amended, under review, in the light of experience gained with their application.

ANNEX

AMENDMENTS TO THE 2009 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS (RESOLUTION MEPC.184(59))

1 Paragraph 6.2 is replaced by the following:

"6.2 CO_2 should be measured using an analyser operating on non-dispersive infrared (NDIR) principle and with additional equipment such as dryers as necessary. SO_2 should be measured using analysers operating on non-dispersive infrared (NDIR) or non-dispersive ultra-violet (NDUV) principles and with additional equipment such as dryers as necessary. Other systems or analyser principles may be accepted, subject to the approval of the Administration, provided they yield equivalent or better results to those of the equipment referenced above. For acceptance of other CO_2 systems or analyser principles, the reference method should be in accordance with the requirements of Appendix III of the NO_x Technical Code 2008."

2 Paragraph 6.8 is replaced by the following:

"6.8 The SO_2 and CO_2 values should be compared on the basis of the same residual water content (e.g. dry or with the same wetness fraction)."

3 paragraph 6.9 is replaced by the following:

"6.9 In justified cases where the CO_2 concentration is reduced by the EGC unit, the CO_2 concentration can be measured at the EGC unit inlet, provided that the correctness of such a methodology can be clearly demonstrated. In such cases the SO_2 and CO_2 values should be compared on a dry basis. If measured on a wet basis the water content in the exhaust gas stream at those points should also be determined in order to correct the readings to dry basis values. For calculation of the CO_2 value on a dry basis, the dry/wet correction factor may be calculated in accordance with paragraph 5.12.3.2.2 of the NO_X Technical Code 2008."

4 Paragraph 10.1.2.1 (ii) is replaced by the following:

"(ii) The pH discharge limit, at the overboard monitoring position, is the value that will achieve as a minimum pH 6.5 at 4 metres from the overboard discharge point with the ship stationary, and which is to be recorded as the overboard pH discharge limit in the ETM-A or ETM-B. The overboard pH discharge limit can be determined either by means of direct measurement, or by using a calculation-based methodology (computational fluid dynamics or other equally scientifically established empirical formulae) to be left to the approval by the Administration, and in accordance with the following conditions to be recorded in the ETM-A or ETM-B:

.1 all EGC units connected to the same outlets are operating at their full loads (or highest practicable load) and with the fuel oil of a maximum sulphur content for which the units are to be certified (Scheme A) or used with (Scheme B);

.2 if a test fuel with lower sulphur content, and/or test load lower than maximum, sufficient for demonstrating the behaviour of the washwater plume is used, the plume's mixing ratio must be established based on the titration curve of seawater. The mixing ratio would be used to demonstrate the behaviour of the washwater plume and that the overboard pH discharge limit has been met if the EGC system is operated at the highest fuel sulphur content and load for which the EGC system is certified (Scheme A) or used with (Scheme B);

.3 where the washwater flow rate is varied in accordance with the EGC system gas flow rate, the implications of this for the part load performance should also be evaluated to ensure that the overboard pH discharge limit is met under any load;

.4 reference should be made to a sea-water alkalinity of 2,200 µmol/litre and pH 8.2[1]; an amended titration curve should be applied where the testing conditions differ from the reference seawater, as agreed by the Administration; and

.5 if a calculation-based methodology is to be used, details to allow its verification such as but not limited to supporting scientific formulae, discharge point specification, washwater discharge flow rates, designed pH values at both the discharge and 4 metres location, titration and dilution data should be submitted."

***

[1] These values could be revised within two years for new installations following the adoption of these amended guidelines upon further inputs on the physical state of the seas resulting from the use of exhaust gas cleaning systems.

ANNEX 2

DRAFT AMENDMENTS TO THE NO_X TECHNICAL CODE 2008

(Testing of gas-fuelled engine and dual fuel engines for NO_X Tier III strategy)

Abbreviations, subscripts and symbols

1 In subparagraphs .1 and .2 and in the title of table 2, the word "marine" is added before the word "diesel".

2 In table 2, row 4 is replaced with the following:

"(H)FID	(Heated) flame ionization detector

"

Chapter 1 – General

3 In paragraph 1.3.10[1], the following new sentence is inserted after the first sentence:

"In addition, a gas-fuelled engine installed on a ship constructed on or after 1 March 2016 or a gas-fuelled additional or non-identical replacement engine installed on or after that date is also considered as a marine diesel engine."

Chapter 4 – Approval for serially manufactured engines: engine family and engine group concepts

4 In paragraph 4.3.8.2.6, after the existing bullet point "– dual fuel", a new bullet point is added as follows:

"– gas fuel"

5 After existing paragraph 4.3.8.2.10, a new paragraph 4.3.8.2.11 is added as follows:

".11 ignition methods:
– compression ignition
– ignition by pilot injection
– ignition by spark plug or other external ignition device"

6 In paragraph 4.4.6.2.5, after the words "injection cam", the words "or gas valve" are inserted.

7 In the first and second bullet points under paragraph 4.4.7.2.1, after the word "injection", the words "or ignition" are inserted, respectively.

8 In paragraph 4.4.7.2.2, after the existing bullet point "– combustion chamber", a new bullet point is added as follows:

"– gas valve specification."

[1] Adopted by resolution MEPC.251(66) which is expected to enter into force on 1 September 2015.

Chapter 5 – Procedures for NO_x emission measurements on a test bed

9 In paragraph 5.2.1.2, after the word "engines", the words "operating on liquid or dual fuel" are inserted.

10 The existing paragraph 5.2.1.3 is renumbered as 5.2.1.3.1 and in the re-numbered paragraph 5.2.1.3.1, after the word "engines", the words "operating on liquid or dual fuel" are inserted.

11 A new paragraph 5.2.1.3.2 is added after the re-numbered paragraph 5.2.1.3.1 as follows:

"5.2.1.3.2 For engines to be tested with gas fuel only with or without cooling of the intake air the parameter f_a shall be determined according to the following:

$$f_a = \left(\frac{99}{p_s}\right)^{1.2} \cdot \left(\frac{T_a}{298}\right)^{0.6} \qquad \text{(2a) "}$$

12 In the second sentence of paragraph 5.3.3, the words "fuel injection pump" are replaced with the word "engine".

13 In the first sentence of paragraph 5.3.4[1], the words "for dual fuel" are deleted.

14 In the second sentence of paragraph 5.4.2, before the word "diesel", the word "marine" is inserted.

15 A new paragraph 5.12.3.2.3 is added as follows:

".3 The calculation shall be in accordance with paragraphs 5.12.3.1 to 5.12.3.2. However, q_{mf}, w_{ALF}, w_{BET}, w_{DEL}, w_{EPS}, f_{fw} values shall be calculated in accordance with the following table:

Factors in the formula (6) (7) (8)		**Formula for factors**
q_{mf}	=	$q_{mf\_G} + q_{mf\_L}$
w_{ALF}	=	$\frac{q_{mf\_G} \times w_{ALF\_G} + q_{mf\_L} \times w_{ALF\_L}}{q_{mf\_G} + q_{mf\_L}}$
w_{BET}	=	$\frac{q_{mf\_G} \times w_{BET\_G} + q_{mf\_L} \times w_{BET\_L}}{q_{mf\_G} + q_{mf\_L}}$
w_{DEL}	=	$\frac{q_{mf\_G} \times w_{DEL\_G} + q_{mf\_L} \times w_{DEL\_L}}{q_{mf\_G} + q_{mf\_L}}$
w_{EPS}	=	$\frac{q_{mf\_G} \times w_{EPS\_G} + q_{mf\_L} \times w_{EPS\_L}}{q_{mf\_G} + q_{mf\_L}}$

"

16 Paragraph 5.12.3.3[1] is replaced with the following:

"5.12.3.3 For the intake air:

$$k_{wa} = 1 - k_{w2} \quad (15)$$ "

17 Paragraph 5.12.4.1 is replaced with the following:

"5.12.4.1 As the NO_X emission depends on ambient air conditions, the NO_X concentration shall be corrected for ambient air temperature and humidity with the factors in accordance with 5.12.4.5, 5.12.4.6 or 5.12.4.7 as applicable."

18 In paragraph 5.12.4.6, the last sentence is replaced with the following:

"However if $H_a \geq H_{SC}$, then H_{SC} shall be used in place of H_a in formula (17) or (17a)."

19 A new paragraph 5.12.4.7 is added after existing paragraph 5.12.4.6 as follows:

"5.12.4.7 For engines to be tested with gas fuel only:

$$\mathrm{k_{hd}} = 0.6272 + 44.030 \times 10^{-3} \times \mathrm{H_a} - 0.862 \times 10^{-3} \times \mathrm{H_a}^2 \quad (17a)$$

where:

H_a is the humidity of the intake air at the inlet to the air filter in g water per kg dry air."

Chapter 6 – Procedures for demonstrating compliance with NO_X emission limits on board

20 A new paragraph 6.1.2 is added after existing paragraph 6.1.1.3 as follows:

"6.1.2 In those instances where an engine is certified to the emission limits given by both regulations 13.4 (Tier II) and 13.5.1.1 (Tier III), the engine shall be put into its Tier III operating condition prior to entry into an emission control area as given in regulation 13.6 and not taken out of that condition until after exit from such an area as shown by the procedures applicable to the particular onboard NO_X verification procedure applied. Additionally, the date, time and position of the ship on which that engine is installed shall be recorded, as appropriate to the procedure used, when the changeover to the Tier III condition was completed prior to entry to such an area or when the changeover from the Tier III condition was commenced after exit from such an area."

21 In the first sentence of paragraph 6.2.1.2, before the word "diesel", the word "marine" is inserted.

22 Sub-paragraph 6.2.2.3.1 is replaced with the following:

".1 injection or ignition timing,"

23 In sub-paragraph 6.2.2.3.14, the word "or" is deleted.

24 At the end of sub-paragraph 6.2.2.3.15, the word "or" is added.

25 A new sub-paragraph 6.2.2.3.16 is added as follows:

".16 gas valve."

26 In the third sentence of paragraph 6.3.1.4[1], the word "dual" is replaced with the word "gas".

27 The footnote of table 6[1] is replaced with the following:

"* Only for engines to be tested with gas fuel."

28 Paragraph 6.3.4.1 is replaced with the following:

"6.3.4.1 Generally all emission measurements with liquid fuel shall be carried out with the engine running on marine diesel fuel oil of an ISO 8217:2005, DM grade. Generally all emission measurements with gas fuel shall be carried out with the engine running on gas fuel equivalent to ISO 8178-5:2008."

29 In paragraph 6.3.4.3[1], before the word "engine", the word "or gas-fuelled" are inserted.

Appendix III – Specifications for analysers to be used in the determination of gaseous components of marine diesel engine emissions

30 Sub-paragraph 1.2.12 is replaced with the following:

".12 O_2 – Oxygen analyser

Paramagnetic detector (PMD), zirconium dioxide (ZRDO) or electrochemical sensor (ECS). ZRDO shall not be used for dual fuel or gas-fuelled engines."

31 At the end of paragraph 3.3, a new sentence is added as follows:

"Optionally, for gas-fuelled engines (without liquid pilot injection), the hydrocarbon analyser may be of the non-heated flame ionization detector (FID) type."

32 At the end of paragraph 3.5, a new sentence is added as follows:

"ZRDO shall not be used for dual fuel or gas-fuelled engines."

Appendix IV – Calibration of the analytical and measurement instruments

33 In paragraphs 5.3, 5.4.2, 8, 8.1.1, 8.2.2 and 8.3.2.10, the symbol "FID" is replaced with the symbol "(H)FID", respectively.

Appendix V – Parent engine test report and test data

Section 1 – Parent engine test report

34 Rows 10, 11 and 12 of sheet 1/5 are replaced with the following:

"

Static injection or ignition timing		deg CA BTDC
Electronic injection or ignition control	No:	Yes:
Variable injection or ignition control	No:	Yes:

"

35 Rows 6 and 27 of sheet 2/5 are replaced, respectively, and a new row is inserted after row 6 as follows:

"

Fuel type to be used on board	Distillate/distillate or heavy fuel/dual fuel or gas fuel
Ignition methods	Compression ignition / ignition by pilot injection / ignition by spark plug or other external ignition device

Injection or ignition timing (range)					

"

36 The title of the table under sheet 3/5 is replaced with the following:

"Liquid fuel characteristics"

37 A new table is added below the table of fuel characteristics under sheet 3/5 as follows:

"**Gas fuel characteristics**

Fuel type				
Fuel properties			Fuel elemental analysis	
Methane number	prEN16726: 2014	/	Carbon	% m/m
Lower heating value		MJ/kg	Hydrogen	% m/m
Boiling point		°C	Nitrogen	% m/m
Density at boiling point		kg/m³	Oxygen	% m/m
Pressure at boiling point		bar (abs)	Sulphur	% m/m
			Methane, CH_4	mol%
			Ethane, C_2H_6	mol%
			Propane, C_3H_8	mol%
			Isobutane, i C_4H_{10}	mol%
			N-Butane,	mol%

			n C_4H_{10}	
			Pentane, C_5H_{12}	mol%
			C6+	mol%
			CO_2	mol%

"

38 Row 11 of sheet 5/5 is replaced and a footnote is added as follows:

"

Fuel rack/gas admission duration** mm/sec											

** Only for engines to be tested with gas fuel"

Section 2 – Parent engine test data to be included in the technical file

39 Row 9 is replaced, new rows are inserted after row 15 and a footnote is added as follows:

"

ISO 8217: 2005 grade (DM or RM), ISO 8178-5:2008 (natural gas)		
Carbon	% m/m	
Hydrogen	% m/m	
Sulphur	% m/m	
Nitrogen	% m/m	
Oxygen	% m/m	
Water	% V/V	
Methane, CH_4**	mol%	
Ethane, C_2H_6**	mol%	
Propane, C_3H_8**	mol%	
Isobutane, i C_4H_{10}**	mol%	
N-Butane, n C_4H_{10}**	mol%	
Pentane, C_5H_{12}**	mol%	
C6+**	mol%	
CO_2**	mol%	

** Only for engines to be tested with gas fuel"

Appendix VI – Calculation of exhaust gas mass flow (carbon balance method)

40 In paragraph 2.5[1], the words "in case of gas mode operation of dual-fuel engine," are deleted.

[1] Adopted by resolution MEPC.251(66) which is expected to enter into force on 1 September 2015.

Appendix VII – Checklist for an engine parameter check method

41 The chapeau of paragraph 1.1 is replaced with the following:

".1 parameter 'injection timing and ignition timing': "

42 At the end of sub-paragraph 1.1.4, the word "and" is added.

43 A new sub-paragraph 1.1.5 is added as follows:

".5 timing indicator or timing light."

Appendix VIII – Implementation of the direct measurement and monitoring method

44 At the end of paragraph 2.1.1.4, a new sentence added as follows:

"Optionally, for gas-fuelled engines (without liquid pilot injection), the hydrocarbon analyser may be of the non-heated flame ionization detector (FID) type."

45 At the end of paragraph 2.1.1.5, a new sentence is added as follows:

"ZRDO shall not be used for dual fuel or gas-fuelled engines."

***

ANNEX 3

DRAFT MEPC CIRCULAR

GUIDANCE ON THE APPLICATION OF REGULATION 13 OF MARPOL ANNEX VI TIER III REQUIREMENTS TO DUAL FUEL AND GAS-FUELLED ENGINES

1 The Marine Environment Protection Committee, at its [sixty-eighth session (11 to 15 May 2015)], recognizing the need for uniform application of regulation 13 of MARPOL Annex VI Tier III requirements to dual fuel and gas-fuelled engines, approved the *Guidance on the application of regulation 13 of MARPOL Annex VI Tier III requirements to dual fuel and gas-fuelled engines*, as set out in the annex.

2 Member Governments are invited to bring the annexed Guidance to the attention of Administrations, industry, relevant shipping organizations, shipping companies and other stakeholders concerned.

3 Member Governments and observer organizations are also invited to provide information on outcome and experience in applying the Guidance to future session of the Committee.

ANNEX

GUIDANCE ON THE APPLICATION OF REGULATION 13 OF MARPOL ANNEX VI TIER III REQUIREMENTS TO DUAL FUEL AND GAS-FUELLED ENGINES

1 The NO_X certification requirements of regulation 13 of MARPOL Annex VI include dual fuel engines (those which can simultaneously use both liquid and gas fuels). At MEPC 66, amendments to the NO_X Technical Code 2008 were adopted in order to specifically cover certain specific aspects related to the NO_X certification of those engines.

2 At MEPC 67, amendments to MARPOL Annex VI were adopted which extend the scope of the definition of a marine diesel engine as given by regulation 2.14 to include gas-fuelled engines installed on ships constructed on or after 1 March 2016 and also such engines installed as additional or non-identical replacement engines on or after that date. At PPR 2, further amendments to the NO_X Technical Code 2008 were considered which relate to the certification of gas-fuelled engines, for consideration by MEPC 68 for approval. As such, these steps may be seen as complementary to the finalization of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), expected to be adopted at MSC 95 in June 2015.

3 Therefore, the procedures for the certification of engines which use gas as a fuel, typically natural gas but could also be other gases, have now been finalized.

4 In the case of gas-fuelled engines, where ignition is initiated by a spark plug or other external ignition device, these engines are generally expected to readily meet the Tier III NO_X emission limits and therefore it is possible that engine builders will seek only Tier III certification for such engines irrespective of whether they are to be installed on ships which operate outside as well as inside the Emission Control Areas (ECA) for NO_X as given by regulation 13.6 of the Annex – currently the North American and the United States Caribbean Sea ECA, both of which will take effect from 1 January 2016.

5 In the case of dual fuel engines, it is generally expected that those engines which use gas fuel in a pre-mix combustion process with the liquid fuel as the pilot ignition source (as opposed to gas-diesel engines which use high pressure gas injection directly into the combustion chamber) will be able to meet the Tier III requirement when operating in that arrangement. Consequently, the Technical Files for such engines will include the restriction that when operating in the Tier III condition the liquid fuel rate will be limited to the certified maximum liquid pilot fuel rate and those engines will undergo their Tier III Parent Engine test on that basis. Additionally, it is anticipated that in many instances these dual fuel engines will also be certified to the Tier II condition when operating on liquid fuel oil only. In these cases the EIAPP Certificate would be completed for both Tier II and Tier III, with a single Technical File giving two different modes of operation.

6 In terms of the applied Onboard NO_X Verification Procedure, virtually all engines use the Parameter Check Method. In this, the Technical Files will provide that all replacements and adjustments to the listed components and settings which affect NO_X emissions are to be recorded in a Record Book of Engine Parameters. This will continue to be the case with engines certified to both Tier II and Tier III, but in addition to recording the change between those two operating conditions, an addition to the NO_X Technical Code expected to be adopted by [MEPC 69] which would also require the ships position, together with the date and time to be recorded, at the point at which the engine was changed over to the Tier III condition prior to entering an ECA under regulation 13.6 of the Annex and changed over from Tier III after exiting such an area.

[7 NO_X emissions during emergency operation under paragraph 1.3.10 of the NO_X Technical Code 2008 shall follow regulation 3.1.2 of MARPOL Annex VI.]

[8 A particular issue for dual fuel engines, particularly those on gas tankers where it is boil-off from the cargo tanks which is the only source of gas fuel onboard, is the situation immediately following building or before and after dry docking when the ship is in a "gas free" condition and the intended first gas loading port is inside or outside an ECA designated for NO_X emission control. As there would not be the gas fuel available onboard in order to operate in a Tier III condition, in such cases a potential scenario would be that the ship involved would need to file a notification in accordance with regulation 18.2 of the unavailability of the required fuel for it to operate in a Tier III condition. Thereafter it would be for the coastal/port State authorities of the NO_X ECA transited to take the action, or no action, as deemed appropriate.]

[8*bis* A particular issue for dual fuel engines is the situation immediately following building or before and after dry docking when the ship is in a "gas free" condition and the intended first gas loading port is inside or outside an ECA designated for NO_X emission control when entering the dry dock the ship should be allowed to use fuel oil in Tier III compliant engines inside a NO_X ECA subject to approval of the coastal/port State. In case there would not be the gas fuel available onboard in order to operate in a Tier III condition, in such cases, a potential scenario would be that the ship involved would need to file a notification in accordance with regulation 18.2 of the unavailability of the required fuel for it to operate in a Tier III condition. Thereafter it would be for the coastal/port State authorities of the NO_X ECA transited to take the action, or no action, as deemed appropriate.]

[9 It is possible that certain auxiliary control devices, as mentioned in regulation 13.9, may be fitted to dual fuel and gas-fuelled engines, covering starting and low load operation.]

***

ANNEX 4

EVALUATION OF PRODUCTS – LIST 1 OF THE MEPC.2/CIRCULAR CARRIAGE REQUIREMENTS FOR USED COOKING OIL

Used cooking oil (PPR 2/3/2)

In considering the information provided the group agreed that the following carriage requirements be assigned to the product:

a.	Product name	Used cooking oil (m)*
c.	Pollution Category:	X
d.	Safety/Pollution Properties:	S/P
e.	Ship Type:	2
f.	Tank Type:	2G
g.	Tank Vents:	Open
h.	Tank Environmental Control:	No
i'.	Electrical Equipment – Class:	--
i"	Electrical Equipment – Group:	--
i"'	Electrical Equipment – Flashpoint >60°C:	Yes
j.	Gauging:	O
k.	Vapour Detection:	No
l.	Fire Protection:	ABC
n.	Emergency Equipment:	No
o.	Special Requirements:	15.19.6, 16.2.6, 16.2.9
	Reporting Country:	--
	Chapter 19 Synonyms:	None

***

ANNEX 5

EVALUATION OF TRADE-NAMED MIXTURES – LIST 3 OF THE MEPC.2/CIRCULAR CARRIAGE REQUIREMENTS FOR WAKSOL 911 A, WAKSOL 911 B AND EC 6671A

Waksol 911 A (PPR 2/3/5)

In considering the information provided the group agreed that the following carriage requirements be assigned to the product:

a.	Product name	Waksol 911 A
c.	Pollution Category:	Y
d.	Safety/Pollution Properties:	S/P
e.	Ship Type:	2
f.	Tank Type:	2G
g.	Tank Vents:	Cont
h.	Tank Environmental Control:	No
i'.	Electrical Equipment – Class:	T3
i"	Electrical Equipment – Group:	IIA
i"'	Electrical Equipment – Flashpoint >60°C:	No
j.	Gauging:	R
k.	Vapour Detection:	FT
l.	Fire Protection:	ABC
n.	Emergency Equipment:	No
o.	Special Requirements:	15.12.3, 15.12.4, 15.19.6, 16.2.9
	Contains	n-Alkanes (C9-C11) and paraffin wax
	Company	Sasol
	Reporting Country	South Africa

Waksol 911 B (PPR 2/3/6)

In considering the information provided the group agreed that the following carriage requirements be assigned to the product:

a.	Product name	Waksol 911 B
c.	Pollution Category:	Y
d.	Safety/Pollution Properties:	S/P
e.	Ship Type:	2
f.	Tank Type:	2G
g.	Tank Vents:	Cont
h.	Tank Environmental Control:	No
i'.	Electrical Equipment – Class:	T3
i"	Electrical Equipment – Group:	IIA
i'"	Electrical Equipment – Flashpoint >60°C:	No
j.	Gauging:	R
k.	Vapour Detection:	FT
l.	Fire Protection:	ABC
n.	Emergency Equipment:	No
o.	Special Requirements:	15.12.3, 15.12.4, 15.19.6, 16.2.6, 16.2.9
	Contains	n-Alkanes (C9-C11) and paraffin wax
	Company	Sasol
	Reporting Country	South Africa

EC6671A (ESPH 20/5/4)

In considering the information provided the group agreed that the following carriage requirements be assigned to the product:

a.	Product name	EC6671A
c.	Pollution Category:	Y
d.	Safety/Pollution Properties:	S/P
e.	Ship Type:	2
f.	Tank Type:	2G
g.	Tank Vents:	Cont
h.	Tank Environmental Control:	No
i'.	Electrical Equipment – Class:	T3
i"	Electrical Equipment – Group:	IIA
i'"	Electrical Equipment – Flashpoint >60°C:	No
j.	Gauging:	Closed
k.	Vapour Detection:	FT
l.	Fire Protection:	ABC
n.	Emergency Equipment:	No
o.	Special Requirements:	15.12, 15.17, 15.19.6
	Contains	Methyl alcohol
	Company	Nalco Champion
	Reporting Country	United Kingdom

***

ANNEX 6

CARGO TANK CLEANING ADDITIVES EVALUATED AND FOUND TO MEET THE REQUIREMENTS OF REGULATION 13.5.2 OF MARPOL ANNEX II

	Name of cleaning additive	Name of manufacturer	Reporting country
1	Bonderite C-AD TR-1020S(DE)	Henkel Belgium N.V.	Belgium
2	Careclean HCF - BG	Marine Care B.V.	Netherlands
3	Cargo Hold Cleanser	Yantai Mercury Chemical Technology Co., Ltd.	China

Changes of names of cargo tank cleaning additives

	Old name	New name
1	Chemalyt 146	Bonderite C-IC 146
2	P3-A	Bonderite C-MC A
3	P3-glin	Bonderite C-MC 12110
4	P3-x vloeibaar	BONDERITE C-MC X VLOEIBA

***

ANNEX 7

DRAFT AMENDMENTS TO MARPOL ANNEX II

ANNEX II

REGULATIONS FOR THE CONTROL OF POLLUTION OF NOXIOUS LIQUID SUBSTANCES IN BULK

Appendices to Annex II

Guidelines for the categorization of noxious liquid substances

The tables under the title "Abbreviated legend to the revised GESAMP Hazard Evaluation Procedure" are replaced with the following:

The Revised GESAMP hazard evaluation procedure

Columns A and B Aquatic environment					
	A			B	
	Bioaccumulation and Biodegradation			Aquatic Toxicity	
Numerical Rating	A1 Bioaccumulation		A2 Biodegradation	B1 Acute Toxicity	B2 Chronic Toxicity
	log Pow	BCF		LC/EC/IC50 (mg/l)	NOEC (mg/l)
0	<1 or > ca.7	no measurable BCF	R: readily biodegradable	>1000	>1
1	≥1 – <2	≥1 – <10	NR: not readily biodegradable	>100 – ≤1000	>0.1 – ≤1
2	≥2 – <3	≥10 – <100		>10 – ≤100	>0.01 – ≤0.1
3	≥3 – <4	≥100 – <500		>1 – ≤10	>0.001 – ≤0.01
4	≥4 – <5	≥500 – <4000		>0.1 – ≤1	≤0.001
5	≥5 – < ca.7	>4000		>0.01 – ≤0.1	
6				≤0.01	

Columns C and D Human health (toxic effects to mammals)						
	C			D		
	Acute Mammalian Toxicity			Irritation, Corrosion and Long-term health effects		
Numerical Rating	C1 Oral Toxicity	C2 Dermal Toxicity	C3 Inhalation Toxicity	D1 Skin irritation and corrosion	D2 Eye irritation and corrosion	D3 Long-term health effects
	LD_{50}/ATE (mg/kg)	LD_{50}/ATE (mg/kg)	LC_{50}/ATE (mg/l)			
0	>2000	>2000	>20	not irritating	not irritating	C – Carcinogenic
1	>300 – ≤2000	>1000 – ≤2000	>10 – ≤20	mildly irritating	mildly irritating	M – Mutagenic R – Reprotoxic
2	>50 – ≤300	>200 – ≤1000	>2 – ≤10	irritating	irritating	Ss – Sensitizing to skin Sr – Sensitizing to respiratory system
3	>5 – ≤50	>50 – ≤200	>0.5 – ≤2	severely irritating or corrosive 3A Corr. (≤4 h) 3B Corr. (≤1 h) 3C Corr. (≤3 min)	severely irritating	A – Aspiration hazard T – Target Organ Toxicity N – Neurotoxic I – Immunotoxic
4	≤5	≤50	≤0.5			

Column E Interference with other uses of the sea			
E1 Tainting*	E2 Physical effects on wildlife and benthic habitats	Numerical rating	E3 Interference with Coastal Amenities
NT: not tainting (tested)	Fp: Persistent Floater	0	no interference *no warning*
T: tainting test positive	F: Floater	1	slightly objectionable *warning, no closure of amenity*
	S: Sinking Substances	2	moderately objectionable *possible closure of amenity*
		3	highly objectionable *closure of amenity*

* Tainting has been deleted as a regulatory criterion for classifying substances. Substances that have already been rated on this basis continue to be listed in sub-column E1 in the GESAMP Composite List.

***

ANNEX 8

DRAFT UNIFIED INTERPRETATION OF SOLAS REGULATION II-2/16.3.3

SOLAS regulations II-2/16.3.3.2 and 16.3.3.3 (Operation of inert gas system)[1]

Interpretation

When a product containing an oxygen-dependent inhibitor is carried on a ship for which inerting is required under SOLAS chapter II-2, the inert gas system shall be operated as required to maintain the oxygen level in the vapour space of the tank at or above the minimum level of oxygen required under paragraph 15.13 of the IBC Code and as specified in the Certificate of Protection.

***

[1] Expected entry into force 1 January 2016.

ANNEX 9

DRAFT UNIFIED INTERPRETATION OF THE IBC CODE

IBC Code, paragraph 15.13.5[1]
–When a product containing an oxygen-dependent inhibitor is to be carried

Interpretation

When a product containing an oxygen-dependent inhibitor is carried on a ship for which inerting is required under SOLAS chapter II-2, the inert gas system shall be operated as required to maintain the oxygen level in the vapour space of the tank at or above the minimum level of oxygen required under paragraph 15.13 of the IBC Code and as specified in the Certificate of Protection.

***

[1] Expected entry into force: 1 January 2016.

ANNEX 10

DRAFT MEPC CIRCULAR

REVISED PPR PRODUCT DATA REPORTING FORM AND RELATED GUIDANCE NOTES

1 The Marine Environment Protection Committee at its [sixty-eight session (11 to 15 May 2015)] approved a revised PPR Product Data Reporting Form and related guidance notes, as set out in the annex.

2 Member Governments are invited to bring the attached reporting form and guidance notes to the attention of Administrations, recognized organizations, port authorities, shipowners, ship operators and other parties concerned.

ANNEX

PPR PRODUCT DATA REPORTING FORM

Properties and characteristics of products proposed for bulk marine transport

1 – Product identity

The product name shall be used in the shipping document for any cargo offered for bulk shipments. Any additional name may be included in parentheses after the product name.

It is important that for mixtures, a clear indication be made as to whether the properties are for the mixture as a whole (as should be the case) or for a component (or components) within the mixture. Unless otherwise indicated, the data provided is assumed to be for the mixture as a whole.

1.1 Other names and identification numbers

Main trade name:	
Main chemical name:	
Chemical formula:	
CAS Number:	
GESAMP EHS Number:	
Molecular structure:	

1.2 Associated synonyms

Synonym name	Type

1.3 Composition

Component name	%	Type

2 – Physical properties

Property		Qual	Value or range	References and comments
Molecular weight				
Density @ 20 ºC	**(kg/m^3)**			
Flash point (cc)	**(°C)**			
Boiling point	**(°C)**			
Melting point/Pour point	**(°C)**			
Water solubility @ 20 ºC	**(mg/l)**			
Viscosity @ 20 ºC	**(mPa.s)**			
Vapour pressure @ 20 ºC	**(Pa)**			
Vapour pressure @ 40ºC*	**(Pa)**			
SVC @ 20 ºC	**(mg/l)**			
SVC @ 40 ºC*	**(mg/l)**			
Autoignition temperature	**(°C)**			
Explosion limits	**(% v/v)**			
Carriage temperature	**(ºC)**			
Unloading temperature	**(ºC)**			
MESG	**(mm)**			

Notes:

1 If values are not available at 20ºC, please provide the reference temperature.

2* SVC values at 40ºC are optional. If the vapour pressure and SVC values are not available at 40ºC, values at a higher temperature are acceptable. If the carriage temperature is higher than 40ºC, then the vapour pressure and SVC should be calculated at that temperature.

3 – Relevant chemical properties

Water reactivity (0 – 2)

0 Any chemical which, in contact with water, would not undergo a reaction to justify a value of 1 or 2.

1 Any chemical which, in contact with water, may generate heat or produce a non-toxic, non-flammable or non-corrosive gas.

2 Any chemical which, in contact with water, may produce a toxic, flammable or corrosive gas or aerosol.

Details

Does the product react with air to cause a potentially hazardous situation? (**Y/N)**

If so, provide details

Reference

Is an inhibitor or stabilizer needed to prevent a hazardous reaction? (Y/N)

If so, provide details

Reference

Is refrigeration needed to prevent a hazardous reaction? (Y/N)

If so, provide details

Reference

4 – Mammalian toxicity

4.1 Acute toxicity

		Qualifier	Value or range	Species	Reference/ comments
Oral LD_{50}	**(mg/kg)**				
Dermal LD_{50}	**(mg/kg)**				
Inhalation LC_{50}	**(mg/l/4h)**				

4.2 Corrosivity and irritation

Is this product corrosive to skin?(**Y/N)**	

If yes:

	Value or range	**Reference/ comments**
Skin corrosion exposure time		

Options: ≤ 3 min., > 3 min. ≤ 1 hour, > 1 hour ≤ 4 hours, unknown/unspecified

	Resultant observation	**Species**	**Reference/ comments**
Skin irritation (4h exposure)			

Options: not irritating, mildly irritating, moderately irritating, severely irritating or corrosive

4.3 Sensitization

	Y/N	**Reference/comments**
Respiratory sensitizer		
Skin sensitizer		

4.4 Other specific long-term effects

	Y/N	**Reference/comments**
Carcinogenic		
Mutagenic		
Toxic to reproduction		
Specific Target Organ Toxicity		
Neurotoxicity		
Immunotoxicity		

5 – GESAMP Hazard Profile

GESAMP Hazard Profile information for products (or components, as appropriate) should be included below, where available.

Column	Property	Value
A1	Bioaccumulation	
A2	Biodegradation	
B1	Acute aquatic toxicity	
B2	Chronic aquatic toxicity	
C1	Acute oral toxicity	
C2	Acute dermal toxicity	
C3	Acute inhalation toxicity	
D1	Skin irritation/corrosivity	
D2	Eye irritation/corrosivity	
D3	Specific health concerns	
E1	Tainting and odour	
E2	Wildlife and seabeds	
E3	Beaches and amenities	

GUIDELINES FOR THE COMPLETION OF THE PPR PRODUCT DATA REPORTING FORM

General comments applicable to all sections of the PPR Product Data Reporting Form

1 It is important that for mixtures, a clear indication be made as to whether the properties are for the mixture as a whole (as should be the case) or for a component (or components) within the mixture. Unless otherwise indicated, the data provided is assumed to be for the mixture as a whole.

2 Most properties have the following boxes associated with them:

.1 **Qual:** This is used to provide a "qualifier", i.e. additional information about the reported value, when required. The data used to complete this box must be selected from the following:

blank	No qualification is necessary or appropriate. It is deemed to mean "="
>	Greater than
<	Less than
~	Approximately
E	Estimated (this can be used with any of the other qualifiers)
NF	Non-flammable (used for flash point, autoignition temperature and explosion limits to show that the product does not present a flammability hazard).

.2 **Lower value**: Where only one value exists, it should be put in this box. Where there is a range of values, the lower value should be put in this box, e.g. mixtures or impure products that have a boiling range, rather than a single boiling point value. The initial boiling point is placed in the **Lower value** box and the dry point is placed in the **Upper value** box. For most purposes, the Lower Value will be used and is normally the only one that must be completed. However, for **Explosion limits**, both the **Lower value** and the **Upper value** are required.

.3 **SVC**: SVC refers to saturated vapour concentration. This value is used to assess the inhalation hazard for products that may be toxic by inhalation, but may not produce vapours in sufficient concentrations to constitute an inhalation hazard.

.4 **Reference and comments**: This should be completed so that the source of data can be traced and verified, if necessary. This may be a reference to company information, information available in the open literature or justification for an estimated value e.g. read across from a similar chemical.

Section 1 – Product identity

3 This section serves to provide as much information as possible on the product. It is recognized that some of the boxes may not be relevant, such as the Chemical Abstract Services Number (CAS Number), which is normally only applicable to technically pure products or process streams. However, it is advisable to complete this section to the extent possible, as it facilitates the classification process and provides a mechanism for checking that the product has not been processed under a different name.

4 **Associated synonyms:** These are product names, other than those identified in the boxes for **Main trade name**, **Main chemical name** and **Product shipping name**; they tend to be less common names and should be described in the **Type of name** section by a qualifier.

5 Synonyms in the official languages of IMO should also be included, where possible.

6 **Composition:** This section shall be used to identify components of mixtures and impurities in any product. Each entry in this section should include the percentage and type (described as either C (Component) or I (Impurity)). In situations where this information is confidential, the data should be provided separately to the Reporting State and/or Secretariat.

Section 2 – Physical properties

7 It is important to recognize that, unless otherwise indicated, **all** the physical properties of the product referred to in this section must be completed in order to enable the assignment of appropriate carriage requirements for the product or mixture, consistent with the properties.

8 Special attention should be given to paragraph 2.1 of these guidelines when completing the section on physical properties within the form.

9 The following additional notes are also applicable to the physical properties section:

.1 If the product is non-flammable then "NF" should be placed in the Qualifier box for flash point, autoignition temperature, explosion limits and maximum experimental safe gap (MESG).

.2 If the flash point is > 200ºC and the autoignition temperature has not been measured, it may safely be estimated as > 200ºC, which is the cut-off value for defining a product as subject to chapter 17 of the IBC Code.

.3 For products which do not have a clear melting point, the pour point is regarded as equivalent. In such cases, the reference should include the term "pour point".

Section 3 – Relevant chemical properties

10 All available data related to the chemical properties of the product referred to in this section should be completed in order to enable the assignment of appropriate carriage requirements for the product or mixture. References to relevant technical reference sources should be provided, where available (e.g. OECD, REACH, etc.)

Water Reactivity Index

11 This parameter is an indication of the product's reactivity with water, which would result in a hazard. As there are no quantitative definitions for this property, the following guidelines are provided, with examples given that can be used for purposes of comparison:

WRI=2 Any chemical which may, in contact with water, produce a toxic, flammable or corrosive gas or aerosol.

WRI=1 Any chemical which may, in contact with water, generate heat or produce a non-toxic, non-flammable or non-corrosive gas.

WRI=0 Any chemical which would, in contact with water, not undergo a reaction to justify a value of 1 or 2.

Section 4 – Mammalian toxicity

12 All available data related to mammalian toxicity of the product referred to in this section should be completed in order to enable the assignment of appropriate carriage requirements for the product or mixture. References to the relevant technical reference sources should be provided, where available (e.g. OECD, REACH, etc.).

13 The box referring to species should be completed so that the scientific basis for the conclusion can be verified and judged if appropriate. Both information on the applied test method (being OECD or any other recognized method) and test species is required, where appropriate.

Section 5 – GESAMP Hazard Profile

14 The GESAMP Hazard Profile (GHP) information, as assigned to the product or mixture as it appears in the GESAMP Composite List, must be provided. If the profile given is for a component (or components) of a mixture, rather than the mixture as a whole, this should be clearly indicated. Where there are multiple components, the GHPs should be provided for all. Additional columns can be added to the table in section 5 for this purpose.

***

ANNEX 11

DRAFT BWM CIRCULAR

GUIDANCE ON BALLAST WATER SAMPLING AND ANALYSIS FOR TRIAL USE IN ACCORDANCE WITH THE BWM CONVENTION AND GUIDELINES (G2)

1 The Marine Environment Protection Committee, at its fifty-eighth session (October 2008), following the adoption of the *Guidelines for ballast water sampling (G2)* (resolution MEPC.173(58)), instructed the Sub-Committee on Bulk Liquids and Gases (BLG) to develop, as a matter of high priority, a circular to provide sampling and analysis guidance.

2 MEPC 65 (13 to 17 May 2013) approved BWM.2/Circ.42 on *Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)*, as agreed by BLG 17 (4 to 8 February 2013)..

3 MEPC 66 (31 March to 4 April 2014) had invited Member Governments and international organizations to submit further information and proposals related to ballast water sampling, analysis and contingency measures to the Sub-Committee on Pollution Prevention and Response (PPR), with a view to further developing and improving the relevant guidance documents and guidelines.

4 [MEPC 68 (11 to 15 May 2015)] approved the revised *Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2),* as agreed by PPR 2 (19 to 23 January 2015), set out in the annex.

5 Member Governments are invited to bring the annexed Guidance to the attention of all parties concerned.

ANNEX 1

GUIDANCE ON BALLAST WATER SAMPLING AND ANALYSIS FOR TRIAL USE IN ACCORDANCE WITH THE BWM CONVENTION AND GUIDELINES (G2)

1 INTRODUCTION

1.1 The purpose of this Guidance is to provide general recommendations on methodologies and approaches to sampling and analysis to test for compliance with the standards described in regulations D-1 and D-2 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention). This Guidance is an updated version of the guidance contained in document BLG 16/WP.4, taking into account advances in research since the document was first drafted, and should be read in conjunction with the BWM Convention, the *Guidelines for port State control under the BWM Convention* (resolution MEPC.259(67)) and the *Guidelines for ballast water sampling (G2)* (resolution MEPC.173(58)). Furthermore, and as instructed by MEPC 64, the sampling and analysis procedures to be used for enforcement of the BWM Convention should result in no more stringent requirements than what is required for Type Approval of ballast water management systems (BWMS).

1.2 This Guidance consists of two parts,

.1 a discussion of the principles of sampling, accompanied by a list of recommended methods and approaches for analysis and sampling protocols available for compliance testing to the D-1 and D-2 standards in section 5; and

.2 background information on sampling and analysis methodologies and approaches, set out in the annex.

1.3 Sampling and analysis for compliance testing is a complex issue. According to the *Guidelines for ballast water sampling (G2)*, testing for compliance can be performed in two steps. As a first step, prior to a detailed analysis for compliance, an indicative analysis of ballast water discharge may be undertaken to establish whether a ship is potentially in compliance with the Convention.

1.4 When testing for compliance, the sampling protocol used should result in a representative sample of the whole discharge of the ballast water from any single tank or any combination of tanks being discharged.

2 DEFINITIONS

For the purpose of this Guidance, the definitions in the BWM Convention apply and:

.1 A *sample* means a relatively small quantity intended to show what the larger volume of interest is like.

.2 *Representative sampling* reflects the relative concentrations and composition of the populations (organisms and/or chemicals) in the volume of interest. Samples should be taken in accordance with the annex, part 1 and/or part 2 of the *Guidelines on ballast water sampling (G2)*.

.3 *Analysis* means the process of measuring and determining the concentrations and composition of the populations of interest (organisms and/or chemicals) within the sample.

.4 An *indicative analysis* means a compliance test that is a relatively quick indirect or direct measurement of a representative sample of the ballast water volume of interest:

.1 an indirect, indicative analysis may include measurements whose parameters do not provide a value directly comparable to the D-2 standard, including biological, chemical, or physical parameters (e.g. dissolved oxygen levels, residual chlorine levels, Adenosine triphosphate (ATP), nucleic acid, *chlorophyll a*, and that by variable fluorescence, etc. The practicalities, applicability and limitations of these methods should be understood before they are used in compliance testing;

.2 a direct measurement, which is directly comparable to the D-2 standard (i.e. the determination of the number of viable organisms per volume) may also be indicative if it has:

.1 a large confidence interval, or

.2 high-detection limits; and

.3 an indicative analysis is an analysis performed in accordance with sections 4.1 and 4.2.

.5 A *detailed analysis* means a compliance test that is likely to be more complex than indicative analysis and is a direct measurement of a representative sample used to determine the viable organism concentration of a ballast water volume of interest. The result of such measurement:

.1 should provide a direct measurement of viable organism concentration in the ballast water discharge which is directly comparable to the D-2 standard (number of viable organisms per volume);

.2 should be of sufficient quality and quantity to provide a precise measurement of organism concentration (+/- [X] organisms per volume) for the size category(ies) in the D-2 standard being tested for; and

.3 should use a measurement method with an adequate detection limit for the purpose for which it is being applied.

A detailed analysis is an analysis performed in accordance with the methods and approaches in sections 4.3 and 4.4. Detailed analysis should usually be undertaken on a sample taken in accordance with the procedures in section 4.4.

.6 *Testing for compliance* using indicative analysis and detailed analysis can employ a range of general approaches or standard methods. These approaches or methods are divided into those that sample a small proportion of the volume of interest to indicate or confirm compliance or a larger proportion of the volume of interest that can be utilized to indicate and confirm compliance. Those that provide a wide confidence interval should not be used to confirm compliance unless the result and confidence limit are demonstrably over the D-2 standard as measured directly or indirectly. Approaches/Standards are highlighted in sections 4.1, 4.2

and 4.4 for indicative analysis and sections 4.3 and 4.4 for detailed analysis.

.7 *Method* means a detailed step-by-step analysis procedure (for indicative or detailed analysis) or sampling methodology, which the laboratory or organization undertaking the work can follow, be audited against and be accredited to.

.8 *Approach* means a detailed step-by-step analysis procedure (for indicative or detailed analysis) or sampling methodology, which the laboratory or organization undertaking the work can follow. These procedures will not have been validated by an international or national standards organization.

.9 *General approach* means a conceptual description or broad methodology of sample collection or analysis.

.10 *The precision* of a measurement system is the degree to which repeated measurements under unchanged conditions show the same results.

.11 *The detection limit* is the lowest concentration level that can be determined to be statistically different from a blank sample within a stated confidence interval. Limits of detection are method and analysis specific.

.12 *Plankton* means *phytoplankton* (e.g. diatoms or dinoflagellates) and *zooplankton* (e.g. bivalve larvae or copepods) that live in the water column and are incapable of swimming against a current.

.13 *Confidence interval* means a statistical measure of the number of times out of 100 that test results can be expected to be within a specified range. For example, a confidence level of 95% means that the result of an action will probably meet expectations 95% of the time.

.14 *Operational indicator* means a parameter used to monitor and control the operation of the BWMS as defined during testing for Type Approval, e.g. limit values of physical or chemical parameters such as flow rates, dose, etc.

.15 *Performance indicator* means a biological parameter (e.g. ATP, *chlorophyll a*, direct counts) used to estimate or measure the performance of the BWMS in achieving the D-2 standard.

3 PRINCIPLES FOR SAMPLING AND ANALYSIS FOR BALLAST WATER DISCHARGES

3.1 All samples and analysis carried out to determine whether a ship is in compliance with the BWM Convention should be performed under reliable and verified QA/QC procedures (note that any method, approach or sampling procedure should be rigorously validated and practicability should be assessed).

3.2 The first premise of any sampling and/or any analysis protocol is to identify the purpose of the protocol, i.e. to prove whether the discharge of a ship is meeting the D-1 standard or meeting the D-2 standard. There are many ways in which this can be done; however, they are limited by:

.1 the requirements of the methodologies available for sampling the ballast water discharge;

.2 the methods of analysis of samples being collected;

.3 the methods involved in statistically processing the results of these analyses;

.4 the specific operation of the ballast water management system (including when the treatment is applied during the ballast cycle and the type of treatment used); and

.5 the practicalities of sampling a very large volume of water and analysing it for very low concentrations of organisms.

3.3 Successful sampling and analysis is also based on identifying the viable biological population being sampled and its variability. If this population is homogenous, it is much easier to sample than one that is known to be heterogeneous. In the case of ballast water, the sample is drawn from a discharge with a population that can vary significantly. Consequently, the samples collected for indicative or detailed analysis should be representative samples.

3.4 Sampling a ballast water discharge is restricted even further when parts of the ballast water may have already been discharged. Very few inferences can be made on the quality of that ballast water already discharged based on sampling the remaining discharge as it happens. The challenge is to determine the volume of interest and how to sample it.

3.5 The qualitative difference between indicative analysis and detailed analysis often relies on the level of statistical confidence, which, in detailed analysis may be superior.

3.6 Indicative analysis (using operational or performance indicators) can be undertaken at any time throughout the discharge. In cases where indicative analysis identifies that a system is grossly exceeding the D-2 standard, it may be sufficient to establish non-compliance, however, the practicalities, application and limitations of the methodology being used for indicative analysis need to be understood fully.

3.7 Based on the discussion in paragraph 3.3, two different potential detailed sampling approaches can therefore be considered:

.1 sampling the entire discharge from a vessel during a port visit. During this approach:

.1 it will be impossible, by definition, for vessels to discharge prior to sampling;

.2 large numbers of samples are likely to be required over a long period of time;

.3 large sample volumes may be required over a long period of time; and

.4 sampling personnel would be required on the vessel over a significant period of time; and

.2 collecting a representative sample of the ballast water being discharged during some chosen period of time, e.g. one sample or a sequence of samples. During this approach:

.1 the sampling can be developed to fit the situation on board the vessel; and

.2 a representative sample of the discharge can be taken, and that volume can be selected in many ways, providing the opportunity for identifying and sampling specific volumes of the discharge if appropriate, e.g. choosing a percentage of the discharge or sampling duration.

3.8 The D-2 standard expresses a low concentration of organisms to identify in the analysis. The confidence in the result of any sampling and analysis depends on the error inherent in the sampling method and on the error inherent in the method used for analysing the sample. The cumulative error of both must be taken into account when evaluating the result.

3.9 The tables in sections 4.1, 4.2 and 4.3 set out the range of methodologies and approaches, currently identified for use to analyse ballast water discharges and how they relate to the specific sampling protocols in section 4.4. These methodologies and approaches are stand-alone techniques that need to be combined with specific sampling protocols. These protocols should recognize the limitations of each methodology, its inherent sampling requirements, and how it can fit into a comprehensive sampling protocol for compliance testing.

3.10 Although some methodologies and approaches used in type approval testing may also be applicable in compliance testing, the latter, especially indicative sampling, may also require other approaches.

Table 1

Definition and differences between indicative and detailed analysis for the D-2 standard

	Indicative analysis	**Detailed analysis**
Purpose	To provide a quick, rough estimate of the number of viable organisms	To provide a robust, direct measurement of the number of viable organisms
Sampling		
Volume	Small or large depending on specific analysis	Small or large depending on specific analysis
Representative sampling	Yes, representative of volume of interest	Yes, representative of volume of interest
Analysis method		
Analysis parameters	Operational (chemical, physical) and/or performance indicators (biological)	Direct counts (biological)
Time-consuming	Lower	Higher
Required skill	Lower	Higher
Accuracy of numeric organism counts	Poorer	Better
Confidence with respect to D-2	Lower	Higher

4 METHODOLOGIES FOR COMPLIANCE TESTING UNDER THE BWM CONVENTION

4.1 Table 2: Analysis methods that may provide an indication of compliance with the D-1 standard[1]

Indicator	General approach	Standard method	Notes	Level of confidence or detection limit and citation for validation studies
Salinity	Conductivity meter to monitor salinity.	No international standard for ballast water analysis at this time although standard methods for measuring salinity do exist.	External elements can affect the salinity.	To be determined.
Salinity	Refractometer to monitor salinity.	No international standard for ballast water analysis at this time although standard methods for measuring salinity do exist.	Temperature can affect the readings.	To be determined.
Types of organisms in discharge – oceanic, coastal, estuarine or fresh water	Visual identification.	No international standard for ballast water analysis at this time.	Expensive, time-consuming, needs extensively trained personnel; may produce false results if encysted organisms from previous ballasting operations hatch.	To be determined.
Turbidity	Portable turbidity sensors.	No international standard for ballast water analysis at this time.	Requires understanding of turbidity characteristics in relation to the distance from shore.	To be determined.
Dissolved Inorganic and Organic constituents (Nutrients, metals coloured dissolved organic matter (CDOM))	Portable nutrient sensors.	No international standard for ballast water analysis at this time.	Requires understanding of inorganic or organic constituent characteristics in relation to the distance from shore.	To be determined.

[1] Additional information can be found in document BLG 16/4.

4.2 **Table 3: Indicative analysis methods for use when testing for potential compliance with the D-2 standard[2]**

Indicator	General approach	Standard method	Notes	Level of confidence or detection limit and citation for validation studies
Viable organisms ≥ 50 µm	Visual counts or stereo-microscopy.	No international standard for ballast water analysis at this time.	Can be expensive and time-consuming, needs moderately trained personnel. (Note that OECD Test Guideline for Testing of Chemicals 202, "*Daphnia* sp. acute immobilization test and reproduction test" could be used as basis for standard methodology.)	To be determined.
Viable organisms ≥ 50 µm	Visual inspection.	No international standard for ballast water analysis at this time.	Visual inspection is likely to only register organisms bigger than 1,000 micro-metres in minimum dimension.	To be determined.
Viable organisms ≥ 10 µm and < 50 µm	Variable fluorometry.	No international standard for ballast water analysis at this time.	Only monitors photosynthetic phytoplankton and thus may significantly underestimate other planktonic organisms in this size fraction.	To be determined.
Viable organisms ≥ 50 µm and ≥ 10 µm and < 50 µm	Photometry, nucleic acid, ATP, bulk fluorescein diacetate (FDA), *chlorophyll a.*	No international standard for ballast water analysis at this time.	Semi-quantitative results can be obtained. However, some of these organic compounds can survive for various lengths of time in aqueous solution outside the cell, potentially leading to false positives. Welschmeyer and Maurer (2012).	To be determined.

[2] Additional information can be found in document BLG 15/5/4.

Indicator	General approach	Standard method	Notes	Level of confidence or detection limit and citation for validation studies
Viable organisms ≥ 50 µm and ≥ 10 µm and < 50 µm	Flow cytometry.	No international standard for ballast water analysis at this time.	Very expensive.	To be determined.
Enterococci	Fluorometric diagnostic kit.	No international standard for ballast water analysis at this time.	Minimum incubation time 6 h. Semi-quantitative results from portable methods (see paragraph 2.2.2 of annex 1).	To be determined.
Escherichia coli	Fluorometric diagnostic kit.	No international standard for ballast water analysis at this time.	Minimum incubation time 6 h. Semi-quantitative results from portable methods (see paragraph 2.2.2 of annex 1).	To be determined.
Vibrio cholerae (O1 and O139)	Test kits.	No international standard for ballast water analysis at this time.	Relatively rapid indicative test methods are available.	To be determined.
Viable organisms ≥ 50 µm and ≥ 10 µm and < 50 µm	Pulse counting fluorescein diacetate (FDA).	No international standard for ballast water analysis at this time.	Sampling kit can be larger than that for bulk fluorescein diacetate (FDA).	To be determined.

4.3 **Table 4: Detailed analysis methods for use when testing for compliance with the D-2 standard**

Indicator	General approach	Standard method	IMO citation	Notes	Level of confidence or detection limit and citation for validation studies
Viable organisms ≥ 50 µm and ≥ 10 µm and < 50 µm	Visual counts or stereo-microscopy examination. May be used with vital stains in conjunction with fluorescence + movement.	No international standard for ballast water analysis at this time, but see US EPA ETV Protocol, v. 5.1	BLG 15/5/5 and BLG 15/5/6 BLG 15/INF.6	Can be expensive and time-consuming, needs trained personnel. (Note that OECD Test Guideline for Testing of Chemicals 202, "*Daphnia* sp. acute immobilization test and reproduction test" could be used as basis for standard methodology.)	To be determined.
Viable organisms ≥ 10 µm and < 50 µm	Visual counts with use of vital stains.	No international standard for ballast water analysis at this time, but see US EPA ETV Protocol, v. 5.1	BLG 15/5/10 (method) BLG 15/5/5 and BLG 15/5/6 (approach) MEPC 58 /INF.10	Requires specific knowledge to operate them. It should be noted that there may be limitations using vital stains with certain technologies.	To be determined. Steinberg et al., 2011
Viable organisms ≥ 10 µm and < 50 µm	Flow cytometers (based on *chlorophyll a* and vital stains).	No international standard for ballast water analysis at this time.	BLG 15/5/5 and BLG 15/5/6	Expensive and require specific knowledge to operate them. It should be noted that there may be limitation using vital stains with certain technologies.	To be determined

Indicator	General approach	Standard method	IMO citation	Notes	Level of confidence or detection limit and citation for validation studies
Viable organisms ≥ 50 µm and Viable organisms ≥ 10 µm and < 50 µm	Flow cameras (based on *chlorophyll a* and vital stains).	No international standard for ballast water analysis at this time.	BLG 15/5/5 and BLG 15/5/6	Expensive and require specific knowledge to operate them. It should be noted that there may be limitations using vital stains with certain ballast water management systems.	To be determined
Viable organisms ≥ 50 µm and Viable organisms ≥ 10 µm and < 50 µm	Culture methods for recovery, regrowth and maturation.	No international standard for ballast water analysis at this time.	BLG 15/5/5 and BLG 15/5/6	Require specific knowledge to conduct them. Densities are expressed as Most Probable Numbers (the MPN method). Most species do not manage to grow using this method therefore cannot be used alone. 2-3 weeks incubation time needed.	To be determined
Enterococci	Culture methods.	ISO 7899-1 or ISO 7899-2	BLG 15/5/5 and BLG 15/5/6	Requires specific knowledge to conduct them. At least 44-h incubation time. EPA Standard Method 9230	To be determined.
Escherichia coli	Culture methods.	ISO 9308-3 or ISO 9308-1	BLG 15/5/5 and BLG 15/5/6	Requires specific knowledge to conduct them. At least 24-h incubation time. EPA Standard Method 9213D	To be determined.

Indicator	General approach	Standard method	IMO citation	Notes	Level of confidence or detection limit and citation for validation studies
Vibrio cholerae (O1 and O139)	Culture and molecular biological or fluorescence methods.	ISO/TS 21872-1/13/	BLG 15/5/5 and BLG 15/5/6	Requires specific knowledge to conduct them. 24-48 h incubation time. US EPA ETV Fykse et al., 2012 (semi-quantitative pass/fail-test) Samples should only be cultured in a specialized laboratory.	To be determined.
Enterococci, *Escherichia coli, Vibrio cholerae (O1 and O139)*	Culture with fluorescense-in-situ hybridization (FISH)	No international standard for ballast water analysis at this time.		Requires specific knowledge to conduct them. Quantitative and qualitative results after 8 h. Samples should only be cultured in a specialized laboratory.	To be determined.
Viable organisms ≥ 50 µm and viable organisms ≥ 10 µm and < 50 µm	Visual counts using stereo-microscopy examination and flow cytometry.	No international Standard for ballast water analysis at this time.	BLG 17/INF.15	A Sampling Protocol that identifies whether a system is broken or not working and producing a discharge that is significantly above the D-2 standard. Designed to detect gross non-compliance with 99.9% confidence. Needs to be Validated.	To be determined.

4.4 **Table 5: General approaches for sampling use when testing for compliance with the BWM Convention**

General approaches for sampling	Discharge line or BW tank	Citation for validation study or use	Sample error and detection limit	Relative sample error amongst approaches
Filter skid + isokinetic sampling	Discharge line	Drake et al., 201First et al., 2012 (land-based testing); shipboard validation underway, Prototype 01, SGS	To be determined	Lower
Cylinder containing plankton net + isokinetic sampling	Discharge line	MEPC 57/INF.17	To be determined	Lower
Sampling tub containing plankton net + isokinetic sampling	Discharge line	Gollasch, 2006 and Gollasch et al., 2007 Cangelosi et al., 2011	To be determined	Lower
Continuous drip sampler + isokinetic sampling	Discharge line	Gollasch and David, 2010, 2013	To be determined	Lower
Grab sample	BW tank	David and Perkovic, 2004; David et al. 2007, BLG14/INF.6	To be determined	Higher

4.5 **Table 6: Sampling and analysis methods/approaches for use when testing compliance with the BWM Convention. A checkmark indicates an appropriate combination of sampling and analysis.**

Analysis type size class or indicator microbe analysis method/approach	**Filter skid + isokinetic sampling**[3]	**Plankton net + isokinetic sampling**	**Continuous drip sampler + isokinetic sampling**	**Grab sample**
Indicative Analysis ≥ 50 µm Visual inspection Stereomicroscopy counts Flow cytometry Nucleic acid ATP *Chlorophyll a,* Bulk *FDA*	✓	✓		
Indicative Analysis < 50 µm and ≥ 10 µm variable fluorometry Flow cytometry Nucleic acid ATP *Chlorophyll a,* bulkBulk *FDA*			✓	✓

[3] Methods other than using an isokinetic approach as defined in Guidelines (G2) for acquiring a representative sample may be used in certain circumstances. Such methods should be validated prior to use.

Analysis type size class or indicator microbe analysis method/approach	**Filter skid + isokinetic sampling**[3]	**Plankton net + isokinetic sampling**	**Continuous drip sampler + isokinetic sampling**	**Grab sample**
Indicative Analysis Enterococci, *E. coli* Fluorometric diagnostics			✓	✓
Indicative Analysis *Vibrio cholerae* Test kits Culture methods + microscopy			✓	✓
Detailed Analysis ≥ 50 µm Stereomicroscopy counts Flow cytometry/Flow camera	✓	✓		
Detailed Analysis < 50 µm and ≥ 10 µm Visual counts + vital stain(s) Flow cytometry/Flow camera Culture methods			✓	
Detailed Analysis Enterococci, *E. coli* Culture methods FISH with pre-cultivation			✓	
Detailed Analysis *Vibrio cholerae* Culture methods FISH with pre-cultivation			✓	

4.6 References

David M & Perkovic M (2004). Ballast Water Sampling as a Critical Component of Biological Invasions Risk Management, Marine Pollution Bulletin, Vol. 49, 313-318.

David M, Gollasch S, Cabrini M, Perkovič M, Bošnjak D & Virgilio D (2007). Results from the First Ballast Water Sampling Study in the Mediterranean Sea – the Port of Koper Study. Marine Pollution Bulletin 54(1), 53-65.

First MR, Lemieux EJ, Hyland WB, Grant JF, Moser CS, Riley SC, Robbins-Wamsley SH, Steinberg MK, Wier TP, Drake LA (2012). Validation of a closed-housing filter skid for in-line sampling of aquatic organisms. Journal of Plankton Research 34:321-331.

Fykse EM, Nilsen T, Nielsen AG, Tryland I, Delacroix S, Blatny JM (2012). Real-time PCR and NASBA for rapid and sensitive detection of *Vibrio cholerae* in ballast water. Marine Pollution Bulletin 64:200-206.

Gollasch S (2006). A new ballast water sampling device for sampling organisms above 50 micron. Aquatic Invasions, Volume 1, Issue 1: 46-50.

Gollasch S, David M, Voigt M, Dragsund E, Hewitt C & Fukuyo Y (2007). Critical review of the IMO International Convention on the Management of Ships' Ballast Water and Sediments. In Hallegraeff, G.M. (ed.): Harmful Algae 6, 585-600.

Gollasch S & David M (2013). Recommendations for Representative Ballast Water Sampling. Final report of research study of the Bundesamt für Seeschifffahrt und Hydrographie (BSH), Hamburg, Germany. Order Number 4500025702. 28 pp.

Gollasch S & David M (2010). Testing Sample Representativeness of a Ballast Water Discharge and developing methods for Indicative Analysis. Final report of research study undertaken for the European Maritime Safety Agency (EMSA), Lisbon, Portugal, 124 pp.

Steinberg MK, Lemieux EJ, Drake LA (2011). Determining the viability of marine protists using a combination of vital, fluorescent stains. Marine Biology 158:1431-1437.

U.S. Environmental Protection Agency (2010). Environmental Technology Verification Program (ETV) Generic protocol for the verification of ballast water treatment technology, Version 5.1. Report number EPA/600/R-10/146, United States Environmental Protection Agency, Washington, D.C.

Welschmeyer N & Maurer B (2012). A portable, sensitive plankton viability assay for IMO shipboard ballast water compliance testing. In: Proceeding of the Global R and D forum on Compliance Monitoring and Enforcement, Eds. A. Olgun, F.T. Karokoc and F. Haa.

Throndsen, J (1978). Chapter 7.6: The dilution-culture method. In Phytoplankton manual, Ed: Sourina, A., UNESCO, France, p. 218-224.

ANNEX 2

TECHNICAL DISCUSSION FOR THE GUIDANCE TO BALLAST WATER SAMPLING AND ANALYSIS IN ACCORDANCE WITH THE BWM CONVENTION AND GUIDELINES (G2)

1 INTRODUCTION

1.1 The purpose of this annex is to provide background information on:

.1 the development and use of methodologies for both indicative and detailed analysis and appropriate sampling; and

.2 analysis of the sample at an accredited laboratory.

1.2 This annex highlights the advantages, disadvantages and limitations of many different measures. Although recommendations are given in this document on what methodologies may be used, there are distinct benefits in using certain technologies at certain times. This should not stop the use of any of the methodologies, as long as the limitations are taken into account.

1.3 Any methods for analysis used for assessing compliance with the BWM Convention should be carefully validated under a range of operating conditions.

2 INDICATIVE ANALYSIS: METHODOLOGY AND APPROACHES

2.1 The D-1 standard

2.1.1 The D-1 standard requires the vessel to exchange its ballast water 200 nm from the coastline in waters 200 m deep, or if this cannot be achieved for safety reasons, 50 nm from the coastline in waters of the same depth. Therefore, the water in exchanged ballast water should have a similar salinity to that of mid-ocean water.

2.1.2 Indicative analysis for the D-1 standard of the BWM Convention could rely on the chemical parameters (e.g. salinity) of the water in the ballast water discharge, or on an estimate of species present. However, the latter might need trained personnel. If the ballast water discharge being tested has a salinity significantly less than that of 30 PSU, then it is likely that the ballast water has not been exchanged en route under the conditions required in the D-1 standard, or that the exchange has not been completed successfully.

2.1.3 Two exceptions to this are:

.1 when ballast water is taken up in port areas that are located in high-salinity environments, above 30 PSU. In such a case ballast water with a PSU of 30 may not originate from mid-ocean waters and therefore the ship may not be compliant with the D-1 standard; or

.2 when ballast water has been exchanged in designated ballast water exchange areas within 50 nm from the coastline in waters that may be of less salinity than the mid-ocean water. In this case the ballast water exchange would be compliant.

Therefore, the origin of the last ballast water exchange should be known before interpreting the results of salinity analysis.

2.1.4 Checking salinity could be backed up by further analysis of the organisms in the ballast water discharge to determine the origin of the ballast water; however, this would take time and need experienced staff. This can be done in line with the visual analysis methodologies outlined in paragraph 2.4.3 below. However, it should be noted that there are many external factors that could affect the salinity and the organisms in the ballast water, such as wet sediments in the ballast tanks, the state of the tide in the port concerned during its uptake and the fact that exchange may not remove all coastal organisms.

2.1.5 There are many ways to quickly and easily monitor the salinity of water on the market, and generic salinity measures should be used for indicative analysis.

2.2 Bacteria levels in the D-2 standard

2.2.1 Bacterial levels could be tested by a wealth of available portable methods. However, as the D-2 standard for bacteria is measured in colony forming units (CFU), the systems utilized may have to include a specific incubation time of the samples, which for commercially available systems is never shorter than four hours. Therefore, the time it takes for incubation limits the use of such systems for indicative analysis.

2.2.2 Advances in fluorometric diagnostics have resulted in a methodology that identifies the presence or absence of bacteria in a sample of the ballast water discharge. This methodology is based upon the detection of enzymes produced by the target bacteria in unconcentrated fresh water or marine samples and presently easily portable test kits for E. coli and Enterococci are available. This method can identify low levels of bacteria in water samples in less than 10 minutes, but the results are only semi-quantitative, i.e. a low level reading equates to a low level of bacteria. However, although the presence of bacteria can be shown, whether or not these organisms are living (i.e. form colonies) cannot be proven with this method at the present time. These diagnostic methods could be used in indicative analysis if very large numbers of organisms are identified.

2.3 Organisms of less than 50 micrometres and greater than or equal to 10 micrometres in minimum dimension[1] in the D-2 standard

2.3.1 Methods to measure the organisms in this category of the D-2 standard can be divided into two categories as follows:

.1 the use of biological indicators for organisms:

.1 nucleic acid;

.2 adenosine triphosphate (ATP), a coenzyme used as the main energy storage and transfer molecule in the cells of all known organisms; and

.3 indicators for the presence of organisms, such as *chlorophyll a*;

[1] The "Minimum Dimension" means the minimum dimension of an organism based upon the dimensions of that organism's body, ignoring e.g. the size of spines, flagellae or antenna. The minimum dimension should therefore be the smallest part of the "body", i.e. the smallest dimension between main body surfaces of an individual when looked at from all perspectives. For spherical shaped organisms, the minimum dimension should be the spherical diameter. For colony forming species, the individual should be measured as it is the smallest unit able to reproduce that needs to be tested in viability tests. This should be considered whenever size is discussed in this document.

.2 the use of direct counts of living organisms (coupling a means to determine viability and manual or automatic counting of individual organisms).

2.3.2 The presence of nucleic acid or ATP in a sample may be taken as an indication of life, but it should be noted that this nucleic acid or ATP could come from any living organism of any size within the sample. There are no definitive methods available to correlate the amount of nucleic acid or ATP with the amount, or viability of organisms in the sample and, therefore, the presence of these chemicals are limited as an indicative analysis methodology. However, zero measurements of these chemicals may indicate that no organisms are in the sample, i.e. the treatment process was successful and in the D-2 standard is being met. Additionally, if nested filters are used to isolate specific size groups, then ATP, which degrades relatively quickly, can provide an indication of the potential presence of a large concentration of organisms in one size class. If linked to thresholds of ATP concentrations, this can be used to indicate samples which are highly likely to be above the standard.

2.3.3 The same problems occur when using other bio-chemical indicators to monitor the number of organisms in this category. As many of the organisms in this size range are likely to be phytoplankton, an obvious step would be to measure the level of *chlorophyll a*, a photosynthetic pigment which is essential for photosynthesis in the sample. Zero concentrations may indicate that there is no phytoplankton in the sample and chlorophyll *a* may also be a good indicator as to whether a BWMS using an oxidizing process was working to design dosages, as it might be expected to bleach such pigments. However, caution has to be exercised as:

.1 *chlorophyll a* can persist in seawater outside of a cell, therefore sampling should only be limited to the particulate phase. However, nucleic acid and ATP can exist in dead organisms, detrital material, senescent or dead cells, decomposing macroalgae, plant detritus from terrestrial ecosystems and other non-living particles, etc.;

.2 there may be zooplankton in the sample being analysed;

.3 no cell count can be directly measured from a *chlorophyll a* measurement, as many small cells may provide a similar signal strength to that of fewer bigger cells; and

.4 no size distinction can be made and the *chlorophyll a* could derive from phytoplankton in the larger size category of the D-2 standard.

As a consequence, direct concentration measurements of this chemical would be difficult to use in indicative analysis. A wealth of portable tools exists to document the *chlorophyll* a content in seawater.

2.3.4 One potential exception is the Pulse-Amplitude Modulated Fluorometer (PAM) which measures the *chlorophyll a* fluorescence in living cells by exciting *chlorophyll a* molecules and registering the subsequent fluorescent signal. Such a response is only available in living cells and it should be noted that this method only provides an indirect measurement of those phytoplankton that use *chlorophyll a* in the sample, in both size categories of the D-2 standard. Testing this methodology on ballast water discharges suggests that there is a correlation between the ratio of variable and maximum fluorescence and the number of phytoplankton in this size category. However, the relationship between fluorescence signals and mixed assemblages of phytoplankton from different locations needs to be validated.

2.3.5 For analysis of organisms above 10 microns in minimum dimension, a flow cytometer may also be used. A common element of these systems is that they automatically count objects, including organisms, per size class in a fluid. The more simplified systems cannot separate organisms from sediment and detritus, or living from dead organisms. More sophisticated systems can also assess organism viability for phytoplankton by using organism stains together with flow cytometry. The separation of living phytoplankton from detrital material and zooplankton is based on the presence of auto chlorophyll fluorescence of phytoplankton cells. It should be noted, however, that using *chlorophyll a* fluorescence as an indicator of living organisms may result in over counting, as the molecule can remain intact for a significant amount of time as has been proved in preparing fixed (dead) samples. The practicability to use such devices on board a ship should be carefully assessed before use. To make a stable stream to produce adequate size of water particles, the device should be set in perfectly horizontal. Also any vibration should be isolated for accurate measurement.

2.3.6 Systems using flow cytometry deliver automated results promptly and may be used to assess the number of living phytoplankton in a sample after treatment with a viability stain. However, readings provided by the flow cytometer should also be examined manually to verify the automated readings. Concerns have been raised by users that the viability of smaller algae may not always be categorized correctly in these systems, as the viability signal may be too low for detection. Other concerns include the efficiency of portable versions and the limited ability of some of them to monitor organisms greater than or equal to 50 micrometres in minimum dimension. Although these systems may become a major tool in the future, there are elements, such as the reliability of portable versions of the systems that limit their use at the present time, which is especially the case for organisms greater than or equal to 50 micrometres in minimum dimension. Also, it is not clear if the time to analyse a sample is greater than can be allotted in compliance testing. These can be overcome by taking the sample off the ship and using a fixed or mobile system near to the ship or the port.

2.3.7 Visual inspection could be another method of indicative analysis that is a quick and simple way to justify the need for detailed analysis. Taking an appropriate sample, concentrating it if necessary, and visually inspecting it against the light may show living organisms in the sample, but it should be noted that without magnification a visual inspection is likely to result in only organisms greater than or equal to 1,000 micrometres in minimum dimension being detected, unless chains or clumps are formed by colony forming organisms or the density of organisms is sufficiently large to colour the water. An assessment of the viability in such an inspection is limited to complete body movements of the organisms as organ activity and antennae or flagella movements may not be seen. As samples from BWMS that are not compliant are likely to contain organism levels that are orders of magnitude above the D-2 performance standard, visual inspections could be used in indicative analysis. However, it is assumed that only organisms bigger than 1,000 micrometres in minimum dimension may be determined in such way, therefore its use for this size category is limited.

2.3.8 Visual inspection can also be undertaken using a field stereomicroscope with a low magnification (e.g. x 10). However, this methodology may require concentration of the sample and may need analysis by a trained operator to detect viable organisms. It should also be noted that this methodology would be more efficient and practicable for organisms greater than or equal to 50 micrometres in minimum dimension.

2.4 Organisms greater than or equal to 50 micrometres in minimum dimension in the D-2 standard

2.4.1 Many of the methodologies for monitoring organisms less than 50 micrometres and greater than or equal to 10 micrometres in minimum dimension may also be valid for monitoring organism levels in this category. However, nucleic acid and ATP methodologies encounter the same problems as outlined in paragraphs 2.3.2 and 2.3.3; and monitoring *chlorophyll a* levels, through fluorometers or the PAM methodology described above, has limited value for this size category of the D-2 standard, as the majority of organisms in this category are likely to be zooplankton.

2.4.2 Visual inspections may significantly underestimate the number of organisms in this size category due to the issues described in paragraph 2.3.8. However, the method may be robust enough to determine whether the BWMS is working at orders of magnitude above the D-2 standard based on a simple extrapolation from the sample to the D-2 standard. Detailed analysis may be needed to confirm this, especially when levels near the D-2 standard are encountered.

2.4.3 Additionally, stereomicroscopy can also be used to identify viable organisms greater than or equal to 50 micrometres in minimum dimension. The sample should be concentrated appropriately. Viability assessment should be based on movements of intact organisms. This movement may be stimulated. In addition organ activity should be observed and fully intact non-moving organisms which show organ activity should be counted as living. Stains might also be used to help in viability determination – though methods are still under development. The viable organism numbers should be recorded and the numbers extrapolated up to the total volume of water filtered.

2.4.4 If the results in paragraphs 2.4.2 and 2.4.3 show elevated levels of organisms, then this result will indicate that the D-2 standard is not being met.

2.4.5 Further research must be encouraged; innovative methods for assessing for D-2 compliance, preferably based on in situ, automatic sampling and analytical procedures, should facilitate the most uniform implementation of the BWM Convention.

2.5 Operational indicators

Other indirect parameters and indicators could be used to indicate whether a BWMS is meeting the D-2 standard. These include, but are not limited to, indicators from the electronic self-monitoring of the BWMS and residual chemicals (or lack of) from the BWMS, such as dissolved oxygen levels, residual chlorine, etc.

3 DETAILED ANALYSIS METHODOLOGIES AND APPROACHES

Once detailed analysis has been instigated by the port State, they should be prepared to undertake full analysis of the sample at an appropriate laboratory.

3.2 Bacteria

3.2.1 There are already international standards in place to analyse for the bacteriological indicators contained within the D-2 standard.

3.2.2 For Enterococci, ISO 7899-1 or 7899-2; or Standard Method 9230 (in the United States) should be used, and ISO 9308-3, ISO 9308-1 or Standard Method 9213D (in the United States) are appropriate for Escherichia coli.

The methods used should be quantitative and based on a 95-percentile statistical evaluation. The number of laboratory samples should be sufficient to define the mean and standard deviation of Log 10 bacterial enumerations.

3.2.3 For *Vibrio cholerae* ISO/TS 21872-1/13 is appropriate. 100 ml of ballast water should be filtered and incubated according to ISO/TS 21872-1. Analysis needs to be undertaken in a specialist laboratory.

3.3 Organisms of less than 50 micrometres and greater than or equal to 10 micrometres in minimum dimension

3.3.1 Many of the analysis methods used to ascertain the numbers of organisms within this category have already been discussed in section 2. However, section 2 focuses on indicative analysis, rather than the more detailed analysis. Therefore, the following sections examine these methodologies in more detail. Some of these methodologies discussed here also relate to organisms greater than or equal to 50 micrometres in minimum dimension.

3.3.2 Simple upright and inverted microscopes are very useful for the enumeration of morphologically healthy organisms and motile organisms, as well as for measuring the size of organisms. Using this technology needs some skill and experience to evaluate the health of the individual organisms in the sample. However, this technology and experience should be available globally.

3.3.3 Fluorescence generated from photosynthetic pigments can be used for more detailed analysis of the morphological health of organisms and for the evaluation of stained organisms and a microscope with fluorescence capabilities is needed. However, this methodology only identifies phytoplankton (both living and dead) in the sample and makes no size differentiation. Zooplankton should be analysed through the methods highlighted in section 3.4.

3.3.4 Fluorescein di-acetate (FDA), chloromethylfluorescein diacetate (CMFDA) and Calcein-AM vital stains have both been used to determine viability. When non-specific esterases (enzymes found in live cells) are present, they cleave the acetate groups from the stains, and the resultant fluorescein molecules fluoresce green when illuminated with a blue light from an epi-fluorescence microscope. This method works best with live samples. Microscopes with a fluorescence capability and operators with skills and experience of analysis should be available at universities and research laboratories worldwide. However, it should be noted that these stains do not always work on all species or at all salinities and further research to validate this approach may be needed to support the use of these stains for this type of analysis.

3.3.5 Flow cytometers are advanced technologies which can be used in a laboratory to determine size, and viability of organisms in ballast water when a reliable vital stain(s) is (are) used to indicate organism viability. Cytometer detected particles, including organisms, can be processed visually or by a computer to quantify viable organisms in that sample. These systems reduce manual labour, but require specific knowledge to operate them. High particle loads in ballast water may reduce the detection limits of these methodologies and the volume of samples analysed. At present, portable versions of these technologies have not fully been proven for use on ballast water discharges, however, samples could be taken off the ship and analysed using a fixed or mobile system near to the ship or the port.

3.3.6 Regrowth experiments, in which the visual appearance of photosynthetic organisms in a sample is followed by a specific period in order to quantify the Most Probable Number (MPN), are methods to evaluate the number of organisms in a sample. However, these are

slow and are work intensive. In addition, a major drawback of this methodology may be that specific growth factors during the incubation may not be fulfilled, giving a risk of bias. Regrowth and reproduction may be seasonably variable, giving different results at different times. Further, a viable organism may be in good health and reproducing rapidly, or in poor health, not reproducing until health has improved. Finally, this is likely to be time-consuming.

3.3.7 Bulk parameter measurements, such as photosynthetic activity, are also not suitable for detailed analysis (please see paragraphs 2.3.2 and 2.3.3), but can be used as supporting data for other methods used to determine the number of viable organisms in the ballast water samples.

3.3.8 Planktonic organisms may be fragile and samples may need to be concentrated further to aid the accurate quantification of organisms. There are many methods to achieve this, however, care has to be taken to reduce physical stress as this may result in reduced viability levels. A simple, rapid, flexible and cautious method for concentrating plankton cells is the use of transparent membrane filters. If the sample analysis is performed on board the sample can be filtered directly on to this membrane, which can subsequently be placed directly under a microscope for examination. The sample volume to be analysed would need to be adjusted depending on the cell density, however, live, vital stained and fixed organisms within this size category can be evaluated on these filters. If the representative analysis is performed at a laboratory, this process for concentration should be performed at the laboratory just before starting the staining process to avoid under-estimate of viable organisms. Importantly, the loss (if any) of organisms (i.e. those cells passing through the filter and recovered in the filtrate) would need to be determined. Alternatively, a filter mesh may be used to concentrate the sample and the concentrated organisms may, after filtration, be transferred into an observation chamber. Again, the loss of organisms through damage must be quantified.

3.4 Organisms greater than or equal to 50 micrometres in minimum dimension in the D-2 standard

3.4.1 Paragraphs 3.3.2 to 3.3.8 are also applicable to the analysis of organisms in this size category.

3.4.2 In addition, the following issues need to be considered when developing a methodology for analysing organism numbers in this size category:

.1 testing the sample for movement and response to different stimuli are simple techniques for the examination of viable/dead zooplankton under a stereomicroscope. The observation for organ activity, such as heartbeats, may also contribute to the viability assessment. The use of a filtering mesh (e.g. 50 microns in diagonal dimension) under the Petri dish of the stereomicroscope, or the addition of 50 micron micro beads to the sample, may help with size calculations and vital stains may also add value to these methodologies. Separate guidelines on this issue are being developed through the land-based facilities and the ETV protocol in the United States;

.2 methods using a combination of flow cytometry and microscopy have the disadvantage of high complexity, high price and small sample sizes, which means the ballast water samples would have to be concentrated further; and

.3 the storage condition and time before analysis is likely to be critical to reduce mortality in the sample.

3.4.3 It is therefore recommended that simple microscopic examination of organisms in this size category is used for compliance monitoring. The microscopic examination of organisms is a robust, simple and cheap methodology which can be completed in laboratories worldwide.

4 SOURCES OF ERROR

4.1 The ideal method for compliance monitoring is a procedure that:

.1 detects organisms in the ballast water discharge;

.2 has an appropriate limit of detection;

.3 is precise;

.4 is accurate;

.5 is economical;

.6 is quick;

.7 can be carried out with minimal technical expertise; and

.8 can be obtained in all parts of the world.

However, any result obtained would have to include confidence limits based on both the sampling error and analytical error.

4.2 Sources of error include, but are not limited to, errors arising within:

.1 sampling, including:

.1 sample loss (e.g. during filtration);

.2 incorrect use of equipment;

.3 day-to-day variations in the conditions in which the sampling is taking place; and

.4 the experience of the technicians;

.2 processing the sample, including:

.1 incorrect use of equipment;

.2 day-to-day variations in the conditions in which the sampling is taking place; and

.3 the experience [and fatigue] of the technicians;

.3 analysis of the sample:

.1 incorrect use of equipment;

.2 the experience [and fatigue] of the technicians;

.3 day-to-day variations in the conditions in which the sampling is taking place;

.4 the number of organisms counted. The distribution of organisms in a range of samples usually follows the Poisson distribution and higher numbers of samples give a lower relative variation and sample error;

.5 the inherent variation and errors arising from the methods used for analysis. This is especially so when the evaluation of organism numbers in a sample is based on manual counting methods due to human error. For example, although the definition of the minimum dimension of an organism in Guidelines (G2) is quite detailed, analytical results may be influenced by practical issues. These include situations when the size of an organism is determined on a two dimensional microscope, which cannot view the organism "from all perspectives"; and

.6 poor harmonization between laboratories and quality control within the laboratory. In the field of chemical analysis, inter-laboratory calibration occurs and is tested. Inter-laboratory calibration of biological samples is also common practice, but the difficulty in the compliance monitoring context is that the viability of the organisms needs to be documented and the viability may be impaired by the mode and duration of sample shipments to different laboratories. Therefore, laboratories should be well managed, and uncertainty limits (the analysis variation) should be calculated for each laboratory. This should be achieved in conjunction with ISO 17025, which provides a standard for the general requirements needed by laboratories to prove they are competent to carry out tests and/or calibrations, including sampling.

4.3 The variation arising from sampling should be added to that from analysis to determine the confidence limits within which the true value of the organism number lies. This has an important bearing on how the result can be used for enforcement of the BWM Convention.

4.4 The sampling uncertainty can be obtained by setting up a null–hypothesis, that is a general or default position that is expected in the results, e.g. the average concentration of organisms is equal to the D-2 standard at a selected level of significance and then the data would be analysed using one of the following tests:

Table 1: Statistical handling of the results

Distribution of the results	Test	Notes
Normal distribution	t-test	It is unlikely this test will be used, as it is not used with "rare" populations, i.e. the expected population of organisms in treated ballast water
A distribution that is not normal	Non-parametric Wilcoxon rank test	Not normal due to the small number of samples
Poisson distribution	Chi-square test	Used when the analytical results are treated as one sample (i.e. the numbers of organisms over the entire volume are very rare [low] and combined).

Ideally, an analysis of the distribution should be performed before the data are statistically evaluated.

4.5 There has been much discussion within the IMO on whether the results of the analysis should be averaged to assess compliance or that every result should have to meet the D-2 standard. This is a unique debate at IMO due to the biological nature of the subject matter being analysed, and different States have significantly different views on this issue. Therefore, it will be very difficult to arrive at a conclusion as in the case of non-compliance the results of the analysis are likely to be used in the legal jurisdictions of each IMO Member State, and each of those States may require different evidence to support any enforcement action.

4.6 If the results of detailed analysis are to be averaged, then both the sample variation and the analysis variation need to be calculated and applied to the result. However, some analysis of the sample variation may be needed, as it may be unacceptably high. For example, for five treated ballast water samples, viable organism number results of 9,9,9,9 and 9 will provide the same average as 0,0,0,0 and 45. Both systems would pass the D-2 standard, if averaged; however, the variation is considerably bigger for the second set of results and may prove to be unacceptable because of the one large value.

4.7 If each of the results is treated as an individual value that has to meet the D-2 standard, then again the confidence limits would have to be calculated from the sampling and analytical errors. Here if all results are less than the D-2 standard, then the sampling has proved that the BWMS is meeting the standard.

4.8 The basic difference between instantaneous and average approaches is that the results of the average approach describe the variations of the concentration of organisms during the deballasting event, whereas the results of the instantaneous approach describes the variation based on the assumptions of the Poisson distribution. However, the average approach, based on the results of a few samples, has the disadvantage that the variation may be too high, is unacceptable and needs to be improved, which could invalidate the evaluation and lead to inconclusive results.

4.9 The instantaneous approach has the disadvantage that variations in the organism levels at different times of the discharge are not taken into account, which should not be a problem if all the samples meet the D-2 standard. If the discharge is not always under the D-2 standard, the problem can be mitigated by using a flow-integrated sample over set periods of time, which, if taken properly, represents an average of the organisms in the treated ballast water over that time when presented with variance estimates and confidence intervals. This constitutes a better representation of the ballast water quality than separate samples. In addition, a lower variation should be obtained because a larger sample is being analyzed. The average approach is likely to have the same disadvantages unless the samples are very large and collected over most of the discharge.

4.10 The differences between applying an instantaneous sampling regime or an average sampling regime to the result are less extreme when taking numerous flow-integrated samples. This is because for each discharge there will be a number of results arising from samples that have been averaged over a specific time.

5 DETAILED ANALYSIS: THE SAMPLE PROTOCOL

5.1 Sample protocols for discharges of treated ballast water through a distinct discharge point fall into two categories, the first based on specified and replicated volumes and the second based on flow integration over a specified time. The first entails taking a specific number of set volumes of the ballast water discharge, whilst the second takes a continuous sample over a set time period. The flow integration sampling protocol can be achieved by either continuously sub-sampling a small amount throughout the entire duration of the discharge, therefore collecting one sample over time, or taking multiple sub-samples over a specific time scale (i.e. 5 minutes, 10 minutes or 15 minutes) repeatedly throughout the discharge, providing a result for each sub-sample.

5.2 However, for sampling protocols based on specified and replicated volumes, defining both the number of samples and their volume to ensure representativeness, takes time. As a representative sampling procedure is needed to ensure compliance with the BWM Convention, then the flow integration protocols based on set times should be implemented.

5.3 Using a sampling protocol that continuously sub-samples small amounts throughout the entire duration of the discharge, may significantly underestimate the amount of larger organisms (i.e. organisms greater than or equal to 50 micrometres in minimum dimension) in the sample due to damage to the organisms held in the cod-end of the filter. If such a system is used then a protocol for replacing the cod end needs to be developed.

5.4 The arrangements for detailed analysis should take into account the requirements of the methods and/or approaches they intend to use for detailed and/or indicative analysis. Special consideration should be given and contingencies arranged for sampling in remote ports, where it is likely to take time to mobilize samplers and sampling resources.

6 DETAILED METHODOLOGY

6.1 As described in paragraph 5.1, there are two distinct ballast water sampling protocols, one based on flow integration and one based on the use of specified and replicated volumes. As they both use filtration and concentration of the sample the following section can apply to both methods.

6.2 For in-line sampling, a sampling system should be set up which:

.1 collects organisms greater or equal to 50 µm;

.2 allows samples of the ballast water to be taken and filtered;

.3 enables the amount of ballast water sampled to be measured to allow for extrapolation of the results; and

.4 allows the filtered ballast water to be discharged safely without affecting the stability and safety of the ship, its crew and the samplers, or other discharges from the vessel such as bilge water.

***

ANNEX 12

DRAFT MEPC RESOLUTION

2015 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that the International Conference on the Safe and Environmentally Sound Recycling of Ships held in May 2009 adopted the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (the Hong Kong Convention) together with six Conference resolutions,

NOTING that regulations 5.1 and 5.2 of the annex to the Hong Kong Convention require that ships shall have on board an Inventory of Hazardous Materials which shall be prepared and verified taking into account guidelines, including any threshold values and exemptions contained in those guidelines, developed by the Organization,

NOTING ALSO resolution MEPC.197(62) by which the Committee adopted *Guidelines for the development of the Inventory of Hazardous Materials* (the Guidelines) and resolved to keep them under review,

RECOGNIZING the need to improve the guidance on threshold values and exemptions, as contained in the Guidelines,

HAVING CONSIDERED, at its sixty-eighth session, the recommendation made by the Sub-Committee on Pollution Prevention and Response, at its second session,

1 ADOPTS the *2015 Guidelines for the development of the Inventory of Hazardous Materials* as set out in the annex to this resolution;

2 INVITES Member Governments to apply the 2015 Guidelines as soon as possible, or latest when the Convention enters into force;

3 AGREES to keep the 2015 Guidelines under review in the light of experience gained with their application;

4 SUPERSEDES the Guidelines adopted by resolution MEPC.197(62).

ANNEX

2015 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS

1 INTRODUCTION

1.1 Objectives

These guidelines provide recommendations for developing the Inventory of Hazardous Materials (hereinafter referred to as "the Inventory" or "the IHM") to assist compliance with regulation 5 (Inventory of Hazardous Materials) of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (hereinafter referred to as "the Convention").

1.2 Application

These guidelines have been developed to provide relevant stakeholders (e.g. shipbuilders, equipment suppliers, repairers, shipowners and ship management companies) with the essential requirements for the practical and logical development of the Inventory.

1.3 Objectives

The objectives of the Inventory are to provide ship-specific information on the actual hazardous materials present on board, in order to protect health and safety and to prevent environmental pollution at ship recycling facilities. This information will be used by the ship recycling facilities in order to decide how to manage the types and amounts of materials identified in the Inventory of Hazardous Materials (regulation 9 of the Convention).

2 DEFINITIONS

The terms used in these guidelines have the same meaning as those defined in the Convention, with the following additional definitions which apply to these guidelines only.

2.1 *Exemption* (as referred to in regulation 5 of the Convention) means materials specified in paragraph 3.3 in these guidelines that do not need to be listed on the IHM, even if such materials or items exceed the IHM threshold values.

2.2 *Fixed* means the conditions that equipment or materials are securely fitted with the ship, such as by welding or with bolts, riveted or cemented, and used at their position, including electrical cables and gaskets.

2.3 *Homogeneous material* means a material of uniform composition throughout that cannot be mechanically disjointed into different materials, meaning that the materials cannot, in principle, be separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

2.4 *Loosely fitted equipment* means equipment or materials present on board the ship by the conditions other than "fixed", such as fire extinguishers, distress flares, and lifebuoys.

2.5 *Product* means machinery, equipment, materials and applied coatings on board a ship.

2.6 *Supplier* means a company which provides products; which may be a manufacturer, trader or agency.

2.7 *Supply chain* means the series of entities involved in the supply and purchase of materials and goods, from raw materials to final product.

2.8 *Threshold value* is defined as the concentration value in homogeneous materials.

3 REQUIREMENTS FOR THE INVENTORY

3.1 Scope of the Inventory

The Inventory consists of:

Part I: Materials contained in ship structure or equipment;

Part II: Operationally generated wastes; and

Part III: Stores.

3.2 Materials to be listed in the Inventory

3.2.1 Appendix 1 of these guidelines (Items to be listed in the Inventory of Hazardous Materials), provides information on the hazardous materials that may be found on board a ship. Materials set out in appendix 1 should be listed in the Inventory. Each item in appendix 1 of these guidelines is classified under tables A, B, C or D, according to its properties:

.1 table A comprises the materials listed in appendix 1 of the Convention;

.2 table B comprises the materials listed in appendix 2 of the Convention;

.3 table C (Potentially hazardous items) comprises items which are potentially hazardous to the environment and human health at ship recycling facilities; and

.4 table D (Regular consumable goods potentially containing hazardous materials) comprises goods which are not integral to a ship and are unlikely to be dismantled or treated at a ship recycling facility.

3.2.2 Tables A and B correspond to part I of the Inventory. Table C corresponds to parts II and III and table D corresponds to part III.

3.2.3 For loosely fitted equipment, there is no need to list this in part I of the Inventory. Such equipment which remains on board when the ship is recycled should be listed in part III.

3.2.4 Those batteries containing lead acid or other hazardous materials that are fixed in place should be listed in part I of the Inventory. Batteries that are loosely fitted, which includes consumer batteries and batteries in stores, should be listed in part III of the Inventory.

3.2.5 Similar materials or items that contain hazardous materials that potentially exceed the threshold value can be listed together (not individually) on the IHM with their general location and approximate amount specified there (hereinafter referred to as "Bulk Listing"). An example of how to list those materials and items is shown in row 3 of table 1 of appendix 3.

3.3 Exemptions – Materials not required to be listed in the Inventory

3.3.1 Materials listed in Table B that are inherent in solid metals or metal alloys, such as steels, aluminium, brasses, bronzes, plating and solders, provided they are used in general construction, such as hull, superstructure, pipes or housings for equipment and machinery, are not required to be listed in the Inventory.

3.3.2 Although electrical and electronic equipment is required to be listed in the Inventory, the amount of hazardous materials potentially contained in printed wiring boards (printed circuit boards) installed in the equipment does not need to be reported in the Inventory.

3.4 Standard format of the Inventory of Hazardous Materials

The Inventory should be developed on the basis of the standard format set out in appendix 2 of these guidelines: Standard format of the Inventory of Hazardous Materials. Examples of how to complete the Inventory are provided for guidance purposes only.

3.5 Revision to threshold values

Revised threshold values in tables A and B of appendix 1 should be used for IHMs developed or updated after the adoption of the revised values and need not be applied to existing IHMs and IHMs under development. However, when materials are added to the IHM, such as during maintenance, the revised threshold values should be applied and recorded in the IHM.

4 REQUIREMENTS FOR DEVELOPMENT OF THE INVENTORY

4.1 Development of part I of the Inventory for new ships[1]

4.1.1 Part I of the Inventory for new ships should be developed at the design and construction stage.

4.1.2 *Checking of materials listed in table A*

During the development of the Inventory (part I), the presence of materials listed in table A of appendix 1 should be checked and confirmed; the quantity and location of table A materials should be listed in part I of the Inventory. If such materials are used in compliance with the Convention, they should be listed in part I of the Inventory. Any spare parts containing materials listed in table A are required to be listed in part III of the Inventory.

[1] In ascertaining whether a ship is a "new ship" or an "existing ship" according to the Convention, the term "a similar stage of construction" in regulation 1.4.2 of the annex to the Convention means the stage at which:

.1 construction identifiable with a specific ship begins: and

.2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

4.1.3 *Checking of materials listed in table B*

If materials listed in table B of appendix 1 are present in products above the threshold values provided in table B, the quantity and location of the products and the contents of the materials present in them should be listed in part I of the Inventory. Any spare parts containing materials listed in table B are required to be listed in part III of the Inventory.

4.1.4 *Process for checking of materials*

The checking of materials as provided in paragraphs 4.1.2 and 4.1.3 above should be based on the Material Declaration furnished by the suppliers in the shipbuilding supply chain (e.g. equipment suppliers, parts suppliers, material suppliers).

4.2 Development of part I of the Inventory for existing ships

4.2.1 In order to achieve comparable results for existing ships with respect to part I of the Inventory, the following procedure should be followed:

.1 collection of necessary information;

.2 assessment of collected information;

.3 preparation of visual/sampling check plan;

.4 onboard visual check and sampling check; and

.5 preparation of part I of the Inventory and related documentation.

4.2.2 The determination of hazardous materials present on board existing ships should, as far as practicable, be conducted as prescribed for new ships, including the procedures described in sections 6 and 7 of these guidelines. Alternatively, the procedures described in this section may be applied for existing ships, but these procedures should not be used for any new installation resulting from the conversion or repair of existing ships after the initial preparation of the Inventory.

4.2.3 The procedures described in this section should be carried out by the shipowner, who may draw upon expert assistance. Such an expert or expert party should not be the same as the person or organization authorized by the Administration to approve the Inventory).

4.2.4 Please refer to appendix 4 (Flow diagram for developing part I of the Inventory for existing ships) and appendix 5 (Example of development process for part I of the Inventory for existing ships.

4.2.5 *Collection of necessary information (step 1)*

The shipowner should identify, research, request and procure all reasonably available documentation regarding the ship. Information that will be useful includes maintenance, conversion and repair documents; certificates, manuals, ship's plans, drawings and technical specifications; product information data sheets (such as Material Declarations); and hazardous material inventories or recycling information from sister ships. Potential sources of information could include previous shipowners, the ship builder, historical societies, classification society records and ship recycling facilities with experience working with similar ships.

4.2.6 *Assessment of collected information (step 2)*

The information collected in step 1 above should be assessed. The assessment should cover all materials listed in table A of appendix 1; materials listed in table B should be assessed as far as practicable. The results of the assessment should be reflected in the visual/sampling check plan.

4.2.7 *Preparation of visual/sampling check plan (step 3)*

4.2.7.1 To specify the materials listed in appendix 1 of these guidelines, a visual/sampling check plan should be prepared taking into account the collated information and any appropriate expertise. The visual/sampling check plan should be based on the following three lists:

.1 List of equipment, system and/or area for visual check (any equipment, system and/or area specified regarding the presence of the materials listed in appendix 1 by document analysis should be entered in the List of equipment, system and/or area for visual check);

.2 List of equipment, system and/or area for sampling check (any equipment, system and/or area which cannot be specified regarding the presence of the materials listed in appendix 1 by document or visual analysis should be entered in the List of equipment, system and/or area as requiring sampling check. A sampling check is the taking of samples to identify the presence or absence of hazardous material contained in the equipment, systems, and/or areas, by suitable and generally accepted methods such as laboratory analysis); and

.3 List of equipment, system and/or area classed as "potentially containing hazardous material" (any equipment, system and/or area which cannot be specified regarding the presence of the materials listed in appendix 1 by document analysis may be entered in the List of equipment, system and/or area classed as "potentially containing hazardous material" without the sampling check. The prerequisite for this classification is a comprehensible justification such as the impossibility of conducting sampling without compromising the safety of the ship and its operational efficiency).

4.2.7.2 Visual/sampling checkpoints should be all points where:

.1 the presence of materials to be considered for the Inventory part I as listed in appendix 1 is likely;

.2 the documentation is not specific; or

.3 materials of uncertain composition were used.

4.2.8 *Onboard visual/sampling check (step 4)*

4.2.8.1 The onboard visual/sampling check should be carried out in accordance with the visual/sampling check plan. When a sampling check is carried out, samples should be taken and the sample points should be clearly marked on the ship plan and the sample results should be referenced. Materials of the same kind may be sampled in a representative manner. Such materials are to be checked to ensure that they are of the same kind. The sampling check should be carried out drawing upon expert assistance.

4.2.8.2 Any uncertainty regarding the presence of hazardous materials should be clarified by a visual/sampling check. Checkpoints should be documented in the ship's plan and may be supported by photographs.

4.2.8.3 If the equipment, system and/or area of the ship are not accessible for a visual check or sampling check, they should be classified as "potentially containing hazardous material". The prerequisite for such classification should be the same prerequisite as in section 4.2.7. Any equipment, system and/or area classed as "potentially containing Hazardous Material" may be investigated or subjected to a sampling check at the request of the shipowner during a later survey (e.g. during repair, refit or conversion).

4.2.9 *Preparation of part I of the Inventory and related documentation (step 5)*

If any equipment, system and/or area is classed as either "containing hazardous material" or "potentially containing hazardous material", their approximate quantity and location should be listed in part I of the Inventory. These two categories should be indicated separately in the "Remarks" column of the Inventory.

4.2.10 *Testing methods*

4.2.10.1 Samples may be tested by a variety of methods. "Indicative" or "field tests" may be used when:

.1 the likelihood of a hazard is high;

.2 the test is expected to indicate that the hazard exists; and

.3 the sample is being tested by "specific testing" to show that the hazard is present.

4.2.10.2 Indicative or field tests are quick, inexpensive and useful on board the ship or on site, but they cannot be accurately reproduced or repeated, and cannot identify the hazard specifically, and therefore cannot be relied upon except as "indicators".

4.2.10.3 In all other cases, and in order to avoid dispute, "specific testing" should be used. Specific tests are repeatable, reliable and can demonstrate definitively whether a hazard exists or not. They will also provide a known type of the hazard. The methods indicated are found qualitative and quantitative appropriate and only testing methods to the same effect can be used. Specific tests are to be carried out by a suitably accredited laboratory, working to international standards[2] or equivalent, which will provide a written report that can be relied upon by all parties.

4.2.10.4 Specific test methods for appendix 1 materials are provided in appendix 9.

4.2.11 *Diagram of the location of hazardous materials on board a ship*

Preparation of a diagram showing the location of the materials listed in table A is recommended in order to help ship recycling facilities gain a visual understanding of the Inventory.

[2] For example ISO 17025.

4.3 Maintaining and updating part I of the Inventory during operations

4.3.1 Part I of the Inventory should be appropriately maintained and updated, especially after any repair or conversion or sale of a ship.

4.3.2 *Updating of part I of the Inventory in the event of new installation*

If any machinery or equipment is added to, removed or replaced or the hull coating is renewed, part I of the Inventory should be updated according to the requirements for new ships as stipulated in paragraphs 4.1.2 to 4.1.4. Updating is not required if identical parts or coatings are installed or applied.

4.3.3 *Continuity of part I of the Inventory*

Part I of the Inventory should belong to the ship and the continuity and conformity of the information it contains should be confirmed, especially if the flag, owner or operator of the ship changes.

4.4 Development of part II of the Inventory (operationally generated waste)

4.4.1 Once the decision to recycle a ship has been taken, part II of the Inventory should be developed before the final survey, taking into account that a ship destined to be recycled shall conduct operations in the period prior to entering the Ship Recycling Facility in a manner that minimizes the amount of cargo residues, fuel oil and wastes remaining on board (regulation 8.2 of the Convention).

4.4.2 *Operationally generated wastes to be listed in the Inventory*

If the wastes listed in part II of the Inventory provided in table C (Potentially hazardous items) of appendix 1 are intended for delivery with the ship to a ship recycling facility, the quantity of the operationally generated wastes should be estimated and their approximate quantities and locations should be listed in part II of the Inventory.

4.5 Development of part III of the Inventory (stores)

4.5.1 Once the decision to recycle has been taken, part III of the Inventory should be developed before the final survey, taking into account the fact that a ship destined to be recycled shall minimize the wastes remaining on board (regulation 8.2 of the Convention). Each item listed in part III should correspond to the ship's operations during its last voyage.

4.5.2 *Stores to be listed in the Inventory*

If the stores to be listed in part III of the Inventory provided in table C of appendix 1 are to be delivered with the ship to a ship recycling facility, the unit (e.g. capacity of cans and cylinders), quantity and location of the stores should be listed in part III of the Inventory.

4.5.3 *Liquids and gases sealed in ship's machinery and equipment to be listed in the Inventory*

If any liquids and gases listed in table C of appendix 1 are integral in machinery and equipment on board a ship, their approximate quantity and location should be listed in part III of the Inventory. However, small amounts of lubricating oil, anti-seize compounds and grease which are applied to or injected into machinery and equipment to maintain normal performance do not fall within the scope of this provision. For subsequent completion of

part III of the Inventory during the recycling preparation processes, the quantity of liquids and gases listed in table C of appendix 1 required for normal operation, including the related pipe system volumes, should be prepared and documented at the design and construction stage. This information belongs to the ship, and continuity of this information should be maintained if the flag, owner or operator of the ship changes.

4.5.4 *Regular consumable goods to be listed in the Inventory*

Regular consumable goods, as provided in table D of appendix 1 should not be listed in part I or part II but should be listed in part III of the Inventory if they are to be delivered with the ship to a Ship Recycling Facility. A general description including the name of item (e.g. TV set), manufacturer, quantity and location should be entered in part III of the Inventory. The check on materials provided for in paragraphs 4.1.2 and 4.1.3 of these guidelines does not apply to regular consumable goods.

4.6 Description of location of hazardous materials on board

The locations of hazardous materials on board should be described and identified using the name of location (e.g. second floor of engine-room, bridge DK, APT, No.1 cargo tank, frame number) given in the plans (e.g. general arrangement, fire and safety plan, machinery arrangement or tank arrangement).

4.7 Description of approximate quantity of hazardous materials

In order to identify the approximate quantity of hazardous materials, the standard unit used for hazardous materials should be kg, unless other units (e.g. m^3 for materials of liquid or gases, m^2 for materials used in floors or walls) are considered more appropriate. An approximate quantity should be rounded up to at least two significant figures.

5 REQUIREMENTS FOR ASCERTAINING THE CONFORMITY OF THE INVENTORY

5.1 Design and construction stage

The conformity of part I of the Inventory at the design and construction stage should be ascertained by reference to the collected Supplier's Declaration of Conformity described in section 7 and the related Material Declarations collected from suppliers.

5.2 Operational stage

Shipowners should implement the following measures in order to ensure the conformity of part I of the Inventory:

.1 to designate a person as responsible for maintaining and updating the Inventory (the designated person may be employed ashore or on board);

.2 the designated person, in order to implement paragraph 4.3.2, should establish and supervise a system to ensure the necessary updating of the Inventory in the event of new installation;

.3 to maintain the Inventory including dates of changes or new deleted entries and the signature of the designated person; and

.4 to provide related documents as required for the survey or sale of the ship.

6 MATERIAL DECLARATION

6.1 General

Suppliers to the shipbuilding industry should identify and declare whether or not the materials listed in table A or table B are present above the threshold value specified in appendix 1 of these guidelines. However, this provision does not apply to chemicals which do not constitute a part of the finished product.

6.2 Information required in the declaration

6.2.1 At a minimum the following information is required in the Material Declaration:

.1 date of declaration;

.2 Material Declaration identification number;

.3 supplier's name;

.4 product name (common product name or name used by manufacturer);

.5 product number (for identification by manufacturer);

.6 declaration of whether or not the materials listed in table A and table B of appendix 1 of these guidelines are present in the product above the threshold value stipulated in appendix 1 of these guidelines; and

.7 mass of each constituent material listed in table A and/or table B of appendix 1 of these guidelines if present above threshold value.

6.2.2 An example of the Material Declaration is shown in appendix 6.

7 SUPPLIER'S DECLARATION OF CONFORMITY

7.1 Purpose and scope

7.1.1 The purpose of the Supplier's Declaration of Conformity is to provide assurance that the related Material Declaration conforms to section 6.2, and to identify the responsible entity.

7.1.2 The Supplier's Declaration of Conformity remains valid as long as the products are present on board.

7.1.3 The supplier compiling the Supplier's Declaration of Conformity should establish a company policy[3]. The company policy on the management of the chemical substances in products which the supplier manufactures or sells should cover:

.1 Compliance with law:

The regulations and requirements governing the management of chemical substances in products should be clearly described in documents which should be kept and maintained; and

[3] A recognized quality management system may be utilized.

.2 Obtaining of information on chemical substance content:

In procuring raw materials for components and products, suppliers should be selected following an evaluation, and the information on the chemical substances they supply should be obtained.

7.2 Contents and format

7.2.1 The Supplier's Declaration of Conformity should contain the following:

.1 unique identification number;

.2 name and contact address of the issuer;

.3 identification of the subject of the Declaration of Conformity (e.g. name, type, model number, and/or other relevant supplementary information);

.4 statement of conformity;

.5 date and place of issue; and

.6 signature (or equivalent sign of validation), name and function of the authorized person(s) acting on behalf of the issuer.

7.2.2 An example of the Supplier's Declaration of Conformity is shown in appendix 7.

8 LIST OF APPENDICES

Appendix 1: Items to be listed in the Inventory of Hazardous Materials

Appendix 2: Standard format of the Inventory of Hazardous Materials

Appendix 3: Example of the development process for part I of the Inventory for new ships

Appendix 4: Flow diagram for developing part I of the Inventory for existing ships

Appendix 5: Example of the development process for part I of the Inventory for existing ships

Appendix 6: Form of Material Declaration

Appendix 7: Form of Supplier's Declaration of Conformity

Appendix 8: Examples of table A and table B materials of appendix 1 with CAS-numbers

Appendix 9: Specific test methods

Appendix 10: Examples of radioactive sources

APPENDIX 1

ITEMS TO BE LISTED IN THE INVENTORY OF HAZARDOUS MATERIALS

Table A – *Materials listed in appendix 1 of the Annex to the Convention*

No.	Materials		Inventory			Threshold level
			Part I	Part II	Part III	
A-1	Asbestos		x			0.1%[4]
A-2	Polychlorinated biphenyls (PCBs)		x			50 mg/kg[5]
A-3	Ozone depleting substances	CFCs	x			no threshold value[6]
		Halons	x			
		Other fully halogenated CFCs	x			
		Carbon tetrachloride	x			
		1,1,1-Trichloroethane (Methyl chloroform)	x			
		Hydrochlorofluorocarbons	x			
		Hydrobromofluorocarbons	x			
		Methyl bromide	x			
		Bromochloromethane	x			
A-4	Anti-fouling systems containing organotin compounds as a biocide		x			2,500 mg total tin/kg[7]

[4] In accordance with regulation 4 of the Convention, for all ships, new installation of materials which contain asbestos shall be prohibited. According to the UN recommendation "Globally Harmonized System of Classification and Labelling of Chemicals (GHS)" adopted by the United Nations Economic and Social Council's Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals (UNSCEGHS), the UN's Sub-Committee of Experts, in 2002 (published in 2003), carcinogenic mixtures classified as Category 1A (including asbestos mixtures) under the GHS are required to be labelled as carcinogenic if the ratio is more than 0.1%. However, if 1% is applied, this threshold value should be recorded in the Inventory and, if available, the Material Declaration and can be applied not later than five years after the entry into force of the Convention. The threshold value of 0.1% need not be retroactively applied to those Inventories and Material Declarations.

[5] In accordance with regulation 4 of the Convention, for all ships, new installation of materials which contain PCBs shall be prohibited. The Organization set 50 mg/kg as the threshold value referring to the concentration level at which wastes, substances and articles containing, consisting of or contaminated with PCB are characterized as hazardous under the Basel Convention.

[6] "No threshold value" is in accordance with the Montreal Protocol for reporting ODS. Unintentional trace contaminants should not be listed in the Material Declarations and in the Inventory.

[7] This threshold value is based on the *Guidelines for brief sampling of anti-fouling systems on ships* (resolution MEPC.104(49)).

Table B – *Materials listed in appendix 2 of the Annex to the Convention*

No.	Materials	Inventory			Threshold value
		Part I	Part II	Part III	
B-1	Cadmium and cadmium compounds	x			100 mg/kg[8]
B-2	Hexavalent chromium and hexavalent chromium compounds	x			1,000 mg/kg[8]
B-3	Lead and lead compounds	x			1,000 mg/kg[8]
B-4	Mercury and mercury compounds	x			1,000 mg/kg[8]
B-5	Polybrominated biphenyl (PBBs)	x			50 mg/kg[9]
B-6	Polybrominated diphenyl ethers (PBDEs)	x			1,000 mg/kg[8]
B-7	Polychlorinated naphthalenes (more than 3 chlorine atoms)	x			50mg/kg[10]
B-8	Radioactive substances	x			no threshold value[11]
B-9	Certain shortchain chlorinated paraffins (Alkanes, C10-C13, chloro)	x			1%[12]

8 The Organization set this as the threshold value referring to the Restriction of Hazardous Substances (RoHS Directive 2011/65/EU, Annex II).

9 The Organization set 50 mg/kg as the threshold value referring to the concentration level at which wastes, substances and articles containing, consisting of or contaminated with PBB are characterized as hazardous under the Basel Convention.

10 The Organization set 50 mg/kg as the threshold value referring to the concentration level at which wastes, substances and articles containing, consisting of or contaminated with PCN are characterized as hazardous under the Basel Convention.

11 All radioactive sources should be included in the Material Declaration and in the Inventory. *Radioactive source* means radioactive material permanently sealed in a capsule or closely bonded and in a solid form that is used as a source of radiation. This includes consumer products and industrial gauges with radioactive materials. Examples are listed in appendix 10.

12 The Organization set 1% as the threshold value referring to the EU legislation that restricts Chlorinated Paraffins from being placed on the market for use as substances or as constituents of other substances or preparations in concentrations higher than 1% (EU Regulation 1907/2006, Annex XVII Entry 42 and Regulation 519/2012).

Table C – *Potentially hazardous items*

No.	Properties		Goods	Inventory		
				Part I	Part II	Part III
C-1	Liquid	Oiliness	Kerosene			x
C-2			White spirit			x
C-3			Lubricating oil			x
C-4			Hydraulic oil			x
C-5			Anti-seize compounds			x
C-6			Fuel additive			x
C-7			Engine coolant additives			x
C-8			Antifreeze fluids			x
C-9			Boiler and feed water treatment and test re-agents			x
C-10			De-ioniser regenerating chemicals			x
C-11			Evaporator dosing and descaling acids			x
C-12			Paint stabilizers/rust stabilizers			x
C-13			Solvents/thinners			x
C-14			Paints			x
C-15			Chemical refrigerants			x
C-16			Battery electrolyte			x
C-17			Alcohol, methylated spirits			x
C-18	Gas	Explosives/ inflammables	Acetylene			x
C-19			Propane			x
C-20			Butane			x
C-21			Oxygen			x
C-22		Green House Gases	CO_2			x
C-23			Perfluorocarbons (PFCs)			x
C-24			Methane			x
C-25			Hydrofluorocarbon (HFCs)			x
C-27			Nitrous oxide (N_2O)			x
C-28			Sulfur hexafluoride (SF_6)			x
C-29	Liquid	Oiliness	Bunkers: fuel oil			x
C-30			Grease			x
C-31			Waste oil (sludge)		x	
C-32			Bilge and/or waste water generated by the after-treatment systems fitted on machineries		x	
C-33			Oily liquid cargo tank residues		x	
C-34			Ballast water		x	
C-35			Raw sewage		x	
C-36			Treated sewage		x	
C-37			Non-oily liquid cargo residues		x	
C-38	Gas	Explosibility/ inflammability	Fuel gas			x

No.	Properties	Goods	Inventory		
			Part I	Part II	Part III
C-39	Solid	Dry cargo residues		x	
C-40		Medical waste/infectious waste		x	
C-41		Incinerator ash[13]		x	
C-42		Garbage		x	
C-43		Fuel tank residues		x	
C-44		Oily solid cargo tank residues		x	
C-45		Oily or chemical contaminated rags		x	
C-46		Batteries (incl. lead acid batteries)			x
C-47		Pesticides/insecticide sprays			x
C-48		Extinguishers			x
C-49		Chemical cleaner (incl. electrical equipment cleaner, carbon remover)			x
C-50		Detergent/bleacher (could be a liquid)			x
C-51		Miscellaneous medicines			x
C-52		Fire fighting clothing and Personal protective equipment			x
C-53		Dry tank residues		x	
C-54		Cargo residues		x	
C-55		Spare parts which contain materials listed in Table A or Table B			x

Table D – *Regular consumable goods potentially containing hazardous materials*[14]

No.	Properties	Example	Inventory		
			Part I	Part II	Part III
D-1	Electrical and electronic equipment	Computers, refrigerators, printers, scanners, television sets, radio sets, video cameras, video recorders, telephones, consumer batteries, fluorescent lamps, filament bulbs, lamps			x
D-2	Lighting equipment	Fluorescent lamps, filament bulbs, lamps			x
D-3	Non ship-specific furniture, interior and similar equipment	Chairs, sofas, tables, beds, curtains, carpets, garbage bins, bed-linen, pillows, towels, mattresses, storage racks, decoration, bathroom installations, toys, not structurally relevant or integrated artwork			x

13 Definition of garbage is identical to that in MARPOL Annex V. However, incinerator ash is classified separately because it may include hazardous substances or heavy metals.

14 This table does not include ship-specific equipment integral to ship operations, which has to be listed in part I of the inventory.

APPENDIX 2

STANDARD FORMAT OF THE INVENTORY OF HAZARDOUS MATERIALS[1]

Part I
Hazardous materials contained in the ship's structure and equipment

I-1 – *Paints and coating systems containing materials listed in table A and table B of appendix 1 of the Guidelines*

No.	Application of paint	Name of paint	Location	Materials (classification in appendix 1)	Approximate quantity		Remarks
1	Anti-drumming compound	Primer, xx Co., xx primer #300	Hull part	Lead	35.00	kg	
2	Anti-fouling	xx Co., xx coat #100	Underwater parts	TBT	120.00	kg	

[1] Examples of how to complete the Inventory are provided for guidance purposes only in accordance with paragraph 3.4 of the Guidelines.

I-2 – *Equipment and machinery containing materials listed in table A and table B of appendix 1 of the guidelines*

No.	Name of equipment and machinery	Location	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
1	Switch board	Engine control room	Cadmium	Housing coating	0.02	kg	
			Mercury	Heat gauge	<0.01	kg	less than 0.01kg
2	~~Diesel engine, xx Co., xx #150~~	~~Engine room~~	~~LeadCadmium~~	~~BearingStarter for blower~~	~~0.02~~	~~kg~~	
3	Diesel engine, xx Co., xx #200	Engine-room	Lead	Starter for blower	0.01	kg	Revised by XXX on Oct. XX, 2008 (revoking No.2)
4	Diesel generator (x 3)	Engine-room	Lead	Ingredient of copper compounds	0.01	kg	
5	Radioactive level gauge	No. 1 Cargo tank	Radioactive substances	Gauge	5 (1.8E+11)	Ci (Bq)	Radionuclides: ^{60}Co

I-3 - *Structure and hull containing materials listed in table A and table B of appendix 1 of the guidelines*

No.	Name of structural element	Location	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
1	Wall panel	Accommodation	Asbestos	Insulation	2,500.00	kg	
2	Wall insulation	Engine control room	Lead	Perforated plate	0.01	kg	cover for insulation material
			Asbestos	Insulation	25.00	kg	under perforated plates
3							

Part II

Operationally generated waste

No.	Location[1]	Name of item (classification in appendix 1) and detail (if any) of the item	Approximate quantity		Remarks
1	Garbage locker	Garbage (food waste)	35.00	kg	
2	Bilge tank	Bilgewater	15.00	m^3	
3	No.1 cargo hold	Dry cargo residues (iron ore)	110.00	kg	
4	No.2 cargo hold	Waste oil (sludge) (crude)	120.00	kg	
5	No.1 ballast tank	Ballast water	2,500.00	m^3	
		Sediments	250.00	kg	

1 The location of a part II or part III item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part. The location of part I items is recommended to be described similarly, as far as practicable.

Part III

Stores

III-1 - *Stores*

No.	Location[1]	Name of item (classification in appendix 1)	Unit quantity		Figure		Approximate quantity		Remarks[2)]
1	No.1 fuel oil tank	Fuel oil (heavy fuel oil)	-		-		100.00	m^3	
2	CO_2 room	CO_2	100.00	kg	50	bottles	5,000.00	kg	
3	Workshop	Propane	20.00	kg	10	pcs	200.00	kg	
4	Medicine locker	Miscellaneous medicines	-		-		-		Details are shown in the attached list.
5	Paint stores	Paint, xx Co., #600	20.00	kg	5	pcs	100.00	kg	Cadmium containing.

1) The location of a part II or part III item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part.

The location of part I items is recommended to be described similarly, as far as practicable.

2) In column "Remarks" for part III items, if hazardous materials are integrated in products, the approximate amount of the contents should be shown as far as possible.

III-2 – *Liquids sealed in ship's machinery and equipment*

No.	Type of liquids (classification in appendix 1)	Name of machinery or equipment	Location	Approximate quantity		Remarks
1	Hydraulic oil	Deck crane hydraulic oil system	Upper deck	15.00	m^3	
		Deck machinery hydraulic oil system	Upper deck and bosun store	200.00	m^3	
		Steering gear hydraulic oil system	Steering gear room	0.55	m^3	
2	Lubricating oil	Main engine system	Engine-room	0.45	m^3	
3	Boiler water treatment	Boiler	Engine-room	0.20	m^3	

III-3 – *Gases sealed in ship's machinery and equipment*

No.	Type of gases (classification in appendix 1)	Name of machinery or equipment	Location	Approximate quantity		Remarks
1	HFC	AC system	AC room	100.00	kg	
2	HFC	Refrigerated provision chamber machine	AC room	50.00	kg	

III-4 – *Regular consumable goods potentially containing hazardous materials*

No.	Location[2]	Name of item	Quantity	Remarks
1	Accommodation	Refrigerators	1	
2	Accommodation	Personal computers	2	

[2] The location of a part II or part III item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part. The location of part I items is recommended to be described similarly, as far as practicable.

APPENDIX 3

EXAMPLE OF THE DEVELOPMENT PROCESS FOR PART I OF THE INVENTORY FOR NEW SHIPS

1 OBJECTIVE OF THE TYPICAL EXAMPLE

This example has been developed to give guidance and to facilitate understanding of the development process for part I of the Inventory of Hazardous Materials for new ships.

2 DEVELOPMENT FLOW FOR PART I OF THE INVENTORY

Part I of the Inventory should be developed using the following three steps. However, the order of these steps is flexible and can be changed depending on the schedule of shipbuilding:

.1 collection of hazardous materials information;

.2 utilization of hazardous materials information; and

.3 preparation of the Inventory (by filling out standard format).

3 COLLECTION OF HAZARDOUS MATERIALS INFORMATION

3.1 Data collection process for hazardous materials

Materials Declaration (MD) and Supplier's Declaration of Conformity (SDoC) for products from suppliers (tier 1 suppliers) should be requested and collected by the shipbuilding yard. Tier 1 suppliers may request from their suppliers (tier 2 suppliers) the relevant information if they cannot develop the MD based on the information available. Thus the collection of data on hazardous materials may involve the entire shipbuilding supply chain (Figure 1).

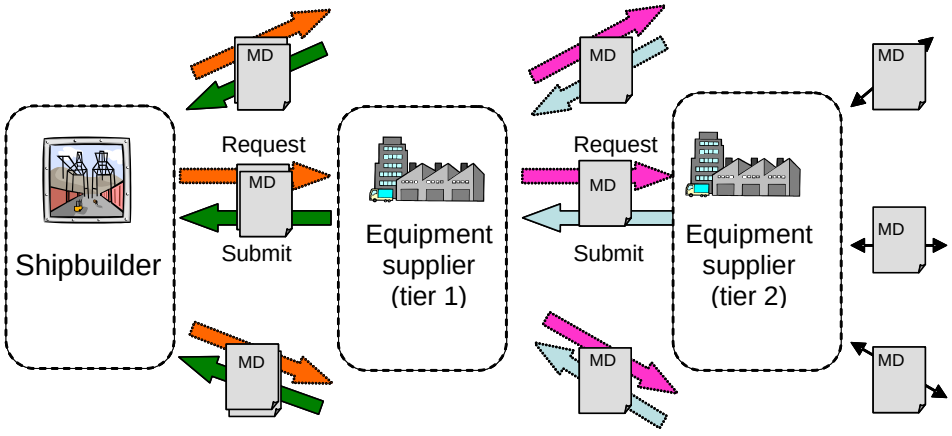


Figure 1 – *Process of MD (and SDoC) collection showing involvement of supply chain*

3.2 Declaration of hazardous materials

Suppliers should declare whether or not the hazardous materials listed in table A and table B in the MD are present in concentrations above the threshold values specified for each homogeneous material in a product.

3.2.1 *Materials listed in table A*

If one or more materials listed in table A are found to be present in concentrations above the specified threshold value according to the MD, the products which contain these materials shall not be installed on a ship. However, if the materials are used in a product in accordance with an exemption specified by the Convention (e.g. new installations containing hydrochlorofluorocarbons (HCFCs) before 1 January 2020), the product should be listed in the Inventory.

3.2.2 *Materials listed in table B*

If one or more materials listed in table B are found to be present in concentrations above the specified threshold value according to the MD, the products should be listed in the Inventory.

3.3 Example of homogeneous materials

Figure 2 shows an example of four homogeneous materials which constitute a cable. In this case, sheath, intervention, insulator and conductor are all individual homogeneous materials.

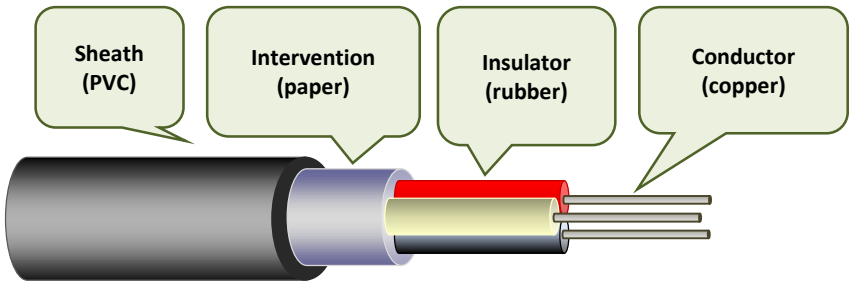


Figure 2 – *Example of homogeneous materials (cable)*

4 UTILIZATION OF HAZARDOUS MATERIALS INFORMATION

Products which contain hazardous materials in concentrations above the specified threshold values should be clearly identified in the MD. The approximate quantity of the hazardous materials should be calculated if the mass data for hazardous materials are declared in the MD using a unit which cannot be directly utilized in the Inventory.

5 PREPARATION OF INVENTORY (BY FILLING OUT STANDARD FORMAT)

The information received for the Inventory, as contained in table A and table B of appendix 1 of these guidelines, ought to be structured and utilized according to the following categorization for part I of the Inventory:

Part I-1 Paints and coating systems;

Part I-2 Equipment and machinery; and

Part I-3 Structure and hull.

5.1 "Name of equipment and machinery" column

5.1.1 *Equipment and machinery*

5.1.1.1 The name of each item of equipment or machinery should be entered in this column. If more than one hazardous material is present in the equipment or machinery, the row relating to that equipment or machinery should be appropriately divided such that all of the hazardous materials contained in the piece of equipment or machinery are entered. If more than one item of equipment or machinery is situated in one location, both name and quantity of the equipment or machinery should be entered in the column. Examples are shown in rows 1 and 2 of table 1

5.1.1.2 For identical or common items, such as but not limited to bolts, nuts and valves, there is no need to list each item individually (see Bulk Listing in paragraph 3.2 of the guidelines). An example is shown in row 3 of table 1.

Table 1 – Example showing more than one item of equipment or machinery situated in one location

No.	Name of equipment and machinery	Location	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
1	Main engine	Engine-room	Lead	Piston pin bush	0.75	kg	
			Mercury	Thermometer charge air temperature	0.01	kg	
2	Diesel generator (x 3)	Engine-room	Mercury	Thermometer	0.03	kg	
3	FC valve (x 100)	Througout the ship	Lead and lead compounds		20.5	kg	

5.1.2 *Pipes and cables*

The names of pipes and of systems, including electric cables, which are often situated in more than one compartment of a ship, should be described using the name of the system concerned. A reference to the compartments where these systems are located is not necessary as long as the system is clearly identified and properly named.

5.2 "Approximate quantity" column

The standard unit for approximate quantity of solid hazardous materials should be kg. If the hazardous materials are liquids or gases, the standard unit should be either m^3 or kg. An approximate quantity should be rounded up to at least two significant figures. If the hazardous material is less than 10 g, the description of the quantity should read "<0.01 kg".

Table 2 – Example of a switchboard

No.	Name of equipment and machinery	Location	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
	Switchboard	Engine control room	Cadmium	Housing coating	0.02	kg	
			Mercury	Heat gauge	<0.01	kg	less than 0.01 kg

5.3 "Location" column

5.3.1 *Example of a location list*

It is recommended to prepare a location list which covers all compartments of a ship based on the ship's plans (e.g. general arrangement, engine-room arrangement, accommodation and tank plan) and on other documentation on board, including certificates or spare parts' lists. The description of the location should be based on a location such as a deck or room to enable easy identification. The name of the location should correspond to the ship's plans so as to ensure consistency between the Inventory and the ship's plans. Examples of names of locations are shown in table 3. For bulk listings, the locations of the items or materials may be generalized. For example, the location may only include the primary classification such as "Throughout the ship" as shown in the table 3 below.

Table 3 – Examples of location names

(A) Primary classification	(B) Secondary classification	(C) Name of location
Throughout the ship		
Hull part	Fore part	Bosun store
		…
	Cargo part	No.1 cargo hold/tank
		No.1 garage deck
		…
	Tank part	Fore peak tank
		No.1 WBT
		No.1 FOT
		…
		Aft Peak Tank
	Aft part	Steering gear room
		Emergency fire pump space
		…
	Superstructure	Accommodation
		Compass deck
		Nav. bridge deck
		…
		Wheel house
		Engine control room
		Cargo control room
		…
	Deck house	Deck house
		…
(A) Primary classification	(B) Secondary classification	(C) Name of location
Machinery part	Engine-room	Engine-room
		Main floor
		2nd floor
		…
		Generator space/room
		Purifier space/room
		Shaft space/room
		Engine casing
		Funnel
		Engine control room
		…
	Pump-room	Pump-room
		…
Exterior part	Superstructure	Superstructure
	Upper deck	Upper deck
	Hull shell	Hull shell
		bottom
		under waterline
		…

5.3.2 *Description of location of pipes and electrical systems*

5.3.2.1 Locations of pipes and systems, including electrical systems and cables situated in more than one compartment of a ship, should be described for each system concerned. If they are situated in a number of compartments, the most practical of the following two options should be used:

.1 listing of all components in the column; or

.2 description of the location of the system using an expression such as those shown under "primary classification" and "secondary classification" in Table 3.

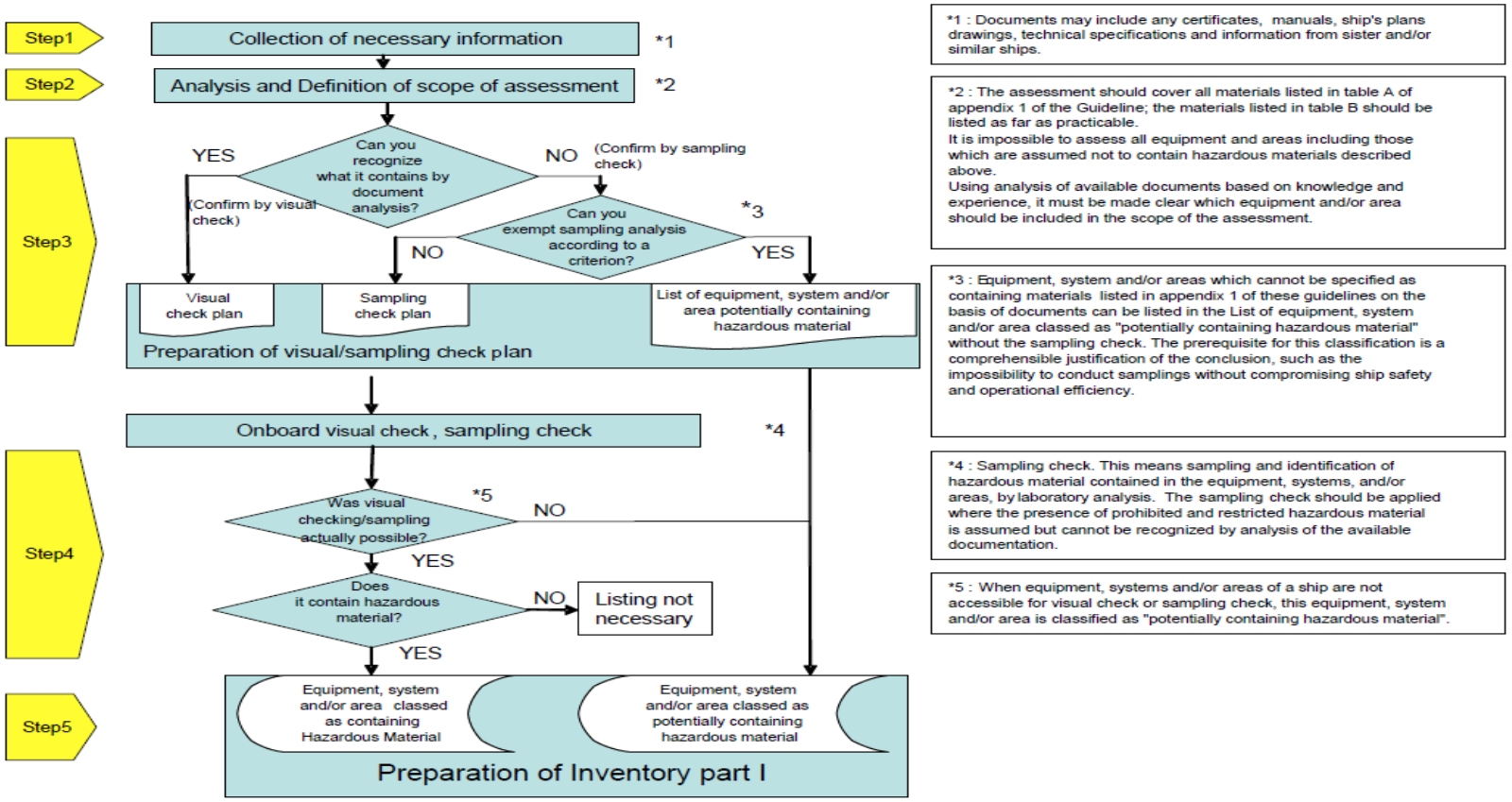
5.3.2.2 A typical description of a pipe system is shown in table 4.

Table 4 – Example of description of a pipe system

No.	Name of equipment and machinery	Location	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
	Ballast water system	Engine-room, Hold parts					

APPENDIX 4

FLOW DIAGRAM FOR DEVELOPING PART I OF THE INVENTORY FOR EXISTING SHIPS



*1 : Documents may include any certificates, manuals, ship's plans drawings, technical specifications and information from sister and/or similar ships.

*2 : The assessment should cover all materials listed in table A of appendix 1 of the Guideline; the materials listed in table B should be listed as far as practicable.
It is impossible to assess all equipment and areas including those which are assumed not to contain hazardous materials described above.
Using analysis of available documents based on knowledge and experience, it must be made clear which equipment and/or area should be included in the scope of the assessment.

*3 : Equipment, system and/or areas which cannot be specified as containing materials listed in appendix 1 of these guidelines on the basis of documents can be listed in the List of equipment, system and/or area classed as "potentially containing hazardous material" without the sampling check. The prerequisite for this classification is a comprehensible justification of the conclusion, such as the impossibility to conduct samplings without compromising ship safety and operational efficiency.

*4 : Sampling check. This means sampling and identification of hazardous material contained in the equipment, systems, and/or areas, by laboratory analysis. The sampling check should be applied where the presence of prohibited and restricted hazardous material is assumed but cannot be recognized by analysis of the available documentation.

*5 : When equipment, systems and/or areas of a ship are not accessible for visual check or sampling check, this equipment, system and/or area is classified as "potentially containing hazardous material".

APPENDIX 5

EXAMPLE OF THE DEVELOPMENT PROCESS FOR PART I OF THE INVENTORY FOR EXISTING SHIPS

1 INTRODUCTION

1.1 In order to develop part I of the Inventory of Hazardous Materials for existing ships, documents of the individual ship as well as the knowledge and experience of specialist personnel (experts) is required. An example of the development process for Part I of the Inventory of Hazardous Materials for existing ships is useful to understand the basic steps as laid out in the Guidelines and to ensure a unified application. However, attention should be paid to variations in different types of ships[1].

1.2 Compilation of part I of the Inventory of Hazardous Material for existing ships involves the following five steps which are described in paragraph 4.2 and appendix 4 of these guidelines.

Step 1: Collection of necessary information;

Step 2: Assessment of collected information;

Step 3: Preparation of visual/sampling check plan;

Step 4: Onboard visual/sampling check; and

Step 5: Preparation of part I of the Inventory and related documentation.

2 STEP 1 - COLLECTION OF NECESSARY INFORMATION

2.1 Sighting of available documents

A practical first step is to collect detailed documents for the ship. The shipowner should try to collate documents normally retained onboard the ship or by the shipping company as well as relevant documents that the shipyard, manufacturers, or classification society may have. The following documents should be used when available:

.1 Ship's specification
.2 General Arrangement
.3 Machinery Arrangement
.4 Spare Parts and Tools List
.5 Piping Arrangement
.6 Accommodation Plan
.7 Fire Control Plan
.8 Fire Protection Plan
.9 Insulation Plan (Hull and Machinery)
.10 International Anti-Fouling System Certificate
.11 Related manuals and drawings
.12 Information from other inventories and/or sister or similar ships, machinery, equipment, materials and coatings
.13 Results of previous visual/sampling checks and other analysis

[1] The example of a 28,000 gross tonnage bulk carrier constructed in 1985 is used in this appendix.

2.1.2 If the ship has undergone conversions or major repair work, it is necessary to identify as far as possible the modifications from the initial design and specification of the ship.

2.2 Indicative list

2.2.1 It is impossible to check all equipment, systems, and/or areas on board the ship to determine the presence or absence of hazardous materials. The total number of parts on board may exceed several thousand. In order to take a practical approach, an indicative list should be prepared that identifies the equipment, system, and/or area on board that is presumed to contain hazardous materials. Field interviews with the shipyard and suppliers may be necessary to prepare such lists. A typical example of an indicative list is shown below.

2.2.2 *Materials to be checked and documented*

Hazardous Materials, as identified in appendix 1 of these guidelines, should be listed in part I of the Inventory for existing ships. Appendix 1 of the guidelines contains all the materials concerned. Table A shows those which are required to be listed and table B shows those which should be listed as far as practicable.

2.2.3 *Materials listed in table A*

2.2.3.1 Table A lists the following four materials:

.1 Asbestos
.2 Polychlorinated biphenyls (PCBs)
.3 Ozone depleting substances
.4 Anti-fouling systems containing organotin compounds as a biocide

2.2.3.2 *Asbestos*

Field interviews were conducted with over 200 Japanese shipyards and suppliers regarding the use of asbestos in production. Indicative lists for asbestos developed on the basis of this research are shown below:

Structure and/or equipment	Component
Propeller shafting	Packing with low pressure hydraulic piping flange
	Packing with casing
	Clutch
	Brake lining
	Synthetic stern tubes
Diesel engine	Packing with piping flange
	Lagging material for fuel pipe
	Lagging material for exhaust pipe
	Lagging material turbocharger
Turbine engine	Lagging material for casing
	Packing with flange of piping and valve for steam line, exhaust line and drain line
	Lagging material for piping and valve of steam line, exhaust line and drain line

Structure and/or equipment	Component
Boiler	Insulation in combustion chamber
	Packing for casing door
	Lagging material for exhaust pipe
	Gasket for manhole
	Gasket for hand hole
	Gas shield packing for soot blower and other hole
	Packing with flange of piping and valve for steam line, exhaust line, fuel line and drain line
	Lagging material for piping and valve of steam line, exhaust line, fuel line and drain line
Exhaust gas economizer	Packing for casing door
	Packing with manhole
	Packing with hand hole
	Gas shield packing for soot blower
	Packing with flange of piping and valve for steam line, exhaust line, fuel line and drain line
	Lagging material for piping and valve of steam line, exhaust line, fuel line and drain line
Incinerator	Packing for casing door
	Packing with manhole
	Packing with hand hole
	Lagging material for exhaust pipe
Auxiliary machinery (pump, compressor, oil purifier, crane)	Packing for casing door and valve
	Gland packing
	Brake lining
Heat exchanger	Packing with casing
	Gland packing for valve
	Lagging material and insulation
Valve	Gland packing with valve, sheet packing with piping flange
	Gasket with flange of high pressure and/or high temperature
Pipe, duct	Lagging material and insulation
Tank (fuel tank, hot water, tank, condenser), other equipments (fuel strainer, lubricant oil strainer)	Lagging material and insulation
Electric equipment	Insulation material
Airborne asbestos	Wall, ceiling
Ceiling, floor and wall in accommodation area	Ceiling, floor, wall
Fire door	Packing, construction and insulation of the fire door
Inert gas system	Packing for casing, etc.
Air-conditioning system	Sheet packing, lagging material for piping and flexible joint

Structure and/or equipment	Component
Miscellaneous	Ropes
	Thermal insulating materials
	Fire shields/fire proofing
	Space/duct insulation
	Electrical cable materials
	Brake linings
	Floor tiles/deck underlay
	Steam/water/vent flange gaskets
	Adhesives/mastics/fillers
	Sound damping
	Moulded plastic products
	Sealing putty
	Shaft/valve packing
	Electrical bulkhead penetration packing
	Circuit breaker arc chutes
	Pipe hanger inserts
	Weld shop protectors/burn covers
	Fire-fighting blankets/clothing/equipment
	Concrete ballast

2.2.3.3 *Polychlorinated biphenyl (PCBs)*

Worldwide restriction of PCBs began on 17 May 2004 as a result of the implementation of the Stockholm Convention, which aims to eliminate or restrict the production and use of persistent organic pollutants. In Japan, domestic control began in 1973, with the prohibition of all activities relating to the production, use and import of PCBs. Japanese suppliers can provide accurate information concerning their products. The indicative list of PCBs has been developed as shown below:

Equipment	**Component of equipment**
Transformer	Insulating oil
Condenser	Insulating oil
Fuel heater	Heating medium
Electric cable	Covering, insulating tape
Lubricating oil	
Heat oil	Thermometers, sensors, indicators
Rubber/felt gaskets	
Rubber hose	
Plastic foam insulation	
Thermal insulating materials	
Voltage regulators	
Switches/reclosers/bushings	
Electromagnets	
Adhesives/tapes	
Surface contamination of machinery	
Oil-based paint	
Caulking	
Rubber isolation mounts	
Pipe hangers	

Equipment	Component of equipment
Light ballasts (component within fluorescent light fixtures)	
Plasticizers	
Felt under septum plates on top of hull bottom	

2.2.3.4 *Ozone depleting substances*

The indicative list for ozone depleting substances is shown below. Ozone depleting substances have been controlled according to the Montreal Protocol and MARPOL Convention. Although almost all substances have been banned since 1996, HCFC can still be used until 2020.

Materials	Component of equipment	Period for use of ODS in Japan
CFCs (R11, R12)	Refrigerant for refrigerators	Until 1996
CFCs	Urethane formed material	Until 1996
	Blowing agent for insulation of LNG carriers	Until 1996
Halons	Extinguishing agent	Until 1994
Other fully halogenated CFCs	The possibility of usage in ships is low	Until 1996
Carbon tetrachloride	The possibility of usage in ships is low	Until 1996
1,1,1-Trichloroethane (methyl chloroform)	The possibility of usage in ships is low	Until 1996
HCFC (R22, R141b)	Refrigerant for refrigerating machine	It is possible to use it until 2020
HBFC	The possibility of usage in ships is low	Until 1996
Methyl bromide	The possibility of usage in ships is low	Until 2005

2.2.3.5 *Organotin compounds*

Organotin compounds include tributyl tins (TBT), triphenyl tins (TPT) and tributyl tin oxide (TBTO). Organotin compounds have been used as anti-fouling paint on ships' bottoms and the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention) stipulates that all ships shall not apply or re-apply organotin compounds after 1 January 2003, and that, after 1 January 2008, all ships shall either not bear such compounds on their hulls or shall bear a coating that forms a barrier preventing such compounds from leaching into the sea. The above-mentioned dates may have been extended by permission of the Administration bearing in mind that the AFS Convention entered into force on 17 September 2008.

2.2.4 ***Materials listed in table B***

For existing ships it is not obligatory for materials listed in table B to be listed in part I of the Inventory. However, if they can be identified in a practical way, they should be listed in the Inventory, because the information will be used to support ship recycling processes. The Indicative list of materials listed in table B is shown below:

Materials	Component of equipment
Cadmium and cadmium compounds	Plating film, bearing
Hexavalent chromium compounds	Plating film
Mercury and mercury compounds	Fluorescent light, mercury lamp, mercury cell, liquid-level switch, gyro compass, thermometer, measuring tool, manganese cell, pressure sensors, light fittings, electrical switches, fire detectors
Lead and lead compounds	Corrosion resistant primer, solder (almost all electric appliances contain solder), paints, preservative coatings, cable insulation, lead ballast, generators
Polybrominated biphenyls (PBBs)	Non-flammable plastics
Polybrominated diphenyl ethers (PBDE)	Non-flammable plastics
Polychlorinated naphthalenes	Paint, lubricating oil
Radioactive substances	Refer to appendix 10
Certain shortchain chlorinated paraffins	Non-flammable plastics

3 STEP 2 – ASSESSMENT OF COLLECTED INFORMATION

Preparation of a checklist is an efficient method for developing the Inventory for existing ships in order to clarify the results of each step. Based on collected information including the indicative list mentioned in step 1, all equipment, systems, and/or areas onboard assumed to contain hazardous materials listed in tables A and B should be included in the checklist. Each listed equipment, system, and/or area on board should be analysed and assessed for its hazardous materials content.

The existence and volume of hazardous materials may be judged and calculated from the Spare parts and tools list and the maker's drawings. The existence of asbestos contained in floors, ceilings and walls may be identified from Fire Protection Plans, while the existence of TBT in coatings can be identified from the International Anti-Fouling System Certificate, Coating scheme and the History of Paint.

Example of weight calculation

No.	Hazardous Materials	Location/equipment/ component	Reference	Calculation
1.1-2	TBT	Flat bottom/paint	History of coatings	
1.2-1	Asbestos	Main engine/ exh. pipe packing	Spare parts and tools list	250 g x 14 sheet = 3.50 kg
1.2-3	HCFC	Ref. provision plant	Maker's drawings	20 kg x 1 cylinder = 20 kg
1.2-4	Lead	Batteries	Maker's drawings	6kg x 16 unit = 96 kg
1.3-1	Asbestos	Engine-room ceiling	Accommodation plan	

When a component or coating is determined to contain hazardous materials, a "Y" should be entered in the column for "Result of document analysis" in the checklist, to denote "Contained". Likewise, when an item is determined not to contain Hazardous Materials, the entry "N" should be made in the column to denote "Not contained". When a determination cannot be made as to the hazardous materials content, the column should be completed with the entry "Unknown".

Checklist (step 2)

Analysis and definition of scope of assessment for "Sample Ship"

No.	Table A/B	Hazardous materials *1	Location	Name of equipment	Component	Quantity			Manufacturer/brand name	Result of documents analysis *2	Procedure of check *3	Result of check *4	Reference/DWG No.
						Unit (kg)	No.	Total (kg)					
[Inventory part I-1.1]													
1	A	TBT	Top side	Painting and coating	A/F Paints			NIL	Paints Co./marine P1000	N			・On Aug., 200X, Sealer Coat applied to all over submerged area before tin-free coating.
2	A	TBT	Flat Bottom				3000m^2		Unknown AF	Unknown			
[Inventory part I-1.2]													
1	A	Asbestos	Lower deck	Main engine	Exh. pipe packing	0.25	14		Diesel Co.	Y			M-100
2	A	Asbestos	3rd deck	Aux.boiler	Lagging		12		Unknown lagging	Unknown			M-300
3	A	Asbestos	Engine room	Piping/flange	Packing					PCHM			
4	A	HCFC	2nd deck	Ref. provision plant	Refrigerant(R22)	20.00	1		Reito Co.	Y			Maker's dwg
5	B	Lead	Nav. Br. deck	Batteries		6	16		Denchi Co.	Y			E-300
[Inventory part I-1.3]													
1	A	Asbestos	Upper deck	Back deck ceilings	Engine room ceiling		20m^2		Unknown ceiling	Unknown			O-25

Notes

*1 Hazardous materirials: material classification

*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=Potentially containing hazardous material

*3 Procedure of Check:. V=Visual check, S=Sampling check

*4 Result of Check: Y=Contained, N=Not contained, PCHM=Potentially containing hazardous material

4 STEP 3 – PREPARATION OF VISUAL/SAMPLING CHECK PLAN

4.1 Each item classified as "Contained" or "Not contained" in step 2 should be subjected to a visual check on board, and the entry "V" should be made in the "Check procedure" column to denote "Visual check".

4.2 For each item categorized as "unknown", a decision should be made as to whether to apply a sampling check. However, any item categorized as "unknown" may be classed as "potentially containing hazardous material" provided comprehensive justification is given, or if it can be assumed that there will be little or no effect on disassembly as a unit and later ship recycling and disposal operations. For example, in the following checklist, in order to carry out a sampling check for "Packing with aux. boiler" the shipowner needs to disassemble the auxiliary boiler in a repair yard. The costs of this check are significantly higher than the later disposal costs at a ship recycling facility. In this case, therefore, the classification as "potentially containing hazardous material" is justifiable.

Checklist (step 3)

Analysis and definition of scope of assessment for "Sample Ship"

No.	Table A/B	Hazardous materials *1	Location	Name of equipment	Component	Quantity			Manufacturer/brand name	Result of documents analysis *2	Procedure of check *3	Result of check *4	Reference/DWG No.
						Unit (kg)	No.	Total (kg)					
[Inventory part I-1.1]													
1	A	TBT	Top side	Painting & Coating	A/F Paints			NIL	Paints Co./marine P1000	N	V		・On Aug., 200X, Sealer Coat applied to all over submerged area before tin-free coating.
2	A	TBT	Flat bottom				3000m^2		Unknown AF	Unknown	S		
[Inventory Part I-1.2]													
1	A	Asbestos	Lower deck	Main engine	Exh. pipe packing	0.25	14		Diesel Co.	Y	V		M-100
2	A	Asbestos	3rd deck	Aux.boiler	Lagging		12		Unknown lagging	Unknown	S		M-300
3	A	Asbestos	Engine room	Piping/flange	Packing					PCHM	V		
4	A	HCFC	2nd deck	Ref. provision plant	Refrigerant(R22)	20.00	1		Reito Co.	Y	V		Maker's dwg
5	B	Lead	Nav. Br. deck	Batteries		6	16		Denchi Co.	Y	V		E-300
[Inventory Part I-1.3]													
1	A	Asbestos	Upper deck	Back deck ceilings	Engine room ceiling		20m^2		Unknown ceiling	Unknown	S		O-25

Notes

*1 Hazardous materirials: material classification

*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=Potentially containing hazardous material

*3 Procedure of check:. V=Visual check, S=Sampling check

*4 Result of check: Y=Contained, N=Not contained, PCHM=Potentially containing hazardous material

4.3 Before any visual/sampling check on board is conducted, a "visual/sampling check plan" should be prepared. An example of such a plan is shown below.

4.4 To prevent any incidents during the visual/sampling check, a schedule should be established to eliminate interference with other ongoing work on board. To prevent potential exposure to Hazardous Materials during the visual/sampling check, safety precautions should be in place on board. For example, sampling of potential asbestos containing materials could release fibres into the atmosphere. Therefore, appropriate personnel safety and containment procedures should be implemented prior to sampling.

4.5 Items listed in the visual/sampling check should be arranged in sequence so that the onboard check is conducted in a structured manner (e.g. from a lower level to an upper level and from a fore part to an aft part).

Example of visual/sampling check plan

Name of ship	XXXXXXXXXX
IMO Number	XXXXXXXXXX
Gross Tonnage	28,000 GT
L x B x D	xxx.xx × xx.xx × xx.xx m
Date of delivery	dd.mm.1987
Shipowner	XXXXXXXXXX
Contact point (Address, Telephone, Fax, E-mail)	XXXXXXXXXX Tel: XXXX-XXXX Fax: XXXX-XXXX E-mail: abcdefg@hijk.co.net
Check schedule	Visual check： dd, mm, 20XX Sampling check：dd, mm, 20XX
Site of check	XX shipyard, No. Dock
In charge of check	XXXX XXXX
Check engineer	XXXX XXXX, YYYY YYYY, ZZZZ ZZZZ
Sampling engineer	Person with specialized knowledge of sampling
Sampling method and anti-scattering measure for asbestos	Wet the sampling location prior to cutting and allow it to harden after cutting to prevent scatter. Notes: Workers performing sampling activities shall wear protective equipment.
Sampling of fragments of paints	Paints suspected to contain TBT should be collected and analysed from load line, directly under bilge keel and flat bottom near amidships.
Laboratory	QQQQ QQQQ
Chemical analysis method	Method by ISO/DIS 22262-1 Bulk materials – Part 1: Sampling and qualitative determination of asbestos in commercial bulk materials and ISO/CD 22262-2 Bulk materials – Part 2: Quantitative determination of asbestos by gravimetric and microscopic methods. ICP Luminous analysis (TBT)
Location of visual/sampling check	Refer to lists for visual/sampling check

Listing for equipment, system and/or area for visual check
See attached "Analysis and definition of scope of investigation for sample ship"

List of equipment, system and/or area for sampling check				
Location	**Equipment, machinery and/or zone**	**Name of parts**	**Materials**	**Result of doc. checking**
Upper Deck	Back deck ceilings	Engine-room ceiling	Asbestos	Unknown
Engine-room	Exhaust gas pipe	Insulation	Asbestos	Unknown
Engine-room	Pipe/flange	Gasket	Asbestos	Unknown
Refer to attached "Analysis and definition of scope of investigation for sample ship" and "Location plan of hazardous materials for sample ship"				

List of equipment, system and/or area classed as PCHM				
Location	**Equipment, machinery and/or zone**	**Name of part**	**Material**	**Result of doc. checking**
Floor	Propeller cap	Gasket	Asbestos	PCHM
Engine-room	Air operated shut-off valve	Gland packing	Asbestos	PCHM
Refer to attached "Analysis and definition of scope of investigation for sample ship" and "Location plan of hazardous materials for sample ship"				

This plan is established in accordance with the Guidelines for the development of the Inventory of Hazardous Materials

Prepared by： XXXX XXXX

Tel.： YYYY-YYYY

E-Mail： XXXX@ZZZZ.co.net

・Document check・date/place：
dd, mm, 20XX at XX Lines Co. Ltd.

・Preparation date of plan：dd. mm, 20XX

5 STEP 4 – ONBOARD VISUAL/SAMPLING CHECK

5.1 The visual/sampling check should be conducted according to the plan. Check points should be marked in the ship's plan or recorded with photographs.

5.2 A person taking samples should be protected by the appropriate safety equipment relevant to the suspected type of hazardous materials encountered. Appropriate safety precautions should also be in place for passengers, crewmembers and other persons on board, to minimize the potential exposure to hazardous materials. Safety precautions could include the posting of signs or other verbal or written notification for personnel to avoid such areas during sampling. The personnel taking samples should ensure compliance with relevant national regulations.

5.3 The results of visual/sampling checks should be recorded in the checklist. Any equipment, systems and/or areas of the ship that cannot be accessed for checks should be classified as "potentially containing hazardous material". In this case, the entry in the "Result of check" column should be "PCHM".

6 STEP 5 – PREPARATION OF PART I OF THE INVENTORY AND RELATED DOCUMENTATION

6.1 *Development of part I of the Inventory*

The results of the check and the estimated quantity of hazardous materials should be recorded on the checklist. Part I of the Inventory should be developed with reference to the checklist.

6.2 *Development of location diagram of hazardous materials*

With respect to part I of the Inventory, the development of a location diagram of hazardous materials is recommended in order to help the ship recycling facility gain a visual understanding of the Inventory.

Checklist (step 4 and step 5)

Analysis and definition of scope of assessment for "Sample Ship"

No.	Table A/B	Hazardous materials *1	Location	Name of equipment	Component	Quantity			Manufacturer/brand name	Result of documents analysis *2	Procedure of check *3	Result of check *4	Reference/DWG No.
						Unit (kg)	No.	Total (kg)					
[Inventory part I-1.1]													
1	A	TBT	Top side	Painting & Coating	A/F Paints			NIL	Paints Co./marine P1000	N	V	N	・On Aug., 200X, Sealer Coat applied to all over submerged area before tin-free coating.
2	A	TBT	Flat Bottom			0.02	3000m^2	60.00	Unknown AF	Unknown	S	Y	
[Inventory part I-1.2]													
1	A	Asbestos	Lower deck	Main engine	Exh. pipe packing	0.25	14	3.50	Diesel Co.	Y	V	Y	M-100
2	A	Asbestos	3rd deck	Aux. boiler	Lagging		12		Unknown lagging	Unknown	S	N	M-300
3	A	Asbestos	Engine room	Piping/flange	Packing					PCHM	V	PCHM	
4	A	HCFC	2nd deck	Ref. provision plant	Refrigerant(R22)	20.00	1	20.00	Reito Co.	Y	V	Y	Maker's dwg
5	B	Lead	Nav. Br. deck	Batteries		6	16	96.00	Denchi Co.	Y	V	Y	E-300
[Inventory part I-1.3]													
1	A	Asbestos	Upp.deck	Back deck ceilings	Engine room ceiling	0.19	20m^2	3.80	Unknown ceiling	Unknown	S	Y	O-25

Notes

*1 Hazardous materirials: material classification

*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=Potentially containing hazardous material

*3 Procedure of check:. V=Visual check, S=Sampling check

*4 Result of check: Y=Contained, N=Not contained, PCHM=Potentially containing hazardous material

Example of the Inventory for existing ships

Inventory of Hazardous Materials for "Sample Ship"

Particulars of the "Sample Ship"

Distinctive number or letters	XXXXNNN
Port of registry	Port of World
Type of vessel	Bulk carrier
Gross Tonnage	28,000 GT
IMO number	NNNNNNN
Name of shipbuilder	xx Shipbuilding Co. Ltd
Name of shipowner	yy Maritime SA
Date of delivery	MM/DD/1988

This inventory was developed in accordance with the guidelines for the development of the Inventory of Hazardous Materials.

Attachment:

1: Inventory of Hazardous Materials

2: Assessment of collected information

3: Location diagram of Hazardous Materials

Prepared by XYZ (Name & address)(mm/dd/20XX)

Inventory of Hazardous Materials: "Sample Ship"

Part I – *hazardous materials contained in the ship's structure and equipment*

I-1 Paints and coating systems containing materials listed in Table A and Table B of appendix 1 of the guidelines

No.	Application of paint	Name of paint	Location *1	Materials (classification in appendix 1)	Approximate quantity		Remarks
1	AF paint	Unknown paints	Flat bottom	TBT	60.00	kg	Confirmed by sampling
2							
3							

I-2 Equipment and machinery containing materials listed in Table A and Table B of appendix 1 of the guidelines

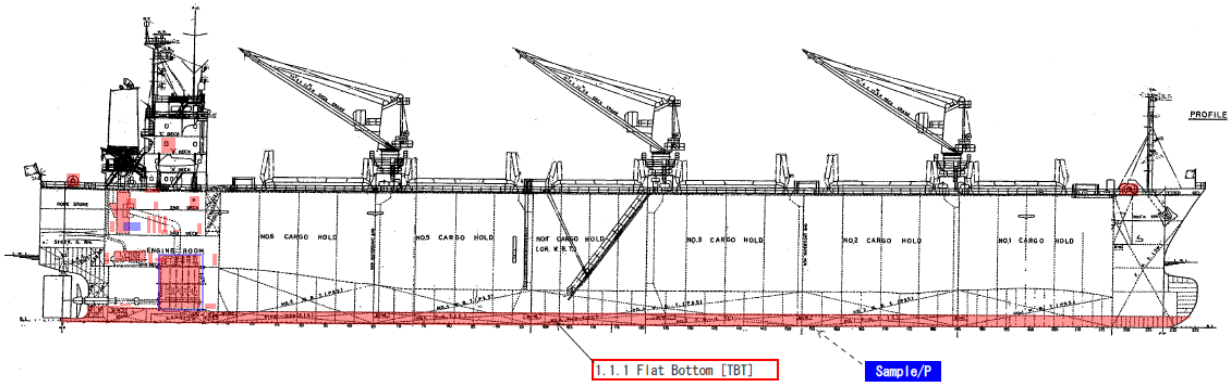
No.	Name of equipment and machinery	Location *1	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
1	Main engine	Lower floor	Asbestos	Exh. pipe packing	3.50	kg	
2	Aux. boiler	3rd deck	Asbestos	Unknown packing	10.00	kg	PCHM (potentially containing Hazardous Material)
3	Piping/flange	Engine-room	Asbestos	Packing	50.00	kg	PCHM
4	Ref. provision plant	2nd deck	HCFC	Refrigerant (R22)	20.00	kg	
5	Batteries	Navig. Bridge deck	Lead		96.00	kg	

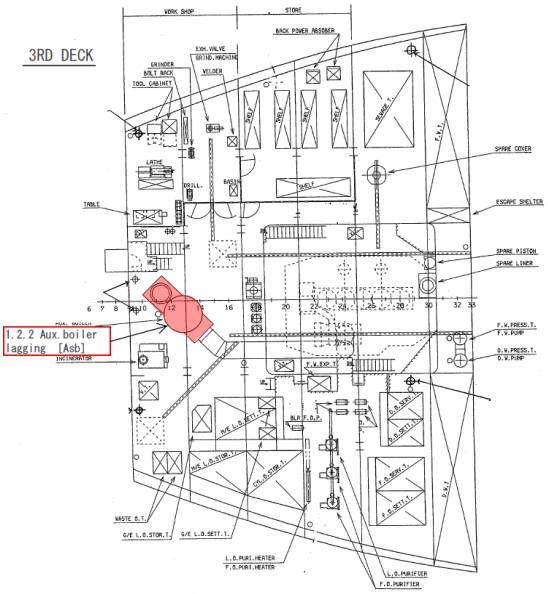
I-3 Structure and hull containing materials listed in Table A and Table B of appendix 1 of the guidelines

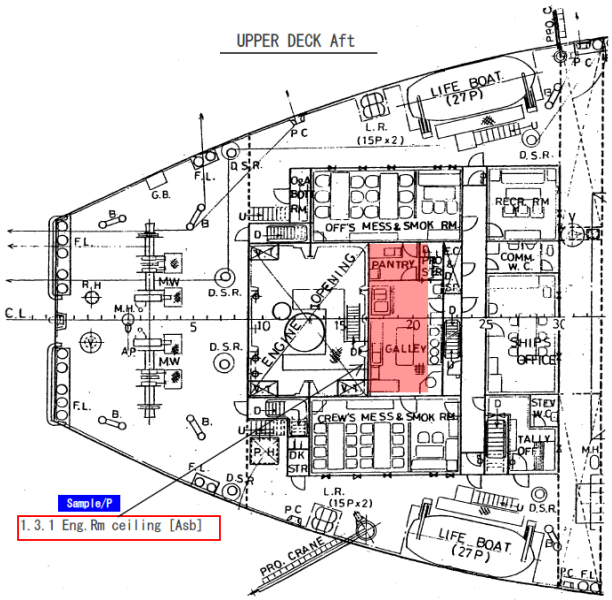
No.	Name of structural element	Location *1	Materials (classification in appendix 1)	Parts where used	Approximate quantity		Remarks
1	Back deck ceiling	Upper deck	Asbestos	Engine-room ceiling (A class)	3.80	kg	Confirmed by sampling
2							
3							

*1 Each item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part.

Example of location diagram of hazardous materials







APPENDIX 6

FORM OF MATERIAL DECLARATION

<Date of declaration>

Date	

<MD ID number>

MD- ID-No.	

<Other information>

Remark 1	
Remark 2	
Remark 3	

<Supplier (respondent) information>

Company name	
Division name	
Address	
Contact person	
Telephone number	
Fax number	
Email address	
SDoC ID no.	

<Product information>

Product name	Product number	Delivered unit			Product information
		Amount	Unit		

<Materials information>

	Unit
This materials information shows the amount of hazardous materials contained in 1	(unit: piece, kg, m, m^2, m^3, etc.) of the product.

Table	Material name		Threshold value	Present above threshold value	If yes, material mass		If yes, information on where it is used
				Yes / No	Mass	Unit	
Table A (materials listed in appendix 1 of the Convention)	Asbestos	Asbestos	0.1%[1]				
	Polychlorinated biphenyls (PCBs)	Polychlorinated biphenyls (PCBs)	50 mg/kg				
	Ozone depleting substance	Chlorofluorocaobons (CFCs)	no threshold value				
		Halons					
		Other fully halogenated CFCs					
		Carbon tetrachloride					
		1,1,1-Trichloroethane					
		Hydrochlorofluorocaobons					
		Hydrobromofluorocaobons					
		Methyl bromide					
		Bromochloromethane					
	Anti-fouling systems containing organotin compounds as a biocide		2,500 mg total tin/kg				

Table	Material name	Threshold value	Present above threshold value	If yes, material mass	If yes, information on where it is used

[1] In accordance with regulation 4 of the Convention, for all ships, new installation of materials which contain asbestos shall be prohibited. According to the UN recommendation "Globally Harmonized System of Classification and Labelling of Chemicals (GHS)" adopted by the United Nations Economic and Social Council's Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals (UNSCEGHS), the UN'S Sub-Committee of Experts, in 2002 (published in 2003), carcinogenic mixtures classified as Category 1A (including asbestos mixtures) under the GHS are required to be labelled as carcinogenic if the ratio is more than 0.1%. However, if 1% is applied, this threshold value should be recorded in the Inventory and, if available, the Material Declaration and can be applied not later than five years after the entry into force of the Convention. The threshold value of 0.1% need not be retroactively applied to those Inventories and Material Declarations.

			Yes / No	Mass	Unit	
Table B (materials listed in appendix 2 of the Convention)	Cadmium and cadmium compounds	100 mg/kg				
	Hexavalent chromium and hexavalent chromium compounds	1,000 mg/kg				
	Lead and lead compounds	1,000 mg/kg				
	Mercury and mercury compounds	1,000 mg/kg				
	Polybrominated biphenyl (PBBs)	50 mg/kg				
	Polybrominated dephenyl ethers (PBDEs)	1,000 mg/kg				
	Polychloronaphthalenes (Cl >= 3)	50 mg/kg				
	Radioactive substances	no threshold value				
	Certain shortchain chlorinated paraffins	1%				

APPENDIX 7

FORM OF SUPPLIER'S DECLARATION OF CONFORMITY

SUPPLIER'S DECLARATION OF CONFORMITY FOR MATERIAL DECLARATION MANAGEMENT

1 Identification number _____

2 Issuer's name _____

Issuer's address _____

3 Object(s) of the declaration _____

_____

_____

4 The object(s) of the declaration described above is in conformity with the following documents：

5	Document No.	Title	Edition/date of issue
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

6 Additional information _____

_____

Signed for and on behalf of

_____

_____

(place and date of issue)

7) _____ _____

(name, function) *(signature)*

APPENDIX 8

EXAMPLES OF TABLE A AND TABLE B MATERIALS OF APPENDIX 1 WITH CAS NUMBERS

This list is developed with reference to Joint Industry Guide No.101. This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

Table	Material Category	Substances	CAS Numbers
Table A (materials listed in appendix 1 of the Convention)	Asbestos	Asbestos	1332-21-4
		Actinolite	77536-66-4
		Amosite (Grunerite)	12172-73-5
		Anthophyllite	77536-67-5
		Chrysotile	12001-29-5
		Crocidolite	12001-28-4
		Tremolite	77536-68-6
	Polychlorinated biphenyls (PCBs)	Polychlorinated biphenyls	1336-36-3
		Aroclor	12767-79-2
		Chlorodiphenyl (Aroclor 1260)	11096-82-5
		Kanechlor 500	27323-18-8
		Aroclor 1254	11097-69-1
	Ozone depleting substances/ isomers (they may contain isomers that are not listed here)	Trichlorofluoromethane (CFC11)	75-69-4
		Dichlorodifluoromethane (CFC12)	75-71-8
		Chlorotrifluoromethane (CFC 13)	75-72-9
		Pentachlorofluoroethane (CFC 111)	354-56-3
		Tetrachlorodifluoroethane (CFC 112)	76-12-0
		Trichlorotrifluoroethane (CFC 113)	354-58-5
		1,1,2 Trichloro-1,2,2 trifluoroethane	76-13-1
		Dichlorotetrafluoroethane (CFC 114)	76-14-2
		Monochloropentafluoroethane (CFC 115)	76-15-3
		Heptachlorofluoropropane (CFC 211)	422-78-6
			135401-87-5
		Hexachlorodifluoropropane (CFC 212)	3182-26-1
		Pentachlorotrifluoropropane (CFC 213)	2354-06-5
			134237-31-3
		Tetrachlorotetrafluoropropane (CFC 214) 1,1,1,3-Tetrachlorotetrafluoropropane	29255-31-0 2268-46-4
		Trichloropentafluoropropane (CFC 215) 1,1,1-Trichloropentafluoropropane 1,2,3-Trichloropentafluoropropane	1599-41-3 4259-43-2 76-17-5
		Dichlorohexafluoropropane (CFC 216)	661-97-2
		Monochloroheptafluoropropane (CFC 217)	422-86-6
		Bromochlorodifluoromethane (Halon 1211)	353-59-3
		Bromotrifluoromethane (Halon 1301)	75-63-8
		Dibromotetrafluoroethane (Halon 2402)	124-73-2
		Carbon tetrachloride (Tetrachloromethane)	56-23-5
		1,1,1, - Trichloroethane (methyl chloroform) and its isomers except 1,1,2-trichloroethane	71-55-6
		Bromomethane (Methyl bromide)	74-83-9
		Bromodifluoromethane and isomers (HBFC's)	1511-62-2
		Dichlorofluoromethane (HCFC 21)	75-43-4
		Chlorodifluoromethane (HCFC 22)	75-45-6
		Chlorofluoromethane (HCFC 31)	593-70-4

Table	Material Category	Substances	CAS Numbers
		Tetrachlorofluoroethane (121) HCFC 1,1,1,2-tetrachloro-2-fluoroethane (HCFC 121a) 1,1,2,2-tetracloro-1-fluoroethane	134237-32-4 354-11-0 354-14-3
		Trichlorodifluoroethane (HCFC 122) 1,2,2-trichloro-1,1-difluoroethane	41834-16-6 354-21-2
		Dichlorotrifluoroethane(HCFC 123) Dichloro-1,1,2-trifluoroethane 2,2-dichloro-1,1,1-trifluroethane 1,2-dichloro-1,1,2-trifluroethane (HCFC-123a) 1,1-dichloro-1,2,2-trifluroethane (HCFC-123b) 2,2-dichloro-1,1,2-trifluroethane (HCFC-123b)	34077-87-7 90454-18-5 306-83-2 354-23-4 812-04-4 812-04-4
		Chlorotetrafluoroethane (HCFC 124) 2-chloro-1,1,1,2-tetrafluoroethane 1-chloro-1,1,2,2-tetrafluoroethane (HCFC 124a)	63938-10-3 2837-89-0 354-25-6
		Trichlorofluoroethane (HCFC 131) 1-Fluoro-1,2,2-trichloroethane 1,1,1-trichloro-2-fluoroethane (HCFC131b)	27154-33-2; (134237-34-6) 359-28-4 811-95-0
		Dichlorodifluoroethane (HCFC 132) 1,2-dichloro-1,1-difluoroethane (HCFC 132b) 1,1-dichloro-1,2-difluoroethane (HFCF 132c) 1,1-dichloro-2,2-difluoroethane 1,2-dichloro-1,2-difluoroethane	25915-78-0 1649-08-7 1842-05-3 471-43-2 431-06-1
		Chlorotrifluoroethane (HCFC 133) 1-chloro-1,2,2-trifluoroethane 2-chloro-1,1,1-trifluoroethane (HCFC-133a)	1330-45-6 1330-45-6 75-88-7
		Dichlorofluoroethane(HCFC 141) 1,1-dichloro-1-fluoroethane (HCFC-141b) 1,2-dichloro-1-fluoroethane	1717-00-6; (25167-88-8) 1717-00-6 430-57-9
		Chlorodifluoroethane (HCFC 142) 1-chloro-1,1-difluoroethane (HCFC142b) 1-chloro-1,2-difluoroethane (HCFC142a)	25497-29-4 75-68-3 25497-29-4
		Hexachlorofluoropropane (HCFC 221)	134237-35-7
		Pentachlorodifluoropropane (HCFC 222)	134237-36-8
		Tetrachlorotrifluropropane (HCFC 223)	134237-37-9
		Trichlorotetrafluoropropane (HCFC 224)	134237-38-0
		Dichloropentafluoropropane, (Ethyne, fluoro-) (HCFC 225) 2,2-Dichloro-1,1,1,3,3-pentafluoropropane(HCFC 225aa) 2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC 225ba) 1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225bb) 3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC 225ca) 1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC 225cb) 1,1-Dichloro-1,2,2,3,3-pentafluoropropane(HCFC 225cc) 1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC 225da) 1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225ea) 1,1-Dichloro-1,2,3,3,3-pentafluoropropane(HCFC 225eb)	127564-92-5; (2713-09-9) 128903-21-9 422-48-0 422-44-6 422-56-0 507-55-1 13474-88-9 431-86-7 136013-79-1 111512-56-2
		Chlorohexafluoropropane (HCFC 226)	134308-72-8
		Pentachlorofluoropropane (HCFC 231)	134190-48-0
		Tetrachlorodifluoropropane (HCFC 232)	134237-39-1
		Trichlorotrifluoropropane (HCFC 233) 1,1,1-Trichloro-3,3,3-trifluoropropane	134237-40-4 7125-83-9
		Dichlorotetrafluoropropane (HCFC 234)	127564-83-4
		Chloropentafluoropropane (HCFC 235) 1-Chloro-1,1,3,3,3-pentafluoropropane	134237-41-5 460-92-4
		Tetrachlorofluoropropane (HCFC 241)	134190-49-1
		Trichlorodifluoropropane (HCFC 242)	134237-42-6

Table	Material Category	Substances	CAS Numbers
		Dichlorotrifluoropropane (HCFC 243) 1,1-dichloro-1,2,2-trifluoropropane 2,3-dichloro-1,1,1-trifluoropropane 3,3-Dichloro-1,1,1-trifluoropropane	134237-43-7 7125-99-7 338-75-0 460-69-5
		Chlorotetrafluoropropane (HCFC 244) 3-chloro-1,1,2,2-tetrafluoropropane	134190-50-4 679-85-6
		Trichlorofluoropropane (HCFC 251) 1,1,3-trichloro-1-fluoropropane	134190-51-5 818-99-5
		Dichlorodifluoropropane (HCFC 252)	134190-52-6
		Chlorotrifluoropropane (HCFC 253) 3-chloro-1,1,1-trifluoropropane (HCFC 253fb)	134237-44-8 460-35-5
		Dichlorofluoropropane (HCFC 261) 1,1-dichloro-1-fluoropropane	134237-45-9 7799-56-6
		Chlorodifluoropropane (HCFC 262) 2-chloro-1,3-difluoropropane	134190-53-7 102738-79-4
		Chlorofluoropropane (HCFC 271) 2-chloro-2-fluoropropane	134190-54-8 420-44-0
	Organotin compounds (tributyl tin, triphenyl tin, tributyl tin oxide)	Bis(tri-n-butyltin) oxide	56-35-9
		Triphenyltin N,N'-dimethyldithiocarbamate	1803-12-9
		Triphenyltin fluoride	379-52-2
		Triphenyltin acetate	900-95-8
		Triphenyltin chloride	639-58-7
		Triphenyltin hydroxide	76-87-9
		Triphenyltin fatty acid salts (C=9-11)	47672-31-1
		Triphenyltin chloroacetate	7094-94-2
		Tributyltin methacrylate	2155-70-6
		Bis(tributyltin) fumarate	6454-35-9
		Tributyltin fluoride	1983-10-4
		Bis(tributyltin) 2,3-dibromosuccinate	31732-71-5
		Tributyltin acetate	56-36-0
		Tributyltin laurate	3090-36-6
		Bis(tributyltin) phthalate	4782-29-0
		Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate(alkyl; C=8)	-
		Tributyltin sulfamate	6517-25-5
		Bis(tributyltin) maleate	14275-57-1
		Tributyltin chloride	1461-22-9
		Mixture of tributyltin cyclopentanecarboxylate and its analogs (Tributyltin naphthenate)	-
		Mixture of tributyltin 1,2,3,4,4a, 4b, 5,6,10,10adecahydro-7-isopropyl-1, 4a-dimethyl-1-phenanthlenecarboxylate and its analogs (Tributyltin rosin salt)	-
		Other tributyl tins & triphenyl tins	-
Table B (Materials listed in appendix 2 of the Convention)	Cadmium/ cadmium compounds	Cadmium	7440-43-9
		Cadmium oxide	1306-19-0
		Cadmium sulfide	1306-23-6
		Cadmium chloride	10108-64-2
		Cadmium sulfate	10124-36-4
		Other cadmium compounds	-
	Chromium VI compounds	Chromium (VI) oxide	1333-82-0
		Barium chromate	10294-40-3
		Calcium chromate	13765-19-0
		Chromium trioxide	1333-82-0
		Lead (II) chromate	7758-97-6
		Sodium chromate	7775-11-3

Table	Material Category	Substances	CAS Numbers
		Sodium dichromate	10588-01-9
		Strontium chromate	7789-06-2
		Potassium dichromate	7778-50-9
		Potassium chromate	7789-00-6
		Zinc chromate	13530-65-9
		Other hexavalent chromium compounds	-
	Lead/lead compounds	Lead	7439-92-1
		Lead (II) sulfate	7446-14-2
		Lead (II) carbonate	598-63-0
		Lead hydrocarbonate	1319-46-6
		Lead acetate	301-04-2
		Lead (II) acetate, trihydrate	6080-56-4
		Lead phosphate	7446-27-7
		Lead selenide	12069-00-0
		Lead (IV) oxide	1309-60-0
		Lead (II,IV) oxide	1314-41-6
		Lead (II) sulfide	1314-87-0
		Lead (II) oxide	1317-36-8
		Lead (II) carbonate basic	1319-46-6
		Lead hydroxidcarbonate	1344-36-1
		Lead (II) phosphate	7446-27-7
		Lead (II) chromate	7758-97-6
		Lead (II) titanate	12060-00-3
		Lead sulfate, sulphuric acid, lead salt	15739-80-7
		Lead sulphate, tribasic	12202-17-4
		Lead stearate	1072-35-1
		Other lead compounds	-
	Mercury/ mercury compounds	Mercury	7439-97-6
		Mercuric chloride	33631-63-9
		Mercury (II) chloride	7487-94-7
		Mercuric sulfate	7783-35-9
		Mercuric nitrate	10045-94-0
		Mercuric (II) oxide	21908-53-2
		Mercuric sulfide	1344-48-5
		Other mercury compounds	-
	Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs)	Bromobiphenyl and its ethers	2052-07-5 (2-Bromobiphenyl)
			2113-57-7 (3-Bromobiphenyl
			92-66-0 (4-Bromobiphenyl)
			101-55-3 (ether)
		Decabromobiphenyl and its ethers	13654-09-6
			1163-19-5 (ether)
		Dibromobiphenyl and its ethers	92-86-4
			2050-47-7 (ether)
		Heptabromobiphenylether	68928-80-3
		Hexabromobiphenyl and its ethers	59080-40-9
			36355-01-8 (hexabromo-1,1'-biphenyl)
			67774-32-7 (Firemaster FF-1)
			36483-60-0 (ether)
		Nonabromobiphenylether	63936-56-1
		Octabromobiphenyl and its ethers	61288-13-9
			32536-52-0 (ether)
		Pentabromobidphenyl ether (note: commercially available PeBDPO is a complex reaction mixture containing a variety of brominated diphenyloxides.	32534-81-9 (CAS number used for commercial grades of PeBDPO)

Table	Material Category	Substances	CAS Numbers
		Polybrominated biphenyls	59536-65-1
		Tetrabromobiphenyl and its ethers	40088-45-7
			40088-47-9 (ether)
		Tribromobiphenyl ether	49690-94-0
	Polychlorinated naphthalenes	Polychlorinated naphthalenes	70776-03-3
		Other polychlorinated naphthalenes	-
	Radioactive substances	Uranium	-
		Plutonium	-
		Radon	-
		Americium	-
		Thorium	-
		Cesium	7440-46-2
		Strontium	7440-24-6
		Other radioactive substances	-
	Certain shortchain chlorinated paraffins (with carbon length of 10-13 atoms)	Chlorinated paraffins (C10-13)	85535-84-8
		Other short chain chlorinated paraffins	-

APPENDIX 9

SPECIFIC TEST METHODS

1 Asbestos

Types to test for: as per resolution MEPC.179(59); Actinolite CAS 77536-66-4 Amosite (Grunerite) CAS 12172-73-5 Anthophyllite CAS 77536-67-5 Chrysotile CAS 12001-29-5 Crocidolite CAS 12001-28-4 Asbestos Tremolite CAS 77536-68-6.

Specific testing techniques: Polarized Light Microscopy (PLM), electron microscope techniques and/or X-Ray Diffraction (XRD) as applicable.

Specific reporting information: The presence/no presence of asbestos, indicate the concentration range, and state the type when necessary.

Notes

.1 The suggested three kinds of testing techniques are most commonly used methods when analysing asbestos and each of them has its limitation. Laboratories should choose the most suitable methods to determine, and in most cases, two or more techniques should be utilized together.

.2 The quantification of asbestos is difficult at this stage, although the XRD technique is applicable. Only a few laboratories conduct the quantification rather than the qualification, especially when a precise number is required. Considering the demand from the operators and ship recycling parties, the precise concentration is not strictly required. Thereby, the concentration range is recommended to report, and the recommended range division according to standard VDI 3866 is as follows:

- Asbestos not detected
- Traces of asbestos detected
- Asbestos content approx. 1% to 15% by mass
- Asbestos content approx. 15% to 40% by mass
- Asbestos content greater than 40% by mass

Results that specified more precisely must be provided with a reasoned statement on the uncertainty.

.3 As to the asbestos types, to distinguish all six different types is time consuming and in some cases not feasible by current techniques; while on the practical side, the treatment of different types of asbestos is the same. Therefore, it is suggested to report the type when necessary.

2 Polychlorinated biphenyls (PCBs)

Note: There are 209 different congeners (forms) of PCB of it is impracticable to test for all. Various organizations have developed lists of PCBs to test for as indicators. In this instance two alternative approaches are recommended. Method 1 identifies the seven congeners used by the International Council for the Exploration of the Sea (ICES). Method 2 identifies 19 congeners and seven types of aroclor (PCB mixtures commonly found in solid shipboard materials containing PCBs). Laboratories should be familiar with the requirements and consequences for each of these lists.

Types to test for: Method 1: ICES7 congeners (28, 52, 101, 118, 138, 153, 180). Method 2: 19 congeners and seven types of aroclor, using the US EPA 8082a test.

Specific testing technique: GC-MS (congener specific) or GC-ECD or GC-ELCD for applicable mixtures such as aroclors. Note: standard samples must be used for each type.

Sample Preparation: It is important to properly prepare PCB samples prior to testing. For solid materials (cables, rubber, paint, etc.), it is especially critical to select the proper extraction procedure in order to release PCBs since they are chemically bound within the product.

Specific reporting information: PCB congener, ppm per congener in sample, and for Method 2, ppm per aroclor in sample should also be reported.

Notes

.1 Certain field or indicator tests are suitable for detecting PCBs in liquids or surfaces. However, there are currently no such tests that can accurately identify PCBs in solid shipboard materials. It is also noted that many of these tests rely on the identification of free chlorine ions and are thus highly susceptible to chlorine contamination and false readings in a marine environment where all surfaces are highly contaminated with chlorine ions from the sea water and atmosphere.

.2 Several congeners are tested for as "indicator" congeners. They are used because their presence often indicates the likelihood of other congeners in greater quantities (many PCBs are mixes, many mixes use a limited number of PCBs in small quantities, therefore the presence of these small quantities indicates the potential for a mix containing far higher quantities of other PCBs).

.3 Many reports refer to "total PCB", which is often a scaled figure to represent likely total PCBs based on the sample and the common ratios of PCB mixes. Where this is done the exact scaling technique must be stated, and is for information only and does not form part of the specific technique.

3 Ozone depleting substances

Types to test for: as per appendix 8 of these guidelines all the listed CFCs, Halons, HCFCs and other listed substance as required by Montreal Protocol.

Specific testing technique: Gas Chromatography-Mass Spectrometry (GC-MS), coupled Electron Capture Detectors (GC-ECD) and Electrolytic Conductivity Detectors (GC-ELCD).

Specific reporting information: Type and concentration of ODS.

4 Anti-fouling systems containing organotin compounds as a biocide

Types to test for: Anti-fouling compounds and systems regulated under annex I to the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (AFS Convention), including: tributyl tins (TBT), triphenyl tins (TPT) and tributyl tin oxide (TBTO).

Specific testing technique: As per resolution MEPC.104(49) (*Guidelines for Brief Sampling of Anti-Fouling Systems on Ships*), adopted 18 July 2003, using ICPOES, ICP, AAS, XRF, GC-MS as applicable.

Specific reporting information: Type and concentration of organotin compound.

Note: For "field" or "indicative" testing it may be acceptable to simply identify presence of tin, due to the expected good documentation on anti-fouling systems.

APPENDIX 10

EXAMPLES OF RADIOACTIVE SOURCES

The following list contains examples of radioactive sources that should be included in the Inventory, regardless of the number, the amount of radioactivity or the type of radionuclide.

Examples of consumer products with radioactive materials

Ionization chamber smoke detectors (typical radionuclides ^{241}Am; ^{226}Ra)
Instruments/signs containing gaseous tritium light sources (^{3}H)
Instruments/signs containing radioactive painting (typical radionuclide ^{226}Ra)
High intensity discharge lamps (typical radionuclides ^{85}Kr; ^{232}Th)
Radioactive lighting rods (typical radionuclides ^{241}Am; ^{226}Ra)

Examples of industrial gauges with radioactive materials

Radioactive level gauges
Radioactive dredger gauges*
Radioactive conveyor gauges*
Radioactive spinning pipe gauges*

***

ANNEX 13

DRAFT GUIDELINES ON INTERNATIONAL OFFERS OF ASSISTANCE IN RESPONSE TO A MARINE OIL POLLUTION INCIDENT

(The text of the draft guidelines is contained in document PPR 2/21/Add.1)

***

ANNEX 14

PART III OF THE DRAFT GUIDELINES FOR THE USE OF DISPERSANTS FOR COMBATING OIL POLLUTION AT SEA

(The text of the draft guidelines is contained in document PPR 2/21/Add.1)

***

ANNEX 15

DRAFT MEPC RESOLUTION

AMENDMENTS TO THE 2011 GUIDELINES ADDRESSING ADDITIONAL ASPECTS TO THE NO_X TECHNICAL CODE 2008 WITH REGARD TO PARTICULAR REQUIREMENTS RELATED TO MARINE DIESEL ENGINES FITTED WITH SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEMS (RESOLUTION MEPC.198(62))

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its fifty-eighth session, the Committee adopted, by resolution MEPC.176(58), a revised MARPOL Annex VI (hereinafter referred to as "MARPOL Annex VI") and, by resolution MEPC.177(58), a revised Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (hereinafter referred to as "the NO_X Technical Code 2008"),

NOTING regulation 13 of MARPOL Annex VI which makes the NO_X Technical Code 2008 mandatory under that Annex,

NOTING ALSO that the use of NO_x-reducing devices is envisaged in the NO_X Technical Code 2008 and that selective catalytic reduction systems (hereinafter referred to as "SCR systems") are such NO_X-reducing devices for compliance with the Tier III NO_x limit,

NOTING FURTHER that, at its sixty-second session, the Committee adopted, by resolution MEPC.198(62), the *2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) Systems*,

HAVING CONSIDERED, at its sixty-eighth session, the draft amendments to the *2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) Systems*, proposed by the Sub-Committee on Pollution Prevention and Response, at its second session,

1 ADOPTS the amendments to the *2011 Guidelines addressing additional aspects to the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) Systems*, as set out at annex to the present resolution;

2 INVITES Administrations to take the aforementioned amendments into account when certifying engines fitted with SCR systems;

3 REQUESTS Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the attention of shipowners, ship operators, shipbuilders, marine diesel engine manufacturers and any other interested groups;

4 AGREES to keep these guidelines, as amended, under review in light of the experience gained with their application.

ANNEX

AMENDMENTS TO THE 2011 GUIDELINES ADDRESSING ADDITIONAL ASPECTS TO THE NO_X TECHNICAL CODE 2008 WITH REGARD TO PARTICULAR REQUIREMENTS RELATED TO MARINE DIESEL ENGINES FITTED WITH SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEMS (RESOLUTION MEPC.198(62))

A new paragraph 6.1.2 is added as follows:

> "6.1.2 The calculation of gaseous emissions in paragraph 6.1.1.1 of these guidelines should be undertaken in accordance with paragraph 5.2.1 of these guidelines."

***

ANNEX 16

DRAFT MEPC CIRCULAR

GUIDANCE FOR ISSUING A REVISED CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT METERS INTENDED FOR MONITORING THE DISCHARGE OF OIL-CONTAMINATED WATER FROM THE CARGO TANK AREAS OF OIL TANKERS

1 The Marine Environment Protection Committee at its [sixty-eight session (11 to 15 May 2015)] approved *Guidance for issuing a revised certificate of type approval for oil content meters intended for monitoring the discharge of oil-contaminated water from the cargo tank areas of oil tankers*, prepared by the Sub-Committee on Pollution Prevention and Response, at its second session, as set out in the annex.

2 Member Governments are invited to bring the attached Guidance to the attention of Administrations, recognized organizations, port authorities, shipowners, ship operators and other parties concerned.

ANNEX

GUIDANCE FOR ISSUING A REVISED CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT METERS INTENDED FOR MONITORING THE DISCHARGE OF OIL-CONTAMINATED WATER FROM THE CARGO TANK AREAS OF OIL TANKERS

Introduction

1 The Marine Environment Protection Committee (the Committee), at its sixty-fifth session, adopted, by resolution MEPC.240(65), the *2013 Amendments to the Revised Guidelines and specifications for oil discharge monitoring and control systems for oil tankers* (resolution MEPC.108(49)), which contain, inter alia, the revised form of certificate of type approval for oil content meters intended for monitoring the discharge of oil-contaminated water from the cargo tank areas of oil tankers.

2 This guidance advises on the issuing of the revised certificate of type approval for oil content meters.

Guidance

3 When the oil content meter (OCM) has been approved in accordance with resolution MEPC.108(49) before 17 May 2013, the Form of Type Approval Certificate (TAC), as provided in resolution MEPC.108(49), may be used:

.1 for OCMs installed on ships not carrying biofuel blends; or

.2 for OCMs installed on ships carrying biofuel blends, until 1 January 2016 (on the condition that the tank residues and washings are pumped ashore).

4 For all ships carrying biofuel blends on or after 1 January 2016, the OCM should have a TAC, as modified by resolution MEPC.240(65).

5 When the OCM has been tested and submitted for approval (or re-approval in the case of OCMs that have undergone modifications but were originally approved in accordance with resolution MEPC.108(49)) on or after 17 May 2013, regardless of whether the OCM is intended for monitoring biofuel blends, the Form of the TAC should be amended in accordance with resolution MEPC.240(65).

***

ANNEX 17

BIENNIAL STATUS REPORT

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE (PPR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1.1.2.3	Unified interpretation to provisions of IMO safety, security, and environment related Conventions	Continuous	MSC / MEPC		III / PPR / CCC / SDC / SSE / NCSR	Ongoing	Ongoing	
2.0.1.2	Guidelines for port State control under the 2004 BWM Convention, including guidance on ballast water sampling and analysis	2015	MEPC	PPR	III	In progress	Postponed	
5.2.1.15	Mandatory Code for ships operating in polar waters	2015	MSC / MEPC	SDC	HTW / PPR / SDC / SSE / NCSR	N/A	N/A	No request received from SDC
5.2.1.16	Non-mandatory instrument on regulations for non-convention ships	2015	MSC	III	HTW / PPR / SDC / SSE / NCSR	N/A	N/A	No request received from III
7.1.2.1	Revised guidelines for the inventory of hazardous materials	2015	MEPC		PPR	In progress	Completed	PPR 2/21, annex 11
7.1.2.5	Production of a manual entitled "Ballast Water Management – how to do it"	2015	MEPC		PPR	In progress	Postponed	

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE (PPR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
7.1.2.6	Guidance for international offers of assistance in response to a marine oil pollution incident	2015	MEPC		PPR	In progress	Completed	PPR 2/21, annex 12
7.1.2.8	Guidance on the safe operation and performance standards of oil pollution combating equipment	2014	MEPC	PPR	SDC	Completed		MEPC 67/12/2
7.1.2.9	Revised section II of the Manual on Oil Pollution-Contingency planning	2015	MEPC		PPR	In progress	Postponed	
7.1.2.10	Guide on oil spill response in ice and snow conditions	2015	MEPC		PPR	In progress	Postponed	
7.1.2.11	Updated IMO dispersant guidelines	2015	MEPC		PPR	In progress	Postponed	
7.1.2.13	Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels	2015	MSC / MEPC	PPR	SDC / SSE	In progress	Postponed	
7.2.2.1	Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code, taking into account recommendations of	Continuous	MEPC		PPR	Ongoing	Ongoing	

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE (PPR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
	GESAMP-EHS							
7.2.3.2	Updated OPRC Model training courses	2015	MEPC		PPR	In progress	Postponed	
7.3.1.1	Guidelines related to MARPOL Annex VI and the NO_x Technical Code in accordance with Action Plan endorsed by MEPC 64	2015	MEPC		PPR	In progress	Postponed	MEPC 67/20, paragraph 16.3
Notes: MEPC 67 agreed to divide this output into two outputs: 1) Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI and not covered by other guidelines, and 2) Guidelines as called for under paragraph 2.2.5.6 of the revised NO_X Technical Code 2008 (NO_X-reducing devices)								
7.3.2.2	Keep under review IMO measures and contributions to international climate mitigation initiatives and agreements (including CO_2 sequestration and ocean fertilization as well as consideration of the impact on the Arctic of emissions of Black Carbon from international shipping)	2015	MEPC		PPR	In progress	Postponed	MEPC 67/20, paragraph 4.8
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	Annual	MSC / MEPC	III	HTW / PPR / SDC / SSE / NCSR	N/A	N/A	No request received from III

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE (PPR)								
Planned output number	**Description**	**Target completion year**	**Parent organ(s)**	**Coordinating organ(s)**	**Associated organ(s)**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
13.0.3.1	Improved and new technologies approved for ballast water management systems and reduction of atmospheric pollution	Annual	MEPC		PPR	Completed	Completed	
…	Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI and not covered by other guidelines	2015	MEPC		PPR	In progress	Postponed	PPR 1/16, paragraph 9.21; MEPC 67/20, paragraph 16.3
Note: See notes on output 7.3.1.1.								
…	Guidelines as called for under paragraph 2.2.5.6 of the revised NO_x Technical Code 2008 (NO_x-reducing devices)	2015	MEPC		PPR	In progress	Output to be deleted	PPR 1/16, paragraph 9.21; MEPC 67/20, paragraph 16.3
Note: See notes on output 7.3.1.1.								

***

ANNEX 18

PROPOSED BIENNIAL AGENDA FOR THE 2016-2017 BIENNIUM[1]

Planned output number	Description	Parent organ(s)	Coordinating organ(s)	Associated organ(s)	Target completion year
1.1.2.3	**Unified interpretation to provisions of IMO safety, security, and environment related Conventions**	MSC / MEPC		III / PPR / CCC / SDC / SSE / NCSR	Continuous
2.0.1.2	~~Guidelines for port State control under the 2004 BWM Convention, including~~ **Revised guidance on ballast water sampling and analysis**	MEPC	PPR	~~III~~	2017
~~5.2.1.15~~	~~Mandatory Code for ships operating in polar waters~~	~~MSC / MEPC~~	~~SDC~~	~~HTW / PPR / SDC / SSE / NCSR~~	~~No request received from SDC~~
5.2.1.16	Non-mandatory instrument on regulations for non-convention ships	MSC	III	HTW / PPR / SDC / SSE / NCSR	2017
~~7.1.2.1~~	~~Revised guidelines for the inventory of hazardous materials~~	~~MEPC~~		~~PPR~~	
7.1.2.5	**Production of a manual entitled "Ballast Water Management – how to do it"**	MEPC		PPR	2017
~~7.1.2.6~~	~~Guidance for international offers of assistance in response to a marine oil pollution incident~~	~~MEPC~~		~~PPR~~	

[1] Proposed modifications to the Sub-Committee's 2014-2015 biennial agenda, as set out in annex 13 to document MEPC 67/20. Outputs printed in bold have been selected for the draft provisional agenda for PPR 3, as shown in annex 3. Struck-out text indicates proposed deletions and shaded text indicates proposed changes. Output numbers subject to change by A 29.

Planned output number	Description	Parent organ(s)	Coordinating organ(s)	Associated organ(s)	Target completion year
~~7.1.2.8~~	~~Guidance on the safe operation and performance standards of oil pollution combating equipment~~	~~MEPC~~	~~PPR~~	~~SDC~~	
7.1.2.9	**Revised section II of the Manual on Oil Pollution-Contingency planning**	MEPC		PPR	2016
7.1.2.10	**Guide on oil spill response in ice and snow conditions**	MEPC		PPR	2016
7.1.2.11	**Updated IMO dispersant guidelines**	MEPC		PPR	2017
7.1.2.13	**Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels**	MSC / MEPC	PPR	SDC / SSE	2017
7.2.2.1	**Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code**~~, taking into account recommendations of GESAMP-EHS~~	MEPC		PPR	Continuous
7.2.3.2	**Updated OPRC Model training courses**	MEPC		PPR	2016
~~7.3.1.1~~	~~Guidelines related to MARPOL Annex VI and the NO_x Technical Code in accordance with Action Plan endorsed by MEPC 64~~	~~MEPC~~		~~PPR~~	

Planned output number	Description	Parent organ(s)	Coordinating organ(s)	Associated organ(s)	Target completion year
7.3.2.2	Keep under review IMO measures and contributions to international climate mitigation initiatives and agreements (including ~~CO_2 sequestration and ocean fertilization as well as~~ **consideration of the impact on the Arctic of emissions of Black Carbon from international shipping**)	MEPC		PPR	2017
12.1.2.1	Analysis of casualty and PSC data to identify trends and develop knowledge and risk-based recommendations	MSC / MEPC	III	HTW / PPR / SDC / SSE / NCSR	Annual
13.0.3.1	**Improved and new technologies approved for ballast water management systems and reduction of atmospheric pollution**	MEPC		PPR	Annual
…	**Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI and not covered by other guidelines**	MEPC		PPR	2016
~~…~~	~~Guidelines as called for under paragraph 2.2.5.6 of the revised NO_x Technical Code 2008 (NO_x-reducing devices)~~	~~MEPC~~		~~PPR~~	

***

ANNEX 19

PROPOSED PROVISIONAL AGENDA FOR PPR 3

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code

4 Code for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels

5 Revised guidance on ballast water sampling and analysis

6 Production of a manual entitled "Ballast Water Management – How to do it"

7 Consideration of the impact on the Arctic of emissions of Black Carbon from international shipping

8 Guidelines pertaining to equivalent methods set forth in regulation 4 of MARPOL Annex VI and not covered by other guidelines

9 Improved and new technologies approved for ballast water management systems and reduction of atmospheric pollution

10 Revised section II of the Manual on oil pollution contingency planning

11 Guide on oil spill response in ice and snow conditions

12 Updated IMO Dispersant Guidelines

13 Updated OPRC Model training courses

14 Unified interpretation to provisions of IMO environment-related Conventions

15 Biennial agenda and provisional agenda for PPR 4

16 Election of Chairman and Vice-Chairman for 2017

17 Any other business

18 Report to the Marine Environment Protection Committee

***

ANNEX 20

STATEMENTS BY DELEGATIONS[1]

ITEM 1

Statement by the delegation of Italy

"On December 27, 2014 at 16.50pm the M/v **Norman Atlantic**, Italian flag, left the port of Patras to Ancona, where it was to arrive at 19.30 pm the following day, with a passenger/crew list of 474 people (419 passengers and 55 crew members) and following route: Patras, Igoumenitsa, Ancona.

At 23.13 pm moored in the Greek port of Igoumenitsa and resumed the navigation at 00.50am.

While sailing at 04.36 am on 28 December, the **Norman Atlantic** in position 44 nautical miles NW of the island of Corfu, 33 nautical miles NE of the island of Othonoi transmitted a DSC Distress reporting fire on board. In the meantime MRCC Rome was informed by the coastal radio station of Palermo and others RCC that had received the DSC Distress.

At 04.45 am CG District Office of Otranto received a MAY-DAY on channel 16 VHF by Norman Atlantic reporting the presence on Board of 55 crew members and about 400 passengers as well as cars.

The ship was, albeit for a few miles, in the Search and Rescue area under responsibility of Greek Maritime Rescue Coordination Center (JRCC Piraeus), with whom MRCC Rome immediately established contacts, learning that it himself had assumed the coordination of SAR operations. At 09.00 am coordination was then hired by ITCG MRCC Rome, considering the ship started drifting towards Albanian territorial waters and in consideration of the flag of the vessel and the seriousness of the event.

The weather conditions were very difficult, there were gale-force winds from 40 to 50 kts, poor visibility and lashing rain.

At 05.27 Palermo coastal radio station reported that **Norman Atlantic** was fallen a lifeboat with the intention to declare abandon ship. At 05.31 JRCC Piraeus reported that it had declared abandoning ship in position Lat. 40° 19'N, Long. 018° 59'E. The position was about 15 nautical miles from the Albanian coast (Cape of Rhodes), in international waters.

MRCC Rome, cooperating with JRCC Piraeus had immediately using a fixed-wing aircraft of the ITCG from the base of Pescara, and a Coast Guard helicopter from Catania, in addition to two patrol boats from Otranto and Santa Maria di Leuca and a tug from Brindisi. MRCC Rome also sent a message via Inmarsat Enhanced Group Calling and a Navtex message directed to all ships present in the of accident to lend assistance to victims. It was also requested the intervention of helicopters of Navy and Air Force.

The entire rescue apparatus, quickly mobilized; during the first few hours of operation, it was constantly reinforced upon arrival in the area of operations of SAR units and of merchant

[1] Statements have been included in this annex in the order in which they were given, sorted by agenda item, and in the language of submission (including translation into any other language if such translation was provided). Statements are available in all the official languages on audio file at: http://docs.imo.org/Meetings/Media.aspx

ships: three ITCG patrol boats, 12 merchant ships and 4 tugs. Aerial operations for the rescue of shipwrecked were conducted with 17 helicopters from the Coast Guard, Navy, Air Force and Greek armed forces (three aircraft).

One hundred and fifty-eight people were embarked on 4 of the merchant ships intervened. Some of those survivors were on board survival craft of **Norman Atlantic** while others were put aboard a merchant ship by helicopters intervened, after having recovered directly from the ship left. All others were evacuated from **Norman Atlantic** on fire by helicopters that have transported them on the ground or on the Navy ship San Giorgio.

Taking into account that the fire on board did not allow all passengers to get to safety, and particularly adverse in heavy weather that did not allow to approach with emergency boats, evacuation operations continued with helicopters without any interruption, even with the onset of night, until about 14.00pm hours on 29 December 2014. Helicopter operations, although hampered by the presence of an open flame superstructures and an intense blanket of smoke were performed successfully. The deck of the ship, on which passengers had gathered, was the only point of 'pick up' used to perform the recovery.

Rescued people were landed partly at the airports of Brindisi and Lecce-Galatina and partly on the Navy ship **San Giorgio**. The ships disembarked the survivors at the ports of Brindisi, Taranto, Bari, Patras and Igoumenitsa.

The number of people on the crew/passenger list was 474 (419 passengers and 55 crew). The Greek authorities have made known that one of the names had never climbed on board. Four hundred and fifty-three people were rescued alive (5 of these were not present on the crew list) and recovered 9 dead bodies into the sea. Therefore 16 people listed passengers plus 2 people, though the names not present on the passenger list, are missing so far.
Search and rescue operations continued over the following days, especially with the use of Italian aircraft (Coast Guard and Navy), Greek aircraft and Albanian patrol boats, as well as with the involvement of the merchant ships in transit in the area, continuing to send notice to mariners and by contacting merchant ships to alert them to pay close attention to possible sightings.

Norman Atlantic was towed to the port of Brindisi, Italy, arriving there on 2 January 2015. The ship has been sequestered for the investigation. The ship continued to burn in port for almost two weeks until 10 January 2015, when firefighters were finally able to enter the hull for inspection.

Italian authorities opened a criminal and technical investigation into the fire. The investigations would determine whether or not criminal negligence played a role in the fire and to understand what is possible to do to increase the safety of navigation on board merchant ships."

Statement by the delegation of Greece

"First of all, I would like to express this delegation's sincere appreciation to his Excellency the Secretary-General for the sympathy that he has shown for the tragic incident of Italian Flag **Norman Atlantic**. Also, we would like to thank the Italian authorities for their courageous efforts and we kindly request Admiral Aliperta to convey our appreciation to the Italian Coast Guard and all the others who were engaged in the SAR operations. I will be brief since the details of the incident have been accurately described by the distinguished delegation of Italy
On Sunday the 28th of December 2014 (05:40 am local time), the Emergency Call Service (112) of Greece received a call from a man who declared himself as one of the passengers onboard the Italian-flagged RO-PAX vessel **Norman Atlantic**, and informed them that the vessel was on fire.

The JRCC/PIRAEUS took over immediately and followed all the indicated and appropriate actions according to SAR Convention and relevant IMO Manuals and Circulars. Under the instructions of the JRCC/PIRAEUS, all vessels in vicinity were gradually involved in the SAR operations in order to render assistance to the **Norman Atlantic**. Furthermore, two Hellenic Navy ships, three HCG Fast Patrol Boats, two Fire Boats and two tugboats were instructed to sail to the area.

JRCC PIRAEUS was in charge of the operation until the exit of the **Norman Atlantic** from the Greek Search and Rescue Region (SRR), at about 06:30 am. Consequently, the MRCC ROME was informed accordingly in order to take over the SAR operations since the vessel was then within the Italian SRR.

When the weather conditions improved, helicopters of the Hellenic Air Force, the Hellenic Coast Guard and the Hellenic Navy actively participated in the evacuation operations which were carried out under the instructions and the co-ordination of MRCC Rome.

Within the framework of the investigation in progress, according to the provisions of SOLAS and European Law, the Greek Authorities are in close cooperation with the Italian competent Authorities in order to provide any information, data and assistance, which will be essential to identify the reasons leading to this marine casualty.

This delegation would like to express their deep sympathy and compassion to the families of those who are still missing and our condolences to the families, the relatives and friends of those who lost their lives."

Statement by the delegation of the Bahamas

"It is with great sadness I must report that on the morning of 2 January 2015 the Bahamas ship **Bulk Jupiter** carrying a cargo of 46,000 tonnes of bauxite suddenly capsized and sank some 120 miles off the coast of Vietnam. The lives of eighteen of the nineteen crew on board were lost. We are sure that everyone would wish to join with us in expressing our most sincere condolences to the families of these seafarers and the Government of the Republic of the Philippines. An investigation has been launched and the report will be issued as soon as possible. Any pressing safety issues which arise in the course of the investigation may be brought to the attention of the Organization before the report is issued. Meanwhile we would like to express our appreciation to Viet Nam for the efforts expended in the Search and Rescue operation and to Malaysia for its positive response to our investigation and facilitating the visit of our investigator to the loading port."

Statement by the delegation of Cyprus

"A Cyprus registered cement carrier **Cemfjord** carrying 2000 tonnes of cement from Denmark to Cheshire in the United Kingdom, was sighted at 1430 hrs on 3 January 2015, 11 nautical miles east of Pentland Skerries by the NorthLink ferry **Hrossey**. Only the bow was visible above the waves. No distress call had been received and the weather at the time was bad with storm force winds and strong current. The ferry remained in the area searching for any sign of possible survivors from the crew of **Cemfjord** of 7 Polish and one Philippino national. Several RNLI Lifeboats joined the search along with two helicopters, an aircraft and a Royal Navy ship. Despite the heroic actions of the crew of the ferry **Hrossey** and the emergency services of RNLI, MCA and the Royal Navy, no survivors or bodies have yet been found.

Immediately upon notification, the United Kingdom Marine Accident Investigating Branch, MAIB dispatched a team of investigators in the area. The Cyprus Marine Accident Investigation and Incident Committee also sent an investigator on site. The Cyprus Maritime

Administration as the flag State of the vessel is a substantially interested party and will therefore assist in any way possible toward the efforts of finding out what really happened to **Cemfjord** and how it was so quickly overturned in such an apparent sudden and tragic manner.

The Government of the Republic of Cyprus expresses its deepest sympathy and condolences to the families of the seven Polish and one Philippino crew and to the Governments of Poland and the Philippines.

The Government of the Republic of Cyprus is deeply appreciative of all the emergency response personnel of MCA, RNLI and the personnel of Royal Air Force and Royal Navy who tirelessly searched the area.

This delegation would like to underline the actions of the Master and the crew of the ferry **Hrossey** who battled through difficult weather conditions for hours in order to seek for any sign of life in the vicinity of the upturned hull of **Cemfjord**. This is a prime example of the true heart and spirit that prevails in seafarers in the time of need. The Government of the Republic of Cyprus is therefore grateful to the crew of the ferry and also to its passengers who defied the weather conditions to offer additional assistance in the search.

We are looking forward to find out the circumstances that caused this tragic loss of life and share that information with the IMO for the interest and benefit of all seafarers and the enhancement of safety."

Statement by the delegation of Poland

"This delegation would like to express our appreciation to the expression made by the distinguished delegation of Cyprus and with regret and sadness join to this situation."