



MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
58th session  
Agenda item 23

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**REPORT OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE  
ON ITS FIFTY-EIGHTH SESSION**

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## 1 INTRODUCTION

1.1 The fifty-eighth session of the Marine Environment Protection Committee was held at IMO Headquarters from 6 to 10 October 2008 under the chairmanship of Mr. A. Chrysostomou (Cyprus). The Committee's Vice-Chairman, Mr. A. Chatterjee (India), was also present.

1.2 The session was attended by delegations from the following Members of IMO:

ALGERIA	KENYA
ANGOLA	LATVIA
ANTIGUA AND BARBUDA	LIBERIA
ARGENTINA	LITHUANIA
AUSTRALIA	LUXEMBOURG
BAHAMAS	MALAYSIA
BANGLADESH	MALTA
BARBADOS	MARSHALL ISLANDS
BELGIUM	MEXICO
BELIZE	MONACO
BOLIVIA	MONGOLIA
BRAZIL	MOROCCO
CAMEROON	NAMIBIA
CANADA	NETHERLANDS
CHILE	NEW ZEALAND
CHINA	NIGERIA
COLOMBIA	NORWAY
COOK ISLANDS	OMAN
CROATIA	PANAMA
CUBA	PAPUA NEW GUINEA
CYPRUS	PERU
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	PHILIPPINES
DENMARK	POLAND
DOMINICA	PORTUGAL
DOMINICAN REPUBLIC	QATAR
ECUADOR	REPUBLIC OF KOREA
EGYPT	ROMANIA
ESTONIA	RUSSIAN FEDERATION
FINLAND	SAINT KITTS AND NEVIS
FRANCE	SAINT VINCENT AND THE GRENADINES
GERMANY	SAN MARINO
GHANA	SAUDI ARABIA
GREECE	SIERRA LEONE
ICELAND	SINGAPORE
INDIA	SLOVENIA
INDONESIA	SOUTH AFRICA
IRAN (ISLAMIC REPUBLIC OF)	SPAIN
IRELAND	SRI LANKA
ISRAEL	SUDAN
ITALY	SWEDEN
JAMAICA	SWITZERLAND
JAPAN	SYRIAN ARAB REPUBLIC

THAILAND  
 TRINIDAD AND TOBAGO  
 TURKEY  
 TUVALU  
 UKRAINE  
 UNITED ARAB EMIRATES

UNITED KINGDOM  
 UNITED STATES  
 URUGUAY  
 VANUATU  
 VENEZUELA

the following Associate Members of IMO:

HONG KONG, CHINA  
 FAROE ISLANDS

by representatives from the following United Nations and Specialized Agencies:

UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)/SECRETARIAT OF  
 THE BASEL CONVENTION/SECRETARIAT OF THE CONVENTION ON  
 MIGRATORY SPECIES  
 INTERNATIONAL LABOUR ORGANIZATION (ILO)  
 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE  
 (UNFCCC)  
 THE REGIONAL MARINE POLLUTION EMERGENCY RESPONSE CENTRE FOR  
 THE MEDITERRANEAN SEA (REMPEC)

by observers from the following intergovernmental organizations:

EUROPEAN COMMISSION (EC)  
 MARITIME ORGANISATION FOR WEST AND CENTRAL AFRICA (MOWCA)  
 LEAGUE OF ARAB STATES  
 REGIONAL ORGANIZATION FOR THE PROTECTION OF THE MARINE  
 ENVIRONMENT (ROPME)  
 INTERNATIONAL OIL POLLUTION COMPENSATION FUNDS (IOPC FUNDS)  
 COMMISSION FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF  
 THE NORTH-EAST ATLANTIC (OSPAR COMMISSION)  
 WEST AND CENTRAL AFRICA MEMORANDUM OF UNDERSTANDING ON  
 PORT STATE CONTROL (ABUJA MoU)  
 INTERNATIONAL WHALING COMMISSION (IWC)  
 REGIONAL ORGANIZATION FOR THE CONSERVATION OF  
 THE ENVIRONMENT OF THE RED SEA AND THE GULF OF ADEN (PERSGA)

and by observers from the following non-governmental organizations:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)  
 INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)  
 INTERNATIONAL UNION OF MARINE INSURANCE (IUMI)  
 INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)  
 INTERNATIONAL RADIO-MARITIME COMMITTEE (CIRM)  
 COMITÉ MARITIME INTERNATIONAL (CMI)  
 INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS (IAPH)  
 BIMCO  
 INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)  
 EUROPEAN CHEMICAL INDUSTRY COUNCIL (CEFIC)  
 OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)

INTERNATIONAL MARITIME PILOTS' ASSOCIATION (IMPA)  
FRIENDS OF THE EARTH INTERNATIONAL (FOEI)  
INTERNATIONAL ASSOCIATION OF THE INSTITUTES OF NAVIGATION (IAIN)  
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)  
COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATIONS (CESA)  
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS  
(INTERTANKO)  
THE INTERNATIONAL GROUP OF P & I ASSOCIATIONS (P & I CLUBS)  
THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED  
(ITOPF)  
THE WORLD CONSERVATION UNION (IUCN)  
ADVISORY COMMITTEE ON PROTECTION OF THE SEA (ACOPS)  
GREENPEACE INTERNATIONAL  
CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)  
INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS  
(INTERCARGO)  
WORLD WIDE FUND FOR NATURE (WWF)  
ASSOCIATION OF EUROPEAN MANUFACTURERS OF INTERNAL  
COMBUSTION ENGINES (EUROMOT)  
INTERNATIONAL PETROLEUM INDUSTRY ENVIRONMENTAL  
CONSERVATION ASSOCIATION (IPIECA)  
THE INSTITUTE OF MARINE ENGINEERING, SCIENCE AND TECHNOLOGY  
(IMarEST)  
INTERNATIONAL SHIP MANAGERS' ASSOCIATION (INTERMANAGER)  
INTERNATIONAL PARCEL TANKERS ASSOCIATION (IPTA)  
INTERNATIONAL SAILING FEDERATION (ISAF)  
INTERNATIONAL HARBOUR MASTERS' ASSOCIATION (IHMA)  
INTERNATIONAL BULK TERMINALS ASSOCIATION (IBTA)  
INTERNATIONAL CHRISTIAN MARITIME ASSOCIATION (ICMA)  
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)  
INTERFERRY  
INTERNATIONAL BUNKER INDUSTRY ASSOCIATION (IBIA)  
INTERNATIONAL ASSOCIATION OF MARITIME UNIVERSITIES (IAMU)  
INTERNATIONAL FUND FOR ANIMAL WELFARE (IFAW)  
INTERNATIONAL PAINT AND PRINTING INK COUNCIL (IPPIC)  
INTERNATIONAL SPILL CONTROL ORGANIZATION (ISCO)

1.3 The Chairman of the Maritime Safety Committee (MSC), Mr. N. Ferrer (Philippines); the Chairmen of the Sub-Committee on Flag State Implementation (FSI), Mrs. Tatjana Krilić (Croatia); and Sub-Committee on Bulk Liquids and Gases (BLG), Mr. Z. Alam (Singapore); were also present.

#### **The Secretary-General's opening address**

1.4 The Secretary-General welcomed participants and delivered his opening address. The full text of the opening address is reproduced in document MEPC 58/INF.24.

#### **Chairman's remarks**

1.5 The Chairman thanked the Secretary-General for his opening address and stated that it would be given every consideration in the work of the Committee.

### **Statements by the delegations of India and the Republic of Korea concerning two Indian seafarers**

1.6 The statement made by the delegation of India and the response statement made by the delegation of the Republic of Korea concerning two Indian seafarers in the Republic of Korea are set out in annex 1.

### **Statement by ICS on behalf of the industry on piracy**

1.7 The statement made by ICS on behalf of the industry concerning piracy in the Gulf of Aden is set out in annex 2.

### **Adoption of the agenda**

1.8 The Committee adopted the agenda (MEPC 58/1) and the provisional timetable for guidance during the session (MEPC 58/1/1, annex 2, as amended). The agenda, as adopted, with a list of documents considered under each agenda item, is set out in document MEPC 58/INF.25.

### **Credentials**

1.9 The Committee noted the report of the Secretary-General that credentials of the delegations were in due and proper order.

## **2 HARMFUL AQUATIC ORGANISMS IN BALLAST WATER**

2.1 The Committee recalled that, from 31 May 2005, the “International Convention for the Control and Management of Ships’ Ballast Water and Sediments” (BWM Convention) had been open for accession by any State and noted that three more States (France, Liberia and South Africa) had acceded to the Convention since the last session, which brought the number of Contracting Governments to 16, representing an encouraging 14.24% of the world merchant fleet tonnage. The Committee urged the other Member States to ratify this Convention at the earliest possible opportunity.

### **ESTABLISHMENT OF THE BALLAST WATER REVIEW GROUP**

2.2 The Committee recalled that MEPC 57 had agreed to re-establish the Ballast Water Review Group at this session and had approved the provisional terms of reference of the Group, as set out in annex 2 of document MEPC 57/21. In view of the significant volume of work, the Committee instructed the Group to start working immediately on the outstanding matters from MEPC 57 and on further development of Guidelines (G2) and (G8). The Committee agreed that the documents related to the above-mentioned matters should be forwarded to the Group for consideration and would not be introduced in plenary when the Group re-joins the plenary at a later stage.

2.3 Following an intervention by Brazil, the Group was also instructed to allow Brazil to come back on their document MEPC 55/2/20 and provide additional clarification as, in their view, the proposals contained in this document were not fully understood during the discussions at BLG 12.

## REPORTS OF THE SIXTH AND SEVENTH MEETINGS OF THE GESAMP-BWWG

2.4 After resuming the consideration of this agenda item on Wednesday, 8 October 2008, the Committee noted that the sixth and seventh meetings of the GESAMP-BWWG were held from 19 to 23 May 2008 and from 30 June to 4 July 2008, at the IMO Headquarters, under the chairmanship of Mr. Jan Linders and Mr. Finn Pedersen, respectively. During the two meetings, the GESAMP-BWWG reviewed a total of six proposals for approval of ballast water management systems that make use of Active Substances submitted by Germany, Japan, the Netherlands, Norway and the Republic of Korea.

2.5 The Committee further noted that the seventh meeting of the GESAMP-BWWG was held as an extraordinary meeting in addition to the regular meeting scheduled between MEPC 57 and MEPC 58, to review the proposals which could not be reviewed by the sixth meeting and which had been submitted before the deadline for submission of proposals for approval to MEPC 58. The Committee expressed its appreciation for the efforts made by the members of the GESAMP-BWWG to accomplish this task and to facilitate timely development of new ballast water technologies.

### Basic Approval

2.6 The Committee, having considered the recommendations contained in annexes 5 and 6 of the "Report of the sixth meeting of the GESAMP-BWWG" (MEPC 58/2/7) as well as recommendations contained in annex 5 of the "Report of the seventh meeting of the GESAMP-BWWG" (MEPC 58/2/8), agreed to give **Basic Approval** to:

- .1 the TG Ballastcleaner and TG Environmentalguard System proposed by Japan in document MEPC 57/2/8;
- .2 the Greenship's Ballast Water Management System proposed by the Netherlands in document MEPC 57/2/7; and
- .3 the Ecochlor® Ballast Water Treatment System proposed by Germany in document MEPC 58/2/2.

2.7 The Committee then invited the Administrations of Japan, the Netherlands and Germany to take into account all the recommendations made in annexes 5 and 6 of the sixth report and annex 5 of the seventh report, respectively, during the further development of the systems.

### Final Approval

2.8 Having examined the recommendations contained in annex 7 of the "Report of the sixth meeting of the GESAMP-BWWG" (MEPC 58/2/7), the Committee agreed to give **Final Approval** to the Electro-Cleen™ System proposed by the Republic of Korea in document MEPC 58/2.

2.9 Following consideration of the recommendations contained in annex 4 of the "Report of the seventh meeting of the GESAMP-BWWG" (MEPC 58/2/8) regarding the OceanSaver® Ballast Water Management System proposed by Norway in document MEPC 58/2/1, the Committee noted the concerns expressed by the delegations of the Netherlands and FOEI and invited these delegations to have additional consultations with the Co-Chairman of the GESAMP-BWWG during the lunch break.

2.10 Having received additional clarification from the Co-Chairman of the GESAMP-BWWG, the Committee agreed to give **Final Approval** to the OceanSaver® Ballast Water Management System proposed by Norway in document MEPC 58/2/1 and, at the same time, invited the Administration of Norway to verify that all the recommendations made in annex 4 of the above report are fully addressed prior to the issuance of a Type Approval Certificate.

2.11 Having examined the recommendations contained in annex 6 of the “Report of the seventh meeting of the GESAMP-BWWG” (MEPC 58/2/8), the Committee did not agree to give **Final Approval** to the NK-O3 BlueBallast System proposed by the Republic of Korea in document MEPC 58/2/3 for the reasons given in annex 6 of the above report.

2.12 The delegation of Republic of Korea thanked GESAMP-BWWG for the recommendations regarding the ballast water management system described in document MEPC 58/2/3 and indicated that all these recommendations were being carefully addressed and a new proposal for Final Approval would be submitted for re-evaluation by the GESAMP-BWWG and subsequent consideration by the Committee at its fifty-ninth session.

### **Future work of the GESAMP-BWWG**

2.13 The Committee, having considered the information provided by the Secretariat, noted the suggested time schedule for the eighth meeting of the GESAMP-BWWG (16 to 20 February 2009) and invited Members to submit their proposals for approval (application dossiers) and the non-confidential description of their ballast water management systems to MEPC 59, as soon as possible but not later than 19 December 2008.

2.14 Recognizing the need to facilitate the timely development of ballast water treatment technologies to alleviate the concerns of the shipping industry regarding their availability and recognizing also, based on previous experience, that a maximum of three application dossiers could be reviewed at any one meeting, the Committee agreed that an additional meeting of the GESAMP-BWWG could be organized if more than three proposals for approval of ballast water management systems are received for the same session of the MEPC in accordance with an established deadline.

2.15 In that context, the Committee agreed further that the reports of such additional meetings would be processed as a matter of urgency with the necessary relaxation of the deadline, to facilitate their consideration during the following session of the MEPC and that only the main body of the GESAMP-BWWG’s reports be translated in all the three working languages with the annexes in English only.

### **METHODOLOGY FOR INFORMATION GATHERING AND THE CONDUCT OF WORK OF GESAMP-BWWG (THE METHODOLOGY)**

2.16 The Committee noted that the GESAMP-BWWG had continued to develop the Methodology during its sixth and seventh meetings to ensure it accurately reflects the provisions of the revised Procedure (G9) and that the updated version of the Methodology was contained in annex 4 of the “Report of the sixth meeting of the GESAMP-BWWG” (MEPC 58/2/7).

2.17 After the introduction by the Co-Chairman of the GESAMP-BWWG and some discussion, the Committee endorsed the updated version of the Methodology and took action as outlined in the following paragraphs.

## **Human Exposure Scenario (HES)**

2.18 The Committee noted the Group's intention to further develop the sections related to Human Exposure Scenario, taking into account comments in document BLG 12/5/8 (United States) and the experience of other Administrations. The Committee invited interested Members and observers to send their comments and suggestions on Human Exposure Scenario to the Secretariat with the understanding that they will be disseminated to the members of the GESAMP-BWWG to facilitate their consideration.

## **Review of the relationship between Procedure (G9) and Guidelines (G8)**

2.19 The Committee agreed to the GESAMP-BWWG's clarification, contained in section 3.3 of the "Report of the sixth meeting of the GESAMP-BWWG" (MEPC 58/2/7), on why analytic ballast water toxicity tests should be conducted immediately after treatment, at the middle, and at the end of the five-day period required in the Guidelines for approval of ballast water management systems (G8) and on how this information will be used in the evaluation.

2.20 The Committee concurred with the view of the GESAMP-BWWG that, in addition to the testing required by paragraphs 5.2.2, 5.2.3 and 5.2.4 of Procedure (G9), from a pragmatic standpoint in the context of toxicity tests during land-based testing, the following information would provide adequate safeguards for the environment:

- .1 acute toxicity testing using fish, invertebrates and plants; or
- .2 chemical analysis demonstrating that there is no significant negative changes during the five-day tank holding time in the chemical by-products; or
- .3 both chemical analysis and acute aquatic toxicity testing,

immediately after treatment and after 24 or 48 hours.

## **Logistical costs and timing implication of the proposal for screening of ballast water management systems and pre-evaluating the testing facilities**

2.21 The Committee noted that the GESAMP-BWWG, having considered the logistical costs and timing implication related to the proposals contained in document BLG 12/5/10 (Norway), had identified a number of aspects, as indicated in section 3.4 of the "Report of the sixth meeting of the GESAMP-BWWG" (MEPC58/2/7), that did not support the approach proposed. In that context, the Committee noted the strategic objective of the GloBallast Programme to develop a "Guidance Manual for Ballast Water Treatment Technology Test Facilities" and the GESAMP-BWWG's willingness to designate its representatives to attend the intended GloBallast Workshop for the development of such guidance to present the Group's expectations regarding the testing facilities and their procedures.

## **Further development of the Methodology**

2.22 The Committee agreed to the GESAMP-BWWG's proposal to explore the possibility of developing or adapting one model with the same basic parameters when calculating Predicted Environmental Concentrations (PEC) used in the risk assessment of the ballast water discharge. The Committee further agreed that additional time should be allocated to take stock of the experience achieved during the first seven meetings and to discuss the lessons learned and the

general aspects related to the evaluation process without the pressure of having to review specific submissions.

2.23 Following an intervention by the delegation of CEFIC with regard to the GESAMP-BWWG's proposal to develop a database containing toxicological, ecotoxicological data and appropriate physical properties for chemical by-products produced by most of the ballast water management systems, the Committee requested the Ballast Water Review Group to consider the suggestions by CEFIC and advise the Committee accordingly.

### **Submission of proposals for approval of ballast water management systems**

2.24 The Committee invited Members to bring Procedure (G9) and the Methodology to the attention of concerned Administrations and to advise the applicants to structure their applications in accordance with the Methodology. The Committee reiterated its request to the Administrations to evaluate the application dossier and confirm that it is satisfactory and complete before submitting to the Organization in accordance with Procedure (G9).

### **OUTCOME OF THE WORK OF THE BLG SUB-COMMITTEE RELEVANT TO BALLAST WATER MANAGEMENT**

2.25 Following consideration of document MEPC 58/2/5 on the outcome of BLG 12 and having noted that document MEPC 58/2/6 "Report of the Working Group on development of Guidelines for uniform implementation of the 2004 BWM Convention (Part 2)" had already been introduced in the Ballast Water Review Group and will be reported upon in the Group's report (MEPC 58/WP.6), the Committee recalled that the sections related to the outcome of Guidelines for ballast water sampling (G2) had been referred to the Ballast Water Review Group for further consideration.

2.26 Also with regard to Guidelines (G2), the delegation of the Bahamas reiterated the concern expressed at BLG 12 that a shipowner who purchased and correctly operated type-approved equipment would be subject to control and prosecution through no fault of their own. To alleviate this concern and provide some certainty, the delegation of the Bahamas suggested that, before initiating any action related to prosecution, the port State control officer should inform the shipowners on the outcome of the port State control inspection in writing and advise them to rectify the non-compliance aspects before returning to the respective country or port. Noting also the suggestions by the United States, the Marshall Islands and FOEI that, being an issue of enforcement, this matter could be better addressed by FSI Sub-Committee, the Committee requested the Ballast Water Review Group to consider the suggestions above and advise the Committee accordingly.

2.27 Noting that BLG 12 had finalized the guidance document regarding the arrangements for responding to emergency situations involving ballast water operations, the Committee approved the guidance document, set out in annex 2 to document BLG 12/17, and instructed the Secretariat to issue a technical circular on this matter.

2.28 The Committee, having noted that the Ballast Water Working Group established at BLG 12 was not able to address all the terms of reference due to the time constraints and the large volume of work assigned, endorsed the Sub-Committee's authorization to the Group to continue its work until the end of BLG 12 session and submit Part 2 of its report directly to MEPC 58.

2.29 The Committee noted further that the Ballast Water Working Group would be re-established during BLG 13 and endorsed its Terms of Reference, set out at annex 3 of document BLG 12/17.

2.30 In view of the significant volume of work required for the timely and effective implementation of the BWM Convention, the Committee agreed to change the title of agenda item “Development of guidelines for uniform implementation of the 2004 BWM Convention” to “Development of guidelines and other documents for uniform implementation of the 2004 BWM Convention” as a high-priority item of the work programme of the BLG Sub-Committee with a target completion date of 2010.

#### **REVIEW OF BALLAST WATER TREATMENT TECHNOLOGIES**

2.31 The Committee noted that five documents, MEPC 58/2/10 (Brazil), MEPC 58/2/12 (Norway), MEPC 58/INF.8 (the Netherlands), MEPC 58/INF.9 (United Kingdom) and MEPC 58/INF.17 (Germany) providing information on the development of ballast water treatment technologies had been submitted to facilitate the review.

2.32 The Committee noted the information regarding the type approval certification of two ballast water management systems granted by the Administrations of Norway and Germany to Pure Ballast and SEDNA®, as contained in documents MEPC 58/2/12 and MEPC 58/INF.17, respectively.

2.33 The Committee noted with appreciation the information in document MEPC 58/INF.8 (the Netherlands) on the testing facility for ballast water treatment technologies at the Royal Netherlands Institute for Sea Research (NIOZ) and document MEPC 58/INF.9 (United Kingdom) on the update of the Industry Guide commissioned by Lloyd’s Register on the current status, availability and specifications of ballast water management systems.

2.34 After a brief discussion, the Committee agreed to refer the five documents mentioned above to the Ballast Water Review Group for further consideration.

#### **OTHER INFORMATION RELATED TO BALLAST WATER MANAGEMENT AND CONTROL**

2.35 The Committee noted the information provided in document MEPC 58/INF.4 (ROPME/MEMAC) on the First Regional Steering Committee Meeting on ballast water management held in the Kingdom of Bahrain from 27 to 29 January 2008 and the information provided by India in document MEPC 58/INF.12 on deliberations at the International Conference on Bio-fouling and Ballast Water Management held from 5 to 7 February 2008, in Goa, India.

#### **ESTABLISHMENT OF THE BALLAST WATER REVIEW GROUP**

2.36 Having completed the consideration of all the sub-items under this agenda item, the Committee agreed to establish the Ballast Water Review Group with the following terms of reference:

“Taking into consideration comments made in plenary, the Ballast Water Review Group is instructed to:

- .1 further consider the Methodology for information gathering and the conduct of work of the GESAMP-BWWG contained in annex 4 to document MEPC 57/2/10, and advise the Committee on how to address the recommendations made by

the GESAMP-BWWG during its fourth and fifth meetings, contained in action items 1 to 4 of document MEPC 57/2 and action item 1 of document MEPC 57/2/10;

- .2 consider the provisions in resolution A.1005(25) and review the issue of a ship subject to regulation B-3.3 constructed in 2010 and the immediate availability of type-approved technology for such a ship to meet the D-2 standard by:
  - .1 refining and applying the existing review methodology employed at MEPC 53 and MEPC 55;
  - .2 assessing the number of vessels to be constructed in 2010 that will need ballast water treatment technology;
  - .3 identifying the current status of ballast water treatment technologies and providing an estimate of how many of them will be available for ships constructed in 2010;
  - .4 taking into account paragraphs 2.2 and 2.3 above, evaluate whether there is sufficient type-approved technology for ships subject to regulation B-3.3 constructed in 2010; and
  - .5 if it is concluded that the immediate availability of type-approved technology for such ships is insufficient, recommend an appropriate course of action for consideration by the Committee;
- .3 complete the work on the draft Guidelines for ballast water sampling (G2) with a view to finalizing these Guidelines providing the needed certainty and recommend these Guidelines for adoption by an MEPC resolution taking into account the existing draft (BLG 12/17, annex 1) and any further submissions;
- .4 consider procedural aspects regarding the submission of proposals for approval of ballast water management systems that make use of Active Substances as discussed at MEPC 57 and, in particular, regarding the communication between the GESAMP-BWWG and the applicants;
- .5 consider any additional changes to the Guidelines for approval of ballast water management systems (G8) based on the draft text provided in annex 3 of the report of the Ballast Water Review Group (MEPC 57/WP.5) and develop an amended version of these Guidelines for adoption by an MEPC resolution;
- .6 continue to consider document BLG 12/5/10 to identify the possible impacts and implications of the proposed arrangements on the GESAMP-BWWG and the availability of technologies;
- .7 continue to consider document MEPC 57/2/12 to identify whether shipboard testing requirements contained in Guidelines (G8) should be changed; and
- .8 submit a written report to plenary on Thursday, 9 October 2008.”

2.37 Having noted that apart from 2.36.2 and 2.36.8 all the other terms of reference listed in paragraph 2.36 above had been already addressed by the Ballast Water Review Group, the Committee requested the Group to focus on the review of the availability of treatment technologies and resolution A.1005(25).

#### **CONSIDERATION OF THE REPORT OF THE BALLAST WATER REVIEW GROUP**

2.38 Upon receipt of the report of the Ballast Water Review Group (MEPC 58/WP.6), the Committee approved it in general and took action as outlined in the following paragraphs.

#### **Guidelines for ballast water sampling (G2)**

2.39 The Committee recalled that BLG 12, having completed its work on the Guidelines for ballast water sampling (G2) (BLG 12/17, annex 1), invited MEPC 58 to adopt these Guidelines by an MEPC resolution and, at the same time, invited the delegations concerned with the lack of certainty in the current version of these Guidelines to submit relevant proposals to MEPC 58 to enhance the certainty and ensure the much needed uniformity.

2.40 The Committee noted the need to finalize Guidelines (G2) to allow countries which are dependent upon the full set of 14 Guidelines to ratify the Convention to do so and to minimize the risk of individual States taking unilateral action.

2.41 The Committee noted that the Review Group had considered documents MEPC 58/2/11 (Brazil), MEPC 58/2/13 (ICS), MEPC 58/INF.10 (Japan) and MEPC 58/INF.23 (FOEI), commenting on Guidelines (G2).

2.42 The Committee noted that the text of Guidelines (G2), with the exception of section 6, seemed to be acceptable to all the participants and therefore the Group used the text provided by ICS in document MEPC 58/2/13 as a basis for further refining paragraph 6.2. Following considerable exchange of views on the text proposed, some delegations agreed to the text proposed by ICS, with the exception of the wording “whole” in paragraph 6.2.2. It was suggested that removing that word would not significantly change the meaning of the paragraph and would still provide useful guidance for taking representative samples. Other delegations were of the view that the word “whole” had a specific meaning and therefore could not agree with the removal. The Chairman of the Review Group then suggested to use the text provided by ICS with the word “whole” in square brackets to replace the chapeau of paragraph 6.2 and subparagraphs 6.2.1 to 6.2.3 of the existing version of the draft Guidelines (G2). After a final review of the whole document, the Review Group unanimously agreed that there were no other changes recommended to the text of these Guidelines.

2.43 Having noted the additional explanation provided by ICS, supported by several other delegations, the Committee agreed to delete the square brackets around the word “whole” in paragraph 6.2.2 and to adopt the Guidelines for ballast water sampling (G2) (see paragraph 2.63.1). The Committee also agreed to instruct the BLG Sub-Committee to develop, as a matter of high priority, an IMO circular to provide sampling and analysis guidance to be followed and to give advice on the uniform application of that guidance. The Committee further agreed to request the FSI Sub-Committee to take note of Guidelines (G2), after their adoption, when developing the Guidelines on port State control under the 2004 BWM Convention.

2.44 Following a proposal from Brazil regarding the need for technical co-operation to ensure uniformity in implementing these Guidelines, the Committee agreed to explore together with the Technical Co-operation Division of the Organization the possibility of providing such technical co-operation and to invite Member States to share their knowledge and experience on sampling and analysis.

### **Revision of the Guidelines for approval of ballast water management system (G8)**

2.45 The Committee recalled that MEPC 57, having considered a number of submissions commenting on the revision of Guidelines (G8), had prepared a draft of the revised Guidelines (G8), which incorporates changes to ensure appropriate appraisal of environmental toxicity during the Type Approval process for systems not subject to Procedure (G9) as agreed by MEPC 56.

2.46 The Committee recalled further that, having considered the comments of the Review Group on document MEPC 57/2/12 (Norway) proposing changes to concentration levels of test organisms during shipboard tests stipulated in Guidelines (G8), MEPC 57 could not agree with the changes proposed and referred the document to MEPC 58 for further consideration.

2.47 The Committee noted that, during the discussion, Norway had proposed that, instead of the proposals in document MEPC 57/2/12 to change the size of organisms in challenge water, only one of the three shipboard tests should fulfil the pre-treatment organism concentrations. After considerable discussions, this proposal was not supported by the Group.

2.48 After some discussion, the Committee agreed to adopt the revised Guidelines for approval of ballast water management systems (G8) (see paragraph 2.63.6).

2.49 Following a proposal by the United States, supported by some other delegations, the Committee agreed to invite Member States to provide information on their experiences regarding shipboard testing and test results.

2.50 The Committee noted the information provided by the United Kingdom in document MEPC 58/2/9 on draft United Kingdom Type Approval Guidelines for ballast water management systems and invited Members to contribute to the further development of such guidance at BLG 13.

2.51 The observer of FOEI informed that difficulty has been reported for ships to find appropriate challenge water to ensure satisfactory completion of shipboard tests to verify compliance with the D-2 standard for type approval in accordance with the Guidelines (G8). There appeared to be a variation in opinion amongst the marine biological scientific community on the matter and therefore, FOEI invited the Administrations to submit papers to BLG 13 on the density and range of planktonic organisms relevant to the testing protocol contained in Guidelines (G8), including seasonal variation in their waters, to assist in planning the type of ship and the voyage itinerary undertaken during the shipboard testing of a ballast water management system in accordance with the above Guidelines.

### **Methodology for information gathering and the conduct of work of the GESAMP-BWWG**

2.52 The Committee recalled that MEPC 57 had instructed the BWRG to consider the Methodology for information gathering and the conduct of work of the GESAMP-BWWG, contained in annex 4 of document MEPC 57/2/10 in light of the actions requested from the Committee in documents MEPC 57/2 and MEPC 57/2/10. In the time available, the Group was

not able to consider all the action items in the two documents above, which were added to the draft terms of reference for the Ballast Water Review Group convened at MEPC 58.

2.53 The Committee noted further that, as a consequence of the adoption of the revised Procedure (G9), MEPC 57 had requested the GESAMP-BWWG to harmonize the Methodology with the revised Procedure and continue to develop the Human Exposure Scenario, which made most of the action items contained in documents MEPC 57/2 and MEPC 57/2/10 redundant. With regard to the last action point on Assessment Factors contained in document MEPC 57/2, which was not redundant, the GESAMP-BWWG had requested further guidance from the MEPC.

2.54 Having noted the explanation received from the Co-Chairman of the GESAMP-BWWG on the use of the Assessment Factors, the Committee agreed that when only two chronic Non-Observed Effect Concentrations (NOECs) are available for use in the marine risk assessment and if chronic tests included the most sensitive organism from the acute set of three tests, an Assessment Factor (AF) of 100 could be used on a case-by-case basis. If the most sensitive group is not included, then an AF of 1000 should be applied.

2.55 Having noted that the BWRG had agreed in principle with a number of editorial changes with respect to the GESAMP-BWWG Methodology, the Committee invited the GESAMP-BWWG to consider the proposed changes to the Methodology at their earliest opportunity and instructed the Secretariat to forward these changes to the GESAMP-BWWG.

#### **Procedural aspects regarding the submission of proposals for approval of ballast water management systems**

2.56 Following the examination of the views regarding the submission of proposals for approval of ballast water management systems, expressed by the GESAMP-BWWG in paragraph 4.1.1 of document MEPC 58/2/8, and the additional information provided by the Co-Chairman of the GESAMP-BWWG as well as the suggestion to have better track changes in the Methodology, the Committee noted the positive developments in this respect and the availability of GESAMP-BWWG to further improve the communication with the proponent Administrations.

#### **Draft MEPC resolution on “Information reporting on type approved ballast water management systems”**

2.57 Following consideration of the draft text of the MEPC resolution on “Information reporting on type approved ballast water management systems”, developed at BLG 12, and the changes made by the BWRG, the Committee agreed to adopt the resolution (see paragraph 2.63.10).

#### **Additional explanation provided by the delegation of Brazil on document MEPC 55/2/20**

2.58 The Committee noted the additional information regarding document MEPC 55/2/20, provided by Brazil, and agreed to include an additional term of reference for the Ballast Water Working Group to be established at BLG 13 on the long-term effects, maintenance and reliability of Ballast Water Management Systems.

## **Review of the availability of ballast water treatment technologies**

2.59 The Committee recalled the conclusion reached at MEPC 56 that a limited number of ballast water treatment technologies would be available to meet the first implementation date of the BWM Convention together with the concerns regarding the capability of all ships subject to regulation B-3.3 to meet the D-2 standard in 2009 due to procedural and logistical problems. The Committee further recalled that, following an initiative by the Secretary-General to address these concerns, the Assembly, at its twenty-fifth session, had adopted resolution A.1005(25) on the Application of the BWM Convention, which calls on States that have not yet done so, to ratify the Convention as soon as possible. In the meantime, the resolution recommends that ships subject to regulation B-3.3 constructed in 2009 should not be required to comply with regulation D-2 until their second annual survey, but no later than 31 December 2011. Operative paragraph 6 of resolution A.1005(25) requests the Committee to:

- .1 keep this resolution under review;
- .2 revise or withdraw the recommendations in paragraphs 2, 3 and 4 as appropriate;
- .3 review, not later than at its fifty-eighth session, in particular, the issue of a ship subject to regulation B-3.3 constructed in 2010 and the immediate availability of type-approved technology for such a ship to meet the D-2 standard; and
- .4 inform the Assembly accordingly.

2.60 Having examined the conclusions of the Review Group regarding the number of new buildings over the next two years and the current status of ballast water treatment technologies, the Committee concluded that ballast water treatment technologies were currently available and more technologies would be available in the near future. With regard to whether there are sufficient type-approved technologies for ships subject to regulation B-3.3 constructed in 2010, the Committee agreed that this issue would be better defined at MEPC 59. Consequently, the Committee agreed to re-establish the Ballast Water Review Group at MEPC 59, to confirm whether there is sufficient type-approved technology for ships subject to regulation B-3.3 constructed in 2010, as instructed by Assembly resolution A.1005(25).

### **Additional matters raised during the preliminary discussions in plenary**

2.61 Having examined the views expressed by the Group on the proposal by Bahamas regarding the situation when a sample taken from a ship is not in compliance with the standard D-2, the Committee agreed that Guidelines (G2) contained technical guidance and that matters related to enforcement could be better dealt with by the FSI Sub-Committee, which is currently developing the Guidelines for port State control under the 2004 BWM Convention. The Committee agreed that the delegation of the Bahamas and other interested delegations could provide their proposals on this matter to either the FSI Sub-Committee or to the Correspondence Group established by the Sub-Committee in this respect.

2.62 Following the examination of the comment made by CEFIC regarding the GESAMP-BWWG's proposal to develop a database (see paragraph 2.23 above) and the conclusions of the Review Group on this matter, the Committee approved the proposal and advised the GESAMP-BWWG that any open database should be limited to data describing chemical by-products formed during ballast water treatment and should not contain proprietary information.

### **Action taken by the Committee**

2.63 Having considered the actions requested by the Review Group and the comments made by the various delegations, the Committee:

- .1 adopted the Guidelines for ballast water sampling (G2) by resolution MEPC.173(58), as set out in annex 3;
- .2 instructed the BLG Sub-Committee to develop, as a high-priority matter, an IMO circular to provide sampling and analysis guidance to be followed and to give advice on the uniform application of that guidance;
- .3 instructed the FSI Sub-Committee to take into account the Guidelines (G2) when developing the Guidelines on port State control under the 2004 BWM Convention;
- .4 agreed to explore, together with the Technical Co-operation Division of the Organization, the possibility of providing technical cooperation to ensure uniform implementation of the Guidelines (G2);
- .5 requested Member States to share information on experience gained in shipboard testing;
- .6 adopted the revised Guidelines for approval of ballast water management systems (G8) by resolution MEPC.174(58), as set out in annex 4;
- .7 requested Member States to provide contributions to the further development of guidance on conducting type approvals to BLG 13;
- .8 endorsed the GESAMP-BWWG's view regarding the Assessment Factor contained in paragraph 4.2 of document MEPC 57/2 and concurred with the view that when only two chronic NOECs are available for use in the marine risk assessment and if chronic tests include the most sensitive organism from the acute set of three tests, an Assessment Factor of 100 could be used on a case-by-case basis. If the most sensitive group is not included, then an Assessment Factor of 1000 should be applied;
- .9 requested the GESAMP-BWWG to consider the proposed changes to the Methodology at their earliest opportunity;
- .10 adopted resolution MEPC.175(58) on "Information reporting on type approved ballast water management systems", as set out in annex 5;
- .11 included an additional term of reference on the long-term effects, maintenance and reliability of Ballast Water Management Systems in the terms of reference for the Ballast Water Working Group to be established at BLG 13;
- .12 concurred with the view that ballast water treatment technologies are currently available and more technologies will be available in the near future and agreed to re-establish the Ballast Water Review Group at MEPC 59 to confirm whether there are sufficient type-approved technologies for

ships subject to regulation B-3.3 constructed in 2010, as instructed by Assembly resolution A.1005(25);

- .13 concurred with the view that Guidelines (G2) are technical guidance and that matters related to enforcement could be better dealt with by the FSI Sub-Committee; and
- .14 approved action point 9 of the report of the sixth meeting of the GESAMP-BWWG (MEPC 58/2/7) and advised the GESAMP-BWWG that any open database should be limited to data describing chemical by-products formed during ballast water treatment and should not contain proprietary information.

### **3 RECYCLING OF SHIPS**

3.1 The Committee recalled that MEPC 57 had made substantial progress in the further development of the draft International Convention for the Safe and Environmentally Sound Recycling of Ships.

3.2 The Committee also recalled that MEPC 57 had agreed to prepare a draft resolution to be adopted by the diplomatic conference addressing the adequacy of ship recycling capacity. For this purpose MEPC 57 had established a correspondence group under the coordination of the United Kingdom and had instructed it to prepare a draft resolution to address the circumstances in which sufficient recycling capacity may not be available both before and following entry-into-force of the convention. MEPC 57 had intended that the draft resolution should: encourage States to ratify the convention (when adopted) at the earliest opportunity; address disincentives for flag and recycling States to ratify the convention; not conflict with the requirements of the convention itself; and not require any amendments to the text of the convention as drafted. The correspondence group had also been instructed to consider the draft resolution in the context of the entry-into-force provisions.

3.3 MEPC 57 had also agreed that there was a strong need for holding an intersessional meeting of the Working Group on Ship Recycling, of four day duration, the week before MEPC 58, in order to consider and resolve any outstanding issues and corresponding text of the draft convention and to prepare a final version of the draft convention for an Article-by-Article and regulation-by-regulation review by MEPC 58, with a view to approval for circulation in time for the diplomatic conference to be hosted by Hong Kong, China, from 11 to 15 May 2009.

3.4 The Committee noted that the fourth intersessional meeting of the Working Group on Ship Recycling had been held at IMO Headquarters from 30 September to 3 October 2008 under the chairmanship of Mr. Jens Henning Koefoed (Norway).

#### **PLANNING OF THE WORK**

3.5 The Committee recalled that the report of the correspondence group on ship recycling had been submitted by the United Kingdom as document MEPC 58/3/3 and the report of the fourth intersessional meeting of the working group on ship recycling had been submitted to the Committee as document MEPC 58/WP.4. In addition, a further 17 documents had been submitted addressing: the draft convention; the guidelines to the draft convention for the Inventory and for the Recycling Facilities; the issue of technical cooperation; ISO's response to the questions raised by document MEPC 57/3/14; the decisions of the ninth meeting of the Conference of the Parties to the Basel Convention; and the resolution of the European Parliament on the Green Paper on better ship dismantling.

3.6 The Committee noted that it needed to undertake an Article-by-Article and regulation-by-regulation review of the draft convention, prior to its approval for circulation to the diplomatic conference. Furthermore, as the intersessional working group had already addressed documents dealing with the draft convention and the draft guidelines, and had also considered the report of the correspondence group, the Committee agreed that plenary should only consider the following issues:

- .1 technical cooperation on ship recycling (document MEPC 58/3);
- .2 ISO's response to the questions raised by document MEPC 57/3/14 (document MEPC 58/3/5);
- .3 the report of the ninth meeting of the Conference of the Parties to the Basel Convention (document MEPC 58/3/9); and
- .4 the report of the fourth intersessional meeting of the Working Group on Ship Recycling (document MEPC 58/WP.4).

## **OUTCOME OF THE COMMITTEE'S CONSIDERATIONS**

### **Technical cooperation on ship recycling**

3.7 The Secretariat, in introducing document MEPC 58/3 on the outcome of the fifty-eighth session of the Technical Co-operation Committee (TC 58) on the issue of the implementation of the new convention, recalled that MEPC 57 had invited the Technical Co-operation Committee to provide its views on mechanisms which can be developed through the Technical Co-operation Programme of the Organization to facilitate, at national level, the implementation of the standards contained in the convention concerning recycling yards in developing countries. Furthermore, the Committee had invited the Technical Co-operation Committee to identify potential sources of funding.

3.8 TC 58 was held from 10 to 12 June 2008 and had suggested that the Technical Co-operation Committee, in collaboration with the MEPC, should work towards the development of a programme of training and capacity enhancement of maritime administrations that would assist Member States to understand and implement the convention.

3.9 The Committee was also reminded that the third session of the Joint ILO-IMO-Basel Convention Working Group on Ship Scrapping was due to be hosted by ILO in Geneva from 29 to 31 October 2008 and that the two main items on the provisional agenda of that meeting were: "joint technical co-operation projects" and "interim measures to be taken prior to the entry-into-force of the convention".

### **ISO's response to the questions raised in document MEPC 57/3/14**

3.10 The ISO observer introduced document MEPC 58/3/5 responding to the questions posed in paragraph 18 of document MEPC 57/3/14, clarifying related matters and providing the current status of the ISO work items, as had been requested by MEPC 57; and re-stating that the ISO standards would not overlap or contradict the relevant IMO provisions. Should this be the case, ISO would immediately take action to rectify the relevant standards.

3.11 In response to the information provided by the ISO, the delegation of Japan, supported by China, India and France, pointed out that the ISO 30000 series would duplicate some of the provisions in the draft IMO convention and its associated guidelines and thus would create confusion to stakeholders. Japan stressed that MEPC had never requested the ISO to develop management standards on ship recycling.

3.12 The delegation of India further explained that the ISO 30000 series is a “business to business” certification scheme and not a “government to business” scheme as mandated by the draft IMO convention for the authorization of recycling facilities by recycling States. In India’s opinion, the ISO 30000 series was therefore inconsistent with the provisions of the convention.

3.13 The Committee agreed that it had never requested ISO to develop a management standard for ship recycling and, furthermore, saw no reason at the present time for ISO to develop such a standard.

### **Report of the ninth meeting of the Conference of the Parties to the Basel Convention**

3.14 The Secretariat of the Basel Convention introduced document MEPC 58/3/9 reporting on the outcome and decisions of the ninth meeting of the Conference of the Parties to the Basel Convention (COP 9) on the subject of environmentally sound management of ship dismantling. The Committee noted that COP 9 had recognized and welcomed the progress made by IMO; had invited IMO to continue to have due regard to the role, competence and expertise of the Basel Convention in matters relating to ship dismantling; and had defined a process by which it intended to assess whether the ship recycling convention would establish an equivalent level of control as that established under the Basel Convention. Also, COP 9 had noted once again in its decision that the duplication of regulatory instruments that have the same objective should be avoided.

3.15 The Committee also noted that the seventh session of the Open-ended Working Group of the Basel Convention is scheduled to meet from 10 to 14 May 2010 to carry out a preliminary assessment of the equivalent level of control between the two conventions in their entirety and then to transmit the results of its consideration to COP 10, scheduled to be held in 2011. In this respect COP 9 had invited Parties to provide, by 31 January 2009, to the Secretariat of the Basel Convention comments on appropriate criteria to be used in such a preliminary assessment.

3.16 The Committee noted further that COP 9 had welcomed the joint technical co-operation programmes relating to sustainable ship recycling developed by the Basel Convention, the International Maritime Organization and the International Labour Organization.

### **European Parliament’s resolution on the Green Paper on better ship dismantling**

3.17 The Committee also noted document MEPC 58/INF.16, providing information on the European Parliament’s resolution on the Green Paper on better ship dismantling.

### **Report of the fourth intersessional meeting of the Working Group on Ship Recycling**

3.18 The Chairman of the intersessional working group, Mr. Jens Koefoed (Norway), introduced the group’s report (MEPC 58/WP.4). The Committee noted that the group, using the text contained in annex 1 of document MEPC 57/WP.6 as the basic text of the draft convention, considered outstanding issues and agreed on the corresponding text of the draft convention. A final version of the draft convention had been prepared for an Article-by-Article and regulation-by-regulation review by MEPC 58.

***Further development of the text of the draft convention – Articles***

3.19 The Committee noted that document MEPC 58/3/13 (India) had proposed that warships should be included under the scope of the convention. The Committee, after some discussion, agreed that warships should not be included as long as they retain their sovereign immunity and also that when warships are decommissioned and then sold to commercial interests, they may lose their sovereign immunity and at that stage they could come under the scope of the convention. The Committee had therefore agreed that there may be a need to develop a guidance document in the future.

3.20 The Committee also noted that document MEPC 58/INF.13 (European Commission) had proposed a specific format for the reporting requirements under Article 12.1, whereby Parties shall provide a list of Ship Recycling Facilities to the Organization for dissemination. During the discussion, it was pointed out that the information sought in the proposal already existed in the form of the Authorization of Ship Recycling Facilities and in its Supplement and that, therefore, Parties should simply provide the Organization with copies of the above. The Committee agreed that the reporting requirements under Article 12.1 should be specified in a Committee Circular rather than in the text of the convention.

3.21 In connection with the square brackets in Article 15.2, the Committee noted that there had been a considerable exchange of views in the working group revolving around three possible options: (a) deletion of the text after “international agreements” on the second line; (b) deletion of the square brackets and retention of the text “and the Basel Convention”; (c) deletion of the square brackets and of the text. The representative of IMO’s Legal Office had expressed the view that the expression “Nothing in this Convention shall prejudice the rights and responsibilities of Parties under other relevant and applicable international agreements” meant that the arrangements in place under those agreements are preserved and therefore are not disturbed or altered one way or another for States which are also Party to this convention. Furthermore, the representative of ILO had drawn the attention of the working group that the present text was a carefully drawn compromise. The delegation of Cyprus had requested to be associated with the statement of the ILO. There had been no consensus and it had therefore been decided to bring this matter to the Committee for its decision.

***Recycling capacity concerns and entry-into-force conditions***

3.22 The Committee noted that, during the discussion of the working group on Article 17 (Entry into force), the United Kingdom as the coordinator of the correspondence group had introduced its report (MEPC 58/3/3) noting that it presented the majority but not the unanimous view of the group.

3.23 The Committee noted that, as described in document MEPC 58/3/3, a variety of views had been expressed in the correspondence group. Amongst those views, a majority of the participants had agreed that it is not feasible to draft a conference resolution for ensuring sufficient recycling capacity following the entry into force of the convention, without conflicting with the requirements of the convention itself. Instead, the group had agreed that the entry-into-force provisions and conditions are a possible way of addressing the recycling capacity problem.

3.24 The Committee was also advised that the working group had also considered: document MEPC 57/3/13 (Japan) on a method for calculating ship recycling capacity based on historic published data; document MEPC 58/3/12 (Bangladesh) proposing a criterion for assessing recycling capacity on the basis of five States, each having at least five authorized Ship Recycling Facilities; and document MEPC 58/3/14 (India) proposing a variation of Option 2 of the report of the correspondence group.

3.25 The Committee noted that the group had seen merit in aspects of all the above proposals and had an extensive discussion on the issue of ship recycling capacity. It had been recognized that overcapacity may be a problem in the future, as a few key recycling States control a large proportion of the world's recycling capacity. The majority of the group had agreed that Article 17 should include a capacity criterion. Some members of the group had recognized that the proposals by Japan and India offered a straightforward mechanism, while some members still favoured the concept in the proposal by Bangladesh and considered that this concept captured the need for compliant ship recycling capacity to be available at the entry into force of the convention. Some members had expressed serious concerns over the use of historical data to calculate recycling capacity.

3.26 The Committee was advised that during the discussion, the representative of IMO's Legal Office had reiterated his view that there was no problem in principle in having recycling capacity as an element in the entry-into-force provisions, but it would be necessary to have clarity and precision on how the recycling capacity was to be objectively determined by the Depositary. The group had agreed that if a capacity criterion were to be included in the entry-into-force conditions, a diplomatic conference resolution would be needed to specify the exact method for the assessment of the convention's entry into force by the Depositary.

3.27 The Committee noted that the group had developed text for Article 17 with square brackets around the criteria. The United Kingdom had reserved its position about the inclusion of this text in the draft convention as this could prejudice other options.

#### ***Further development of the text of the draft convention – Annex***

3.28 The Committee noted that the group had discussed the text proposed in document MEPC 58/3/12 (Bangladesh) for general exceptions to the provisions of the convention under regulation 3. The group had agreed that whereas the convention should not include such a regulation, the cases of abandoned and of wrecked ships may warrant the development of a guidance document at a future stage.

3.29 The Committee also noted that on the basis of the proposal in document MEPC 58/3/11 (France) the group had introduced in the draft Convention a voluntary audit scheme. According to this, recycling States will be able to introduce additional transparency to the process of the authorization of Ship Recycling Facilities by disseminating through the Organization the results of the audit scheme to interested stakeholders. This auditing scheme, which will be carried out by the Competent Authorities or an organization recognized by the Party, is intended to contribute to a more uniform implementation of the convention amongst volunteering Parties with Ship Recycling Facilities operating under their jurisdiction (regulation 16.3).

3.30 The Committee noted further that extensive discussions had taken place throughout the meeting of the working group on the restructure of the reporting requirements under the convention as contained in regulation 25 based on proposals contained in documents MEPC 58/3/4 (Denmark) and MEPC 58/3/8 (Belgium and Turkey). The Group had agreed on

new text for regulation 25 and associated consequential amendments. The following benefits were pointed out as arising from this restructure: (a) increased certainty for the industry; (b) increased clarity and transparency; and (c) consent by the recycling State as early as practical and reasonable.

### ***Guidelines***

3.31 In view of the importance of adopting the Guidelines for the Inventory of Hazardous Materials and the Guidelines for the Safe and Environmentally Sound Ship Recycling as soon as possible after the adoption of the convention, the Committee noted that the Group had also considered the following three submissions relating to these guidelines: documents MEPC 58/3/2 (Japan and Germany), MEPC 58/3/7 (Denmark) and MEPC 58/INF.18 (Japan). Acknowledging that it did not have sufficient time for a thorough review of the guidelines, the Group had agreed on the need for the establishment of a correspondence group for the development of these two guidelines with a view to their finalization, if possible, at MEPC 59.

3.32 The ILO representative recalled the good and constructive working relationship that has existed between IMO and ILO over the years and noted that this co-operation had been given practical effect in Article 15 and in regulation 3 of the draft convention. The wording that was adopted ensured that the draft convention would not inadvertently place governments in a position where they must deal with inconsistent obligations between applicable ILO and IMO conventions. The ILO has a number of conventions and other instruments for protecting occupational health and safety in connection with ship recycling activities and it was suggested that these would need to be recognized in the new convention and its associated guidelines.

3.33 The Committee approved the report of the intersessional working group in general and, in particular (annexes are those of document MEPC 58/WP.4):

- .1 noted that the working group had finalized its work on the development of the text of the draft convention, as set out in annex 1;
- .2 conducted an Article-by-Article and regulation-by-regulation review of the draft convention; and
- .3 established an intersessional correspondence group, under the coordination of Japan<sup>1</sup>, for the further development of the Guidelines for the Safe and Environmentally Sound Ship Recycling and the Guidelines for the Inventory of Hazardous Materials, with the following Terms of Reference:

“On the basis of the outcomes of the 4th Intersessional Meeting of the Working Group on Ship Recycling and of MEPC 58, the Correspondence Group on Ship Recycling is instructed to:

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<sup>1</sup> **Co-ordinator:**  
Mr. Shinichiro OTSUBO  
Director for International Regulations  
Safety Standards Division  
Maritime Bureau  
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- .1 further develop the text of the Guidelines for Safe and Environmentally Sound Ship Recycling and of the Guidelines for the Inventory of Hazardous Materials, taking into account proposals in documents: MEPC 58/3/2 (Japan and Germany), MEPC 58/3/7 (Denmark), MEPC 58/3/10 (Germany) and MEPC 58/INF.18 (Japan), as well as proposals contained in relevant documents submitted to earlier sessions of the Committee;
- .2 if possible, finalize the Guidelines for Safe and Environmentally Sound Ship Recycling and the Guidelines for the Inventory of Hazardous Materials; and
- .3 report the outcome of its deliberations to MEPC 59.”

3.34 During the Article-by-Article and regulation-by-regulation review in the plenary, the Committee considered the following comments made by delegations.

3.35 Norway proposed to insert “Unless otherwise specified in this Convention” at the beginning of Article 3.3, for the purpose of allowing the application of the convention’s requirements to ships below 500 GT in regulation 4. The Committee did not support the proposal as it considered that it represented an expansion to the scope of the convention. Norway stated that it would submit a further proposal on this matter to the diplomatic conference.

3.36 In relation to the second paragraph of Article 7, which the 4th intersessional working group had agreed to delete, the United States reaffirmed its concern that the convention needs to respect the confidentiality of trade secrets and of other proprietary information protected by national law. The United States indicated that it may submit a proposal to the diplomatic conference on this subject.

3.37 In connection with the square brackets in Article 15.2, the representative of the Basel Convention noted the general agreement expressed during the development of the draft convention, that the Basel Convention would continue to apply to activities, to ship recycling facilities and to ships excluded from the scope of the ship recycling convention. The representative therefore suggested that an appropriate reference to the Basel Convention in the text of the convention may provide a useful indicator as to applicable regimes in the future.

3.38 The representative of the International Labour Organization recalled that the text in Article 15.2 was the result of a delicate compromise in earlier discussions. Paragraph 1 referred to UNCLOS because of its paramount importance in maritime law, while paragraph 2 drew attention to those instruments that are most critical in ship recycling. The ILO therefore preferred that the specific reference to its conventions be maintained in the body of the convention in order to underscore the obligations of ratifying States under relevant ILO conventions.

3.39 Following an extensive discussion, the Committee agreed to delete “including those of the International Labour Organization [and the Basel Convention]” from Article 15.2. The Committee also agreed to instruct the drafting group to develop a new operative paragraph in the preamble of the IMO Convention noting the role of the Basel Convention, and also to prepare a draft Conference resolution acknowledging the contribution of the International Labour Organization and of the Basel Convention in the development of the draft convention on ship recycling.

3.40 The Committee discussed Article 17 on the entry into force of the convention. There was a broad range of views expressed reflecting the discussions that had taken place in the intersessional correspondence and working groups. The Committee agreed to maintain the text that had been proposed by the working group within square brackets and invited submissions to the diplomatic Conference on this subject. On this basis, the United Kingdom withdrew its earlier reservation.

3.41 The Committee then agreed to instruct the drafting group to consider drafting solutions to the three issues raised in plenary by IACS: threshold values for the Inventory of Hazardous Materials; consideration of the responsibilities of surveyors involved in the final survey; and the alignment in Appendix 1 of the draft convention of the specified control measures for TBT with the understanding reached at MEPC 57 (MEPC 57/21, paragraph 12.9).

3.42 The Committee finally agreed to instruct the drafting group to clarify in the text of the convention whether it is intended that the Competent Authority or that the Ship Recycling Facility be the responsible body for copying to the flag State the Statement of Completion at the end of recycling.

#### **ESTABLISHMENT OF THE DRAFTING GROUP ON SHIP RECYCLING**

3.43 The Committee established the Drafting Group on Ship Recycling under the chairmanship of Mrs. Katy Ware (United Kingdom) with the following Terms of Reference:

“The Drafting Group is instructed to:

- .1 produce a clean text of the draft International Convention for the Safe and Environmentally Sound Recycling of Ships for approval by the Committee, taking into account the comments made in plenary and on the basis of decisions made concerning the draft convention contained in document MEPC 58/WP.4;
- .2 prepare a draft Conference resolution expressing appreciation to the Basel Convention and to the International Labour Organization; and
- .3 provide a written report to plenary on Thursday, 9 October 2008.”

3.44 The Committee noted that the drafting group had carefully reviewed the draft convention and had finalized the draft text as set out in annex 1 of its report MEPC 58/WP.7.

3.45 The Committee also noted that the group, within the time available, had been unable to find drafting solutions to the following issues:

- .1 Article 14 – Dispute settlement: Various proposals were made to clarify in the text that Parties to a dispute would have to agree to the means by which the dispute would be settled.
- .2 regulation 5 – Inventory of Hazardous Materials: A proposal was made to revise regulation 5.1.1 as follows (new text is underlined):

identify as Part I, measurable concentrations of Hazardous Materials listed in Appendices 1 and 2 to this Convention and contained in ship’s structure and equipment, their location and approximate quantities;

- .3 regulation 10 – Surveys: A proposal was made to revise regulation 10.1.4.2 as follows (text to be deleted is struck through):
- that the Ship Recycling Plan developed by the Ship Recycling Facility(ies), ~~complies with the requirements of this Convention, and,~~ unless a Party has made a declaration pursuant to Article 16.6, has been approved by the Competent Authority(ies).
- .4 regulation 25 – Reporting upon completion: Various proposals were made to clarify who is responsible (in the recycling State) for copying to the Administration (flag State) the Statement of Completion.
- .5 Appendix 1 – Controls of Hazardous Materials: The group was unable to align the description for the control measure for TBT with the understanding reached at MEPC 57 (document MEPC 57/21, paragraph 12.9).

3.46 With regard to the inconclusive discussion that had taken place in the drafting group over Article 14 on Dispute settlement, the Committee agreed to insert the words “by them” in square brackets, after the text ending “agreed upon”, so as to clarify the means by which a dispute would be settled.

3.47 Regarding the deletion by the Committee of text making reference to ILO from paragraph 2 of Article 15, ILO, supported by ITF, expressed its concern and stated that this deletion may have considerable impact on the conditions under which ships will be recycled. ILO noted that the convention does not apply to ships of less than 500 GT and therefore not all workers involved in ship recycling may be adequately covered for safety and health as well as training. ILO, therefore, indicated that it might submit appropriate proposals to the diplomatic Conference.

3.48 Malta, supported by Panama, the Marshall Islands, Singapore and Cyprus, expressed its concern over the fact that the obligation placed by regulation 10.1.4.2 taken together with Article 16.6 as well as regulation 9 to “verify that the Ship Recycling Plan developed by the Ship Recycling Facilities complies with the requirements of this Convention”, placed undue responsibilities on flag State Administrations and their recognized organizations. Malta held the view that the text, as it currently stood, implied that flag States would be approving the commercial activities of Ship Recycling Facilities within the jurisdiction of other States, potentially contravening the sovereignty of recycling States.

3.49 During the discussion, an alternative text addressing the concerns expressed by Malta was proposed for regulation 10.1.4.2. Although there was support for the proposed text, the Committee agreed to place the words “complies with the requirements of this Convention, and” in regulation 10.1.4.2 within square brackets and also to include the alternative text in its report, as shown below:

- “10.1.4.2 that the Ship Recycling Plan developed by the Ship Recycling Facility(ies) identifies correctly the information contained in the International Certificate on Inventory of Hazardous Materials; and has been submitted to the Competent Authority(ies), unless the Party of the Competent Authority has made a declaration pursuant to Article 16.6.”

3.50 The delegation of France expressed its concern regarding the unresolved issue for clarifying the reporting requirements upon completion of recycling under regulation 25. France was of the view that the Competent Authority (recycling State) should be responsible for copying the Statement of Completion to the Administration (flag State) because of the following reasons:

- .1 the Ship Recycling Facilities probably do not know to whom the report in the flag State should be sent;
- .2 in cases when the flag State does not receive such a report, the question is whether the Administration would be expected to contact directly the Ship Recycling Facility, and if so, what should the Administration do in cases when the Ship Recycling Facility did not respond; and
- .3 according to paragraph 5 of Article 12, the flag State is required to report annually to the Organization a list of ships deregistered for the purpose of recycling. To do this, the flag State needs to be informed by the Competent Authority of the Ship Recycling Facility, in order to know which ships have been recycled out of all ships that have been deregistered.

3.51 The Committee could not agree to amending regulation 25 at that stage and suggested that further consideration could be given to this matter at the diplomatic Conference.

#### **Report of the Drafting Group on Ship Recycling**

3.52 The Committee approved the report of the drafting group (MEPC 58/WP.7) in general and, in particular:

- .1 noted that the drafting group has completed its work and had produced the final text of the draft International Convention for the Safe and Environmentally Sound Recycling of Ships;
- .2 approved the final text of the draft convention, as set out in annex 6 to this report;
- .3 noted that the drafting group had prepared, at the Committee's request, a provisional draft Conference resolution expressing appreciation to the Parties of the Basel Convention and to the International Labour Organization for their contribution in the development of the draft Convention and agreed to the draft Conference resolution, as set out in annex 7 to this report;
- .4 instructed the Secretariat to carry out any necessary editorial/conforming changes to the draft convention before circulation for the Conference; and
- .5 requested the Secretary-General to circulate the text of the draft convention to all Members at least six months before the date of the diplomatic Conference with a view to adoption.

3.53 Australia requested to record its concern on the text in the draft Convention regarding non-Party recycling facilities that meet or exceed the draft Convention's standards. In Australia's view, rules for trade and for protecting health and the environment can, and should be, mutually supportive. Australia considered that the draft Convention's environmental and health protection goals could still be met by allowing trade with non-Parties that have equivalent

environmental and health protection standards. In Australia's view, this would be consistent with Members' obligations under the World Trade Organization agreement. Members were therefore encouraged to have regard to this aspect prior to the proposed adoption of the draft Convention at the diplomatic Conference. The statement by Australia was supported by the United States, Singapore and the Russian Federation.

3.54 India, supported by Saudi Arabia, stated that the subject of Party/non-Party had already been debated by the Committee at length and that the issue should be closed. India also noted that the relevant instruments of the World Trade Organization provided for exemptions on environmental grounds. Furthermore, as the potential problem of recycling capacity was being addressed through the entry into force conditions, India stressed that the convention should not allow the avoidance of its requirements through Party/non-Party arrangements.

3.55 Turkey requested to record in the Committee's report that it is not a State party to UNCLOS and as such, Turkey's national position regarding the application of the said convention remained the same.

3.56 Turkey also requested to include in the Committee's report information on the Pilot Project it had proposed to conduct on the trial recycling of two ships in accordance with the provisions of the draft convention. The statement by Turkey is set out as annex 8 to this report.

## 4 PREVENTION OF AIR POLLUTION FROM SHIPS

### GENERAL

4.1 The Committee recalled that MEPC 57 had considered a proposal by the Secretary-General seeking the development and adoption of a global agreement to limit, or reduce, Greenhouse Gas (GHG) emissions from ships by December 2009. The proposal was not intended as an amendment to the original GHG Work Plan, agreed at MEPC 55; but rather as an identification of the components in the Plan which could realistically be concluded before the originally-set date.

4.2 MEPC 57 welcomed the Secretary-General's proposal to expedite IMO's work on GHG emissions and accepted with appreciation the offer of Norway to host an intersessional meeting of the Working Group on GHG Emissions from Ships (GHG WG 1), whose outcome would be considered by the Committee at the present session.

4.3 The Committee recalled also that, at MEPC 57, it decided by an overwhelming majority to take the principles listed in paragraph 4.73 of its report (MEPC 57/21) as its reference for further debate on GHG emissions from international shipping. However, the principle of making any future GHG regime "**binding and equally applicable to all flag States in order to avoid evasion**" was challenged by a number of Member States and several proposals for amendments were made, but none agreed upon. Following the debate, MEPC 57 accepted a proposal by the Chairman to carefully reflect on the issue in the intersessional period in order to reach consensus on the fundamental principles at this session.

4.4 The Committee recalled further that MEPC 57, in concluding its debate on GHG emissions-related issues, approved the Terms of Reference for the intersessional meeting of the Working Group on GHG Emissions from Ships held in Oslo, Norway, from 23 to 27 June 2008, and re-established the Correspondence Group on GHG-related issues.

4.5 The Committee noted that document MEPC 58/4/1 (ISO) would be considered by the Drafting Group on amendments to Annex VI, to be established under agenda item 5.

4.6 In addition to the submissions from Member Governments and observer delegations, the Committee had before it the outcomes of the following groups and bodies:

- .1 the report of the first Intersessional Working Group on GHG Emissions from Ships held in Oslo from 23 to 27 June 2008;
- .2 a progress report from the Steering Committee and phase 1 of the Updated 2000 Study on GHG Emissions from Ships;
- .3 the interim report of the Intersessional Correspondence Group on GHG-related issues; and
- .4 the outcome of SBSTA 28 held in Bonn, Germany, from 2 to 13 June 2008 and the Climate Change Talks held in Accra, Ghana, from 21 to 27 August 2008.

4.7 No less than 45 documents (including four INF documents) were before the Committee for consideration and, in order to facilitate an orderly debate despite the heavy workload, the Committee agreed to conduct the discussion by grouping those documents addressing the same, or similar, matters, as follows:

- .1 consideration of the Report of the intersessional GHG WG that met in Oslo (MEPC 58/4) and other documents commenting upon it or dealing with matters of policy and/or principle;
- .2 consideration of other documents addressing topics of a general nature and other background issues;
- .3 recalling that, at MEPC 57, only basic documents on GHG issues had been introduced in plenary while the rest were referred directly to the Working Group, the Committee agreed that all technical documents related to the CO<sub>2</sub> Design Index, Operational Index, Baselines and Best Practices, would be introduced in the Working Group to be established at this session, thus saving precious time for discussion of policy issues in plenary;
- .4 consideration of proposals on market-based measures; and
- .5 development of precise Terms of Reference for the Working Group.

4.8 The Committee noted the documents for consideration, grouped together in four categories, as follows:

**Category 1 – 11 documents on the outcome of the intersessional GHG WG, general comments thereon and other documents on application of measures and matters of principle or policy**

MEPC 58/4 (Secretariat); MEPC 58/4/15 (United Kingdom); MEPC 58/4/16 (Australia *et al.*); MEPC 58/4/17 (United States); MEPC 58/4/18 (Cyprus); MEPC 58/4/20 (Secretariat);

MEPC 58/4/23 (part) (Australia); MEPC 58/4/31 (Brazil); MEPC 58/4/32 (China and India); MEPC 58/INF.14 (Norway); and MEPC 58/INF.21 (FOEI).

### **Category 2 – Six documents with general information on GHG issues**

MEPC 58/4/2 (Secretariat); MEPC 58/4/4 (Secretariat); MEPC 58/INF.6 (Secretariat); MEPC 58/4/5 (Secretariat); MEPC 58/4/5/Add.1 (Secretariat); and MEPC 58/4/41 (Australia and the Netherlands).

### **Category 3 – 23 documents of a technical nature (Design and Operational CO<sub>2</sub> Indices and baselines) to be introduced in the Working Group**

MEPC 58/4/6 (Denmark and Norway); MEPC 58/4/7 (Finland and Sweden); MEPC 58/4/8 (Denmark); MEPC 58/4/9 (Denmark); MEPC 58/4/10 (Denmark); MEPC 58/4/12 (CESA); MEPC 58/4/14 (INTERTANKO); MEPC 58/4/24 (Denmark); MEPC 58/4/26 (Japan); MEPC 58/4/27 (Japan); MEPC 58/4/28 (Japan); MEPC 58/4/29 (Japan); MEPC 58/4/30 (IACS); MEPC 58/4/33 (China); MEPC 58/4/34 (China); MEPC 58/4/35 (United States); MEPC 58/4/36 (Canada); MEPC 58/4/38 (Canada); MEPC 58/4/3 (Secretariat); MEPC 58/4/11 (Marshall Islands); MEPC 58/4/13 (INTERTANKO *et al.*); MEPC 58/4/37 (Canada); and MEPC 58/INF.7 (ICS *et al.*).

### **Category 4 – Six documents on market-based measures**

MEPC 58/4/19 (IBIA); MEPC 58/4/21 (IMarEst); MEPC 58/4/22 (Denmark); MEPC 58/4/23 (part) (Australia); MEPC 58/4/25 (France *et al.*); and MEPC 58/4/39 (WWF).

## **REPORT OF THE INTERSESSIONAL GHG WORKING GROUP, COMMENTS AND OTHER DOCUMENTS ON MATTERS OF PRINCIPLE OR POLICY**

4.9 As agreed above, the Committee started the discussion with the consideration of the outcome of the intersessional GHG Working Group (GHG WG 1), general comments thereon and other documents on application of measures and matters of principle or policy.

4.10 The Director, Marine Environment Division, introduced document MEPC 58/4 (Secretariat), providing the outcome of the intersessional GHG Working Group. He highlighted that more than 210 representatives from Member Governments and observer organizations participated in the 5-day meeting hosted by the Government of Norway and organized by the Norwegian Maritime Directorate. In accordance with its terms of reference, the intersessional meeting had structured the discussion under the following items on its agenda:

- .1 development of a CO<sub>2</sub> Design Index for new ships;
- .2 review of the a CO<sub>2</sub> Operational Index (MEPC/Circ.471);
- .3 development of a CO<sub>2</sub> Baseline methodology;
- .4 development of reduction mechanisms, including their implementation;
- .5 development of best practices; and
- .6 level of reduction and other GHG matters.

4.11 The Director stressed that without the intersessional meeting, the Committee would not be in a position to further advance the GHG issue at the present session and, although some points under discussion could not be finalized during the meeting due to lack of time, it was to be expected that significant progress could be made during the week. He finalized by thanking the Government of Norway for its generosity and hard work in organizing the meeting, as well as for its warm hospitality.

4.12 The Chairman, in endorsing the words of the Director, MED, expressed his deep appreciation to the Government of Norway for the excellent organization of the intersessional meeting and thanked especially all the delegates who, through hard work and tireless dedication, had contributed to the success of the meeting.

4.13 Having approved the report of GHG WG 1 (MEPC 58/4) in general, the Committee turned to the 14 action points in paragraph 8.1 of that document. The Committee, noticing that 12 action points invited it to “note” the outcome of the intersessional meeting’s discussion, agreed to note those 12 action points. However, regarding action points 8.1.2 and 8.1.4, whereby it was being invited to consider the draft Guidelines on the method of calculation of the CO<sub>2</sub> Design Index and the draft regulatory text for a mandatory CO<sub>2</sub> Design Index, respectively, the Committee, recalling its previous decision in paragraph 4.7.3 above, agreed to refer them to the Working Group to be established under this agenda item.

4.14 In order to facilitate discussion, the Committee agreed to a proposal by the Chairman to further structure the introduction of documents, and discussion of the proposals contained therein, along three additional categories, namely:

- .1 proposals on the form of a legal instrument; documents: MEPC 58/4/15 (United Kingdom), MEPC 58/4/17 (United States) and part of MEPC 58/4/18 (Cyprus);
- .2 application of the proposed measures; documents: MEPC 58/4/16 (Australia, Canada *et al.*), MEPC 58/4/20 (Secretariat), part of MEPC 58/4/23 (Australia), MEPC 58/4/31 (Brazil) and MEPC 58/4/32 (China and India); and
- .3 other issues; documents: part of MEPC 58/4/18 (Cyprus), MEPC 58/INF.14 (Norway) and MEPC 58/INF.21 (FOEI).

4.15 The delegation of South Africa expressed its hope that the Organization should work in unison with other UN bodies in the vital task of combating climate change and that, in taking important decisions at the present session, it would do so in accordance with those principles adopted at other UN fora.

### ***Form of legal instrument***

4.16 The United Kingdom, in document MEPC 58/4/15, considered the need for an independent mandatory instrument to address GHG emissions from shipping and the form that instrument could take. Having reviewed the possible shortcomings that an amendment to MARPOL Annex VI, or even the adoption of a new Annex VII to MARPOL could entail, a new stand-alone instrument represented the only available option despite the timeframe necessary for its adoption and eventual entry into force.

4.17 The United States, in document MEPC 58/4/17, proposed a possible framework for action (not requiring amendments to MARPOL Annex VI, or a new mandatory instrument) to increase energy efficiency for new ships through a combination of mandatory and voluntary actions for addressing emissions from new and existing ships.

4.18 Cyprus, in document MEPC 58/4/18, proposed a “solution outline” to move forward the work in IMO on GHG emissions from ships including a mandatory Design CO<sub>2</sub> Index under MARPOL Annex VI and a voluntary Operational Index.

4.19 Once the three documents had been introduced, the Chairman opened a debate on the issue of whether any new mandatory measures should be in the form of amendments to MARPOL Annex VI, a new Annex VII to MARPOL, or a new stand-alone instrument.

4.20 Before concluding the debate, however, and taking into account that the Consortium in charge of the Update of the 2000 IMO GHG Study had scheduled a presentation to the Committee on the outcome of Phase 1 of the Study to take place at close of business, the Chairman proposed that the Committee turn to documents related to the Update of the 2000 IMO GHG Study. The Committee agreed to this approach.

#### **UPDATING OF THE 2000 IMO GHG STUDY**

4.21 The Chairman of the Steering Committee for the updating of the 2000 IMO GHG Study, Ms Petra Bethge, Germany, briefly introduced documents MEPC 58/4/2 and MEPC 58/4/4, as well as MEPC 58/INF.6.

4.22 The Committee noted that document MEPC 58/4/2 provided a progress report by the Steering Committee on the updating of the 2000 IMO Greenhouse Gas Study.

4.23 The Committee noted with appreciation the introduction by the coordinator of the international Consortium contracted to undertake the update of the Study, Dr. Buhaug of MARINTEK, who provided a summary of the main findings in documents MEPC 58/4/4 (Executive Summary) and MEPC 58/INF.6 (Full Report) with information on Phase 1 of the updated 2000 IMO Study on GHG emissions from ships. The Committee noted, *inter alia*, the following findings:

- .1 CO<sub>2</sub> emissions from international shipping have been estimated both from activity data and from international fuel statistics. It was concluded that the activity-based estimates with use of detailed activity data (for different ship sizes and types) gave a better assessment of global fuel consumption and CO<sub>2</sub> emissions from international shipping than fuel statistics, due to apparent under-reporting of marine bunker sales;
- .2 the consensus estimate for 2007 CO<sub>2</sub> emissions from international shipping amounts to 843 million tonnes CO<sub>2</sub>; and
- .3 future emissions from international shipping have been estimated based on global developments outlined by the Intergovernmental Panel on Climate Change (IPCC). Assuming that there are no explicit regulations on CO<sub>2</sub> emissions from ships, CO<sub>2</sub> emissions are predicted in the base scenarios to increase by a factor

of 2.4 to 3.0 by 2050. For 2020, the base scenario predicts increases ranging from 1.1 to 1.3. These predictions take into account significant efficiency improvements resulting from expected long-term increases in energy prices.

4.24 The Committee noted with appreciation the information provided by the delegation of Japan that the Japanese Shipowners Association had made a donation of US\$100,000 as a contribution to the funding of the Study and any follow-up work.

#### **GENERAL STATEMENTS BY MANY DELEGATIONS**

4.25 Before resuming the discussion on the issue of whether any new mandatory measures should be in the form of amendments to MARPOL Annex VI, a new Annex VII to MARPOL, or a new stand-alone instrument (paragraphs 4.16 to 4.20 above), the Chairman opened the floor for general statements at the request of several delegations.

4.26 Delegations of 43 Member States and one Associate Member, as well as three observer organizations in consultative status, listed by order of intervention, delivered general statements on matters of principle or policy concerning the GHG issue: China; Brazil; Saudi Arabia; India; France; Argentina; Hong Kong, China; Italy; Mexico; Democratic People's Republic of Korea; Greece; the United States; Singapore; the Republic of Korea; Venezuela; Peru; the Philippines; Norway; Egypt; Finland; Belgium; Ghana; Chile; Namibia; the Netherlands; Australia; the Russian Federation; Uruguay; Japan; the Islamic Republic of Iran; the United Kingdom; Bolivia; the Marshall Islands; Vanuatu; New Zealand; Ecuador; Denmark; Germany; Sweden; Spain; Indonesia; Colombia; Sierra Leone; Mongolia; FOEI; IACS and WWF.

The statements, as delivered by the delegations, are set out in annex 9.

4.27 Many delegations spoke in favour of the common but differentiated responsibility (CBDR) principle under the UNFCCC and its Kyoto Protocol. In their view, any mandatory regime aiming at reducing GHG emissions from ships should be applicable to developed countries listed in Annex I of the UNFCCC only.

4.28 Many other delegations expressed the opinion that, given the global mandate of IMO as regards the safety of ships and the protection of the marine and atmospheric environment from ship emissions, the IMO regulatory framework on the GHG issue should be applicable to all ships, irrespective of the flags they fly. It was stressed that, as three-quarters of the world's merchant fleet fly the flag of developing countries not listed in Annex I to the UNFCCC, any regulatory regime on the reduction of GHG from shipping would become meaningless and ineffective for the purpose of combating climate change, if applicable only to Annex I countries. A number of delegations emphasized the need to progress the technical discussions and address the matter of application separately.

#### **INTERVENTIONS BY THE SECRETARY-GENERAL**

4.29 The Secretary-General commented with appreciation upon a previous statement by the delegation of South Africa (paragraph 4.15 above) calling upon IMO to act in unison with other UN bodies in the combat against climate change while, at the same time, preserving the principle of consensus under which the Organization has usually made decisions along its history of 50 years of service to the world's maritime community. He thanked also the delegations of China and Brazil for their constructive approach in the course of the current debate and informed the Committee that he maintained a close relationship with the Executive-Director of the

UNFCCC, Mr. de Boer, trying to ensure that the outcome of the debate at IMO would be in conformity with the principles enshrined in the UNFCCC.

4.30 Once the general statements had been delivered, the Secretary-General intervened to inform the Committee that, in relation to certain assertions that had been made, he wished to put the record straight concerning the standing of the International Maritime Organization *vis-à-vis* other UN organizations and agencies. He quoted article 59 of the IMO Convention which states:

*“The Organization shall be brought into relationship with the United Nations in accordance with Article 57 of the Charter of the United Nations as the specialized agency in the field of shipping and the effect of shipping on the marine environment ....”*

The Organization, thus, had a global mandate and global competence on matters related to the protection of the environment from emissions caused by shipping and was not subordinated to any other UN body in that respect.

#### **CHAIRMAN’S PRELIMINARY SUMMING-UP**

4.31 In view of the time constraints and the imperious need to address other urgent matters in the Committee’s agenda, the Chairman proposed to the Committee the establishment of the Working Group in order to progress the work towards the finalization of the Design CO<sub>2</sub> Index for new ships and the Operational CO<sub>2</sub> Index for all ships, in accordance with the Committee’s GHG Work Plan agreed at MEPC 55.

4.32 The Chairman proposed that the Working Group, in order to make the best use of the time available, could start working immediately on the mentioned technical measures set out in the 23 “Category 1” documents mentioned in paragraph 4.8 above, without addressing the issue of whether those measures should be implemented by means of a mandatory or voluntary instrument; and report back to the plenary, where a decision could be made in that respect.

4.33 Following some debate, the Committee, in concurring with a proposal by Brazil, agreed to change the terms “Design CO<sub>2</sub> Index” to “Energy Efficiency Design Index”; and “Operational CO<sub>2</sub> Index” to “Energy Efficiency Operational Index”.

4.34 The Committee also agreed with the Chairman’s proposal to consider the remaining issues under this agenda item, namely: market-based measures, applicability and other related matters such as the possible establishment of an IMO GHG Fund as proposed by Cyprus (MEPC 58/4/18) when the Working Group was recalled to the plenary to present its report.

4.35 The Committee, in endorsing a proposal by the Chairman, expressed its sincere appreciation to the outgoing Working Group Chairman, Mr. Bin Okamura (Japan), for his excellent leadership of the Working Group on Air Pollution from Ships that had dealt with so many challenging, complex and politically sensitive issues under his very able chairmanship.

4.36 The Committee noted that Mr. Koichi Yoshida (Japan) had agreed to take over as Working Group Chairman and expressed its appreciation that he was willing to undertake this challenging task.

## **ESTABLISHMENT OF THE WORKING GROUP ON GHG EMISSIONS FROM SHIPS**

4.37 The Committee agreed to establish the Working Group on GHG emissions from ships, under the chairmanship of Mr. Koichi Yoshida (Japan), with the following terms of reference:

“Taking into account all relevant documents, as well as comments and decisions made in plenary, the Working Group was instructed to:

- .1 try to finalize the Energy Efficiency Design Index, including:
  - .1 the method of calculation, using annex 5 to document MEPC 58/4 as a basis;
  - .2 the regulatory text, using annex 6 to document MEPC 58/4 as a basis;
  - .3 a verification procedure; and
  - .4 any necessary associated guidelines;
- .2 try to finalize the review of the interim guidelines on the Energy Efficiency operational index (MEPC/Circ.471), including the Carbon to CO<sub>2</sub> factors for marine fuels to be communicated to IPCC;
- .3 consider the proposals on introduction of a management tool for all ships, taking into account the Ship Efficiency Management Plan described in document MEPC 58/INF.7;
- .4 develop further the guidance on best practices and other voluntary operational measures including reference text to be incorporated in the regulatory framework;
- .5 list, if any, possible impacts on the shipping sector from the measures envisaged; and
- .6 present a written report to plenary by Thursday, 9 October 2008.”

## **MARKET-BASED MEASURES**

4.38 The Committee considered documents MEPC 58/4/22 (Denmark); part of MEPC 58/4/23 (Australia); MEPC 58/4/25 (France, Germany and Norway); MEPC 58/4/19 (IBIA); MEPC 58/4/21 (IMarEst) and MEPC 58/4/39 (WWF).

4.39 Denmark, in document MEPC 58/4/22, commented on the main concerns raised at the GHG-WG 1 relating to the development of market-based mechanisms with GHG reduction potential and further elaborated on the feasibility of establishing an International Compensation Fund for GHG Emissions from Ships. Preferential treatment of developing countries through the “International Compensation Fund for GHG emissions from Ship” was advocated so as to observe the CBDR principle. The Fund would be easy to administer although it was recognized that its implementation would need consensus and strong political will among the maritime community.

4.40 Australia, in part of document MEPC 58/4/23, welcomed many aspects of the global levy proposal as a stand-alone mechanism that would apply equally to all ships while potentially offering a source of support for developing countries also for development of clean technology.

4.41 Norway, in introducing document MEPC 58/4/25 providing comments on the outcome of GHG-WG 1, advocated the setting up of an Emissions Trading System (ETS) for shipping as a workable mechanism which should be further developed. The document proposed that the input on ETS submitted to GHG-WG 1 should be further considered if the Committee decided to continue considering market-based measures. Those principles to be observed for an ETS were, in the view of the co-sponsors:

- .1 global application to all ships above a certain size;
- .2 emissions cap;
- .3 enforcement by flag State (obligation) and port State (right);
- .4 an open system (trading with other sectors) as opposed to a closed one (trading within shipping only); and
- .5 use of auction revenues.

4.42 IBIA, in document MEPC 58/4/19, focused on a practical approach to a CO<sub>2</sub> Cap and Trade Scheme for the shipping sector. A set of arguments for the proposal was provided as an incentive to provoke constructive debate and consideration of a practical implementation. A Global Registry composed of parties in the bunker industry (sellers and buyers) was proposed. Emission trading of excess CO<sub>2</sub> above the mandatory cap was seen as an adequate tool to control CO<sub>2</sub> emissions from shipping which would otherwise continue growing if there was no major technological breakthrough in the meantime (assuming world economy and trade continue growing).

4.43 IMarEst, in document MEPC 58/4/21, proposed a framework for the assessment of the potential regulatory control and market-based measures being considered for the control of GHG emissions from ships in international trade. The proposed framework could, if agreed, be developed further and might provide a useful tool facilitating future debates and decisions. Under the proposal, potential regulatory controls were defined as: CO<sub>2</sub> Design Index; port tax on carbon emission, or CO<sub>2</sub> Design Index; fuel levy; and ETS.

4.44 WWF, in document MEPC 58/4/39, addressed some concerns raised at GHG WG 1 regarding market-based instruments and outlined new analysis and practical implications of the possible options for an ETS, fuel levy, or hybrid scheme carried out for WWF. In the view of WWF, expected revenue figures, as calculated in the document, could generate considerable funds for developing countries in application of the CBDR principle. WWF stated further that an economic instrument that is both global and differentiated was possible to develop addressing the basic principles of UNFCCC and IMO at the same time.

4.45 A considerable debate followed the introduction of the documents. The majority of delegations which took the floor opposed the development of any market-based measures intended for the reduction of GHG emissions from ships as long as the issue of CBDR was not resolved in full recognition of article 2.2 of the Kyoto Protocol. In any case, in the view of those delegations, the matter could not be settled until after COP 15 in December 2009.

4.46 Other delegations and observers were of the view that, notwithstanding several interesting proposals before the Committee at the current session on market-based measures, the issue was still at a preliminary stage and further information and studies were needed before the Committee could reach an informed decision on such a highly complex matter.

4.47 It was recognized that documents on the subject submitted to GHG WG 1 and the present session, relevant background documents, as well as new submissions should form the basis for further discussion at MEPC 59. It was also recognized that further submissions addressing all matters pertaining to market-based measures, including their feasibility, were needed to enable the Committee to hold an in-depth discussion at MEPC 59. It was agreed to dedicate enough time to hold such an in-depth discussion at MEPC 59.

4.48 The Committee, therefore, requested delegations to provide as much information as possible to MEPC 59 with a view to facilitating a more focused debate at that session.

4.49 In the course of the discussion on market-based measures, the delegations of India and Greece delivered general statements which are set out in annex 10.

#### **OUTCOME OF THE WORKING GROUP ON GHG EMISSIONS FROM SHIPS**

4.50 In considering the report of the Working Group on GHG emissions from ships (MEPC 58/WP.8), the Committee noted the considerable discussion that had taken place within the Group, especially on the method of calculation of the Energy Efficiency Design Index (EEDI) for new ships.

4.51 The Committee noted the firm opposition by several delegations to the issuance of an MEPC Circular to disseminate the EEDI among the maritime community at this stage and, following a thorough discussion, agreed to the use of the draft Interim EEDI, as developed by the group, for calculation and trial purposes with a view to gaining experience on its robustness and adequacy of purpose.

4.52 The Committee noted also that, on the issue of possible impacts on the shipping sector (paragraph 37 of document MEPC 58/WP.8), some delegations did not agree that possible negative safety impacts had been appropriately considered in developing the formula for the EEDI.

4.53 In view of the considerable tasks still outstanding in respect of the review of the Interim Energy Efficiency Operational Index (MEPC/Circ.471); the introduction of a management tool; guidance on best practices; and possible impacts on the shipping sector, the Committee concurred with the group's view that the intersessional GHG Working Group should be re-convened to carry out further work before MEPC 59. The Committee agreed to schedule the meeting in the week after BLG 13 (9 to 13 March 2009).

4.54 Having discussed and resolved the above issues, the Committee approved the report in general and:

- .1 approved the use of the draft Interim Guidelines on the method of calculation of the Energy Efficiency Design Index for new ships, for calculation/trial purposes with a view to further refinement and improvement, as set out in annex 11;
- .2 endorsed the group's agreement to use document MEPC 58/4/8 for further studies and trials;

- .3 noted that the group was unable to finalize the review of the Energy Efficiency Operational Index;
- .4 approved the establishment of an intersessional correspondence group to further advance the work on the Energy Efficiency Operational Index with the following terms of reference:

“The Correspondence Group on Review of the Energy Efficiency Operational Index (MEPC/Circ.471) co-ordinated by Japan\* is instructed to:

  - .1 prepare a draft revised text of the Energy Efficiency Operational Index (MEPC/Circ.471), taking into account documents MEPC 58/4 (annex 7), MEPC 58/4/11, MEPC 58/4/13, MEPC 58/WP.8 and other relevant documents as well as input and comments from participating Member Governments and observer organizations;
  - .2 provide status of its work, as appropriate, to the second intersessional meeting of the Working Group on Greenhouse Gas Emissions from Ships (GHG-WG 2); and
  - .3 submit a written report with a revised text of the Energy Efficiency Operational Index to MEPC 59 for consideration;
- .5 noted the outcome of the discussion on the Management Tool for all ships;
- .6 noted that the group had developed further the Guidance on Best Practices for fuel-efficient operation of ships and agreed that the text had been finalized and could be used in conjunction with the ship’s Energy Efficiency Management Plan; and
- .7 approved the holding of an intersessional meeting of the GHG Working Group back-to-back with BLG 13, from 9 to 13 March 2009, to carry out further necessary work under the Terms of Reference, as set out in annex 12.”

4.55 The Committee invited delegations and industry observers to disseminate the Interim Guidelines on the EEDI to the maritime community at large, so that adequate experience can be gained on its adequacy as a tool to improve energy efficiency for new ships.

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4.56 The Committee recalled that MEPC 57 had re-established the Intersessional Correspondence Group on Greenhouse Gas Emissions from Ships co-ordinated by Australia and the Netherlands\* (MEPC 57/21 paragraph 4.117.3) and noted that an interim report had been submitted to this session as document MEPC 58/4/41. The Committee noted further that in accordance with the decision by MEPC 57 (MEPC 57/21 paragraph 4.117.4) the Correspondence Group would continue working with the following Terms of Reference:

“Taking into consideration available relevant information, the Intersessional Correspondence Group on Greenhouse Gas Emissions from Ships is instructed to:

- .1 prepare detailed proposals on the measures identified in the Correspondence Group report (MEPC 57/4/5 and MEPC 57/4/5/Add.1), which have not been identified for further consideration by the GHG Working Group; and
- .2 present a final report to MEPC 59.”

4.57 The Committee, recognizing that a number of documents had not been introduced and that others had not been thoroughly considered due to time constraints, agreed to keep the documents, or relevant parts of them, in abeyance for consideration at MEPC 59 as appropriate: MEPC 58/4/15 (United Kingdom), MEPC 58/4/16 (Australia, Canada, Denmark, Germany, Japan, Marshall Islands, Norway, Panama and United States), MEPC 58/4/17 (United States), MEPC 58/4/18 (Cyprus), MEPC 58/4/20 (Secretariat), MEPC 58/4/23 (Australia), MEPC 58/4/31 (Brazil) and MEPC 58/4/32 (China and India).

## **5 CONSIDERATION AND ADOPTION OF AMENDMENTS TO MANDATORY INSTRUMENTS**

5.1 The Committee recalled that MEPC 57 (31 March to 4 April 2008) had approved the proposed amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code with a view to adoption at the present session (MEPC 57/21, paragraphs 4.58.4 and 4.58.7). The proposed amendments were circulated by the Secretary-General of the Organization, in accordance with Article 16(2)(a) of the MARPOL Convention, under cover of Circular letter No.2861 of 7 April 2008.

5.2 Following a proposal by the Chairman, the Committee agreed to consider the matters under this agenda item in the following order:

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- .1 Draft amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code;
- .2 Criteria and Procedure for Designation of Emission Control Area (Appendix III to MARPOL Annex VI);
- .3 Unified Interpretations under the current MARPOL Annex VI and the NO<sub>x</sub> Technical Code and guidelines under the revised Annex and Code;
- .4 Guidelines for the development of a VOC management plan; and
- .5 Implementation of the revised MARPOL Annex VI.

### **Draft amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code**

5.3 The Committee considered document MEPC 58/5 (Secretariat) with the draft text of the proposed amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code and noted that the Secretariat, in accordance with the request of MEPC 57 (MEPC 57/21, paragraph 4.58.10), had carried out necessary editorial/conforming changes to the draft amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code. The Committee also considered the observations listed in paragraph 8 of document MEPC 58/5 and agreed that only the observations in items .1 and .2 should be considered in plenary and the rest would be dealt with by the Drafting Group.

#### ***Definition of marine diesel engines***

5.4 The Committee agreed that the definition of marine diesel engine in regulation 2(14) of MARPOL Annex VI and in paragraph 1.3.10 of the NO<sub>x</sub> Technical Code should not include engines which operate under normal service conditions on a gas fuel only.

#### ***SO<sub>x</sub> emission limits for exhaust gas cleaning system***

5.5 In respect of the SO<sub>x</sub> emission limits for exhaust gas cleaning system that was removed from regulation 14 of the current MARPOL Annex VI (e.g., the limit for exhaust gas cleaning systems is 6.0 g SO<sub>x</sub>/kWh as it applies to areas where fuel is limited to maximum 1.5% sulphur content), the Committee agreed that the SO<sub>x</sub> emission limit for exhaust gas cleaning system should not be included in the revised Annex but in the Guidelines for exhaust gas cleaning systems (resolution MEPC.170(57) as revised). The Committee also agreed that the relevant equivalent levels applicable to meet the various sulphur limits now included in the draft Annex (4.50, 3.50, 1.50, 1.00, 0.50 and 0.10%) should be included in the Guidelines as proposed in document MEPC 58/5/8 (Marshall Islands and ICS).

#### ***Definition of sulphur***

5.6 The Committee agreed that a definition of sulphur was not needed in the revised Annex VI as this is described in the test method in ISO 8754: 2003.

#### ***Date of entry into force of the revised Annex and Code***

5.7 The Committee considered document MEPC 58/5/10 (Japan) proposing that the date of entry into force of the revised MARPOL Annex VI and the NO<sub>x</sub> Technical Code be set on 1 July 2010, instead of 1 March 2010, as indicated in the associated draft MEPC resolution.

5.8 The Committee agreed to the proposal by Japan to set the entry-into-force date on 1 July 2010 for the revised Annex and Code to allow sufficient time for updating of affected guidelines and development of new guidelines as required by the revision. A large number of delegations reasoned that this would facilitate smooth implementation as it would enable the Committee to consider the matter over two sessions. Enabling finalization of the related guidelines would also provide predictability for the industry and promote efficient enforcement of the revised emissions reduction measures from the entering into force.

#### ***Regulation 13(7) Existing Engines***

5.9 The Committee considered document MEPC 58/5/9 (United States) proposing a modification to paragraph 1.3.2 of the NO<sub>x</sub> Technical Code, to clarify that installation of an approved method to existing engines should not be seen as a “substantial modification” as defined in the NO<sub>x</sub> Technical Code as this would trigger a new certification process. The United States also recommended a modification of regulation 13(7)(a) of MARPOL Annex VI to specify this distinction.

5.10 A large number of delegations supported the clarification proposed by the United States and the Committee agreed to instruct the Drafting Group accordingly.

#### ***The impact of sulphur limits on ferry operations in Northern Europe***

5.11 The Committee considered document MEPC 58/5/11 (INTERFERRY) providing comments and information on possible impacts on ferry operations in Northern Europe under the revised MARPOL Annex VI. INTERFERRY also proposed that the overall environmental impact under the revised MARPOL Annex VI should be taken into consideration by the appropriate bodies to maintain a level playing field between different modes of transport.

5.12 A number of delegations stressed that the matters raised by INTERFERRY had been satisfactorily considered in the revision process and the negotiations leading to the delicately balanced package approved by MEPC 57 that represented a compromise that should not be reopened.

5.13 The Committee agreed to note the information provided and the views expressed by delegations, with no further action needed.

#### **Fuel oil specification – response from ISO**

5.14 The Committee considered document MEPC 58/4/1 (ISO) responding to the request by MEPC 57 for a review of marine fuel oil specifications. The ISO working group was re-established in the spring of 2008 and would consider the list of parameters and appropriate limits and report back to MEPC.

5.15 The Committee welcomed the information provided by ISO and expressed appreciation for the work of the ISO working group that was re-established to undertake the review following the request by MEPC 57. Several delegations expressed concerns that the revised standard would not be published prior to the entering into force of the revised MARPOL Annex VI. The delegation of ISO assured the Committee that the work would be fast-tracked by issuing a “Public Available Standard” (PAS) and that the PAS would be published in time for the entering into force (1 July 2010) and that a progress report would be submitted to MEPC 59 to keep the Committee informed.

## **Criteria and Procedure for Designation of Emission Control Areas**

5.16 The Committee recalled that MEPC 57 had noted the debate in the working group on air pollution on possible relaxation of “the criteria and procedures for designation of emission control areas” as set forth in Appendix III to MARPOL Annex VI. MEPC 57 had agreed that those interested in relaxing the current criteria should submit proposals for consideration by MEPC 58.

5.17 The Committee considered document MEPC 58/5/3 (France and Germany) proposing relaxation of the “Criteria and Procedures for Designation of Emission Control Areas (ECA)” by deleting some existing criteria for the designation of an ECA. The co-sponsors further proposed to delete paragraph 7 of regulation 14 of MARPOL Annex VI, so as not to delay the effective date of an ECA for 12 months after entry into force, as it is today (a 12-month grace period).

5.18 The Committee also considered document MEPC 58/5/6 (OCIMF) proposing modifications of the criteria by adding an assessment of fuel availability within the proposed ECA and by deleting introductory paragraph 1.2 of Appendix III and the requirement to provide meteorological information. OCIMF held the view that a rapid growth of ECAs would have a significant impact on fuel markets in those areas and also globally.

5.19 The Committee considered document MEPC 58/5/7 (IPIECA) proposing the same modifications of the criteria as OCIMF (MEPC 58/5/6). IPIECA emphasized that the requirement to demonstrate environmental needs and cost-effectiveness of a proposed ECAs should be maintained and the regional fuel supply situation should be assessed including regional impacts on neighbouring countries, where necessary.

5.20 A significant number of delegations supported the proposal by France and Germany but an equal number of delegations stressed that no amendments should be made as the existing criteria had served their purpose well and that they could not support a relaxation. Also, several delegations supported the proposal by OCIMF and IPIECA based on the challenges experienced when trying to obtain compliant fuel in connection with the two SECAs designated under the current Annex VI.

5.21 Following a proposal by the Chairman and in the absence of a majority view, the Committee agreed that no amendments should be made to Appendix III.

## **Unified Interpretations under the current MARPOL Annex VI and the NO<sub>x</sub> Technical Code and guidelines under the revised Annex and Code**

5.22 The Committee recalled that MEPC 57 had noted that the Working Group on Air Pollution did not consider whether MEPC/Circ.473 and MEPC.1/Circ.540, containing unified interpretations to the current MARPOL Annex VI and the NO<sub>x</sub> Technical Code, should be revoked. MEPC 57 had agreed, due to time constraints and taking into account that this was not an urgent matter, that the issue should be considered at MEPC 58.

5.23 The Committee considered document MEPC 58/5/2 (Secretariat) providing a summary of the unified interpretations presently in force and guidelines in need of updating, as well as the new guidelines which may need to be developed.

5.24 The Committee agreed to revoke MEPC/Circ.473 and MEPC.1/Circ.540 on the existing unified interpretations under the current MARPOL Annex VI and the NO<sub>x</sub> Technical Code upon the entry into force of the revised Annex and Code.

5.25 The Committee recalled its decision to set the entry-into-force date on 1 July 2010 and that review of relevant non-mandatory instruments as a consequence of the revised Annex VI and the NO<sub>x</sub> Technical Code was already on the work programme for the BLG Sub-Committee. Based on this background, the Committee agreed that there was no need to establish a correspondence group on the matter but that the drafting group should develop the necessary instructions for BLG to carry out the work.

#### ***Washwater discharge criteria for exhaust gas cleaning systems***

5.26 The Committee considered document MEPC 58/5/5 (Secretariat) providing a reply from GESAMP on the interim washwater discharge criteria, as set out in section 10 of the revised Guidelines for Exhaust Gas Cleaning Systems (resolution MEPC.170(57)). GESAMP was seeking clarifications on some specific issues in order to complete the work. The Committee noted GESAMP's preparedness to advise the Committee on the washwater discharge criteria and agreed to task the Drafting Group to develop a draft reply to GESAMP.

5.27 The Committee considered document MEPC 58/5/8 (Marshall Islands and ICS) highlighting the need for further amendments to the revised Guidelines for Exhaust Gas Cleaning Systems (resolution MEPC.170(57)) to reflect amendments to MARPOL Annex VI.

5.28 The Committee agreed that the proposed amendments should not be further considered before the advice from GESAMP is received and noted that resolution MEPC.170(57) would be valid until the revised Annex VI enters into force.

#### ***Guidelines for certification of exhaust gas after-treatment NO<sub>x</sub> systems***

5.29 The Committee considered document MEPC 58/5/4 (Denmark, Japan and the Republic of Korea) which stressed the need for development of guidelines for certification of exhaust gas after-treatment systems for the Tier III NO<sub>x</sub> limit. The co-sponsors also proposed the engine group concept as the appropriate certification procedure for compliance with Tier III, in which engines and after-treatment systems should be certified separately.

5.30 The Committee considered document MEPC 58/5/12 (United States) which recommended that any future guidelines for certification of Tier III exhaust gas treatment system should be applied to large bore engines only (cylinder displacement more than 30 litres). In response to the "group certificate" concept described in document MEPC 57/4/46 (Denmark), the United States advocated that there is no significant hurdle to verify NO<sub>x</sub> emissions at all test cycle points during sea trials.

5.31 A number of delegations supported the proposal to develop guidelines for certification of exhaust gas after-treatment systems for the Tier III NO<sub>x</sub> limit but reminded the Committee that this was not an urgent matter as Tier III would only apply from 1 January 2016.

5.32 The Committee agreed to instruct the BLG Sub-Committee to carry out the necessary work.

### **Guidelines for the development of a VOC management plan**

5.33 The Committee recalled that MEPC 57 had agreed that the draft Guidelines for the development of a VOC management plan should be presented to this session with a view to adoption by an MEPC resolution (MEPC 57/21, paragraph 4.58.11).

5.34 The Committee considered document MEPC 58/5/1 (Secretariat) containing the draft Guidelines for the development of a VOC management plan and agreed to instruct the Drafting Group to review and finalize the draft guidelines with a view to adoption.

### **Early implementation of the principles of regulation 18(2) of the revised Annex VI**

5.35 The Committee considered document MEPC 58/14 (IPTA and ICS) which proposed that the principles of regulation 18(2) of the revised MARPOL Annex VI should also be applied, through an MEPC circular, in the interim period prior to its entry into force. The interim application period would be from the date of adoption of the MEPC circular until the end of the application period of the current MARPOL Annex VI. The principles of regulation 18(2) entail that if a ship, despite its best efforts, is unable to purchase the required fuel quality, it should follow certain notification procedures and thereby not risk detention or other control measures in the next port or ports of call.

5.36 A large number of delegations supported the proposal by IPTA and ICS. However, some delegations stressed that a change of destination due to continued trading of cargoes during the voyage or other commercial reason could not, on its own, justify that a vessel was unable to source compliant fuel.

5.37 The Committee agreed that the principles of regulation 18(2) of the revised MARPOL Annex VI should also be applied in the interim period prior to its entry into force as many ships experienced challenges in purchasing compliant fuel in some areas. The Committee also agreed to instruct the Drafting Group to review the draft MEPC circular set out at annex to document MEPC 58/14 and, with this as a basis, finalize a draft MEPC circular for adoption by the Committee.

### **Additional item in the term of reference for the Drafting Group**

5.38 The Committee, in view of the need, added an additional term of reference to the work of the Drafting Group to address the impact of the entry-into-force date for the revised Annex VI and the revised NO<sub>x</sub> Technical Code 2008. Since the Committee decided to set the entry-into-force date as 1 July 2010, there was a period of only six months for Administrations and recognized organizations acting on their behalf to certify engines and issue Engine International Air Pollution Prevention Certificates in order to comply with regulation 13(4) (Tier II NO<sub>x</sub> regulations for new engines). In order to enable Administrations to use the procedures in the revised NO<sub>x</sub> Technical Code 2008 prior to the entry into force of the revised Annex, and to avoid the practical implementation difficulties posed by the six-month period between the entry into force of the Annex and the effective date for Tier II compliance set forth in regulation 13(4), the Committee agreed that the Drafting Group should develop a draft circular, for consideration and approval by the Committee, attaching interim guidelines for the application of the revised NO<sub>x</sub> Technical Code 2008 in order to facilitate the effective implementation of regulation 13(4).

## **Establishment of the Drafting Group on amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code**

5.39 The Committee recalled that MEPC 57 had agreed in principle to establish a Drafting Group on Amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code and had agreed to establish the group under the Chairmanship of Ms Lindy Johnson (United States) with the following Terms of Reference:

“Taking into account all submitted documents as well as comments and decisions made in plenary, the Drafting Group is instructed to:

- .1 review and finalize the text of the revised MARPOL Annex VI and incorporate the decimal numbering system in paragraphs and sub-paragraphs;
- .2 review and finalize the text of the revised NO<sub>x</sub> Technical Code;
- .3 review and finalize the draft guidelines for the development of a VOC management plan (MEPC 58/5/1);
- .4 identify the guidelines to be updated or developed by the BLG Sub-Committee and prepare any necessary instructions;
- .5 develop a draft response to GESAMP on the requested clarifications on the interim washwater discharge criteria (MEPC 58/5/5);
- .6 review and finalize a draft MEPC Circular on interim application of the principles of regulation 18(2) using the annex to document MEPC 58/14 as a basis;
- .7 develop for consideration and adoption by the Committee a draft circular attaching interim guidelines for the application of the revised NO<sub>x</sub> Technical Code 2008 in order to facilitate the implementation of regulation 13(4); and
- .8 submit a written report to the plenary for consideration and adoption of these amendments on Thursday, 9 October 2008.”

### **Outcome of the Drafting Group and adoption of the amendments**

5.40 In introducing the report, the Chairperson highlighted the issue of gas fuels, an issue that needed to be resolved prior to the adoption of the revised Annex VI. It was first discussed in the definition of fuel oil in regulation 2 and then again in regulation 18. It was noted that the application of the requirements pertaining to the Bunker Delivery Note and samples of gas fuels would create practical implementation difficulties and potentially serious safety hazards. It was also noted that gas-fuelled ships were covered by the revised Annex VI and a decision was therefore needed on whether or not the provisions should apply to them.

5.41 The Chairperson stated that the Group had worked extremely hard and extended her sincere thanks to all the members of the group for their critical scrutiny of the text and their helpful observations and patience. She also thanked the members of the Secretariat, in particular, Mr. Dachang Du, Mr. Eivind Vågslid, Ms Lucy Essuman and Mr. Tomonori Hiratsuka. Before closing, Ms Johnson thanked the Chairman of the Working Group, Mr. Bryan Wood-Thomas, for

the decisions he took, for listening to all points of view and for leading the group fairly so that there were few, if any issues, that the Drafting Group found contentious in its deliberations. His tireless efforts, sound advice and ability to grasp the nuances of the political and technical landscape and, thus, facilitate consensus was nothing short of amazing.

5.42 The Committee noted the following corrections to the report of the Drafting Group (MEPC 58/WP.9) in addition to those set out in MEPC 58/WP.9/Corr.1:

- .1 paragraph 8.1 should read as follows:

“Ozone Depleting Substances, other than hydro-chlorofluorocarbons, were combined for ease of listing and the words, “installed before the date of 19 May 2005”, were added, as only systems installed before this date are now allowed to be used”; and

- .2 paragraph 16 should read as follows:

“Two issues arose in the review of this document. First, the Group considered whether, because of paragraph 7 of regulation 15, gas carriers were also required to have a VOC management plan. In carefully examining the wording of the regulation, the Group decided that this was not the case and did not include any reference to gas carriers in the cover resolution or in the guidelines for the development of a VOC management plan.”

5.43 Having considered the report of the Drafting Group on amendments to MARPOL Annex VI and the NO<sub>x</sub> Technical Code (MEPC 58/WP.9 and MEPC 58/WP.9/Corr.1), the Committee approved the report in general and, consequently:

- .1 considered whether any amendment to the revised MARPOL Annex VI regarding gas fuels should be adopted as raised in paragraphs 11 and 12 of the report, as amended by MEPC 58/WP.9/Corr.1, and agreed to add the following two sentences to the end of regulation 18.4:

“Paragraphs 5, 6, 7.1, 7.2, 8.1, 8.2, 9.2, 9.3 and 9.4 of this regulation do not apply to gas fuels such as Liquefied Natural Gas, Compressed Natural Gas or Liquefied Petroleum Gas. The sulphur content of gas fuels delivered to a ship specifically for combustion purposes onboard that ship shall be documented by the supplier.”;

- .2 noted that, as a consequence, annex 1 to document MEPC 58/WP.9, containing the revised MARPOL Annex VI, should be amended as follows:

- .1 the following should be added to the end of regulation 18.4:

“Paragraphs 5, 6, 7.1, 7.2, 8.1, 8.2, 9.2, 9.3 and 9.4 of this regulation do not apply to gas fuels such as Liquefied Natural Gas, Compressed Natural Gas or Liquefied Petroleum Gas. The sulphur content of gas fuels delivered to a ship specifically for combustion purposes onboard that ship shall be documented by the supplier.”;

- .2 in the Supplement to the International Air Pollution Prevention Certificate, the following amendments were needed to paragraph 2.1.1 to conform to the wording of paragraphs 3.1 and 3.2 of regulation 12:

“the words “halons or chlorofluorocarbons (CFCs)” should be replaced with “ozone depleting substances, other than hydro-chlorofluorocarbons,”;

- .3 noted that in all annexes to document MEPC 58/WP.9, the words “on board” or “on-board” should be changed to “onboard”;
- .4 adopted, by resolution MEPC.176(58), the revised MARPOL Annex VI, as set out in annex 13, as modified by the decisions taken by the Committee referred to in paragraphs 5.42 and 5.43 above;
- .5 adopted, by resolution MEPC.177(58), the revised NO<sub>x</sub> Technical Code 2008, as set out in annex 14;
- .6 agreed to refer the guidelines for the development of a VOC management plan (MEPC 58/WP.9, annex 3) to the BLG Sub-Committee for consideration;
- .7 approved the Terms of Reference for the Sub-Committee on Bulk Liquids and Gases to update or develop guidelines and to consider guidance on several issues relating to the revised Annex VI and the NO<sub>x</sub> Technical Code 2008, as set out in annex 15;
- .8 agreed to the draft response to GESAMP on the clarifications needed to provide the comments and input requested by MEPC 57 on the interim washwater discharge criteria for exhaust gas cleaning systems, as set out in annex 16;
- .9 noted that the Drafting Group had reviewed and finalized a draft MEPC circular inviting Member States to consider applying the principles outlined in regulation 18.2 of the revised Annex VI to the current Annex VI. Revised regulation 18.2 addresses the situation when a ship is found by a Party not to be in compliance with the standards for compliant fuel oils. Document MEPC 58/14, submitted by the International Parcel Tankers Association and the International Chamber of Shipping, noted that there have been cases under the current Annex VI where ships have not been able to obtain fuel to comply with the existing SO<sub>x</sub> Emission Control Areas (SECA) requirements. While there was support in the Committee for adopting this circular, a number of delegations had expressed concern regarding paragraph 3 of document MEPC 58/14, which stated that ships in certain trades, such as the chemical/parcel tanker trade which might have last minute changes of destination, can sometimes have difficulties in planning bunkering operations far in advance and thus may not have compliant fuel onboard for operating in a SECA. It was felt by those delegations concerned that this should not be considered a valid reason for applying the principles outlined in revised regulation 18.2;
- .10 approved the draft MEPC circular on interim application of the principles of regulation 18.2 and requested the Secretariat to issue it as MEPC.1/Circ.637;
- .11 approved the draft MEPC circular pertaining to interim guidelines for the application of the NO<sub>x</sub> Technical Code 2008 in order to facilitate the implementation of regulation 13.4 and requested the Secretariat to issue it as MEPC.1/Circ.638; and

- .12 expressed profound appreciation to all the parties that had been involved in the challenging and technically complicated revision of MARPOL Annex VI and the NO<sub>x</sub> Technical Code since it was agreed to by the Committee at its fifty-third session in July 2005, in particular to:
- Member Governments and observer organizations that had provided scientific and expert input into the work and had submitted documents enabling the work to progress expeditiously, and had worked tirelessly to reach this important decision that would significantly reduce air pollution from ships, offering benefits for the environment and humans in the entire world; and greatly esteemed the co-operation and flexibility showed by all Member States and involved observers enabling IMO to reach this vital agreement;
  - the BLG Sub-Committee and its Chairman (Mr. Zafrul Alam of Singapore);
  - the BLG Working Group on Air Pollution, its members and Chairman (Mr. Bryan Wood-Thomas of the United States);
  - the MEPC Working Group on Air Pollution, its members and Chairmen (Mr. Bin Okamura of Japan and Mr. Bryan Wood-Thomas of the United States);
  - the informal Cross Government/Industry Scientific Group of Experts established by the Secretary-General to evaluate the effects of the different fuel options proposed under the revision of MARPOL Annex VI, its members, the subgroup leaders and its Chairman (Mr. Mike Hunter of the United Kingdom);
  - leaders and members of other informal groups facilitating the work as well as coordinators and members of correspondence groups;
  - the Governments of Norway and Germany for hosting intersessional meetings during the period of refurbishment of the IMO Headquarters; and
  - the Chairperson of the Drafting Group, Ms. Lindy Johnson (United States) and all its members for finalizing the work in a successful way.

5.44 After the adoption of the revised MARPOL Annex VI and the NO<sub>x</sub> Technical Code 2008, the delegation of Germany wholeheartedly thanked and congratulated the Committee, IMO and all its Members for this historical decision, which was a major step forward in the protection of the environment, as well as in enhancing the operational conditions for shipping and, at the same time, the public view of the shipping sector. In its view, the unanimous adoption was a striking proof of what the Committee can achieve, despite the different backgrounds and the diverse positions at the beginning of the negotiations of three years ago. The delegation of Germany further went on to say that it was now time to dedicate all efforts into the implementation of the revised Annex and Code to achieve what had been intended. The delegation of Germany stated that different challenges might be faced at national or regional level when implementing the new regulations, e.g., challenges such as to prevent modal shift to less environmentally friendly means of transport in some regions. Such challenges had to be addressed at national or regional level, where necessary. However, in the view of Germany, challenges were, to some extent, inherent in ambitious goals. The delegation of Germany also stated that the fact that a compromise could be achieved illustrated how successful IMO could be. The delegation of Germany closed by thanking the Chairman of the Working Group, Mr. Bryan Wood-Thomas and

the Chairperson of the Drafting Group, Ms. Lindy Johnson, and the Secretariat for their hard and excellent work.

5.45 The Secretary-General stated that this was a monumental decision for the Committee and IMO as a new milestone in the history of the organization had been reached through the unanimous adoption of the revised MARPOL Annex VI and the NO<sub>x</sub> Technical Code. He was sure that all involved joined in his delight at the accomplishment, and that both the environment and the maritime industry would benefit substantially from the successful outcome of the endeavour. The considerable work done had been followed closely, with appreciation, by politicians and the media around the globe and the final adoption of the package of measures would not only have the positive benefits already mentioned, it would, in addition, underline the efficiency and effectiveness of IMO while also contributing to enhancing the image of shipping in the minds of policy-makers and the public in all corners of the world. In extending thanks and congratulations to all those involved in the process, the Secretary-General underlined that the Chairman of the Committee equally deserved unreserved appreciation for his great share in this success.

5.46 The Secretary-General went on to state that the unanimous adoption had showed that IMO was well able to make a success story of complex and sensitive issues – a feat that promised well for the next challenge, namely, the limitation and reduction of GHG emissions from shipping operations. The successful outcome of the efforts undertaken proved, once again, that IMO was focused, united and determined to reach decisions by consensus, thereby underlining IMO's relevance as an international body capable of dealing with all items on its agenda, an Organization with the mandate and competence to set global standards in a global environment.

## **6 INTERPRETATIONS OF AND AMENDMENTS TO MARPOL AND RELATED INSTRUMENTS**

### **PROPOSAL TO REVISIT RESOLUTION MEPC.108(49) (MANUALLY OPERATED ALTERNATIVES IN THE EVENT OF EQUIPMENT MALFUNCTIONS)**

6.1 The delegation of Denmark, in document MEPC 58/6/2, raised the concern that in the event of equipment malfunctions it appears possible to discharge oil or oily mixtures from cargo tanks of oil tankers only with an ineffective visual control carried out by the crew and not by any other means to control the oil content for compliance with the established limits, which may lead to pollution of the sea. The delegation, therefore, proposed that paragraph 6.11 of resolution MEPC.108(49) on “Manually operated alternatives in the event of equipment malfunctions” should be revisited so as to avoid any uncontrolled discharge of oil, and in order to be in accordance with MARPOL Annex I, regulation 34.

6.2 The Committee shared this concern and agreed that the DE Sub-Committee should review resolution MEPC.108(49) which it had developed, taking into account the proposal by Denmark, and report back to MEPC 59. The Committee thanked Denmark for bringing this issue to its attention.

6.3 On the general point of discussing proposed amendments to MARPOL, the delegation of the Netherlands expressed the concern that several proposals had been submitted to this session to amend MARPOL Annex I under separate items of the agenda (e.g., items 6 and 10). The delegation suggested that such proposals, whether proposed afresh or already considered by a Sub-Committee, be presented under one item, if possible, including the status of the proposal. This would enable delegations to keep track of the status of proposed amendments.

6.4 This concern was shared by other delegations and the Committee agreed to request the Secretariat to keep this in mind when processing documents which propose amendments to the mandatory instruments and develop a matrix with their status, as appropriate.

#### **PROPOSALS FOR UNIFIED INTERPRETATIONS**

6.5 IACS, in document MEPC 58/6, invited the Committee to consider IACS's unified interpretation on how to calculate the distance 'h' measured from the baseline shown in Figure 2 of MARPOL Annex I, regulations 12A.6-8 and 11.8 on oil fuel tank protection, as amended by resolution MEPC.141(54), when the vessel is fitted with a skeg or when the vessel is designed with permanent trim. These proposals, shown in the annex to document MEPC 58/6, concern vessels with an aggregate oil fuel capacity of  $600\text{m}^3 < x < 5,000\text{m}^3$  and  $> 5,000\text{m}^3$ , respectively.

6.6 The Committee noted that IACS, in document MEPC 58/6/1, proposed another uniform interpretation for MARPOL Annex I, regulation 23.7.3.2, on Accidental oil outflow performance, as amended by resolution MEPC.117(52), regarding the definition of the overpressure used for calculations of cargo level after bottom damage. For bottom damages the calculation of oil outflow of a tank is based on hydrostatic balance and the effect of overpressure. This definition is critical when undertaking the design of a ship and, in the view of IACS, it was important that the figure used was clear and that an appropriate operational pressure was used in the determination of the number of bulkheads. IACS, therefore, proposed the following unified interpretation:

*“The pressure  $p$  is to be taken as the maximum static inert gas pressure that is obtained at the discharge side of the non-return device fitted forward of the deck water seal or 5 kPa, whichever is greater. However,  $p$  need not be taken more than the maximum tank pressure corresponding to the P/V valve set-point.”*

6.7 The Committee approved the Unified Interpretation on the application of the factor 'h' measured from the baseline shown in Figure 2 of MARPOL Annex I, regulations 12A.6-8 and 11.8 on oil fuel tank protection, as set out in annex 17 to this report. The Committee further approved the Unified Interpretation of MARPOL Annex I, regulation 23.7.3.2 on Accidental oil outflow performance, as set out in annex 18 to this report.

#### **OTHER PROPOSALS**

##### **Request for clarification of application of MARPOL Annex I, regulation 12A**

6.8 IACS, in document MEPC 58/6/3, recalled that amendments to MARPOL Annex I had been adopted by resolution MEPC.141(54) in which a new regulation 12A on oil fuel tank protection was added. This regulation would apply to all ships with an aggregate oil fuel capacity of  $\geq 600\text{m}^3$ , which are delivered on or after 1 August 2010, as defined in regulation 1.28.9 of Annex I. IACS had received queries from industry on the applicability of the new regulation 12A, in the case of conversions from single-hull oil tankers to bulk/ore carriers. While it was clear that converting a single hull oil tanker to a bulk/ore carrier was a change in ship type and therefore constituted a major conversion as per regulation 1.9.1.2, it was unclear if:

- .1 regulation 12A should be applied to the entire bulk/ore carrier, i.e. all new and existing fuel oil tanks; or

- .2 regulation 12A should be applied only to the newly installed/converted fuel oil tanks of the bulk/ore carrier; or
- .3 regulation 12A should not apply where the fuel tank arrangements remain unchanged after conversion, i.e. in cases where the actual conversion work is carried out only in the cargo area without affecting the fuel oil tanks located outside the cargo region; and no new fuel oil tanks are added anywhere in the ship such that total fuel oil capacity is not exceeding that prior to the conversion, i.e. the risk level remains the same.

6.9 It was IACS's view that this issue needed to be addressed as a matter of urgency and IACS requested the Committee to consider the arguments in its document and clarify which of the three proposals above, or a hybrid thereof, was correct.

6.10 A majority of the delegations that spoke supported the first clarification offered by IACS, in view of the fact that after a major conversion (regulation 1.9.1.2) the ship was treated as a "new" ship. The Committee therefore agreed that regulation 12A should be applied to the entire bulk/ore carrier, i.e., all new and existing fuel oil tanks. As requested, the Secretariat, in consultation with IACS, produced a final text for this clarification, which reads as follows:

"With regard to conversions from single-hull oil tankers to bulk/ore carriers, regulation 12A of MARPOL Annex I should be applied to the entire bulk/ore carrier, i.e. all new and existing fuel oil tanks."

The Committee agreed with this clarification.

### **Revision of MARPOL Annex I concerning the record of construction and equipment for oil tankers (Form B)**

6.11 IACS, in document MEPC 58/6/4, also proposed to improve the Record of Construction and Equipment for Oil Tankers (Form B), in areas of Form B which do not provide specific information on the arrangement of oil tankers. Form B was a mandatory requirement under MARPOL Annex I, as it is Appendix II to Annex I, and therefore must be amended in accordance with article 16 of the MARPOL Convention. Notwithstanding this procedural issue, IACS invited the views of the Committee regarding proposed revisions of the MARPOL Annex I, Form B, in order to provide additional detail to document more completely the arrangement of different categories of oil tankers. The proposed revisions to section 5.8 of Form B were shown in annex 1 to document MEPC 58/6/4, whereas its annex 2 contained the justification for these proposals.

6.12 Several delegations representing Parties to the MARPOL Convention supported the proposal by IACS.

6.13 The Committee, after a short debate, approved the proposed amendment to section 5.8 of Form B of MARPOL Annex I, Appendix II, as set out in annex 19 to this report, and noted that the proposed amendment must follow the procedure set out in article 16 of the MARPOL Convention. Therefore, the Committee instructed the Secretariat to ensure the timely circulation of the proposed amendment in combination with the other amendments to Form B, which the Committee considered under item 10 of its agenda, at the recommendation of the DE Sub-Committee (MEPC 58/10/1, annex 2), in accordance with article 16 so that this amendment could be formally adopted at MEPC 59.

**STATUS REPORT ON THE REVIEW OF MARPOL ANNEX V**

6.14 The delegation of Canada reported on the status of the Correspondence Group's progress on the Review of MARPOL Annex V and its Guidelines (MEPC 58/6/5). Members of the Group continued to discuss issues (i.e. an overall and technical assessment of Annex V; reception facilities and how they function in the waste management chain; managing garbage on board ships, etc.) and were examining scientific information on the global extent of marine debris, particularly from sea-based sources. A new revised text of Annex V and its Guidelines must be proposed in the final report of the Group to MEPC 59, but more analysis was needed to confirm that supporting evidence for any proposed changes was of a compelling nature. The Correspondence Group would continue its work in the intersessional period, guided by available scientific evidence, towards consensus on possible recommendations to the Committee, which may include:

- .1 that no further action was required on Annex V;
- .2 the requirement for a specific amendment to Annex V or its Guidelines;
- .3 a proposal for a new work item for the Committee;
- .4 a request to another IMO body for consideration or action; and
- .5 a request to another United Nations organization for consideration or action.

6.15 The delegation of the Netherlands, while acknowledging that the review of MARPOL Annex V was not an easy task to co-ordinate, expressed the view that the planned review should be completed at MEPC 59 in accordance with the terms of reference adopted at MEPC 57 (MEPC 57, paragraph 5.12). To achieve this target, the delegation proposed that the Correspondence Group should focus its work, first, on developing a set of definitions under Annex V and, secondly, to start from the presumption of a general prohibition on the discharge of garbage from ships.

6.16 This view was supported by several other delegations. The delegation of New Zealand noted in this respect that while no firm scientific conclusions could be drawn at this stage on the overall sources of marine debris or litter because of incomplete datasets, the fact that an unacceptable quantity of debris originated from the shipping industry demonstrated the need for completion of this review at MEPC 59.

6.17 In conclusion, the Committee noted the status report and thanked the delegation of Canada, the Chairman and members of the Correspondence Group for the work done thus far. The Committee also instructed the Correspondence Group<sup>1</sup> to continue working during the intersessional period on the basis of clear definitions, as suggested, and with due regard to the suggested general prohibition on the discharge of garbage from ships and to submit a final report

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to MEPC 59, as reflected in its Terms of Reference agreed at MEPC 57 (MEPC 57/21, paragraph 5.12).

## **7 IMPLEMENTATION OF THE OPRC CONVENTION AND THE OPRC-HNS PROTOCOL AND RELEVANT CONFERENCE RESOLUTIONS**

7.1 The Committee considered three documents under this agenda item as follows: MEPC 58/WP.1, Report of the eighth meeting of the OPRC-HNS Technical Group; MEPC 58/7 (Secretariat) Manual on assessment of oil spill risks and preparedness; and MEPC 58/7/1 (Secretariat) IMO/UNEP Manual on the assessment and restoration of environmental damage following marine oil spills.

### **Report of the eighth meeting of the OPRC-HNS Technical Group**

7.2 The Committee noted that the eighth session of the OPRC-HNS Technical Group was held from 29 September to 3 October 2008, under the chairmanship of Mr. Nick Quinn (New Zealand), and that the report of the Group was issued under symbol MEPC 58/WP.1.

7.3 During consideration of the report of the Technical Group, the delegation of the Bahamas questioned whether the Technical Group could establish three Correspondence Groups like the Committee and Sub-Committees.

7.4 The Committee noted the clarification provided by the Secretariat that the Technical Group had been established at MEPC 48 as a subsidiary body of the MEPC and that the Committee had agreed that the working arrangements of subsidiary bodies, as defined in the “Guidelines on the organization and method of work of the Maritime Safety Committee and Marine Environment Protection Committee and their subsidiary bodies” would apply to the Technical Group, as identified in the terms of reference established for it (MEPC 49/22/Add.1).

7.5 The Committee noted the comments made by the delegation of the Netherlands, indicating its appreciation to the Technical Group for fully addressing the comments it had put forward at MEPC 57 with regard to the format of the work programme and consistency issues with the provisional agenda, as reflected in the new work programme.

7.6 The Committee approved the report (MEPC 58/WP.1) in general and, in particular:

- .1 endorsed the view of the Group to submit the finalized text of the Guidance document on the identification and observation of spilled oil, for approval by MEPC 59, while noting the proposal to publish the document as a joint IMO/IPIECA publication;
- .2 concurred with the Group’s decision to combine the information contained in the Guidance document on the establishment of joint co-ordinated information centres, with that found in the Manual on incident command systems, and to develop these as a single Manual;
- .3 endorsed the view of the Group to submit the finalized draft course materials for two introductory courses on HNS, i.e. the Introduction to the response to HNS in the marine environment – Operational level and – Management level, for approval at MEPC 59;

- .4 urged Member States to report any marine casualties and incidents involving HNS, in accordance with the provisions of the Revised harmonized reporting procedures – Reports under SOLAS regulation I/21 and MARPOL 73/78, articles 8 and 12 (MSC-MEPC.3/Circ.1) utilizing the module on maritime casualties and incidents of the Global Integrated Shipping Information System (GISIS);
- .5 approved the revised terms of reference for the OPRC-HNS Technical Group, as set out in annex 20;
- .6 agreed with the prioritization of the two work items referred by MEPC 57, i.e. Oil spill response in ice and snow conditions and Updating of the IMO dispersant guidelines, as low priority items within the context of the Group's work programme;
- .7 welcomed the election of Mr. Nick Quinn (New Zealand) as the new Chairman, and Mr. Suh Woo Rack (Republic of Korea) as the new Vice-Chairman of the OPRC-HNS Technical Group for the year 2009; and
- .8 approved the work programme and provisional agenda for the ninth meeting of the OPRC-HNS Technical Group, as set out in annexes 21 and 22 respectively, and the scheduling of the ninth session of the OPRC-HNS Technical Group the week prior to MEPC 59.

#### **Manual on assessment of oil spill risks and preparedness**

7.7 The Committee recalled that, further to its consideration of a proposal submitted by the Russian Federation for the development of an IMO Manual on Assessment of oil spill risks and preparedness at MEPC 49, it had approved the new work item and referred the matter to the OPRC-HNS Technical Group for action.

7.8 The Committee noted that the Group, at TG 5, having considered a draft of the Manual developed over a number of sessions and recognizing that it did not meet the needs of developing countries as well as could be expected, agreed on a new structure to address the identified shortcomings and a plan and timeframe for execution of the work.

7.9 The Committee further noted that at TG 7, having reviewed the draft text developed on the basis of the new agreed structure, the Group had reached agreement on the finalized text of the Manual and instructed the Secretariat to undertake any final editing and to submit the finalized draft to MEPC 58 for approval.

7.10 The Committee considered document MEPC 58/7 (Secretariat) containing the final draft text of the Manual on assessment of oil spill risks and preparedness, as agreed by the Technical Group at its seventh session.

7.11 The delegation of the Russian Federation, having originally proposed the development of this Manual, expressed its support for and agreement to the draft under consideration, noting that it provided good strategic guidance for developing oil spill response capacity. The delegation further expressed its desire for, in addition to this guidance, the development of more practical and operational guidance, which could include specific examples that would assist users in developing a minimum level of response capacity, in particular for oil terminals.

7.12 The Committee approved the draft text of the Manual on assessment of oil spill risks and preparedness and instructed the Secretariat to work with IPIECA to prepare the document for publishing as a new volume in the IMO/IPIECA report series.

**IMO/UNEP Manual on the assessment and restoration of environmental damage following marine oil spills (MEPC 58/7/1)**

7.13 The Committee recalled that the OPRC-HNS Technical Group, at its second session, had first considered a draft Manual on natural resource damage assessment, as prepared by the United Nations Environment Programme (UNEP), following its experience of the Tasman Spirit oil spill incident that occurred in Karachi, Pakistan, in July 2003 (MEPC/OPRC-HNS/TG 2/11).

7.14 The Committee recalled further that, given the relevance of the proposal to IMO's ongoing work regarding preparedness and response to oil spills and the link with IMO's activities in implementing the OPRC Convention and OPRC-HNS Protocol, and also building on IMO's longstanding co-operation with UNEP, it had agreed to UNEP's proposal to develop the above-mentioned Manual as a joint IMO-UNEP publication. Having considered this information at MEPC 52, the Committee had added this item to the work programme of the OPRC-HNS Technical Group.

7.15 The Committee noted that the Group had encountered a number of challenges throughout the development of the Manual, which considerably lengthened the timeframe for its development and finalization. Having reached consensus on the outstanding issues at TG 6, the Technical Group finalized and reached agreement on the text at TG 7 and instructed the Secretariat to submit the Manual for approval at MEPC 58 (MEPC 57/WP.1).

7.16 The Committee approved the draft text of the IMO/UNEP Manual on the assessment and restoration of environmental damage following marine oil spills and instructed the Secretariat to work with UNEP to prepare the document for publication as a joint IMO/UNEP Manual.

7.17 The Committee noted the endorsement of the delegation of Italy of both Manuals, recognizing their usefulness, and its support for the ongoing work of the Technical Group.

**8 IDENTIFICATION AND PROTECTION OF SPECIAL AREAS AND PARTICULARLY SENSITIVE SEA AREAS**

**Antarctic Shipping**

8.1 The Committee recalled that MEPC 57, having noted information provided by the observer from FOEI on Antarctic area vessel issues, in particular regarding concerns about the increased number and type of vessels operating in the Antarctic area, recent incidents and that the work programme of BLG 13 would include "Amendments to MARPOL Annex I on the use and carriage of heavy grade oil on ships in the Antarctic area", invited proposals to future meetings of the Committee, and the BLG Sub-Committee, as appropriate.

8.2 The observer from FOEI, on behalf of the co-sponsors of document MEPC 58/8 (FOEI, Greenpeace International, IFAW and WWF) on Antarctic Shipping, highlighted that, while the Antarctic area south of 60°S latitude is recognized as sensitive and vulnerable to the impacts of pollution and had been designated as a Special Area under MARPOL Annexes I, II and V, the area remained vulnerable to the threat from international shipping.

8.3 The observer from FOEI suggested that a joint IMO/Antarctic Treaty Consultative Meeting (ATCM) Working Group be established to consider and collaborate on solutions to shipping threats in the Antarctic Treaty Area. The observer proposed that the main task of this joint Working Group would be: to conduct a comprehensive assessment of potential risks and impacts on the area from vessels; identify the presence or absence of a measure to address those impacts; analyse whether a measure exists or whether it has been effectively implemented; and, whether further action is needed. It was also suggested that for the Antarctic Treaty Area, or discrete areas within the area, a risk assessment and assessment against the PSSA Guidelines should be undertaken, and IMO measures developed as associative protective measures (APMs), if appropriate.

8.4 The observer from FOEI, also proposed that the Committee endorse the Antarctic and Southern Ocean Coalition (an umbrella NGO group that includes FOEI, Greenpeace International, IFAW and WWF) proposal to host a Workshop in 2009, to work on a comprehensive assessment of the threats to the Antarctic area from the full range of vessels operating in the area. The Workshop would seek to address both risks and routine operations and begin identifying appropriate mitigation measures.

8.5 All the delegations that spoke, including Argentina, Belgium, Brazil, Chile, Egypt, Italy, New Zealand, the Netherlands, Norway, Sweden and the United Kingdom shared the concerns of the co-sponsors regarding the increased number and types of vessels operating in the Antarctic Treaty area and the importance of protecting this area through greater collaboration between IMO and the Parties to the Antarctic Treaty.

8.6 The Committee noted the view of Argentina that it considered the Antarctic Treaty as the competent instrument to guide the protection of the marine environment in that continent and, therefore, no joint IMO-ATCM Working Group would be needed.

8.7 The Committee noted New Zealand's invitation to participate in the Antarctic Treaty Meeting of Experts (ATME) on the management of ship-borne tourism in the Antarctic Treaty area that it would host in Wellington from 6 to 8 December 2009<sup>2</sup>.

8.8 Several delegations stressed the importance of work currently being undertaken by the Organization, including work scheduled for the BLG Sub-Committee, as set out in paragraph 8.1, and the work scheduled for the DE Sub-Committee on Amendments to the Guidelines for ships operating in Arctic ice-covered waters (Polar Code), which, when finalized, would apply to both Polar Regions. Members were reminded to include experts in polar matters on their delegations to future sessions of these meetings.

8.9 Having considered the action points in paragraph 19 of document MEPC 58/8, and noting that all interested parties can attend MEPC meetings and submit documents and, if needed, an *ad hoc* group could be established during MEPC, the Committee decided that a joint IMO-ATCM Working Group should not be established at present. The Committee, however, endorsed the Antarctic and Southern Ocean Coalition's proposal to host a Workshop in 2009 to address both risks and routine operations and begin identifying appropriate mitigation measures. The Committee agreed that no financial or human resources could be made available by IMO for this purpose.

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## **9 INADEQUACY OF RECEPTION FACILITIES**

9.1 The Committee recalled that with regard to work item 5.1 (Development of Guidelines for establishing regional arrangements for reception facilities) in the Action Plan on the inadequacy of port reception facilities, it had agreed at MEPC 55 that it was not appropriate to adopt a further MEPC resolution to recognize regional arrangements as satisfying MARPOL obligations in view of the fact that the relevant MARPOL regulations require each Party to provide reception facilities, and that regional arrangements may contravene the current MARPOL requirements. Recognizing though the benefit of having such regional arrangements in place, MEPC 55 had agreed to recognize the benefit of regional arrangements as means of providing reception facilities.

9.2 The Committee further recalled that it had requested Member States to provide their views to future sessions of the Committee on how these regional arrangements could be better institutionalized but that no submissions had been received at either MEPC 56 or MEPC 57. The invitation to Member States to submit relevant information for consideration had consequently been reiterated, bearing in mind that the target completion date for work item 5.1 of the Action Plan is 2008.

9.3 In response, document MEPC 58/9 (Australia, Marshall Islands, New Zealand, the United States, Vanuatu and the Secretariat of the Pacific Regional Environment Programme (SPREP)) had been submitted outlining views on how regional arrangements for reception facilities in small island and less developed archipelagic States could be better institutionalized.

9.4 In reviewing document MEPC 58/9, the Committee noted that the co-sponsors support regional arrangements when unique circumstances prevail and that the co-sponsors believe that, as an example, in the case of the Pacific Region's small islands and less developed archipelagic States, such circumstances have been clearly demonstrated.

9.5 The Bahamas, supported by a number of delegations, expressed general support for the principles presented in document MEPC 58/9, while stressing that the approach could also be applicable to similar States in the Caribbean.

9.6 The delegation of Norway, in supporting the approach in principle, expressed the view that the proposal to institutionalize the regional arrangements by amending the relevant MARPOL Annexes would not be a straight forward task as regional arrangements might contravene the current MARPOL requirements. Therefore, this should be approached carefully.

9.7 The delegation of the Netherlands, in supporting Norway, advised that they had identified a number of practical concerns which would need to be addressed but offered support in working to resolve these issues.

9.8 The delegation of Cuba made a statement concerning the current situation of port reception facilities in Cuba after the passage of two hurricanes which destroyed equipment intended to comply with MARPOL regulations. The delegation of Cuba requested the assistance of IMO in order to re-establish the damaged services. The text of this statement is set out in annex 23.

9.9 Following discussions, the Committee endorsed the two main elements in document MEPC 58/9:

- .1 in order to institutionalize regional arrangements for providing reception facilities, appropriate amendments should be made to the relevant MARPOL Annexes and resolution MEPC.83(44); and
- .2 until any future amendments to the relevant MARPOL Annexes are adopted and entered into force, the decision of MEPC 55 to recognize the benefit of regional arrangements as a means of providing reception facilities should continue.

9.10 With respect to developing amendments to the relevant MARPOL Annexes, Member States were invited to propose appropriate amendments to a future session of the Committee.

## **10 REPORTS OF SUB-COMMITTEES**

### **OUTCOME OF BLG 12**

10.1 The Committee recalled that the twelfth session of the Sub-Committee on Bulk Liquids and Gases (BLG 12) had been held from 4 to 8 February 2008 and that its report was issued as document BLG 12/17.

10.2 The Committee noted that urgent matters emanating from BLG 12 relating to the “Prevention of air pollution from ships” and “Harmful aquatic organisms in ballast water” had already been dealt with at MEPC 57.

10.3 It was noted further that the outcome of BLG 12 on other ballast water management issues had been addressed separately under agenda item 2.

10.4 The Committee approved the report of BLG 12 in general and took action as indicated hereunder on all remaining items referred to it by the Sub-Committee as reflected in document MEPC 58/10 (Secretariat).

### **Draft amendments to MARPOL Annex I**

10.5 The Committee considered the draft amendments to MARPOL Annex I on the prevention of pollution during the transfer of oil cargo between oil tankers at sea. In this context, the Committee noted two documents: MEPC 58/10/4 (IACS) and MEPC 58/10/7 (Liberia, the Marshall Islands, Singapore, the United States, INTERTANKO, ICS and OCIMF) proposing further modifications to the draft which had been submitted for consideration.

10.6 In document MEPC 58/10/4 from IACS, it was noted that ship-to-ship transfer (STS) operations require both oil tankers involved in the transfer to have an approved STS plan and that accordingly, a practical implementation regime is required in order to accommodate this situation.

10.7 It was proposed to address this by linking the provision of an STS plan to the first IOPP survey following entry into force of the new regulation. All STS operations carried out on/after 15 months from the entry-into-force date would then need to be in accordance with the approved plan.

10.8 This approach was widely endorsed by a number of Member States and these modifications to the draft amendment were accordingly agreed. The length of the application timeline was discussed but it was accepted that 15 months was needed in order to accommodate a permissible 3 months' grace period on the survey date.

10.9 Following an intervention from OCIMF to request clarification that approval could be through the Safety Management System Documentation and that it was not a requirement for approval of a stand-alone STS plan, it was confirmed that this was indeed the intent of the regulation.

10.10 In document MEPC 58/10/7, it was proposed by the co-sponsors that draft regulation 42 ("advance notification") of MARPOL Annex I should either be deleted from the present amendments or modified such that notification of STS transfers are only required for operations within territorial seas or internal waters.

10.11 After extensive debate on this issue reflecting on the impact of a notification period both in terms of commercial considerations and rights under UNCLOS, it was agreed that draft regulation 42 should be retained but that the reference to the exclusive economic zone in paragraph 1 should be placed in square brackets, with a decision on this point to be taken at MEPC 59.

10.12 The Committee approved, with a few changes, the draft amendments to MARPOL Annex I concerning prevention of pollution during transfer of oil cargo between oil tankers at sea, as set out in annex 24, with a view to adoption at MEPC 59.

#### **Other issues**

10.13 The Committee endorsed the Sub-Committee's view that, in principle, the Chairman of the GESAMP/EHS Working Group should be present, if needed, at ESPH Working Group meetings during the debate on the report and the discussion on the evaluation of new products for inclusion in the IBC Code. The Committee agreed that, if needed, funding support should be made available from the revenue arising from the new charging mechanism put into place for EHS evaluations.

10.14 The Committee noted the Sub-Committee's agreement to specify in the cover note of MEPC.2/Circ.14 that MEPC.2/Circ.13 would remain valid until 31 December 2008 and that MEPC.2/Circ.14 will become effective on 1 January 2009. This action was needed in order to tie in with the adoption of the 2007 amendments to the IBC Code which would enter into force on 1 January 2009. The Committee further noted that the temporary precedence arrangements previously applied to List 1 products in the MEPC.2/Circular would no longer be required.

10.15 The Committee noted the Sub-Committee's view on issuing a new publication of the IBC Code in order to clarify the product listings in force following the introduction of the new amendments.

10.16 The Committee endorsed the future work programme for the intersessional meeting of the ESPH Working Group from 27 to 31 October 2008 and noted that the revision of chapter 19 of the IBC Code would continue as part of the work programme with a target completion date of 2009.

10.17 The Committee, noting MSC 84's concurrent decision, approved the holding of an intersessional meeting of the ESPH Working Group in 2009.

10.18 The Sub-Committee's progress in its consideration of the application of requirements for bio-fuels and bio-fuel blends was noted.

10.19 With respect to the proposal to expand the terms of reference of the ESPH Working Group to include blending on board during the sea voyage, whilst some delegations advised that this was an ongoing practice and therefore a concern, others had the view that insufficient information had been made available to support this point.

10.20 The Committee agreed that a final decision on whether to expand the terms of reference on this topic should be taken by the BLG Sub-Committee. If a need is demonstrated by the submission of relevant information and agreed by BLG 13, the Intersessional ESPH Working Group may then, on this occasion, work on this issue during 2009. In view of this decision, it was noted that only shore blended bio-fuel blends can be addressed at the forthcoming ESPH 14 meeting.

10.21 The Committee noted that the Sub-Committee had agreed to establish an intersessional correspondence group on the development of measures for minimizing the transfer of invasive aquatic species through bio-fouling of ships to further progress the issue and report to BLG 13.

10.22 Following MSC 84's concurrent decision, the Committee approved the proposed revised work programme of the Sub-Committee and the provisional agenda for BLG 13. This included a new high-priority item on the work programme and agenda for BLG 13 on Amendments to MARPOL Annex I on the use and carriage of heavy grade oil (HGO) in the Antarctic area (see paragraph 19.9). With respect to the latter item, the Committee agreed that the Sub-Committee should be requested to develop amendments for review at MEPC 59.

10.23 The Committee endorsed the course of action taken by the Sub-Committee to approve BLG.1/Circ.23 on requirements for the carriage of Gas-to-Liquid oils and agreed also to issue this as MEPC.1/Circ.639.

#### **OUTCOME OF DE 51**

10.24 The Committee recalled that the fifty-first session of the Sub-Committee on Ship Design and Equipment (DE 51) had been held from 18 to 22 February 2008 and that its report was issued as document DE 51/28.

10.25 The Committee noted that, although DE 51 was held before MEPC 57, no urgent items arising from DE 51 had to be addressed at the last session of the Committee.

10.26 The Committee approved the report of DE 51 in general and took action on the items referred to it by the Sub-Committee as reflected in document MEPC 58/10/1 (Secretariat) as indicated hereunder.

#### **Draft amendments to MARPOL Annex I and consequential amendments to the IOPP Certificate and ORB**

10.27 The Committee considered the draft amendments to MARPOL Annex I but noted that further text changes had been proposed in document MEPC 58/10/6 (Ireland) relating to the text of existing regulation 12.1 and the combination of draft subparagraphs 12.2.2 and 12.2.3.

10.28 The Committee accepted these changes and agreed to modify the text accordingly. In this context, it was noted that in view of the renumbering of existing paragraphs 2 and 3, there would be a consequential need to also update the Unified interpretations applicable to these paragraphs (U.I.16 and U.I.17, respectively).

10.29 With respect to the new subparagraphs proposed in the draft amendments for Regulation 1 – Definitions, the term “waste oil” as used in paragraph 1.31 was questioned by the delegation of the Netherlands, as “waste oil” is not defined. To avoid any misunderstandings on this point, it was agreed that “waste oil” should be qualified as “generated during the normal operation of a ship”.

10.30 The Committee subsequently approved the draft amendments to regulations 1, 12, 13, 17 and 38 of MARPOL Annex I, with a view to adoption at MEPC 59, as set out in annex 25.

10.31 The Committee also approved draft amendments to the Supplement to the IOPP Certificate Forms A and B, with a view to adoption at MEPC 59, as set out in annex 26.

10.32 The Committee noted that the Sub-Committee had noted views that the development of unified interpretations on the use of code letters in the Oil Record Book would be beneficial. The delegation of the Netherlands advised that they did not support this view since it was preferable to have clarity in the interpretation of the code letters in the Oil Record Book itself, revising the text as needed.

10.33 The Committee considered draft amendments to the Supplement to the Oil Record Book Parts I and II but noted that further text changes had been proposed in document MEPC 58/10/6 (Ireland) relating to footnote changes for sections C and I in List of Items to be recorded for ORB Part 1. The delegation of Denmark, having consulted with other delegations, expressed the view that whilst there was support for the footnote amendment for section C, the information conveyed by the proposed footnote for section I (relating to voluntary entries pertaining to bilge tanks) would be better communicated via a Circular. This was accepted by the Committee. The draft amendments to the Oil Record Book, as set out in annex 27, were approved by the Committee with a view to adoption at its next session.

10.34 Having taken the above decisions, the Committee requested the Secretary-General to circulate the proposed amendments to MARPOL Annex I, the IOPP Certificate and Oil Record Book in accordance with the requirements of article 16 of the MARPOL Convention with a view to adoption at MEPC 59.

10.35 On the issue of communicating guidance to seafarers who are already using evaporation from sludge tanks as a method of reducing sludge volumes, as raised by the Marshall Islands and others in document MEPC 58/10/5, the Committee agreed to request the Secretariat to issue a Circular (MEPC.1/Circ.640) advising that the proper way of recording such operations in the Oil Record Book was to utilize code letter C.12.4. This Circular should also communicate the information referred to above in 10.33 in relation to the note on voluntary entries pertaining to the content of bilge tanks.

10.36 The Committee agreed that the MEPC circular should be brought to the attention of the FSI Sub-Committee, in order to consider its alignment with port State control procedures.

10.37 The delegation of Denmark advised that they intended to propose guidelines to the Oil Record Book for consideration at the Committee’s next session.

10.38 As an additional point, the Committee noted that guidance was required as to what percentage reduction in the volume of sludge from evaporation should be accepted. To address this issue, the Committee agreed to refer this matter to the DE Sub-Committee for consideration.

### **Bilge and sludge handling issues**

10.39 The Committee noted that the Sub-Committee, with regard to the issue of a mandatory phase-out of oily water separators and oil discharge monitoring systems complying with resolutions MEPC.60(33) and A.586(14), had invited Member Governments and interested organizations to submit comments and proposals to DE 52 under the agenda item “Any other business”.

10.40 The Committee concurred with the view of the Sub-Committee that, with regard to the issue of electronic means to control oil discharges from ships, while the use of electronic means to control oil discharges on board ships should be possible, those means should not be intended as a replacement of the current Oil Record Book, which had proved to be an effective way of controlling illegal discharges, but rather as a supplement to it, which could help reinforce compliance, and should only be fitted voluntarily.

10.41 The Committee approved an MEPC circular on Supplementary guidelines on approval of bilge and sludge handling systems for compliance with MARPOL Annex I (DE 51/28, annex 10) and requested the Secretariat to issue this as MEPC.1/Circ.641.

10.42 The Committee also approved a draft MSC/MEPC circular on Blanking of bilge discharge piping systems in port, subject to concurrent decision by MSC 85 later this year.

10.43 The Committee noted that the DE Sub-Committee has requested the FP Sub-Committee to consider the matter of safety issues associated with the heating of oil residue (sludge) to a level likely to be above its flashpoint as a method to reduce its water content, and provide advice to MEPC accordingly.

10.44 In this context, the Committee noted the concerns on this issue expressed in document MEPC 58/10/5 but agreed that the work tasked to the FP Sub-Committee should continue. Member States were invited to submit any relevant information to the FP Sub-Committee which may facilitate their work in order that further decisions may be taken at MEPC 59.

10.45 The Committee approved an MEPC circular on Amendments to the Revised guidelines for systems handling oily wastes in machinery spaces of ships incorporating guidance notes for an integrated bilge water treatment system (IBTS) (DE 51/28, annex 12) and requested the Secretariat to issue this as MEPC.1/Circ.642.

10.46 The Committee also approved an MEPC circular on Harmonized implementation of the Revised guidelines and specifications for pollution prevention equipment for machinery spaces of ships during the type-approval process (DE 51/28, annex 13) and requested the Secretariat to issue this as MEPC.1/Circ.643.

10.47 In this regard, it was noted that document MEPC 58/10/9 (United Kingdom and IMarEST) questioned if a new test procedure for chemical separation treatments which operate on a cyclic process was now needed (since the normal test methods based on a continuous flow of fluid cannot be applied in such cases). The Committee recognized that this may be beneficial and invited proposals to be put forward for consideration at a future session of the Committee.

## **Unified interpretation to regulation 12.1 of MARPOL Annex I**

10.48 The Committee considered the revocation of Unified Interpretation 15.1.5 to regulation 12.1 of MARPOL Annex I but noted that further clarification on how this should be applied had been proposed in document MEPC 58/10/8 (Japan). This reflected the view that the current UI 15.1.5 should continue to be applicable to ships on which the building contract is placed before the date of the revocation of UI 15.1.5 or, in the absence of a building contract, the keel of which is laid before the same date. Additionally, it proposed that revocation of UI 15.1.5 should take effect on the same date when amendments to MARPOL Annex I, which relate to the definition of “oil residue (sludge) tanks”, enter into force.

10.49 The Committee agreed with the proposal and endorsed the new text proposed for UI 15.1.5 as set out in annex 28.

### **Other issues**

10.50 The Committee considered the development of a unified interpretation for new ships which will give the possibility for reduction of the oil residue (sludge) tank capacity equal to the size of the incinerator capacity or other oil residue (sludge) reduction equipment. This was not supported by the Committee and it was concluded that there was no need for a Unified Interpretation.

10.51 The Committee noted the view of the Sub-Committee that the draft amendments to SOLAS regulation II-1/3-5.2 agreed at the session, prohibiting all new installations of asbestos on board ships without exceptions, might have an impact on the Ship Recycling Convention currently under development.

### **OUTCOME OF FSI 16**

10.52 The Committee recalled that the sixteenth session of the Sub-Committee on Flag State Implementation (FSI 16) was held from 2 to 6 June 2008 and its report was issued as document FSI 16/18.

10.53 The Committee approved the report of FSI 16 in general and, in particular, took action on the items referred to it by the Sub-Committee as reflected in document MEPC 58/10/2 (Secretariat), indicated hereunder.

10.54 The Committee endorsed the Sub-Committee’s decision to request the Secretariat to collate the proposals for the completion of the study on the combination of casualty and port State control data and to identify the datasets that might be needed for combining casualty and PSC data.

10.55 The Committee also endorsed the Sub-Committee’s decision not to require Members to complete Part 3 of their MARPOL reports under MEPC/Circ.318 starting from 2008, as the Secretariat can utilize data extracted from the GISIS module on port reception facilities when compiling summary reports for the Annual Enforcement Report on Reception Facilities (Parts 3a and 3b of MEPC/Circ.318).

10.56 The Committee further endorsed the Sub-Committee’s agreement to consider amending MEPC/Circ.318 at a later stage when it becomes clear whether the reporting requirements for the Annual Statistic Report on MARPOL-related discrepancies and detentions (Part 4 of MEPC/Circ.318) could also be satisfied through a data extraction from GISIS, thereby avoiding two amendments of MEPC/Circ.318 within a relatively short period of time.

10.57 The Committee approved the Advanced Notification Form (ANF) of the Action Plan on Tackling the Inadequacy of Port Reception Facilities (FSI 16/5, annex 1) and requested the Secretariat to issue this as MEPC.1/Circ.644.

10.58 The Committee also approved the Waste Delivery Receipt (WDR) of the Action Plan on Tackling the Inadequacy of Port Reception Facilities (FSI 16/5, annex 2) and requested the Secretariat to issue this as MEPC.1/Circ.645. In this context, as commented earlier, it was noted that waste should be qualified as meaning that “generated during the normal operation of a ship”.

10.59 The Committee endorsed the Sub-Committee’s agreement to extend the target completion date of work items 2.1, 2.3, 3.1, 3.2, 4.1, 4.2 and 5.3 of the Action Plan on Tackling the Inadequacy of Port Reception Facilities to 2009.

10.60 The Committee considered the proposed MSC-MEPC.3 circular on Reports on marine casualties and incidents (FSI 16/18, annex 1). In reviewing this, it was noted that there is an oversight in annex 2 of the draft MSC-MEPC.3 circular as it is currently set out. This relates to section 7.3.3 of annex 2 of the draft where the category options for Chemicals in Bulk are presented using the old MARPOL system of A, B, C, D. Following the revision of MARPOL Annex II, the new pollution categories of X, Y, Z and OS should be employed and the draft circular needs to be corrected accordingly. Subject to this amendment and to concurrent decision by MSC 85 later this year, the Committee approved the MSC-MEPC.3 circular.

10.61 The Committee endorsed the Sub-Committee’s decision on the issues of the finalization of protocols with the Secretariats of those PSC regimes, which have agreed in principle with the data exchange of reports on all PSC inspections, and the establishment of the data exchange with the PSC Information Centres.

10.62 The Committee noted the Sub-Committee’s view that the draft MSC/MEPC circular on Blanking of bilge discharge piping systems in port did not need any changes, and its request to the Secretariat to provide all PSC regimes with a copy of the draft circular, as requested by DE 51.

10.63 The Committee further noted the Sub-Committee’s agreement to re-establish the Correspondence Group on Port State Control and its instruction, *inter alia*, to initiate the development of draft Guidelines on PSC under the 2004 BWM Convention taking into account the outcome of MEPC 58 on Guidelines for ballast water sampling (G2).

10.64 The Committee approved, subject to MSC’s concurrent decision, an MSC-MEPC circular on Unified interpretation of the application of regulations governed by the building contract date, the keel-laying date and the delivery date for the requirements of the SOLAS and the MARPOL Conventions.

10.65 The Committee concurred with the Sub-Committee’s recommendation to add an annex 7 to the Code for the Implementation of Mandatory IMO Instruments showing the amendments to IMO instruments not yet accepted at the date of revision of the Code, but expected to be accepted and to enter into force within the following months, and instructed the Sub-Committee to develop this accordingly, subject to MSC’s concurrent decision and the endorsement of the Council.

10.66 The Committee noted the outcome of the Sub-Committee’s review of the question of the applicability of IMO Conventions to FPSOs and FSUs.

10.67 The Committee approved the proposed revised work programme of the Sub-Committee and provisional agenda for FSI 17 (see paragraph 19.13).

10.68 The Committee endorsed the report on the status of the Sub-Committee's planned outputs in the High-level Action Plan for the current biennium.

### **Review of the Consolidated Audit Summary Report**

10.69 The Committee noted that, as requested by MEPC 57 (MEPC 57/21, paragraph 10.27), the Sub-Committee had considered document A 25/8/2 on the Consolidated Audit Summary Report (FSI 16/18, paragraph 14.35) and had requested its Correspondence Group on the Review of the Survey Guidelines under HSSC and the Code for the Implementation of Mandatory IMO Instruments to conduct a detailed review of the Summary Report with a view to:

- .1 developing a methodology for the analysis of the Summary Report so as to provide feedback to Member States and the Organization on the recurrent findings, including identification of possible underlying causes and best practices; and
- .2 making recommendations on the effectiveness of the implementation by Member States of mandatory instruments falling within the scope of the audit scheme, and on the areas where specific technical co-operation activities would benefit Member States.

10.70 The Committee noted that the outcome of FSI 17 (April 2009) on the report of the Correspondence Group would be submitted to MEPC 59 for consideration with a view to then informing the Council and the Assembly in due course.

### **OUTCOME OF NAV 54**

10.71 The Committee recalled that the fifty-fourth session of the Sub-Committee on Safety of Navigation (NAV 54) was held from 30 June to 4 July 2008 and its report was issued as document NAV 54/25.

10.72 The Committee noted the information referred to it by the Sub-Committee as outlined in document MEPC 58/10/3 (Secretariat) in relation to "Amendments to the existing ship reporting system for the Papahānaumokuākea Marine National Monument Particularly Sensitive Sea Area, (CORAL SHIPREP)" and the "Impact of resolution MEPC.118(52) (revised MARPOL Annex II) upon existing AIS shipboard installations".

### **OUTCOME OF SLF 51**

10.73 The Committee recalled that the fifty-first session of the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF 51) was held from 14 to 18 July 2008 and its report was issued as document SLF 51/17.

10.74 From the report of SLF 51, the Committee noted the following comment, in relation to the "Impact of small pleasure and fishing craft on the marine environment":

“5.26 Recalling the comments made in plenary and the instruction by MSC 84 on addressing the possible action by IMO on the impact of small pleasure and fishing craft on the marine environment, the Sub-Committee noted the group’s concern that it had minimal expertise in environmental matters and, therefore, it could not properly address these issues. Consequently, the Sub-Committee agreed that relevant environmental issues should be addressed by the MEPC, in consultation with other UN agencies and non-governmental organizations, and invited MEPC 58 to consider the above view and take action as appropriate.”

10.75 In the context of this comment, the Committee decided that this matter should be considered further at MEPC 59.

### **OUTCOME OF DSC 13**

10.76 The Committee recalled that the thirteenth session of the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC 13) was held from 22 to 26 September 2008, but noted that, with respect to DSC 13, no urgent matters have come forward and, consequently, the outcome of this meeting relating to the Committee’s work will be submitted to MEPC 59 for consideration.

## **11 WORK OF OTHER BODIES**

11.1 Under this agenda item the Committee had before it three documents and agreed to deal with them in the following order:

- .1 Outcome of TCC 58: document MEPC 58/11;
- .2 Outcome of MSC 84: document MEPC 58/11/1; and
- .3 Outcome of the one hundredth session of the Council: document MEPC 58/11/2.

### **OUTCOME OF TC 58**

11.2 The Committee noted that the fifty-eighth session of the Technical Co-operation Committee was held from 10 to 12 June 2008 and its report was circulated as document TC 58/13. Those matters of relevance to the Committee’s work had been reported in document MEPC 58/11 (Secretariat).

11.3 The Committee agreed to take into account all issues related to marine environment protection in that report under agenda item 15 – Technical Co-operation Sub-programme for the Protection of the Marine Environment.

### **OUTCOME OF MSC 84**

11.4 The Committee noted that the eighty-fourth session of the Maritime Safety Committee was held from 7 to 16 May 2008 and its report was circulated under the symbol MSC 84/24 and Add.1, 2 and 3. The outcome of MSC 84 relevant to the work of this Committee had been summarized in document MEPC 58/11/1 (Secretariat).

11.5 The Committee noted also that the outcomes of MSC 84 on the Human Element (HE); Formal Safety Assessment (FSA); Work Programme of the Committee and subsidiary bodies and the Application of the Committees' Guidelines would be considered under agenda items 16, 17, 19, and 20, respectively.

11.6 In considering document MEPC 58/11/1, the Committee agreed to note, in general, the outcomes of MSC 84 on all issues of relevance to its work and take MSC 84's action into account, as appropriate, under the relevant items of its agenda.

11.7 The Committee noted, in particular, that MSC 84 had taken action on the following matters of interest to its work, as reported hereunder:

- .1 adoption of the Casualty Investigation Code (resolution MSC.255(84));
- .2 adoption of amendments to the IMDG Code (resolution MSC.262(84));
- .3 adoption of amendments to the Guidelines on the Enhanced Survey Programme of inspections during surveys of bulk carriers and oil tankers (resolution MSC.261(84));
- .4 adoption of Revised performance standards and functional requirements for LRIT (resolution MSC.263(84)); and Establishment of the LRIT data exchange on an interim basis (resolution MSC.264(84));
- .5 on the issue of possible need for amendments to IMO instruments, including MARPOL, following the eventual adoption of the Goal-based new ship construction standards (GBS) for bulk carriers and oil tankers, MSC 84 agreed to consider the matter in detail at MSC 85 when the GBS are expected to be finalized;
- .6 having noted the concurrent decision of MEPC 57, MSC 84 endorsed the action taken by DSC 12 in issuing DSC.1/Circ.54 on Information on the amendments to the IMDG Code marine pollutant provisions during the voluntary implementation period of the amendments, from 1 January to 31 December 2009;
- .7 having noted the concurrent decision of MEPC 57, MSC 84 endorsed the action taken by DSC 12 in issuing DSC.1/Circ.55 on Guidance on the application of chapter 2.10 (Marine Pollutants) of the IMDG Code following amendment 33-06;
- .8 MSC 84 agreed that, in the context of reducing the generation of SO<sub>x</sub> gases when furthering the development of provisions for gas-fuelled ships, the relevant provisions of MARPOL Annex VI, as amended, should be taken into account;
- .9 MSC 84 concurred with MEPC 57's decision that an intersessional meeting of the ESPH Working Group should be held some time in 2009;
- .10 having noted that MEPC 57 had agreed to a joint MSC-MEPC circular requesting Members Governments to collect data on halons for the maritime sector and report this information directly to the Ozone Secretariat, MSC 84 agreed that the circular should not be misunderstood to mean that halons could not be used to extinguish a fire on board a ship, and approved MSC-MEPC.1/Circ.3 on Decreasing

availability of halons for marine use, having added a new paragraph 5 in that respect;

- .11 MSC 84 agreed to refer documents MEPC 57/20 and MEPC 57/INF.18 on the impact of small pleasure and fishing craft on the marine environment, which MEPC 57 had invited the MSC to consider in the context of its work on the safety of fishing vessels, to the SLF Sub-Committee for advice; and
- .12 MSC 84 agreed to refer the issue of possible updates of AIS after the entry into force of the revised MARPOL Annex II on 1 January 2007, to the NAV Sub-Committee for consideration (see paragraph 10.72).

11.8 In addition, the Committee noted that MSC 84, had noted the request of MEPC 57, in the context of the MSC resolution on use of LRIT information for safety and marine environmental protection purposes (MSC.242(83)), to seek in the future the view of the MEPC prior to adoption of similar resolutions.

### **OUTCOME OF C 100**

11.9 The Committee noted that the one hundredth session of the Council was held from 16 to 20 June 2008 and its summary of decisions was issued under the symbol C 100/D. The matters of interest to the Committee had been summarized in document MEPC 58/11/2, including the Council's action concerning the report of MEPC 57.

11.10 The Committee noted further that C 100 also considered issues associated with Strategy and planning – Monitoring of performance; Voluntary IMO Member State Audit Scheme; Relations with intergovernmental and non-governmental organizations; and Report on the status of conventions and other multilateral instruments, all of which are relevant to the work of the Committee.

11.11 The Committee noted, finally, that C 100 had endorsed the Secretary-General's proposal that the theme for World Maritime Day 2009 should be "Climate change: A challenge for IMO too!".

### **Application for consultative status**

11.12 On the issue of Relations with non-governmental organizations, the Committee considered applications from four NGOs for consultative status with IMO referred to it by C 100 for further screening, namely the International Ship Recycling Association (ISRA), the International Council on Clean Transportation (ICCT), the World Shipping Council (WSC) and NACE International.

11.13 In considering the application by ISRA, the Committee concurred with the view expressed by the delegation of India and supported by the delegation of France, that ISRA does not have members in the major ship recycling States and, therefore, the Committee agreed to recommend to Council that consultative status should not be granted to ISRA.

11.14 The Committee agreed to establish a small informal group meeting outside normal working hours under the chairmanship of Mr. Chatterjee (Vice-Chairman of the Committee) to further screen the applications of ICCT, WSC and NACE International, in accordance with the Rules Governing Relationships with Non-Governmental International Organizations, and report back to plenary.

11.15 Having received the report of the informal group (MEPC 58/WP.10), the Committee agreed to recommend to the Council that consultative status should:

- .1 be granted to the World Shipping Council (WSC); and
- .2 not be granted to the International Council on Clean Transportation (ICCT) and NACE International.

## **12 STATUS OF CONVENTIONS**

12.1 The Committee noted the information on the status of IMO conventions and other instruments relating to marine environment protection (MEPC 58/12) as follows:

- .1 Annex 1 shows the status, as at 30 June 2008, of the IMO conventions and other instruments relating to marine environment protection;
- .2 Annex 2 shows the status, as at 30 June 2008, of MARPOL;
- .3 Annex 3 shows the status, as at 30 June 2008, of the amendments to MARPOL;
- .4 Annex 4 shows the status, as at 30 June 2008, of the 1990 OPRC Convention;
- .5 Annex 5 shows the status, as at 30 June 2008, of the 2000 OPRC-HNS Protocol;
- .6 Annex 6 shows the status, as at 30 June 2008, of the 2001 AFS Convention; and
- .7 Annex 7 shows the status, as at 30 June 2008, of the 2004 BWM Convention.

12.2 The Committee also noted the following information provided by the Secretariat since document MEPC 58/12 was issued on 30 June 2008.

- .1 With regard to annex 2 on the status of MARPOL:
  - .1 The United Republic of Tanzania deposited its instrument of accession to MARPOL Annexes I, II, III, IV and V on 23 July 2008;
  - .2 Chile deposited its instrument of accession to MARPOL Annex V on 15 August 2008;
  - .3 The Syrian Arab Republic deposited its instrument of accession to MARPOL Annex VI on 26 August 2008;
  - .4 El Salvador deposited its instrument of accession to MARPOL Annexes I, II, III, IV and V on 24 September 2008; and
  - .5 The United States deposited its instrument of ratification of MARPOL Annex VI on 8 October 2008.
- .2 With regard to annex 4 on the status of the 1990 OPRC Convention:
  - .1 South Africa deposited its instrument of accession on 4 July 2008.

- .3 With regard to annex 5 on the status of the 2000 OPRC-HNS Protocol:
  - .1 Liberia deposited its instrument of accession on 18 September 2008; and
  - .2 Denmark deposited its instrument of ratification on 30 September 2008.
- .4 With regard to annex 6 on the status of the 2001 AFS Convention:
  - .1 South Africa deposited its instrument of accession on 2 July 2008;
  - .2 The Republic of Korea deposited its instrument of accession on 24 July 2008;
  - .3 Germany and Vanuatu deposited their instruments of accession on 20 August 2008; and
  - .4 Liberia deposited its instrument of accession on 17 September 2008.
- .5 With regard to annex 7 on the status of the 2004 BWM Convention:
  - .1 Liberia deposited its instrument of accession on 17 September 2008; and
  - .2 France deposited its instrument of accession on 24 September 2008.

### **13 HARMFUL ANTI-FOULING SYSTEMS FOR SHIPS**

#### **Update on the Anti-Fouling Systems Convention**

13.1 The Committee, having considered the updated information provided in document MEPC 58/13 (Secretariat), noted that the AFS Convention had entered into force on 17 September 2008 and that seven more States (Germany, Liberia, the Marshall Islands, the Netherlands, the Republic of Korea, South Africa and Vanuatu) had ratified the Convention since its last session, bringing the total to 35 Parties, representing 62.69 % of the world's gross tonnage. The Committee urged all those States that had not yet ratified this Convention to do so at the earliest opportunity.

13.2 With a view to facilitating the implementation of the Convention, the Committee reiterated its invitation to Member States to provide the Organization with information regarding any anti-fouling systems approved, restricted, or prohibited under their domestic law in accordance with Article 9(1)(b) of the Convention and other information regarding the implementation and enforcement of the Convention.

#### **Draft Guidance on best management practices for removal of anti-fouling systems from ships**

13.3 The Committee recalled that it had invited Members to develop guidance on the environmentally sound management of wastes from the application or removal of harmful anti-fouling systems and that MEPC 57 noted the "Interim advice on the management of waste streams resulting from the removal of anti-fouling systems from ships" (MEPC 57/INF.2), developed by the Scientific Group under the London Convention and Protocol.

13.4 In that context, the Committee noted the updated version of the “Draft Guidance on best management practices for removal of anti-fouling systems from ships, including TBT hull paints” (MEPC 58/INF.3), further developed by the Scientific Group under the London Convention and Protocol, and invited the Consultative Meeting of Contracting Parties to the London Convention and Protocol to provide the final version of the guidance document to MEPC 59, taking into consideration the comments on the environmental risk posed by in-water cleaning, made by the observer from IUCN.

#### **14 PROMOTION OF IMPLEMENTATION AND ENFORCEMENT OF MARPOL AND RELATED INSTRUMENTS**

14.1 The Committee considered the proposal by IPTA and ICS to apply the principles of regulation 18.2 of the revised MARPOL Annex VI also to the *current* MARPOL Annex VI (MEPC 58/14) under item 5 of the agenda (see paragraphs 5.43.9 and 5.43.10).

14.2 The Committee noted with appreciation the outcome of ROPME’s 6th Regional Steering Committee meeting on Administration and Implementation of the MARPOL Convention, which was held in Bahrain, from 27 to 29 January 2008, in anticipation of the effective date of the Special Area status in the ROPME Sea Area for MARPOL Annexes I and V on 1 August 2008. The results were: (1) an agreement of a 5-year Regional Action Plan for Prevention of and Response to Marine Pollution from Ships in the ROPME Sea Area; and (2) a Regional Strategic Action Plan for Implementation of the BWM Convention. Both Plans were subsequently adopted by the ROPME Council (MEPC 58/INF.5).

14.3 The Committee congratulated the ROPME Sea Area countries for their achievement in providing adequate reception facilities for the Special Area and in adopting the Regional Strategic Action Plan for Implementation of the BWM Convention.

#### **15 TECHNICAL CO-OPERATION SUB-PROGRAMME FOR THE PROTECTION OF THE MARINE ENVIRONMENT**

15.1 The Committee recalled that, given the importance of technical co-operation in the work of the Organization, updates on TC activities were prepared for the attention of the Committee at each session, with comprehensive status reports at MEPC spring sessions in non-Assembly years.

15.2 The Committee considered document MEPC 58/15 (Secretariat) providing an update on the activities of the 2008-2009 ITCP related to the protection of the marine environment and undertaken during the period from 1 January to 30 June 2008. The document also covers the activities carried out under the major projects and other related activities during the same period. The Committee noted that document MEPC 58/11, which reports on the outcome of the fifty-eighth session of the Technical Co-operation Committee, is also relevant to this agenda item. The Committee further noted that, as in the past, the principal achievements pertain mainly to the training of officials in seminars/workshops/training courses on marine environment protection, in particular the OPRC and MARPOL Conventions, promotion and enhancement of regional co-operation through the development of regional actions such as strategic action plans for the implementation of the MARPOL and OPRC Conventions, regional contingency plans for combating accidental marine pollution, environmental waste management guidelines for port operation, regional ballast water management strategies and action plans, etc. With regard to the OPRC Convention, the Committee noted the Organization’s continued fruitful co-operation with the petroleum and shipping industries and its pursuance of the implementation of OPRC-related activities under the framework of the IMO/Oil industry Global Initiative (GI), especially under the IMO/Industry-funded GI Project for West and Central Africa.

15.3 The Committee took note of the following:

- .1 the implementation of the technical co-operation activities by the Marine Environment Division for the period covering January to June 2008 including the work carried out under the three major projects directly managed by the Marine Environment Division; namely: (1) the GEF-UNDP-IMO Project-Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships' Ballast Water (GloBallast Partnerships); (2) the project on Building Partnerships for Environmental Protection and Management of the Seas of East Asia (PEMSEA); and (3) the GEF/IBRD/IMO Marine Electronic Highway Demonstration Project; the last being implemented in close co-operation with the Maritime Safety Division;
- .2 the Global Industry Alliance (GIA) for Marine Biosafety, within the framework of the GloBallast Partnerships Project, noting also the potential for this pioneering global partnership to accelerate innovative solutions to help address ballast water issues and to serve as a major facilitator and model for such private-public sector alliances at regional and national levels.

15.4 The Committee noted concerns regarding IMO's capacity to meet the growing needs of developing countries for technical assistance with the related challenge of ensuring an equitable and sustainable means of funding the ITCP. In this regard, the Committee also noted the pressure placed on the ITCP as new instruments were adopted and the concomitant requirements by Member States to implement and enforce them.

15.5 The Committee further noted the praiseworthy contribution to the ITCP of the 58 partnership arrangements to date with developing and developed countries, regional and international organizations and expressed its appreciation of the generous offers made recently by some of the long standing supporters of IMO's ITCP.

15.6 The Committee was informed of the project being developed by IMO to build capacity in developing countries to address greenhouse gas emissions (GHG) from ships. The project was being developed in anticipation of the outcome of the work of the Organization on GHGs and was being discussed with the European Commission, which expressed an interest to fund such a project. Some IMO member States were also considering lending their support to the project.

15.7 The representative of the European Commission thanked the Secretariat for the update on the ITCP and informed the Committee that the Commission was considering support to the GHG project within the context of the Environment and Natural Resources Thematic Programme (ENRTP), which would be in the magnitude of several million euros.

15.8 The delegation of Kenya thanked the Secretariat for IMO's continuous support under the ITCP and, in relation to the GHG project, expressed their satisfaction for having been chosen as one of the potential beneficiaries under the project. The delegation would give their full support to the GHG project.

15.9 The delegation of the Netherlands thanked the Secretariat for a comprehensive overview on activities implemented under the ITCP. The delegation informed the Committee that the Government of the Netherlands would contribute 31,000 euros to IMO's ITCP to address the technical assistance needs arising from the adoption of the revised MARPOL Annex VI.

15.10 Several delegations expressed their appreciation for the support they had received from IMO. In particular, the delegation of Ghana thanked the Secretariat and the International Petroleum Industry Environmental Conservation Association (IPIECA) for the assistance provided in organizing a three-day workshop as part of the 2008 World Maritime Day celebrations. The workshop aimed at sensitizing the national stakeholders on the challenges facing their country in the wake of the discovery of important offshore oil reserves.

15.11 The Namibian delegation thanked the Secretariat for the assistance provided in a number of national projects leading to the development and finalization of the national contingency plan under the IMO/IPIECA Global Initiative Programme. The delegation further expressed its appreciation of the continuous IMO and IPIECA commitment, especially in the development of national sensitivity maps for oil spill response.

15.12 The delegation of Malaysia expressed their appreciation for the untiring efforts being made by the Marine Environment Division aimed at achieving progress in the development and implementation of the Marine Electronic Highway Project. They further expressed their support of the IMO initiatives to further enhance the protection of the marine environment.

15.13 The delegation of Croatia, as one of the Lead partnering countries (LPC) for the Mediterranean region under the GloBallast Partnerships Project, informed the Committee of the recent developments under the Project. The Committee took note of the establishment in May 2008 of the National Task Force (NTF) for Croatia as the forum for the development of the National Ballast Water Strategy. The NTF will work on the preparation for ratification by Croatia of the BWM Convention, which is intended to be ratified by next year.

15.14 The delegation of Croatia further recalled that one of the goals of the Globallast Partnerships Project was to encourage and facilitate regional co-operation in relation to ballast water issues, a goal which was vital for semi-enclosed seas like the Adriatic Sea and the Mediterranean Sea to ensure a harmonized approach in the implementation of the Convention. In this context, the Committee was informed on the different activities undertaken within the framework of the Project, including the First GloBallast Regional Task Force Meeting for the Mediterranean Region, which was held in Dubrovnik, Croatia, in September 2008. The meeting was convened by the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) in co-operation with the Regional Activity Centre for Specially Protected Areas (RAC / SPA) and the Croatian Ministry of Sea, Transport and Infrastructure. After having highlighted the achievements of the Dubrovnik meeting, the Croatian delegation expressed its willingness to exchange its experiences with other regions through the GloBallast family network. The delegation also pledged to continue to initiate, support and actively participate in all activities under the GloBallast Partnerships Project, aiming to reduce the presently high risk of spread of unwanted organisms through ships ballast water.

15.15 The delegation of Argentina expressed their appreciation to the Secretariat on the activities carried out under the ITCP and made special reference to the national workshop, recently hosted by Argentina within the framework of the GloBallast Partnerships Project, in which Uruguay had also participated. The aim of the workshop was to establish the necessary policy, legal and institutional reforms and to build technical and institutional capacity to implement the BWM Convention. The Committee noted that Argentina is a Lead Partnering Country for the "South East Pacific and Argentina" region and that it has translated thirteen modules of the Ballast Water Management Introductory Course into Spanish as its contribution to the work of the Organization in this field.

15.16 The Chairman drew the Committee's attention to the fact that the constituent programmes of the IMO Integrated Technical Co-operation Programme can only be delivered if the required funding is secured from IMO's internal resources and/or external donor contributions. He expressed appreciation for all financial and in-kind contributions to the ITCP. In this regard, he recalled the on-going negotiations between IMO and the Government of Sweden for the conclusion of the very important partnership programme, which will be funded by the Swedish Government to the amount of some 7 million US dollars. He thanked the Government of Sweden and invited Member States and international organizations to continue, and if possible increase, their appreciable support for IMO's technical co-operation activities so that successful delivery of the programme can be achieved.

15.17 The Committee took note of the information provided regarding the implementation of the technical co-operation activities for the period from January to June 2008.

## **16 ROLE OF THE HUMAN ELEMENT**

### **Report of the Joint MSC/MEPC Working Group on Human Element**

16.1 The Committee, recalling that the Joint MSC-MEPC Working Group on Human Element met during MSC 84 and its report (MSC 84/WP.6) had been considered and approved by MSC 84, also approved the report of the Joint Group (MEPC 58/16) and, in particular, approved:

- .1 MSC-MEPC.7/Circ.7 on Guidance on near-miss reporting; and
- .2 MSC-MEPC.7/Circ.4 on Updated action plan on the Organization's strategy to address the human element.

### **Other issues**

16.2 The Committee noted with appreciation the information provided by the United Kingdom (MEPC 56/INF.11) related to Human Element Assessment Tool (HEAT).

16.3 The Committee, having noted that the next session of the Joint MSC/MEPC Working Group on Human Element in 2009 would consider, *inter alia*, the draft amendments to the Revised Guidelines on Implementation of the ISM Code, invited Member Governments and international organizations to submit comments and proposals on the matter, so that the Revised Guidelines could be finalized with a view to submitting them to A 26 for adoption.

## **17 FORMAL SAFETY ASSESSMENT**

17.1 The Committee recalled that MEPC 56 had noted that the one matter that needed consideration within the context of the Formal Safety Assessment Guidelines relevant to its work was the draft Environmental Risk Evaluation Criteria. MEPC 56 had also recognized the need to carry out an in-depth analysis of the proposed environmental risk evaluation criteria for the purpose of the Formal Safety Assessment (FSA) before inclusion of such criteria in the IMO FSA Guidelines (MSC/Circ.1023-MEPC/Circ.392, as consolidated in MSC 83/INF.2). MEPC 56 had therefore agreed to establish a correspondence group, under the coordination of Greece.

17.2 The Committee noted that progress had been made by the correspondence group in the intersessional period (between MEPC 56 and MEPC 57), but at MEPC 57 divergent views still remained on some key issues which required further analysis and discussions between members of the correspondence group, in particular:

- .1 on establishing an appropriate Severity Index (SI) in the Hazid step;
- .2 whether “costs of averting a spill (CATS)” or an alternative criterion would offer the needed decision-making quality; and
- .3 the acceptable boundaries of the ALARP region, slope of F-N diagram and what is the variable of horizontal axis.

17.3 The Committee noted that MEPC 57 had subsequently agreed to continue with the work of the correspondence group, under the coordination of Greece. In this connection, the Committee noted that MSC 84 recognizing that, at MSC 85, there would be an outcome of MEPC 58 regarding environmental risk acceptance criteria and submissions related to the review of FSA studies, agreed to retain the item in the provisional agenda for MSC 85, and encouraged Member Governments and international organizations to submit, to MSC 85, proposals and comments on matters related to the review of the FSA studies and arrangements for the FSA Experts Group.

17.4 The Committee had before it documents MEPC 58/17 (Greece), which contained the work carried out in the intersessional period by the correspondence group, MEPC 58/17/1 (Japan), which provided information on the relation between cost of oil spills and weight of oil spilled based on an analysis of data from the IOPC Funds data, and MEPC 58/17/2 and MEPC 58/INF.2 (both by Denmark), which provided information on the FSA study on crude oil tankers carried out within the research project SAFEDOR.

17.5 Following an intervention by the delegation of Denmark, the Committee agreed to invite the MSC to consider documents MEPC 58/17/2 and MEPC 58/INF.2 at MSC 86 when the FSA Expert Group is expected to meet in the context of the guidance on the use of human element analysing process (HEAP) and formal safety assessment (FSA) in the rule-making process of IMO (MSC/Circ.1022-MEPC/Circ.391). In this context, the Committee noted that the purpose of circulating the study at this meeting was to give experts from Member States and other interested parties as much time as possible to provide feedback on the study in preparation for MSC 86.

17.6 In light of the technical nature of the subject, the Committee considered, in the first instance, the establishment of a working group to progress the work but noting that no working group on the subject was envisaged by MEPC 57 as well as the concern expressed by some delegations of the lack of the necessary expertise present within their delegations to participate in such a working group, it was agreed to establish an informal consultation group under the chairmanship of Professor Harilaos Psaraftis (Greece) to enable those members of the Correspondence Group who were present at MEPC to have an initial exchange of views and for the group to verbally report to the Committee later in the week.

17.7 The group met from 7 to 8 October 2008, and was attended by delegations from Canada, China, Finland, Greece, Japan, Malaysia, New Zealand, Norway, Turkey, and United States, and by observers from BIMCO, OCIMF and INTERTANKO.

17.8 In his verbal report, the Chairman of the group noted that the objective was to work on all pending issues outlined in paragraph 17.2 above, and to propose a way forward. The group did not consider submissions MEPC 58/17/2 and MEPC 58/INF.2 on the FSA study for crude oil carriers however noted that the one part of this FSA study that is relevant for the work on Environmental Risk Evaluation Criteria within the context of FSA guidelines is the threshold of USD 60,000/tonne used as the CATS criterion in the study.

17.9 The group's Chairman informed the Committee that the group had recognized that, though divergence of opinions existed among group members on some key issues, there were probably also areas where agreement could be reached. The group had agreed that non-linearity between cleanup costs and oil spill volume had been documented in various studies. The group had also agreed that, in spite of various documented shortcomings, in Steps 3 and 4 of the FSA one could use an "oil spill cost per unit volume" criterion to assess the cost-effectiveness of risk control options (RCOs). In fact, in spite of the extensive discussion and debate on this subject since MEPC 56, the group had agreed that no better and practical alternative was identified.

17.10 There was still a divergence of views among members of the group regarding what the threshold for such a criterion might be. The CATS approach uses the above type of criterion, and has a value of USD 60,000/tonne as threshold. On the other hand, the group had noted that the Japanese approach outlined in document MEPC 58/17/1 which is based on IOPCF data, did not use this type of criterion, but developed a non-linear function between spill cost and spill volume.

17.11 Following a query as to what the equivalent value of "oil spill cost per unit volume" was implied by the approach outlined by Japan, the group had been informed that the value was USD 4,000/tonne if one considered the ratio of total spill cost divided by total spill volume, and slightly lower than USD 2,000/tonne if an equivalent average cost was considered. The group had also discussed what types of costs were included in spill cost figures in the analysis carried out by Japan, and whether one should multiply cleanup costs by appropriate coefficients to account for environmental costs and (possibly) society's willingness to pay to prevent spills instead of incurring their cost.

17.12 After some discussion, the group had noted that it would be impossible to conclude during the session what the appropriate value of the "oil spill cost per unit volume" threshold might be, although a clear majority expressed the opinion that the threshold should be much less than USD 60,000/tonne. Some members of the group suggested that two values might be warranted, one for small spills and the other for large spills, but the difficulties associated with such an approach was pointed out, particularly for small spills, for which inadequate data exist.

17.13 The group's Chairman informed the Committee that the Group had agreed that further investigation of this matter was necessary, and that it had discussed ways to finalize this by MEPC 59. The re-establishment of a Correspondence Group was proposed as a way forward.

17.14 On the issue of combining environmental criteria with safety criteria, the group had concurred with the approach proposed in section 4 of the annex to document MEPC 58/17, which would be simplified further if a volume-based approach was followed. The group had noted, however, that it was important to show both environmental and safety criteria in the cost-benefit analysis (CBA), so that a complete picture could be formed.

17.15 On the issue of the proper Risk Matrix or Index (step 1 of the FSA), the group had proposed to use oil spill volume as the severity variable; with the matrix to be finalized once the issue of the CATS threshold is agreed. Similarly, the group had agreed to defer the issue of ALARP region and F-N diagram until after the issue of the CATS threshold is resolved.

17.16 The group had also recognized the importance of the data to be able to test and apply any agreed methodology. Most group members had expressed the view that casualty databases used for FSA studies should be made public and contain information properly organized so as to reveal the real causes of the accidents. Some members had expressed the view that IMO should take the lead in such an activity. The group had finally noted that the information provided in the GISIS, in particular, the module on reported casualty incidents might contribute to this end, even though GISIS may still be insufficient due to the lack of reporting by Member States.

17.17 The delegation of the Netherlands reiterated the view it expressed at MEPC 57 and underlined that it was preferable to gain experience first with the methodology developed so far before going into further detail.

17.18 Having received the verbal report of the Group, the Committee agreed to:

- .1 retain this agenda item for MEPC 59;
- .2 re-establish a Correspondence Group under the co-ordination of Greece\*, with a view to finalizing the subject of environmental risk evaluation criteria with the following terms of reference:
  - .1 recommend an appropriate criterion for assessing environmental consequences in Step 4 of the FSA, including an appropriate threshold value for ascertaining if a specific Risk Control Option (RCO) is cost-effective;
  - .2 recommend a way of combining environmental and safety criteria for those RCOs that effect both environmental and fatality risk;
  - .3 recommend an appropriate risk matrix or index for environmental criteria;
  - .4 recommend an appropriate ALARP region and F-N diagram, including an appropriate value for the slope of the F-N curve;
  - .5 address the issue of collection and reporting of relevant data;
  - .6 recommend any further relevant action; and
  - .7 submit a written report to MEPC 59.

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17.19 With regard to the proposal to establish a Working Group on this subject at MEPC 59, the Committee considered the proposal under agenda item 19 – Work programme of the Committee and subsidiary bodies.

17.20 In light of the work to be carried out, the Committee invited MSC to retain the item in the provisional agenda for MSC 87.

## **18 DEVELOPMENT OF A GUIDANCE DOCUMENT FOR MINIMIZING THE RISK OF SHIP STRIKES WITH CETACEANS**

18.1 The Committee recalled that the International Whaling Commission (IWC) had established a “Ship Strikes Working Group” in 2005 under its Conservation Committee on the initiative of Belgium to conduct the work and that the outcome of the Working Group was brought to the attention of the Committee so as to:

- .1 identify large-area and small-area hot spots of dense shipping globally;
- .2 offer guidance for improved reporting and data management and processing from IWC member nations as well as others;
- .3 evaluate the potential for whale-related data into Automatic Identification System (AIS) data that appear on vessel radar screens;
- .4 advise on the setting up of a centralized international database on ship strikes using a template with standardized parameters;
- .5 as appropriate, advise on ship-related national and regional legislation, rules and action plans to reduce the impact of ship strikes, with priority for high-risk areas; and
- .6 continue to review the work of the Ship Strikes Working Group, widen its membership and circulate the progress report widely.

18.2 The Committee further recalled that the matter was first raised at MEPC 55 (9 to 13 October 2006) and that MEPC 55 had agreed that IMO was the competent body to address ship strikes with cetaceans globally and had invited delegations to submit proposals to the Committee for consideration.

18.3 The Committee noted that MEPC 57, on the basis of document MEPC 57/18/2 (Australia, Belgium, Italy, IUCN, IFAW and the UNEP/CMS/ASCOBANS Joint Secretariat), had agreed to the inclusion of a new high-priority item on “Development of a guidance document for minimizing the risk of ship strikes with cetaceans” in the agenda of MEPC 58 (October 2008) with a target completion date of 2010 (three sessions).

18.4 The Committee considered document MEPC 58/18 (United States) which highlighted the need to develop the draft guidance document for minimizing the risk of ship strikes with cetaceans and provided such a draft guidance document in the annex to the document.

18.5 The Committee then considered document MEPC 58/18/1 (Australia and Belgium) and MEPC 58/INF.15 (Spain). Document MEPC 58/18/1 addressed the concerns expressed by some

delegations on the inadequacy of information and statistics on incidents and ships strikes with cetaceans and its impacts, and provided a summary of the data collected by the IWC Vessel Strike Data Standardization Group. Document MEPC 58/INF.15 (Spain) provided information on the work being undertaken in Spain to improve safety of navigation and enhance the conservation of cetaceans.

18.6 Several delegations and non-governmental organizations expressed support for the development of a guidance document for minimizing the risk of ship strikes with cetaceans.

18.7 The Committee, recognizing that further work was needed to fully develop the draft guidance document, agreed to invite delegations to provide comments on the draft guidance document, as submitted by the United States in document MEPC 58/18, with a view to approval at its next session for circulation as an MEPC circular.

## **19 WORK PROGRAMME OF THE COMMITTEE AND SUBSIDIARY BODIES**

### **Proposal for a new item on noise from commercial shipping and its adverse impacts on marine life**

19.1 The Committee noted a proposal by the United States (MEPC 58/19) on the development of non-mandatory technical guidelines to minimize the introduction of incidental noise from commercial shipping operations into the marine environment to reduce potential adverse impacts on marine life and its inclusion as a new work programme of the Committee with target completion date of three or four sessions, starting from MEPC 59 (July 2009).

19.2 The Committee also noted a submission by Australia (MEPC 58/INF.19), which provided additional information on ship traffic noise in the southern hemisphere (Australia and the Southern Ocean) consisting of machinery noise (main engines, gearing) and hydrographic noise (flow, propeller singing/cavitation) that overlap with sounds (between 10 Hz and 1 KHz) produced by certain mammals such as seals, sea lions and whales as well as some fish with potential to disturb behaviour and interfere with critical life functions of marine life.

19.3 In accordance with paragraph 2.20 of the Committees' Guidelines (MSC-MEPC.1/Circ.2), the Chairman made a preliminary assessment on the proposed new work programme by the United States. The Chairman's assessment showed that the criteria for general acceptance provided in paragraph 2.10 of the Committees' Guidelines had been met.

19.4 During deliberation, some delegations suggested that this new work programme item should be considered as a low priority item in the work programme of the Committee. The Chairman informed the Committee that prioritization of work programme items would only be made when it is forwarded to the sub-committees for consideration.

19.5 The Committee, having considered the proposal by the United States, approved the inclusion of a new item in the agenda of MEPC 59 (July 2009) on "Noise from commercial shipping and its adverse impacts on marine life" with a target completion date of three or four sessions and invited Member Governments to submit appropriate documents to MEPC 59 for consideration.

19.6 The Committee also approved the establishment of an intersessional correspondence group, as proposed in paragraph 7 of document MEPC 58/19, co-ordinated by United States<sup>3</sup> with the following terms of reference:

- “.1 identify and address ways to minimize the introduction of incidental noise into the marine environment from commercial shipping to reduce the potential adverse impact on marine life, in particular develop voluntary technical guidelines for ship-quieting technologies as well as potential navigation and operational practices; and
- .2 provide a written report to MEPC 59.”

### **Work programme and provisional agenda of the BLG Sub-Committee**

19.7 The Committee recalled that MSC 84 (7 to 16 May 2008) noted that MEPC 57 had agreed to include, in the work programme of the BLG Sub-committee and the provisional agenda for BLG 13, high-priority items on “Review of relevant non-mandatory instruments as a consequence of the amended MARPOL Annex VI and the NO<sub>x</sub> Technical Code” and on “Amendments to MARPOL Annex I on the use and carriage of heavy grade oil on ships in the Antarctic area”, both with a target completion date of 2010 (MSC 84/24, paragraph 22.5).

19.8 The Committee noted that MSC 84 had revised and approved the work programme of the BLG Sub-Committee and the provisional agenda for BLG 13 and requested the Secretariat to inform the MEPC accordingly (MSC 84/24, paragraphs 22.7 and 22.8).

19.9 The Committee considered document MEPC 58/19/1 (Secretariat) and approved the work programme of the BLG Sub-Committee and provisional agenda for BLG 13, requesting the Secretariat to inform the MSC accordingly. The work programme of the BLG Sub-Committee and provisional agenda for BLG 13 are set out in annex 29.

### **Work programme and provisional agenda of the FSI Sub-Committee**

19.10 The Committee noted that MSC 84 had revised and approved the work programme of the FSI Sub-Committee and provisional agenda for FSI 16 (MSC 84/24, paragraphs 22.31 and 22.32).

19.11 The Committee also noted that MSC 84 had agreed:

- .1 to instruct the FSI Sub-Committee to develop appropriate amendments to the Survey Guidelines under the HSSC (resolution A.997(25)) to explain the possibility of alternative arrangement where on bottom inspection in dry dock may be substituted by a bottom inspection with the ship in water (MSC 84/24, paragraph 22.26); and

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- .2 to include, in the work programme of the FSI Sub-Committee, a high priority item on “Development of a Code for Recognized Organizations”, with two sessions to complete the item, and instructed the FSI Sub-Committee to include the item in the provisional agenda for FSI 17 (MSC 84/24, paragraph 22.27).

19.12 The Committee noted that, after MSC 84, FSI 16 (2 to 6 June 2008) had considered its work programme and proposed to include the item on “Development of a code of conduct for assurance of the safety of crew and maritime navigation during demonstration/campaigns against ships on the high seas” but deferred the inclusion of the item on its provisional agenda since the matter would be considered by NAV 54 and the outcome would be reported to FSI 17 (FSI 16/WP.7, paragraph 15.2).

19.13 The Committee, having considered document MEPC 58/19/1 (Secretariat), approved the work programme of the FSI Sub-Committee and provisional agenda for FSI 17, as approved by MSC 84, including amendments proposed by FSI 16 and requested the Secretariat to inform MSC accordingly. The work programme of the FSI Sub-Committee and provisional agenda for FSI 16 are set out in annex 30.

#### **Work programme of the DSC, NAV and DE Sub-Committees, which relate to environmental issues**

19.14 The Committee noted that MSC 84 had revised and approved the work programme of the DSC, NAV and DE Sub-Committees (MSC 84/24, section 22 and MSC 84/24/Add.2, annex 21).

19.15 The Committee further noted that NAV 54 (30 June to 4 July 2008) had revised its work programme for consideration by MSC 85 and by MEPC 58 for items which relate to environmental issues (NAV 54/25, annex 16).

19.16 The Committee, having considered document MEPC 58/19/2 (Secretariat), approved the work programmes of the DSC, NAV and DE Sub-Committees as revised by MSC 84 and as proposed by NAV 54, which relate to environmental issues and requested the Secretariat to inform MSC accordingly. The work programmes of the DSC, NAV and DE-Sub-Committees, which relate to environmental issues, are set out in annex 31.

#### **Activities, priorities and plan of meeting weeks of the Committees and their subsidiary bodies for the biennium 2010 – 2011**

19.17 The Committee recalled that paragraph 2.5 of the Guidelines on the organization and method of work of the MSC and MEPC and their subsidiary bodies (MSC-MEPC.1/Circ.2) requires that, at the end of every second year, the Committee Chairmen should submit to their respective Committees a joint plan covering the activities, priorities and meeting requirements of their subsidiary bodies over the following two years.

19.18 The Committee noted that, in preparing the activities and priorities of the Committees, the Chairmen had noted that the Assembly, at its twenty-fifth session, had approved resolution A.990(25) on the High-level Action Plan of the Organization and priorities for the 2008-2009 biennium, which identified the high-level actions, including priorities for specific items for the respective Committees, necessary to achieve the strategic objectives in the Strategic Plan for the Organization for the six-year period 2008-2013 (resolution A.989(25)).

19.19 The Committee further noted that the provisions of resolution A.900(21), which sets the objectives of the Organization in the 2000s and provides specific directions as to the areas on which the Committees should focus their attention during the current decade; as well as the provisions of resolution A.901(21) on IMO and technical co-operation in the 2000s.

19.20 The Committee recalled that MEPC 57 and MSC 84 had approved the work programmes of the sub-committees for the immediate future. The sub-committees' proposed revised work programmes, including priorities for each work programme item and target completion dates or number of sessions needed to complete the items are shown in the annex to document MSC 85/23 and MSC 85/23/Add.1.

19.21 The Committee, taking into account the technical workload of the Organization, the priorities assigned by the Assembly in resolution A.990(25) to subjects for consideration by the MSC and the MEPC and the advice provided by the Chairmen of the sub-committees, approved, subject to the concurrent decision by MSC 85, the following plan of meeting weeks for the MSC and the MEPC and their subsidiary bodies for the biennium 2010-2011 for inclusion in the Secretary-General's relevant budget proposals:

Year	MSC	MEPC	BLG	DSC	FP	FSI	COMSAR	NAV	DE	SLF	STW	Total
2010	3	2	1	1	1	1	1	1	2	1	1	15
2011	1.5	1	1	1	1	1	1	1	1	1	1	11.5
Grand total (weeks)												26.5

19.22 The Committee, in approving the above meeting plan, noted, in particular, that the two sessions planned for the DE Sub-Committee in 2010 will be decided by MSC 85 (26 November to 5 December 2008).

### **Items to be included in the Committee's agenda for its forthcoming three sessions**

19.23 The Committee approved, as amended, the items to be included in the agendas for MEPC 59, MEPC 60 and MEPC 61 (MEPC 58/WP.2), which are set out in annex 32.

### **Dates for MEPC 59, MEPC 60 and MEPC 61**

19.24 The Committee noted that MEPC 59 would be held from 13 to 17 July 2009 and that MEPC 60 is tentatively scheduled to be held in March 2010 and MEPC 61 in October 2010.

### **Working/review/drafting groups at MEPC 59**

19.25 The Committee agreed, in principle, to establish the following working/review/drafting groups at MEPC 59:

- .1 Working Group on GHG Issues;
- .2 Working Group on Guidelines for Ship Recycling;
- .3 Review Group on Ballast Water Technologies;

- .4 Drafting Group on Amendments to Mandatory Instruments; and
- .5 Joint MSC/MEPC Working Group on Human Element.

### **Correspondence Groups**

19.26 The Committee agreed to establish the following intersessional correspondence groups, which should report to MEPC 59:

- .1 Correspondence Group on GHG issues;
- .2 Correspondence Group on Energy Efficiency Operational Index;
- .3 Correspondence Group on Review of MARPOL Annex V;
- .4 Correspondence Group on Environmental Risk Evaluation Criteria;
- .5 Correspondence Group on Guidelines for Ship Recycling; and
- .6 Correspondence Group on Noise from Commercial Shipping.

### **Intersessional meetings**

19.27 The Committee approved the holding of the following intersessional meetings:

- .1 Working Group on GHG Issues to be held in March 2009, which should report to MEPC 59;
- .2 ESPH Working Group to be held in 2009; and
- .3 OPRC/HNS Technical Group to be held in the week before MEPC 59 in July 2009, which should report to MEPC 59.

## **20 APPLICATION OF THE COMMITTEES' GUIDELINES**

20.1 The Committee noted that the Chairmen of MSC, MEPC, LEG and sub-committees had met on 10 May 2008 during MSC 84 to consider how to maximize the efficiency and effectiveness of the Committees and sub-committees, bearing in mind the Strategic Plan for the Organization (for the six-year period 2008-2013) and High-level Action Plan and priorities for the 2008-2009 biennium.

### **Report of the 2008 Chairmen's meeting and relevant decisions of MSC 84**

20.2 The Committee considered the report of the 2008 Chairmen's meeting (MEPC 58/20) in conjunction with the outcome of MSC 84 on the aforementioned report (MEPC 58/20/1) and noted all the actions requested of the Committee taking into account that MSC 84 had agreed to endorse all the actions requested in the report of the 2008 Chairmen's meeting.

### **Amendments to the Committees' Guidelines**

20.3 The Committee noted that the revised Committees' Guidelines with all the amendments as approved by MEPC 57 and MSC 84 and their previous sessions had been circulated by means of MSC-MEPC.1/Circ.2.

### **Guidelines on the application of the Strategic Plan and the High-level Action Plan**

20.4 The Committee noted that C/ES.24 had established a correspondence group to develop guidelines on the application of the Strategic Plan and the High-level Action Plan, which would be reviewed by the *ad hoc* Council Working Group on the Organization's Strategic Plan (CWGSP), for approval by the Council at its 101st session in November 2008. The Committee's Guidelines on the organization and method of work may need to be revised in light of the aforementioned guidelines to be developed by the Council.

### **Number of meeting groups**

20.5 The Committee noted the issues related to the Strategic Plan for the Organization and High-level Action Plan on the reduction of meeting weeks and number of meeting groups had been addressed by the 2007 Chairmen's meeting (MSC 84/24, paragraph 21.6) and further noted that the 2008 Chairmen's meeting had reiterated its recommendations of its last meeting, which MSC 83 and MEPC 57 had agreed, that:

- .1 intersessional working groups and technical groups should not be held at the same time as the Committee or sub-committee meetings; and
- .2 splinter groups of a working group, if established, should meet outside of normal working hours.

### **Table of planned output**

20.6 With regard to the recommendations of the 2008 Chairmen's meeting on the table of planned output in resolution A.990(25), which is envisaged as a practical management and monitoring tool for the work of the Committees and sub-committees, the Committee agreed with MSC 84 (MSC 84/24, paragraphs 22.81 and 22.82) that:

- .1 the table of planned output prepared for resolution A.990(25) contained some parts which do not precisely provide the actual work programmes of the sub-committees and needed to be reviewed by all sub-committee Chairmen together with respective Secretaries to recover any missing work programme items of the sub-committees and improve the accuracy of the table;
- .2 the table of planned output should also be reviewed by the Committees during the biennium in question and should be revised to include any urgent new work programme items and that such updating should be reported to the Council for endorsement; and
- .3 the table of planned output should also provide entries on the status of work of the sub-committees on the long-term work programme item which would not yield the final output in the biennium in question.

## **Cross-referencing of work to the strategic directions, high-level actions and planned outputs**

20.7 Regarding the referencing in the summary table of all IMO documents to Strategic and High-level Action Plans, the Committee noted that the following actions have been taken to date:

- .1 all documents submitted to IMO meetings now contain, in the summary box, reference links to the strategic directions, high-level actions and planned outputs for the biennium;
- .2 that the work programmes of the sub-committees now link each work programme item to the strategic directions, high-level actions and planned outputs for the biennium; and
- .3 that the document on Preliminary assessment of proposals for new work programme items includes an assessment of whether new proposals are within the scope of the Organization's Strategic and High-level Action Plans, including related cross-referencing.

## **21 ELECTION OF THE CHAIRMAN AND VICE-CHAIRMAN FOR 2009**

21.1 In accordance with rule 17 of the Rules of Procedure, the Committee unanimously re-elected Mr. Andreas Chrysostomou (Cyprus) as Chairman, and Mr. Ajoy Chatterjee (India) as Vice-Chairman, both for 2009.

## **22 ANY OTHER BUSINESS**

### **The impact of small craft on the marine environment**

22.1 The Committee noted that document MEPC 58/22 (Barbados, Croatia and FOEI) concerning the impact of small craft on the marine environment had been withdrawn.

### **Use of seawater lubricated tube bearings to eliminate stern tube oil pollution from ships**

22.2 The Committee noted with appreciation the information contained in document MEPC 58/INF.22 (Canada) on the use of seawater lubricated tube bearings to eliminate stern tube oil pollution from ships.

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## ANNEX 1

**STATEMENTS BY THE DELEGATIONS OF INDIA AND THE REPUBLIC OF KOREA  
CONCERNING TWO INDIAN SEAFARERS****Statement by the delegation of India**

Our intervention is related to the continuing unjust and unreasonable detention of the two Indian nationals Capt Jasprit Chawla and Chief officer Syam Chetan of “Hebei Spirit” who were acquitted by a Court of the Republic of Korea as being innocent of all charges of violating the nation’s Ocean Pollution Law. Following an oil spill incident of 7 December 2007 when a floating crane collided with the anchored “Hebei Spirit”.

The continued Detention highlights the injustices that were often perpetrated on shipmasters, who really bore little responsibility for an accident, other than they were in charge of a ship that was involved.

Yet again we see with regret and anguish that seafarers are being victimized due to a malicious tangled web of extra-judicial or/and extra-legal interpretation of the local law.

When even some of the worst civil or criminal offenders worldwide can be released on bail and allowed to live in their place of normal residence, pending trial or re-trial, why not the two seafarers, whose only fault was to be on an anchored VLCC which fell in the path of a runaway crane barge?

We fully accept the need for a thorough investigation of accidents and for those responsible for wrongful conduct, to face the consequences.

We wish to convey our surprise, disappointment and great concern that the Courts of the Republic of Korea have determined to continue to detain the ship’s officers, despite their acquittal, for possibly as long as a year pending further hearings. Such measures appear to be unjustified, unreasonable and in contravention of the Men’s rights.

We remind those responsible for the continued detention of the seafarers that the trial determined that another vessel, which had been towing the floating crane that struck the anchored tanker, was wholly responsible for the incident. Despite this finding the seafarers have continued to be detained, notwithstanding their own and their employer’s assurance that should a further trial take place, they would attend it.

The two officers have been detained in the Republic of Korea since 7 December 2007 and we believe from recent experience in similar cases that such continued unjust detention may well affect the physical and mental health of the two men. This could be avoided by permitting them to return home now to their families until such time as they are needed to assist any further investigation in the Republic of Korea.

As an industry serving international society, we remain committed to protecting the environment and to the prompt and thorough investigation of accidents at sea. We are committed to bringing to justice those involved in intentional actions that may damage the marine environment.

However, we cannot and will not support the criminalization of seafarers, nor unjust, unreasonable and unfair treatment that is contrary to the principles of IMO and ILO, including the Guidelines on the fair treatment of seafarers in the event of a marine accident.

We are afraid that the industry's recruitment crisis will worsen unless its members unite to protect seafarers from unreasonable legal attacks. What is more, if the industry does not protect crew members, it will become even more difficult to convince young men to go to sea.

We all live off the sea and seafaring, one way or the other. Let us hold our heads high and also hold our seafaring colleagues' freedom and respect even higher.

We appeal to our Korean colleagues here to use their influence in helping Capt. Jasprit Chawla and Chief Officer Syam Chetan return home as soon as possible. Let there be two families out there in India who can say with happiness and pride "At sea, a sailor never leaves the other in distress; our seafaring family members/sons were rescued by the industry colleagues on land too."

#### **Response statement by the delegation of the Republic of Korea**

This delegation would like to thank the distinguished delegate from India for raising the matter regarding the two Indian seafarers who have been staying in Korea. The Korean Government has lots of sympathy with the case and the welfare of seafarers as a whole and hope they return to India as soon as possible since the Republic of Korea is also one of those countries who sends a large number of seafarers to places outside Korea for working on board ships.

At present, they are staying in a hotel in Korea and are free to move and meet people as they like. They are neither in custody nor in prison.

The matter is a legal matter which involves serious and sensitive issues with respect to the "Hebei Spirit" incident which had caused a catastrophic pollution to the western coastline of Korea. At present, the case is being dealt with by a high court, i.e. an appeal court. According to Korea's legal system, substantial hearing and investigation into an important case is taken up to a high court, whose decision may change the decision of a district court, i.e. the first court.

According to information from the Korean Government, the legal process by the high court is expected to be completed by the end of November. Also, there is still consultation between relevant governmental bodies including the Justice Ministry for expediting the process.

I will report the position of the distinguished Indian delegate to the Korean Government for its good reference with an aim to facilitating the process for seafarers to return to India as soon as possible.

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**ANNEX 2****STATEMENT BY ICS ON BEHALF OF THE INDUSTRY  
CONCERNING PIRACY IN THE GULF OF ADEN**

This statement is made on behalf of BIMCO, INTERCARGO, International Association of P & I Associations, InterManager, INTERTANKO, IPTA, ITF, IUMI, OCIMF, SIGTTO and ICS.

As organizations we are looking forward to a week of debate on the environmental performance of shipping and not least on the challenge of reducing carbon emissions from international shipping. But the dreadful problem of piracy in the Gulf of Aden is also at the forefront of our mind.

Such is the state of lawlessness in the Gulf of Aden that attacks on innocent merchant ships are taking place every single day. Ships and their crews are being captured and held to ransom by organized armed criminal gangs seemingly able to operate with impunity.

In June of this year, the United Nations Security Council adopted resolution 1816 that allowed States cooperating with the Transitional Federal Government to enter the territorial waters of Somalia and use all the necessary means to repress acts of piracy and armed robbery in a manner consistent with action permitted on the High Seas. The Secretary-General has recognized the massive scale of this issue and we are grateful for his personal intervention which led directly to the adoption of this resolution. It is a fundamental principle of UNCLOS that the High Seas shall be used for peaceful purposes and furthermore that all States shall co-operate to the fullest extent possible in the repression of piracy on the High Seas. These are the principles that also now apply in Somalian waters.

So far, in a response to resolution 1816, some states have deployed a limited number of warships to the region.

This is an enormous area of water through which passes a significant portion of the world's trade and an even more significant percentage of its oil supply - more than 10% of the world's traded oil. At any one moment around 300 ships are passing through the area serving the needs of the nations and peoples of the world; their right to the freedom of the High Seas for lawful purposes is under intolerable threat from organized criminals. The stress on the captured crews and on other seafarers who listen to their frantic, often unanswered, radio calls for assistance can scarcely be imagined.

The fact that successful attacks are being carried out with ruthless determination, virtually every single day and that a dozen ships and more than 250 seafarers are being held captive, today, demonstrates without a shadow of doubt that insufficient resources are being applied to this shocking problem. We could not imagine that such complacency would apply if civil aircraft were the target of unlawful attacks.

Calls for the industry to arm itself for protection are inappropriate, and only serve to deepen the sense of lawlessness and the abandonment of international legal principles in these waters.

We fully recognize that this is not a matter for discussion at this Committee meeting, but we urge all governments to take the necessary steps to eradicate this very serious problem to international shipping. Specifically these steps include:

- a commitment to increased numbers of deployed warships in the Gulf of Aden and to their coordinated action;
- the renewal of UN Security Council resolution 1816 for a longer timeframe and to strengthen the text on actions required to repress piracy; and
- an agreement to establish a legal jurisdiction to identify and punish criminals under due process.

There must be a determined effort to eradicate this problem once and for all. This is a problem that only governments acting within existing international law can solve and it is our plea that they take immediate steps to do so.

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## ANNEX 3

## RESOLUTION MEPC.173(58)

Adopted on 10 October 2008

## GUIDELINES FOR BALLAST WATER SAMPLING (G2)

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 the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on Ballast Water Management for Ships held in February 2004 adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Ballast Water Management Convention) together with four Conference resolutions,

NOTING that regulation A-2 of the Ballast Water Management Convention requires that discharge of ballast water shall only be conducted through ballast water management in accordance with the provisions of the Annex to the Convention,

NOTING FURTHER that article 9 of the Ballast Water Management Convention provides that a ship to which the Convention applies may, in any port or offshore terminal of another Party, be subject to inspection by officers duly authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention. Such an inspection is limited to, *inter alia*, a sampling of the ship's ballast water, carried out in accordance with the guidelines to be developed by the Organization,

NOTING ALSO that the International Conference on Ballast Water Management for Ships, in its resolution 1, invited the Organization to develop Guidelines for uniform application of the Convention as a matter of urgency,

HAVING CONSIDERED, at its fifty-eighth session, the draft Guidelines for ballast water sampling (G2) developed by the Ballast Water Review Group,

1. ADOPTS the Guidelines for ballast water sampling (G2) as set out in the Annex to this resolution;
2. INVITES Governments to apply the Guidelines as soon as possible, or when the Convention becomes applicable to them; and
3. AGREES to keep the Guidelines under review.

## ANNEX

### **DRAFT GUIDELINES FOR BALLAST WATER SAMPLING (G2)**

#### **1 INTRODUCTION**

1.1 The objectives of these Guidelines are to provide Parties, including port State control officers, with practical and technical guidance on ballast water sampling and analysis for the purpose of determining whether the ship is in compliance with the Ballast Water Management Convention (the Convention) according to article 9 “Inspection of Ships”. These Guidelines only address general technical sampling procedures, and do not address legal requirements.

1.2 These Guidelines provide general recommendations for ballast water sampling by port State control authorities. Guidance on sampling procedures for use by Parties in assessing compliance with regulations D-1 or D-2 is given in the annex to these Guidelines.

1.3 Sampling by port State control or other authorized officers, should seek to use methods that are (a) safe to the ship, inspectors, crew and operators; and (b) simple, feasible, rapid and applicable at the point of ballast discharge.

1.4 The time needed for analysis of samples shall not be used as a basis for unduly delaying the operation, departure, or movement of the vessel. Article 12 of the Convention applies. Additionally, the use of validated automated systems for ballast water sampling and analysis should be explored when the developments of such systems are sufficiently progressed.

#### **2 BACKGROUND**

2.1 Sampling requirements for compliance control of regulations D-1 and D-2 of the Convention will differ as these two regulations have significantly different parameters. Sections 2.2 and 2.3 below reproduce the text contained in the Convention.

##### **2.2 Ballast water exchange standard (D-1)**

2.2.1 Ships performing ballast water exchange in accordance with regulation D-1 of the Convention shall do so with an efficiency of at least 95 per cent volumetric exchange of ballast water.

2.2.2 For ships exchanging ballast water by the pumping-through method, pumping through three times the volume of each ballast water tank shall be considered to meet the standard. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 per cent volumetric exchange is met.

##### **2.3 Ballast water performance standard (D-2)**

2.3.1 Regulation D-2 of the Convention refers to two size categories of organisms and a group of indicator microbes. Ships conducting ballast water management in accordance with regulation D-2 shall discharge:

- .1 less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension;
- .2 less than 10 viable organisms per millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension; and
- .3 discharge of the indicator microbes shall not exceed:
  - (i) Toxicogenic *Vibrio cholerae* (O1 and O139) with less than 1 colony forming unit (cfu) per 100 millilitres or less than 1 cfu per 1 gramme (wet weight) zooplankton samples;
  - (ii) *Escherichia coli* less than 250 cfu per 100 millilitres; and
  - (iii) Intestinal *Enterococci* less than 100 cfu per 100 millilitres.

### **3 DEFINITIONS**

3.1 For the purpose of these Guidelines, the definitions as stated in the Convention apply and:

- .1 “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.
- .2 “Sampling Point” means that place in the ballast water piping where the sample is taken.
- .3 “Sampling Facilities” means the equipment installed to take the sample.

### **4 SAMPLING FOR COMPLIANCE WITH THE BALLAST WATER EXCHANGE STANDARD (REGULATION D-1)**

4.1 In-tank samples may be taken via sounding or air pipes and manholes by using pumps, sampling bottles or other water containers. Samples may also be taken from the discharge line.

4.2 Sampling the ballast water on arriving ships may provide information on compliance with regulation B-4 of the Convention by analysing their physical and/or chemical parameters. However, it is difficult to use indicator (physical/chemical) parameters in isolation to conclusively prove that ballast water exchange either has or has not occurred to the D-1 Standard. As with any analytical procedures or techniques used to test for compliance with regulation B-4, methods used to test for compliance with ballast water exchange requirements should be rigorously validated and widely distributed through the Organization.

## **5 SAMPLING FOR COMPLIANCE WITH THE BALLAST WATER PERFORMANCE STANDARD (REGULATION D-2)**

5.1 Although the Convention contains no requirements for provision of sampling points, the Guidelines for approval of ballast water management systems (G8) adopted by resolution MEPC.174(58) do expressly call for the provision of sampling facilities, not only for the purpose of type approval, but also for the purpose of these ballast water sampling Guidelines (refer to paragraphs 3.2, 3.8, and section 8 of the Guidelines for approval of ballast water management systems (G8) for further detail regarding provision of sampling facilities).

5.2 Samples should be taken from the discharge line, as near to the point of discharge as practicable, during ballast water discharge whenever possible.

5.3 In cases where the ballast system design does not enable sampling from the discharge line, other sampling arrangements may be necessary. Sampling via manholes, sounding pipes, or air pipes is not the preferred approach for assessing compliance with regulation D-2. Scientific trials have shown that using these sampling locations may not provide accurate estimates of organism concentrations that would occur in the discharge, i.e. such sampling may provide an under- or over-estimate of the concentration of organisms.

5.4 In-tank sampling should only be used if ballast water treatment occurs on uptake prior to or whilst ballast water is in the tank. If any part of the treatment process occurs during the ballast water discharge, then in-tank sampling will be inappropriate.

5.5 In light of these potential shortcomings, sampling to determine compliance with regulation D-2 should, whenever practicable to do so, be carried out in the discharge line near the discharge point.

5.6 An exception to this is the case when tanks are emptied through direct overboard discharge valves, as in upper side wing tanks, rather than through the ballast pumps. In such cases, tank sampling may be an appropriate approach.

## **6 BALLAST WATER SAMPLING AND ANALYSIS**

6.1 In accordance with article 9 of the Convention, a Party may sample the ship's ballast water for the purpose of determining whether the ship is in compliance with the Convention in accordance with these Guidelines.

6.2 Any sampling protocol for testing of compliance with the Convention should observe the following principles to help ensure consistency of approach between Parties and to provide certainty to the shipping industry:

- .1 the sampling protocol should be in line with these Guidelines;
- .2 the sampling protocol should result in samples that are representative of the whole discharge of ballast water from any single tank or any combination of tanks being discharged;

- .3 the sampling protocol should take account of the potential for a suspended sediment load in the discharge to affect sample results;
- .4 the sampling protocol should provide for samples to be taken at appropriate discharge points;
- .5 the quantity and quality of samples taken should be sufficient to demonstrate whether the ballast water being discharged meets with the relevant standard;
- .6 sampling should be undertaken in a safe and practical manner;
- .7 samples should be concentrated to a manageable size;
- .8 samples should be taken, sealed and stored to ensure that they can be used to test for compliance with the Convention;
- .9 samples should be fully analysed within test method holding time limit using an accredited laboratory; and
- .10 samples should be transported, handled and stored with the consideration of the chain of custody.

6.3 Prior to testing for compliance with the D-2 standard, it is recommended that, as a first step, an indicative analysis of ballast water discharge may be undertaken to establish whether a ship is potentially compliant or non-compliant. Such a test could help the Party identify immediate mitigation measures, within their existing powers, to avoid any additional impact from a possible non-compliant ballast water discharge from the ship.

6.4 In emergency or epidemic situations, port States may use alternative sampling methods which may need to be introduced at short notice and should endeavour to communicate these to ships entering ports under their jurisdiction. Although in such situations they may not necessarily notify the Organization, such notification could be beneficial for other Parties.

6.5 Alternative sampling measures instigated as a result of paragraph 6.4 should give due cognizance to the requirements of article 12 of the Convention.

6.6 Given the complexity in ballast water sampling and analysis, it is likely that new approaches will be developed for ballast sampling and analyses of the composition, concentration, and viability of organisms. Administrations are encouraged to share information concerning methods for the analysis of ballast water samples, using existing scientific reports, and papers distributed through the Organization.

6.7 The Organization should make available, through any appropriate means, information communicated to it regarding ballast water sampling and analysis.

6.8 Further guidance on the interpretation of the results arising from sample analysis will be developed by the Organization in due course.

## Annex

This annex provides practical recommendations regarding sampling techniques and procedures for use by Member States and port State control and other authorized officers assessing compliance with regulation D-1 or D-2.

PART 1	SAMPLING FROM THE BALLAST WATER DISCHARGE LINE
PART 2	SAMPLING FROM BALLAST WATER TANKS
PART 3	SAMPLING AND ANALYSIS PROTOCOLS
PART 4	SAMPLE DATA FORMS
PART 5	HEALTH AND SAFETY ASPECTS
PART 6	RECOMMENDATION FOR A PORT STATE CONTROL BALLAST WATER SAMPLING KIT
PART 7	MAINTENANCE, STORAGE, LABELLING AND TRANSPORTATION
PART 8	CHAIN OF CUSTODY RECORD

### **PART 1 – SAMPLING FROM THE BALLAST WATER DISCHARGE LINE**

1 The advantage in sampling the biota present in the ballast water discharge line is that this is most likely to accurately represent the concentration of substances and organisms in the actual discharge, which is of primary concern in assessing compliance with the discharge regulations.

2 The disadvantages of this method are that, on most ships, in-line sampling should be carried out in the engine room, where space may be limited, and the handling of water once the samples were concentrated may be impracticable.

3 In order to undertake an accurate measurement on the organism concentration in the ballast water, it is recommended to install an “isokinetic” sampling facility. Isokinetic sampling is intended for the sampling of water mixtures with secondary immiscible phases (i.e. sand or oil) in which there are substantial density differentials. In such conditions, convergence and divergence from sampling ports is of significant concern. Since most organisms are relatively neutrally buoyant, true isokinetic sampling is unnecessary. However, the mathematics related to isokinetic sampling are deemed to be useful as a basis for describing and specifying sampling geometries. Isokinetic sampling is necessary to ensure that a sample contains the same proportions of the various flowing constituents as the flow stream being sampled. During isokinetic sampling the sampling device does not alter the profile or velocity of the flowing stream at the moment or point at which the sample is separated from the main flow stream. Under isokinetic conditions, the velocities of both the sample and the main flow are equal at the point at which the sample is separated from the main flow. To achieve isokinetic sampling conditions, a sampler is designed to separate a subsection of the total flow-stream in a manner that does not encourage or discourage water entry other than that which is otherwise in the cross-section of the sampler opening. In other words, flow streams in the main flow of the pipe should not diverge or converge as they approach the opening of the sampler.

#### **4 Technical specifications for design of in-line sampling facilities**

4.1 Through computational fluid dynamics modelling, it has been shown that the isokinetic diameter calculation can provide guidance for sizing of sample ports for sampling of organisms.

Simulations showed that flow transitions from the main stream were best for sample port diameters between 1.5 and 2.0 times the isokinetic diameter. Ports sized in this range had smooth transitions and pressure profiles that allowed for direct sampling without the need of a pump to induce sample collection. The isokinetic sample port diameter should therefore be determined generally according to the equation:

$$D_{iso} = D_m \sqrt{Q_{iso} / Q_m}$$

where  $D_{iso}$  and  $D_m$  are the diameters of the sample port opening and the main flow in the discharge line, respectively; and  $Q_{iso}$  and  $Q_m$  represent the respective volumetric flow rates through the two pipes. It is recommended that sample port size be based on the combination of maximum sample flow rate and minimum ballast flow rate that yields the largest isokinetic diameter.

4.2 The opening of the sampling pipe should be chamfered to provide a smooth and gradual transition between the inside and outside pipe diameters.

4.3 The length of the straight sample pipe facing into the flow can vary, but should not usually be less than one diameter of the sampling pipe. The sampling port should be oriented such that the opening is facing upstream and its lead length is parallel to the direction of flow and concentric to the discharge pipe which may require sampling pipes to be “L” shaped with an upstream facing leg if installed along a straight section of discharge pipe.

4.4 The need to be able to service the sample pipe is important and should be considered, taking the safety of ship into consideration. Therefore, the sampling pipe should be retrievable either manually, or mechanically, or it should be in a system which can be isolated. Because of the potential for the opening and interior of the sample pipe to become occluded by biological or inorganic fouling, it is recommended that samplers be designed to be closable at the opening, removed between sampling intervals or be easily cleaned prior to sampling.

4.5 The sample pipe and all associated parts of the sampler that come into contact or near proximity with the ballast piping should be constructed of galvanically compatible materials and generally corrosion resistant. Any corrosion of the sampling system will affect sample flow rates and potentially sample representativeness.

4.6 If flow control of the sample flow rate is required, ball, gate and butterfly valve types should be avoided as they may cause significant shear forces which may result in organism mortality. For flow control, it is recommended that diaphragm valves or similar valve types be used to minimize sharp velocity transitions. For flow distribution, ball valves may be utilized in such a manner that they are either fully open or fully closed.

## **5 Technical specifications for installation of a sample point in the ballast water discharge line**

5.1 The sample taken should be removed from the main pipeline at a location where the flowing stream at the sample point is representative of the contents of the stream. The sample facility should be placed at a point where the flow in the main pipe is fully mixed and fully developed.

5.2 The sampling point should be installed in a straight part of the discharge line as near to the ballast water discharge overboard as practicable. The sampling facility should be positioned such that a representative sample of ballast water is taken. It is recommended that the position of the sample point is established using methods such as computational fluid dynamics.

## **PART 2 – SAMPLING FROM BALLAST WATER TANKS**

1 In-tank sampling may be appropriate for assessing D-1 compliance. There may be circumstances when in-tank sampling to provide an indication of compliance or non-compliance with the ballast water performance standard D-2 may be found appropriate. D-2 compliance should be assessed at ballast water discharge, whenever this is possible.

### **2 Manholes**

2.1 Sampling of ballast water via manholes allows direct access to ballast tanks and ballast holds.

2.2 The disadvantages of this type of sampling access include the need for opening and closing manholes and hatches. Further, overlaying cargo may prevent access for sampling. Also, hatches and horizontal openings inside tanks are not aligned one below the other, which means that although the tank may have three or more decks, only the top deck may be accessible for sampling. Further, in some ships, access hatches and vertical openings are on the side of the tank and thus are not accessible unless the tank is empty. Another disadvantage is ladders and platforms may inhibit access to the full depth of the tank. Sampling from some certain parts of the ballast water tank may result in a lack of representation of the whole ballast water discharge.

2.3 Samples should be collected using scientific sampling equipment including plankton nets and pumps, as appropriate, for the sampling and analytical method intended for use.

2.4 Whenever possible samples should be taken from multiple water depths inside the ballast tank.

2.5 When employing plankton nets:

- .1 the sample should be taken in a vertical net haul from the deepest sampling point accessible in the tank;
- .2 all plankton nets should be lowered to the maximum accessible depth inside the ballast tank and retrieved at a speed of approximately 0.5 m/s; and
- .3 multiple vertical net hauls may be needed to meet the required sample volume. The water volume sampled may be measured by flow meters in the opening of the net or by noting the sampling depth and net opening diameter.

2.6 When employing pumps:

- .1 pump intake pipes should be lowered to multiple depths (if possible) for different samples to obtain a vertical sample; and
- .2 the water volume sampled may be measured by flow meters in the hose or by using larger containers to measure the pumped water volume.

### **3 Sounding pipes or air pipes**

3.1 Sampling by sounding pipes, when available, could be appropriate due to accessibility. However, there are some limitations when using this point to test for compliance. The use of sounding pipes will be more effective when the ship's sounding pipes are perforated along their length, ensuring better mixing of ballast water and that within the sounding tube. However, care must be taken if initial water samples from a sounding pipe indicate no or insufficient exchange even though the ship's records document otherwise. Experience has shown that in some cases water within unperforated sounding pipes is not affected during an exchange. This may occur during flow-through because the water in pipes is not exposed to the mixing within the tank. This may also occur during empty refill when water in the sounding pipes is held within the pipe by vacuum pressure while the tanks are drained and then filled.

3.2 Samples should be collected using scientific sampling equipment as appropriate.

### **4 Use of pumps**

4.1 Pumps of various types may be used to sample via sounding or air pipes.

4.1.1 The use of pumps may be limited by inability to overcome the pumping head, i.e. when the vertical distance from the pump to the water level in tank exceeds 10 metres, suction pumps cannot be used.

4.1.2 Pump intake pipes should be lowered to multiple depths (if possible) for different samples to obtain a vertical sample. The water volume sampled may be measured by flow meters in the hose or by using larger containers to measure the pumped water volume.

4.2 In principle, intrinsically safe pumps should be used in all circumstances.

4.3 Pumps that do not contribute to the mortality of organisms should be preferred.

## **PART 3 – SAMPLING AND ANALYSIS PROTOCOLS**

1 The sample volume and number of samples required will depend upon:

- .1 the objective of sampling, e.g., to determine the number of organisms in different size classes; to assess the viability of organisms in different size classes; or to assess compliance with the D-1 or D-2 standard;
- .2 the specific analytical method to be used; and
- .3 the statistical significance and certainty required.

2 Sample handling and storage will also vary depending on the objectives and specific analytical methods. In particular the way the sample is taken (e.g., net or pump) and the conditions in which it is stored (e.g., light, temperature, storage container) should be appropriate for the analytical method used.

3 Sample analysis methods are rapidly developing and the best available procedures should be used consistently with availability.

4 The sampling and analysis methodologies to test for compliance with the Convention are still in development. Although significant technical advances and refinements have been made in these areas since the adoption of the Convention, there are still numerous issues to be resolved. Administrations are still undertaking research to define the most appropriate methods to test for compliance, and the best way to take, handle and analyse samples.

5 At the present time, there are no specific sampling or analysis protocols that can be recommended for Administrations to use. However, it is expected that in due course this information is likely to become available once full compliance testing regimes are developed and Administrations have had time to gain experience and develop best practice in ballast water sampling and analysis.

6 An IMO circular will be developed as a high-priority matter, to provide sampling and analysis protocols to be followed and give advice on the uniform application of these protocols. Such a circular will be updated when new protocols are developed.

7 To aid this process, Administrations are requested to supply information on any scientifically validated sampling and analysis techniques to the Organization, as soon as possible.

#### PART 4 – SAMPLE DATA FORM

The following minimum information is recommended for sample documentation:

Sampling date	
Ship particulars	<b>Name of ship:</b>  Distinctive number or letters Port of registry: Gross tonnage: IMO Number: Date of construction: Ballast water capacity:
Identification of sampled tank*	
Type and position of sampled tank*	
Capacity of sampled tank*	(m <sup>3</sup> )
Type of ballast water management undertaken	(type of exchange or treatment)
Make of ballast water management system	
Date of ballast water management undertaken	
Sample identification code	(including number of replicate)
Sample type	(larger, smaller plankton, microbes)
Sampling techniques used	net (including depth of vertical net haul, net opening size, mesh size) pumps (including sampling depth, pumping capacity in l/min.) bottle (incl. sampling depth, bottle capacity in l.) specify other sampling technique if used
Sampling time/start	
Sampling end time	
Origin of water sampled*	(lat/lon/port)

\* If appropriate.

Type of sampling access point	
Location of sampling access point	
Water volume sampled	(by volume)
In case sample is concentrated on board specify filter or net sizes (if applicable)	( $\mu\text{m}$ )
Preservative (if used)	
Transport to laboratory	cooling container, dark storage, etc.
Sample results	

\* If appropriate.

Other information as necessary should be included in the table.

## **PART 5 – HEALTH AND SAFETY ASPECTS**

1 As shipboard and port State control procedures on health and safety aspects already exist there is no need to develop new procedures for the purpose of ballast water sampling. In general, ship procedures, especially for entry into enclosed spaces, shall be followed if more stringent than national regulations. However, the following paragraphs provide some additional guidance.

2 Worker health and safety should be a primary consideration during all the sampling operations as ships and ports are hazardous environments in which to work. Any sampling operation should be undertaken after consideration of the specific risks associated with the ballast water being sampled. Appropriate personal protective equipment connected with the work should be worn as necessary.

3 In the event sampling involves entry into confined spaces, Recommendations for entering enclosed spaces aboard ships (resolution A.864(20)) and relevant IACS Recommendations on confined space safe practice ([www.iacs.org.uk](http://www.iacs.org.uk)), and standard industry practice on man entry into enclosed spaces should be consulted (e.g., ISGOTT).

4 All electrical equipment, including torches, should be intrinsically safe for use on board ships when required. Safety limitations on the use of mobile telephones, etc., should always be observed. Standard industry practice on the use of electrical equipment including mobile telephone should be consulted (e.g., ISGOTT).

5 All electrical equipment to be used aboard should be checked to ensure that it is intrinsically safe. Pumps in particular should be fitted with waterproof junctions at the point where the electrical lead passes into the pump body and all plugs should be waterproof with rubber casings. If there is any doubt about an electrical supply or equipment aboard a vessel, advice from the ship's master or a member of the port company electrical staff should be sought.

## **PART 6 – RECOMMENDATION FOR A PORT STATE CONTROL BALLAST WATER SAMPLING KIT**

1 The sampling kit for discharge line sampling should in minimum consist of:

- net or sieve to concentrate sample (with replacement material of identical mesh size);

- at least two containers to measure water volume extracted from discharge line. The container is further needed to collect sieved water for rinsing sieve or net when sampling is completed;
- water appropriate for rinsing net or sieve;
- funnel to ease filling of sample container;
- sample containers including sterile containers for microbial analysis;
- all necessary forms including sample data reporting/chain of custody forms;
- toolkit to enable net or sieve replacement, etc.;
- tape to seal the sample jar lid to the jar; and
- first aid kit.

2 The sampling kit for manhole sampling should in minimum consist of:

- plankton net with an associated flow meter – scientific trials have shown that plankton nets equipped with a cone shaped opening and filtering cod-end provide the most accurate samples. Nets to be lowered down into the tank should further not exceed 1 m in length and 30 cm in diameter to reduce the risk to become entangled inside the tank. A spare net including an extra cod end should be added to the sampling kit in case damages occur. A weight (minimum 1 kg) should be used to keep the wire vertical during the net haul;
- rope to lower down net (the rope should be metered to document net haul depth);
- net or sieve to concentrate sample (with replacement material of identical mesh size) spare sieves with identical mesh size should be added to the sampling kit in case damages occur;
- collecting sieved water for rinsing sieve and plankton net when sampling is completed;
- water bottle to rinse net or sieve;
- funnel to ease filling of sample container;
- sample containers including sterile containers for microbial analysis;
- all necessary forms including sample data reporting/chain of custody forms;
- toolkit to enable net or sieve replacement, etc.;
- tape to seal the sample jar lid to the jar; and
- first aid kit.

- 3 The sampling kit for sounding or air pipe sampling should in minimum consist of:
- pump (e.g., suction, power or air driven);
  - hose (optional with weight to ease lowering down the hose);
  - net or sieve to concentrate sample (with replacement material of identical mesh size);
  - at least two containers to measure water volume pumped on deck. The container is further needed to collect sieved water for rinsing sieve when sampling is completed and to rinse hose;
  - water bottle to rinse net or sieve;
  - funnel to ease filling of sample container;
  - sample containers including sterile containers for microbial analysis;
  - all necessary forms including sample data reporting/chain of custody forms;
  - toolkit to enable net or sieve replacement, opening of sounding or air pipes, etc.;
  - tape to seal the sample jar lid to the jar; and
  - first aid kit.

## **PART 7 – MAINTENANCE, STORAGE, LABELLING AND TRANSPORTATION**

1 Samples should be handled and stored as appropriate for the intended analytical method. The sample collection data form and chain of custody record should be kept with each individual sample.

2 Sample Sealing: Tape should be used to seal the sample jar lid to the jar.

3 Sample data forms: Prior to the beginning of the sampling programme, a suitable set of recording forms based on part 4 should be designed which incorporate all the sample information required to meet the aims of the programme. Details of each sample should be entered on the forms as soon as practicable.

4 Labelling of sample containers: Each sample container should be labelled by, e.g., using a waterproof permanent marker and additional vegetal paper which may be deposited inside the sample container, if appropriate. The information recorded should include but not be limited to the date, ship name, sample identification code, tank numbers and preservative if used. Codes may be used for some of these details as long as they are included on the sample data forms.

## **PART 8 – CHAIN OF CUSTODY RECORD**

- 1 In the context of compliance control, it is advisable to maintain chain of custody records for the samples collected.
- 2 Information to be included should contain a complete record of those handling the sample from the time of the sampling onwards.
- 3 The chain of custody should also include date, ship identification, sample identification code, and a list of people who have handled the sample, including the person who takes the sample, dates and time, and the reason for sample transfer and the integrity of the sample on transfer.

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**ANNEX 4****RESOLUTION MEPC.174(58)****Adopted on 10 October 2008****GUIDELINES FOR APPROVAL OF  
BALLAST WATER MANAGEMENT SYSTEMS (G8)**

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 the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on Ballast Water Management for Ships held in February 2004 adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Ballast Water Management Convention) together with four conference resolutions,

NOTING that regulation D-3 of the Annex to the Ballast Water Management Convention provides that ballast water management systems used to comply with this Convention must be approved by the Administration, taking into account Guidelines developed by the Organization,

NOTING ALSO resolution MEPC.125(53) by which the Committee adopted the Guidelines for approval of ballast water management systems (G8),

NOTING FURTHER that by resolution MEPC.125(53), the Committee resolved to keep Guidelines (G8) under review in the light of experience gained,

HAVING CONSIDERED, at its fifty-eighth session, the recommendation made by the Ballast Water Review Group,

1. ADOPTS the revised Guidelines for approval of ballast water management systems (G8), as set out in the Annex to this resolution;
2. INVITES Member Governments to give due consideration to the revised Guidelines (G8) when type approving ballast water management systems;
3. AGREES to keep the revised Guidelines (G8) under review in the light of experience gained;
4. URGES Member Governments to bring the aforementioned Guidelines to the attention of manufacturers of ballast water management systems and other parties concerned with a view to encouraging their use; and
5. REVOKES the Guidelines adopted by resolution MEPC.125(53).

ANNEX

**GUIDELINES FOR APPROVAL OF  
BALLAST WATER MANAGEMENT SYSTEMS (G8)**

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## **GUIDELINES FOR APPROVAL OF BALLAST WATER MANAGEMENT SYSTEMS (G8)**

### **1 INTRODUCTION**

#### **General**

1.1 These Guidelines for approval of ballast water management systems are aimed primarily at Administrations, or their designated bodies, in order to assess whether ballast water management systems meet the standard as set out in regulation D-2 of the “International Convention for the Control and Management of Ships’ Ballast Water and Sediments,” hereafter referred to as the “Convention”. In addition, this document can be used as guidance for manufacturers and shipowners on the evaluation procedure that equipment will undergo and the requirements placed on ballast water management systems. These Guidelines should be applied in an objective, consistent and transparent way and their application should be evaluated periodically by the Organization.

1.2 Articles and regulations referred to in these Guidelines are those contained in the Convention.

1.3 The Guidelines include general requirements concerning design and construction, technical procedures for evaluation and the procedure for issuance of the Type Approval Certificate of the ballast water management system.

1.4 These Guidelines are intended to fit within an overall framework for evaluating the performance of systems that includes the experimental shipboard evaluation of prototype systems under the provisions of regulation D-4, approval of ballast water management systems and associated systems that comply fully with the requirements of the Convention, and port State control sampling for compliance under the provisions of article 9 of the Convention.

1.5 The requirements of regulation D-3 stipulate that ballast water management systems used to comply with the Convention must be approved by the Administration, taking into account these Guidelines. In addition to such ballast water management system approval, as set forth in regulation A-2 and regulation B-3, the Convention requires that discharges of ballast water from ships must meet the regulation D-2 performance standard on an on-going basis. Approval of a system is intended to screen-out management systems that would fail to meet the standards prescribed in regulation D-2 of the Convention. Approval of a system, however, does not ensure that a given system will work on all vessels or in all situations. To satisfy the Convention, a discharge must comply with the D-2 standard throughout the life of the vessel.

1.6 The operation of ballast water management systems should not impair the health and safety of the ship or personnel, nor should it present any unacceptable harm to the environment or to public health.

1.7 Ballast water management systems are required to meet the standards of regulation D-2 and the conditions established in regulation D-3 of the Convention. These Guidelines serve to evaluate the safety, environmental acceptability, practicability and biological effectiveness of the systems designed to meet these standards and conditions.

The cost effectiveness of type-approved equipment will be used in determining the need for revisions of these Guidelines.

1.8 These Guidelines contain recommendations regarding the design, installation, performance, testing environmental acceptability and approval of ballast water management systems.

1.9 To achieve consistency in its application, the approval procedure requires that a uniform manner of testing, analysis of samples, and evaluation of results is developed and applied. These Guidelines should be applied in an objective, consistent, and transparent way; and their suitability should be periodically evaluated and revised as appropriate by the Organization. New versions of these Guidelines should be duly circulated by the Organization. Due consideration should be given to the practicability of the ballast water management systems.

### **Goal and purpose**

1.10 The goal of these Guidelines is to ensure uniform and proper application of the standards contained in the Convention. As such the Guidelines are to be updated as the state of knowledge and technology may require.

1.11 The purposes of these Guidelines are to:

- .1 define test and performance requirements for the approval of ballast water management systems;
- .2 assist Administrations in determining appropriate design, construction and operational parameters necessary for the approval of ballast water management systems;
- .3 provide a uniform interpretation and application of the requirements of regulation D-3;
- .4 provide guidance to Administrations, equipment manufacturers and shipowners in determining the suitability of equipment to meet the requirements of the Convention and of the environmental acceptability of treated water; and
- .5 assure that ballast water management systems approved by Administrations are capable of achieving the standard of regulation D-2 in land-based and shipboard evaluations and do not cause unacceptable harm to the vessel, crew, the environment or public health.

### **Applicability**

1.12 These Guidelines apply to the approval of ballast water management systems in accordance with the Convention.

1.13 These Guidelines apply to ballast water management systems intended for installation on board all ships required to comply with regulation D-2.

## Summary of requirements

1.14 The land-based and shipboard approval requirements for ballast water management systems specified in these guidelines are summarized below.

1.15 The manufacturer of the equipment should submit information regarding the design, construction, operation and functioning of the ballast water management system in accordance with Part 1 of the annex. This information should be the basis for a first evaluation of suitability by the Administration.

1.16 The ballast water management system should be tested for Type Approval in accordance with the procedures described in Parts 2 and 3 of the annex.

1.17 Successful fulfilment of the requirements and procedures for Type Approval as outlined in Parts 2 and 3 of the annex should lead to the issuance of a Type Approval Certificate by the Administration.

1.18 When a Type Approved ballast water management system is installed on board, an installation survey according to section 8 should be carried out.

## 2 BACKGROUND

2.1 The requirements of the Convention relating to approval of ballast water management systems used by ships are set out in regulation D-3.

2.2 Regulation D-2 stipulates that ships meeting the requirements of the Convention by meeting the ballast water performance standard must discharge:

- .1 less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension;
- .2 less than 10 viable organisms per millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension; and
- .3 less than the following concentrations of indicator microbes, as a human health standard:
  - .1 Toxicogenic *Vibrio cholerae* (serotypes O1 and O139) with less than 1 Colony Forming Unit (cfu) per 100 millilitres or less than 1 cfu per 1 gramme (wet weight) of zooplankton samples;
  - .2 *Escherichia coli* less than 250 cfu per 100 millilitres; and
  - .3 Intestinal *Enterococci* less than 100 cfu per 100 millilitres.

### **3 DEFINITIONS**

For the purpose of these Guidelines:

3.1 Active Substance means a substance or organism, including a virus or a fungus that has a general or specific action on or against harmful aquatic organisms and pathogens.

3.2 Ballast Water Management System (BWMS) means any system which processes ballast water such that it meets or exceeds the ballast water performance standard in regulation D-2. The BWMS includes ballast water treatment equipment, all associated control equipment, monitoring equipment and sampling facilities.

3.3 The Ballast Water Management Plan is the document referred to in regulation B-1 of the Convention describing the ballast water management process and procedures implemented on board individual ships.

3.4 Ballast Water Treatment Equipment means equipment which mechanically, physically, chemically, or biologically processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments. Ballast water treatment equipment may operate at the uptake or discharge of ballast water, during the voyage, or at a combination of these events.

3.5 Control Equipment refers to the installed equipment required to operate and control the ballast water treatment equipment.

3.6 The Convention means the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

3.7 Monitoring Equipment refers to the equipment installed for the assessment of the effective operation of the ballast water treatment equipment.

3.8 Sampling Facilities refers to the means provided for sampling treated or untreated ballast water as needed in these Guidelines and in the "Guidelines for ballast water sampling (G2)" developed by the Organization.

3.9 Shipboard Testing is a full-scale test of a complete BWMS carried out on board a ship according to Part 2 of the annex to these Guidelines, to confirm that the system meets the standards set by regulation D-2 of the Convention.

3.10 Treatment Rated Capacity (TRC) is the maximum continuous capacity expressed in cubic metres per hour for which the BWMS is type approved. It states the amount of ballast water that can be treated per unit time by the BWMS to meet the standard in regulation D-2 of the Convention.

3.11 Land-based Testing is a test of the BWMS carried out in a laboratory, equipment factory or pilot plant including a moored test barge or test ship, according to Parts 2 and 3 of the annex to these Guidelines, to confirm that the BWMS meets the standards set by regulation D-2 of the Convention.

3.12 Viable Organisms are organisms and any life stages thereof that are living.

#### **4 TECHNICAL SPECIFICATIONS**

4.1 This section details the general technical requirements which a BWMS should meet in order to obtain Type Approval.

##### **Ballast water management systems**

4.2 The BWMS should not contain or use any substance of a dangerous nature, unless adequate arrangements for storage, application, mitigation, and safe handling, acceptable to the Administration, are provided to mitigate any hazards introduced thereby.

4.3 In case of any failure compromising the proper operation of the BWMS, audible and visual alarm signals should be given in all stations from which ballast water operations are controlled.

4.4 All working parts of the BWMS that are liable to wear or to be damaged should be easily accessible for maintenance. The routine maintenance of the BWMS and troubleshooting procedures should be clearly defined by the manufacturer in the operating and maintenance manual. All maintenance and repairs should be recorded.

4.5 To avoid interference with the BWMS, the following items should be included:

- .1 every access of the BWMS beyond the essential requirements of paragraph 4.4, should require the breaking of a seal;
- .2 if applicable, the BWMS should be so constructed that a visual alarm is always activated whenever the BWMS is in operation for purposes of cleaning, calibration, or repair, and these events should be recorded by the control equipment;
- .3 in the event of an emergency, suitable by-passes or overrides to protect the safety of the ship and personnel should be installed; and
- .4 any bypass of the BWMS should activate an alarm, and the bypass event should be recorded by the Control Equipment.

4.6 Facilities should be provided for checking, at the renewal surveys and according to the manufacturer's instructions, the performance of the BWMS components that take measurements. A calibration certificate certifying the date of the last calibration check, should be retained on board for inspection purposes. Only the manufacturer or persons authorized by the manufacturer should perform the accuracy checks.

##### **Ballast water treatment equipment**

4.7 The ballast water treatment equipment should be robust and suitable for working in the shipboard environment, should be of a design and construction adequate for the service for which it is intended and should be so installed and protected as to reduce to a minimum

any danger to persons on board, due regard being paid to hot surfaces and other hazards. The design should have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.

4.8 The ballast water treatment equipment should be provided with simple and effective means for its operation and control. It should be provided with a control system that should be such that the services needed for the proper operation of the ballast water treatment equipment are ensured through the necessary automatic arrangements.

4.9 The ballast water treatment equipment should, if intended to be fitted in locations where flammable atmospheres may be present, comply with the relevant safety regulations for such spaces. Any electrical equipment that is part of the BWMS should be based in a non-hazardous area, or should be certified by the Administration as safe for use in a hazardous area. Any moving parts, which are fitted in hazardous areas, should be arranged so as to avoid the formation of static electricity.

#### **Control and monitoring equipment**

4.10 The BWMS should incorporate control equipment that automatically monitors and adjusts necessary treatment dosages or intensities or other aspects of the BWMS of the vessel, which while not directly effecting treatment, are nonetheless required for proper administration of the necessary treatment.

4.11 The control equipment should incorporate a continuous self-monitoring function during the period in which the BWMS is in operation.

4.12 The monitoring equipment should record the proper functioning or failure of the BWMS.

4.13 To facilitate compliance with regulation B-2, the control equipment should also be able to store data for at least 24 months, and should be able to display or print a record for official inspections as required. In the event the control equipment is replaced, means should be provided to ensure the data recorded prior to replacement remains available on board for 24 months.

4.14 It is recommended that simple means be provided aboard ship to check on drift by measuring devices that are part of the control equipment, repeatability of the control equipment devices, and the ability to re-zero the control equipment meters.

### **5 TYPICAL DOCUMENT REQUIREMENTS FOR THE PLAN APPROVAL PROCESS**

5.1 The documentation submitted for approval should include at least the following:

- .1 a description of the BWMS. The description should include a diagrammatic drawing of the typical or required pumping and piping arrangements, and sampling facilities, identifying the operational outlets for treated ballast water and any waste streams as appropriate and necessary. Special considerations

may have to be given to installations intended for ships that have unusual pumping and piping arrangements;

- .2 equipment manuals, supplied by manufacturers, containing details of the major components of the BWMS and their operation and maintenance;
- .3 a generic operations and technical manual for the complete BWMS. This manual should cover the arrangements, the operation and maintenance of the BWMS as a whole and should specifically describe parts of the BWMS which are not covered by the manufacturer's equipment manuals;
- .4 the operations section of the manual including normal operational procedures and procedures for the discharge of untreated water in the event of malfunction of the ballast water treatment equipment, maintenance procedures, and emergency action necessary for securing the ship;
- .5 methods for the conditioning of treated water prior to discharge should be provided, and assessment of discharged water should include a description of the effect of treatment on the ship's ballast water, in particular the nature of any treatment residuals and by-products and the water's suitability for discharge into coastal waters. A description should also be provided of any actions necessary to monitor, and if necessary "condition", treated water prior to discharge in order that it meets applicable water quality regulations; if it can reasonably be concluded that the treatment process could result in changes to the chemical composition of the treated water such that adverse impacts to receiving waters might occur upon discharge, the documentation should include results of toxicity tests of treated water. The toxicity tests should include assessments of the effects of hold time following treatment, and dilution, on the toxicity. Toxicity tests of the treated water should be conducted in accordance with paragraphs 5.2.3 to 5.2.7 of the Procedure for approval of ballast water management systems that make use of Active Substances (G9), as revised, (resolution MEPC.169(57));
- .6 a description of BWMS side streams (e.g., filtered material, centrifugal concentrate, waste or residual chemicals) including a description of the actions planned to properly manage and dispose of such wastes;
- .7 a technical section of the manual including adequate information (description and diagrammatic drawings of the monitoring system and electrical/electronic wiring diagrams) to enable faultfinding. This section should include instructions for keeping a maintenance record;
- .8 a technical installation specification defining, *inter alia*, requirements for the location and mounting of components, arrangements for maintaining the integrity of the boundary between safe and hazardous spaces and the arrangement of the sample piping; and

- .9 a recommended test and checkout procedure specific to the BWMS. This procedure should specify all the checks to be carried out in a functional test by the installation contractor and should provide guidance for the surveyor when carrying out the on board survey of the BWMS and confirming the installation reflects the manufacturer's specific installation criteria.

## **6 APPROVAL AND CERTIFICATION PROCEDURES**

6.1 A BWMS which in every respect fulfils the requirements of these Guidelines may be approved by the Administration for fitting on board ships. The approval should take the form of a Type Approval Certificate of BWMS, specifying the main particulars of the apparatus and any limiting conditions on its usage necessary to ensure its proper performance. Such certificate should be issued in the format shown in appendix 1. A copy of the Type Approval Certificate of BWMS should be carried on board ships fitted with such a system at all times.

6.2 A Type Approval Certificate of BWMS should be issued for the specific application for which the BWMS is approved, e.g., for specific ballast water capacities, flow rates, salinity or temperature regimes, or other limiting conditions or circumstances as appropriate.

6.3 A Type Approval Certificate of BWMS should be issued by the Administration based on satisfactory compliance with all the test requirements described in Parts 2, 3 and 4 of the annex.

6.4 An Administration may issue a Type Approval Certificate of BWMS based on separate testing or on testing already carried out under supervision by another Administration.

6.5 The Type Approval Certificate of BWMS should:

- .1 identify the type and model of the BWMS to which it applies and identify equipment assembly drawings, duly dated;
- .2 identify pertinent drawings bearing model specification numbers or equivalent identification details;
- .3 include a reference to the full performance test protocol on which it is based, and be accompanied by a copy of the original test results; and
- .4 identify if it was issued by an Administration based on a Type Approval Certificate previously issued by another Administration. Such a certificate should identify the Administration that conducted the tests on the BWMS and a copy of the original test results should be attached to the Type Approval Certificate of BWMS.

6.6 An approved BWMS may be Type Approved by other Administrations for use on their vessels. Should a system approved by one country fail Type Approval in another country, then the two countries concerned should consult one another with a view to reaching a mutually acceptable agreement.

## **7 INSTALLATION REQUIREMENTS**

### **Sampling facilities**

7.1 The BWMS should be provided with sampling facilities so arranged in order to collect representative samples of the ship's ballast water.

7.2 Sampling facilities should in any case be located on the BWMS intake, before the discharging points, and any other points necessary for sampling to ascertain the proper functioning of the equipment as may be determined by the Administration.

## **8 INSTALLATION SURVEY AND COMMISSIONING PROCEDURES**

8.1 Verify that the following documentation is on board in a suitable format:

- .1 a copy of the Type Approval Certificate of BWMS;
- .2 a statement from the Administration, or from a laboratory authorized by the Administration, to confirm that the electrical and electronic components of the BWMS have been type-tested in accordance with the specifications for environmental testing contained in Part 3 of the annex;
- .3 equipment manuals for major components of the BWMS;
- .4 an operations and technical manual for the BWMS specific to the ship and approved by the Administration, containing a technical description of the BWMS, operational and maintenance procedures, and backup procedures in case of equipment malfunction;
- .5 installation specifications;
- .6 installation commissioning procedures; and
- .7 initial calibration procedures.

8.2 Verify that:

- .1 the BWMS installation has been carried out in accordance with the technical installation specification referred to in paragraph 8.1.5;
- .2 the BWMS is in conformity with the Type Approval Certificate of BWMS issued by the Administration or its representative;
- .3 the installation of the complete BWMS has been carried out in accordance with the manufacturer's equipment specification;
- .4 any operational inlets and outlets are located in the positions indicated on the drawing of the pumping and piping arrangements;

- .5 the workmanship of the installation is satisfactory and, in particular, that any bulkhead penetrations or penetrations of the ballast system piping are to the relevant approved standards; and
- .6 the control and monitoring equipment operates correctly.

## ANNEX

This annex provides detailed test and performance specifications for a BWMS and contains:

**PART 1 – Specifications for Pre-test Evaluation of System Documentation**

**PART 2 – Test and Performance Specifications for Approval of Ballast Water Management Systems**

**PART 3 – Specification for Environmental Testing for Approval of Ballast Water Management Systems**

**PART 4 – Sample Analysis Methods for the Determination of Biological Constituents in Ballast Water**

### **PART 1 – SPECIFICATIONS FOR PRE-TEST EVALUATION OF SYSTEM DOCUMENTATION**

1.1 Adequate documentation should be prepared and submitted to the Administration as part of the approval process well in advance of the intended approval testing of a BWMS. Approval of the submitted documentation should be a pre-requisite for carrying out independent approval tests.

#### **General**

1.2 Documentation should be provided by the manufacturer/developer for two primary purposes: evaluating the readiness of the BWMS for undergoing approval testing, and evaluating the manufacturer's proposed test requirements and procedures for the test.

#### **Readiness evaluation**

1.3 The readiness evaluation should examine the design and construction of the BWMS to determine whether there are any fundamental problems that might constrain the ability of the BWMS to manage ballast water as proposed by the manufacturer, or to operate safely, on board ships. The latter concern should, in addition to basic issues related to the health and safety of the crew, interactions with the ship's systems and cargo, and potential adverse environmental effects, also consider the potential for longer-term impacts to the safety of the crew and vessel through effects of the BWMS on corrosion in the ballast system and other spaces.

1.4 The evaluation should also address the degree, if any, to which the manufacturer's/developer's efforts during the research and development phase tested the performance and reliability of the system under operational shipboard conditions and should include a report of the results of those tests.

## **Test proposal evaluation**

1.5 Evaluation of the test proposal should examine all of the manufacturer's stated requirements and procedures for installing, calibrating, and operating (including maintenance requirements) the BWMS during a test. This evaluation should help the test organization to identify any potential health or environmental safety problems, unusual operating requirements (labour or materials), and any issues related to the disposal of treatment by-products or waste streams.

## **Documentation**

1.6 The documentation to be submitted should include at least the following:

- .1 **Technical Manual** – The technical description should include:
  - product specification;
  - process description;
  - operational instructions;
  - details (including Certificates where appropriate) of the major components and materials used;
  - technical installation specifications in accordance with manufacturers' specific installation criteria;
  - system limitations; and
  - routine maintenance and trouble-shooting procedures.
- .2 **BWMS Drawings** – Diagrammatic drawings of the pumping and piping arrangements, electrical/electronic wiring diagrams, which should include reference to any waste streams and sampling points;
- .3 **Link to the Ballast Water Management Plan** – Information regarding the characteristics and arrangements in which the system is to be installed as well as the scope of the ships (sizes, types and operation) for which the system is intended. This information can later form the link between the system and the ship's ballast water management plan; and
- .4 **Environmental and Public Health Impacts** – Potential hazards for the environment should be identified and documented based on environmental studies performed to the extent necessary to assure that no harmful effects are to be expected. In the case of ballast water management systems that make use of Active Substances or Preparations containing one or more Active Substances the "Procedure for the approval of ballast water management systems that make use of Active Substances (G9)", as revised, should be

followed. The system should then ensure that dosage of the Active Substance and the maximum allowable discharge concentration is kept under the approved criteria at all times. In the case of ballast water management systems that do not make use of Active Substances or Preparations, but which could reasonably be expected to result in changes to the chemical composition of the treated water such that adverse impacts to receiving waters might occur upon discharge, the documentation should include results of toxicity tests of treated water as described in paragraph 5.1.5 of these Guidelines.

1.7 The documentation may include specific information relevant to the test set-up to be used for land-based testing according to these Guidelines. Such information should include the sampling needed to ensure proper functioning and any other relevant information needed to ensure proper evaluation of the efficacy and effects of the equipment. The information provided should also address general compliance with applicable environment, health and safety standards during the Type Approval procedure.

## **PART 2 – TEST AND PERFORMANCE SPECIFICATIONS FOR APPROVAL OF BALLAST WATER MANAGEMENT SYSTEMS**

The Administration decides the sequence of land-based and shipboard testing.

### **2.1 Quality Assurance and Quality Control Procedures**

2.1.1 The testing body performing the tests should have implemented appropriate quality control measures in accordance with recognized international standards acceptable to the Administration.

2.1.2 The approval testing process should contain a rigorous quality control/quality assurance program, consisting of:

- .1 Both a Quality Management Plan (QMP) and a Quality Assurance Project Plan (QAPP). Guidance on preparation of these plans, along with other guidance documents and other general quality control information are available from appropriate international organizations<sup>4</sup>.
- .2 The QMP addresses the quality control management structure and policies of the testing body (including subcontractors and outside laboratories).
- .3 The QAPP is a project specific technical document reflecting the specifics of the BWMS to be tested, the test facility, and other conditions affecting the actual design and implementation of the required experiments.

### **2.2 Shipboard tests**

2.2.1 A shipboard test cycle includes:

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<sup>4</sup> Such as ISO/IEC 17025.

- .1 the uptake of ballast water of the ship;
- .2 the storage of ballast water on the ship;
- .3 treatment of the ballast water in accordance with paragraph 2.2.2.3 by the BWMS, except in control tanks; and
- .4 the discharge of ballast water from the ship.

#### **Success criteria for shipboard testing**

2.2.2 In evaluating the performance of BWMS installation(s) on a ship or ships, the following information and results should be supplied to the satisfaction of the Administration:

- .1 Test plan to be provided prior to testing.
- .2 Documentation that the BWMS is of a capacity within the range of the treatment rated capacity for which it is intended.
- .3 The amount of ballast water tested in the test cycle on board should be consistent with the normal ballast operations of the ship and the BWMS should be operated at the treatment rated capacity for which it is intended to be approved.
- .4 Documentation of the results of three consecutive, valid test cycles showing discharge of treated ballast water in compliance with regulation D-2.
- .5 Valid tests are indicated by uptake water, for both the control tank and ballast water to be treated, with viable organism concentration exceeding 10 times the maximum permitted values in regulation D-2.1 and control tank viable organism concentration exceeding the values of regulation D-2.1 on discharge.
- .6 Sampling regime:
  - .1 For the control tank:
    - .1 three replicate samples of influent water, collected over the period of uptake (e.g., beginning, middle, end); and
    - .2 three replicate samples of discharge control water, collected over the period of discharge (e.g., beginning, middle, end).
  - .2 For treated ballast water:
    - .1 Three replicate samples of discharge treated water collected at each of three times during the period of discharge (e.g., 3 x beginning, 3 x middle, 3 x end).
  - .3 Sample sizes are:

- .1 For the enumeration of organisms greater than or equal to 50 micrometres or more in minimum dimension, samples of at least one cubic metre should be collected. If samples are concentrated for enumeration the samples should be concentrated using a sieve no greater than 50 micrometres mesh in diagonal dimension.
- .2 For the enumeration of organisms greater than or equal to 10 micrometres and less than 50 micrometres in minimum dimension, samples of at least one litre should be collected. If samples are concentrated for enumeration the samples should be concentrated using a sieve no greater than 10 micrometres mesh in diagonal dimension.
- .3 For the evaluation of bacteria a sample of at least 500 millilitres should be taken from the influent and treated water. In the absence of laboratory facilities on board the toxicogenic test requirements should be conducted in an appropriately approved laboratory. However, this may limit the applicability of this test.
- .7 The test cycles including invalid and unsuccessful test cycles are to span a trial period of not less than six months.
- .8 The applicant is requested to perform three consecutive test cycles that comply with regulation D-2 and which are valid in accordance with paragraph 2.2.2.5. Any invalid test cycle does not affect the consecutive sequence.
- .9 The source water for test cycles shall be characterized by measurement of salinity, temperature, particulate organic carbon and total suspended solids.
- .10 For system operation throughout the trial period, the following information should also be provided:
  - .1 documentation of all ballast water operations including volumes and locations of uptake and discharge, and if heavy weather was encountered and where;
  - .2 the possible reasons for the occurrence of an unsuccessful test cycle, or a test cycle discharge failing the D-2 standard should be investigated and reported to the Administration;
  - .3 documentation of scheduled maintenance performed on the system;
  - .4 documentation of unscheduled maintenance and repair performed on the system;
  - .5 documentation of engineering parameters monitored as appropriate to the specific system; and
  - .6 documentation of functioning of the control and monitoring equipment.

## **2.3 Land-based testing**

2.3.1 The test set-up including the ballast water treatment equipment should operate as described in the provided documentation during at least 5 valid replicate test cycles. Each test cycle should take place over a period of at least 5 days.

2.3.2 A land-based test cycle should include:

- .1 the uptake of ballast water by pumping;
- .2 the storage of ballast water for at least 5 days;
- .3 treatment of ballast water within the BWMS, except in control tanks; and
- .4 the discharge of ballast water by pumping.

2.3.3 Testing should occur using different water conditions sequentially as provided for in paragraphs 2.3.17 and 2.3.18.

2.3.4 The BWMS should be tested at its rated capacity or as given in paragraphs 2.3.13 to 2.3.15 for each test cycle. The equipment should function to specifications during this test.

2.3.5 The analysis of treated water discharge from each test cycle should be used to determine that the average of discharge samples does not exceed the concentrations of regulation D-2 of the Convention.

2.3.6 The analysis of treated water discharge from the relevant test cycle(s) should also be used to evaluate the toxicity of the discharged water for BWMS that make use of Active Substances and also for those BWMS that do not make use of Active Substances or Preparations but which could reasonably be expected to result in changes to the chemical composition of the treated water such that adverse impacts to receiving waters might occur upon discharge. Toxicity tests of the treated water discharge should be conducted in accordance with paragraphs 5.2.3 to 5.2.7 of the Procedure for approval of ballast water management systems that make use of Active Substances, as revised (resolution MEPC.169(57)).

### **Land-based testing objectives, limitations and criteria for evaluation**

2.3.7 The land-based testing serves to determine the biological efficacy and environmental acceptability of the BWMS under consideration for Type Approval. The approval testing aims to ensure replicability and comparability to other treatment equipment.

2.3.8 Any limitations imposed by the ballast water management system on the testing procedure described here should be duly noted and evaluated by the Administration.

### **Land-based set-up**

2.3.9 The test set-up for approval tests should be representative of the characteristics and arrangements of the types of ships in which the equipment is intended to be installed. The test set-up should therefore include at least the following:

- .1 the complete BWMS to be tested;
- .2 piping and pumping arrangements; and
- .3 the storage tank that simulates a ballast tank, constructed such that the water in the tank should be completely shielded from light.

2.3.10 The control and treated simulated ballast tanks should each include:

- .1 a minimum capacity of 200 m<sup>3</sup>;
- .2 normal internal structures, including lightening and drainage holes;
- .3 standard industry practices for design, construction and surface coatings for ships; and
- .4 the minimum modifications required for structural integrity on land.

2.3.11 The test set-up should be pressure-washed with tap water, dried and swept to remove loose debris, organisms and other matter before starting testing procedures, and between test cycles.

2.3.12 The test set-up will include facilities to allow sampling as described in paragraphs 2.3.26 and 2.3.27 and provisions to supply influents to the system, as specified in paragraph 2.3.19 and/or 2.3.20. The installation arrangements should conform in each case with those specified and approved under the procedure outlined in section 7 of the main body to these Guidelines.

#### **Ballast water treatment equipment scaling**

2.3.13 In-line treatment equipment may be downsized for land-based testing, but only when the following criteria are taken into account:

- .1 equipment with a TRC equal to or smaller than 200 m<sup>3</sup>/h should not be downscaled;
- .2 equipment with a TRC larger than 200 m<sup>3</sup>/h but smaller than 1,000 m<sup>3</sup>/h may be downscaled to a maximum of 1:5 scale, but may not be smaller than 200 m<sup>3</sup>/h; and
- .3 equipment with a TRC equal to, or larger than, 1,000 m<sup>3</sup>/h may be downscaled to a maximum of 1:100 scale, but may not be smaller than 200 m<sup>3</sup>/h.

2.3.14 The manufacturer of the equipment should demonstrate by using mathematical modelling and/or calculations, that any downscaling will not affect the ultimate functioning and effectiveness on board a ship of the type and size for which the equipment will be certified.

2.3.15 In-tank treatment equipment should be tested on a scale that allows verification of full-scale effectiveness. The suitability of the test set-up should be evaluated by the manufacturer and approved by the Administration.

2.3.16 Larger scaling may be applied and lower flow rates used than provided for in 2.3.13, if the manufacturer can provide evidence from full-scale shipboard testing and in accordance with 2.3.14 that scaling and flow rates will not adversely affect the ability of the results to predict full-scale compliance with the standard.

**Land-based test design – inlet and outlet criteria**

2.3.17 For any given set of test cycles (5 replicates is considered a set) a salinity range should be chosen. Given the salinity, the test water used in the test set up described above should have dissolved and particulate content in one of the following combinations:

	Salinity		
	> 32 PSU	3 – 32 PSU	< 3 PSU
Dissolved Organic Carbon (DOC)	> 1 mg/l	> 5 mg/l	> 5 mg/l
Particulate Organic Carbon (POC)	> 1 mg/l	> 5 mg/l	> 5 mg/l
Total Suspended Solids (TSS)	> 1 mg/l	> 50 mg/l	> 50 mg/l

2.3.18 At least two sets of tests cycles should be conducted, each with a different salinity range and associated dissolved and particulate content as prescribed in paragraph 2.3.17. Tests under adjacent salinity ranges in the above table should be separated by at least 10 PSU<sup>5</sup>.

2.3.19 Test organisms may be either naturally occurring in the test water, or cultured species that may be added to the test water. The organism concentration should comply with paragraph 2.3.20 below.

2.3.20 The influent water should include:

- .1 test organisms of greater than or equal to 50 micrometres or more in minimum dimension should be present in a total density of preferably 10<sup>6</sup> but not less than 10<sup>5</sup> individuals per cubic metre, and should consist of at least 5 species from at least 3 different phyla/divisions;
- .2 test organisms greater than or equal to 10 micrometres and less than 50 micrometres in minimum dimension should be present in a total density of preferably 10<sup>4</sup> but not less than 10<sup>3</sup> individuals per millilitre, and should consist of at least 5 species from at least 3 different phyla/divisions;
- .3 heterotrophic bacteria should be present in a density of at least 10<sup>4</sup> living bacteria per millilitre; and

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<sup>5</sup> For example, if one set of test cycles is carried out at >32 PSU and a second set at 3-32 PSU, the test cycle in the 3-32 PSU range needs to be at least 10 PSU less than the lowest salinity used in the test cycle in the >32 PSU range.

- .4 the variety of organisms in the test water should be documented according to the size classes mentioned above regardless if natural organism assemblages or cultured organisms were used to meet the density and organism variety requirements.

2.3.21 The following bacteria do not need to be added to the influent water, but should be measured at the influent and at the time of discharge:

- .1 Coliform;
- .2 Enterococcus group;
- .3 *Vibrio cholerae*; and
- .4 Heterotrophic bacteria.

2.3.22 If cultured test organisms are used, then it should be ensured that local applicable quarantine regulations are taken into account during culturing and discharge.

#### **Land-based monitoring and sampling**

2.3.23 Change of numbers of test organisms by treatment and during storage in the simulated ballast tank should be measured using methods described in Part 4 of the annex, paragraphs 4.5 to 4.7.

2.3.24 It should be verified that the treatment equipment performs within its specified parameters, such as power consumption and flow rate, during the test cycle.

2.3.25 Environmental parameters such as pH, temperature, salinity, dissolved oxygen, TSS, DOC, POC and turbidity (NTU)<sup>6</sup> should be measured at the same time that the samples described are taken.

2.3.26 Samples during the test should be taken at the following times and locations: immediately before the treatment equipment, immediately after the treatment equipment and upon discharge.

2.3.27 The control and treatment cycles may be run simultaneously or sequentially. Control samples are to be taken in the same manner as the equipment test as prescribed in paragraph 2.3.26 and upon influent and discharge. A series of examples are included in figure 1.

2.3.28 Facilities or arrangements for sampling should be provided to ensure representative samples of treated and control water can be taken that introduce as little adverse effects as possible on the organisms.

2.3.29 Samples described in paragraphs 2.3.26 and 2.3.27 should be collected in triplicate on each occasion.

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<sup>6</sup> NTU=Nominal Turbidity Unit.

2.3.30 Separate samples should be collected for:

- .1 organisms of greater than or equal to 50 micrometres or more in minimum dimension;
- .2 organisms greater than or equal to 10 micrometres and less than 50 micrometres in minimum dimension;
- .3 for coliform, enterococcus group, *Vibrio cholerae* and heterotrophic bacteria; and
- .4 toxicity testing of treated water, from the discharge, for BWMS that make use of Active Substances and also for those BWMS that do not make use of Active Substances or Preparations but which could reasonably be expected to result in changes to the chemical composition of the treated water such that adverse impacts to receiving waters might occur upon discharge.

2.3.31 For the comparison of organisms of greater than or equal to 50 micrometres or more in minimum dimension against the D-2 standard, at least 20 litres of influent water and 1 cubic metre of treated water, in triplicate respectively, should be collected. If samples are concentrated for enumeration, the samples should be concentrated using a sieve no greater than 50 micrometres mesh in the diagonal dimension.

2.3.32 For the evaluation of organisms greater than or equal to 10 micrometres and less than 50 micrometres in minimum dimension, at least 1 litre of influent water and at least 10 litres of treated water should be collected. If samples are concentrated for enumeration, the samples should be concentrated using a sieve no greater than 10 micrometres mesh in the diagonal dimension.

2.3.33 For the evaluation of bacteria, at least 500 millilitres of influent and treated water should be collected in sterile bottles.

2.3.34 The samples should be analysed as soon as possible after sampling, and analysed live within 6 hours or treated in such a way so as to ensure that proper analysis can be performed.

2.3.35 The efficacy of a proposed system should be tested by means of standard scientific methodology in the form of controlled experimentation, i.e. “experiments”. Specifically, the effect of the BWMS on organism concentration in ballast water should be tested by comparing treated ballast water, i.e. “treated groups”, to untreated “control groups”, such that:

- .1 one experiment should consist of a comparison between control water and treated water. Multiple samples, but at a minimum of three, of control and treated water within a single test cycle should be taken to obtain a good statistical estimate of the conditions within the water during that experiment. Multiple samples taken during a single test cycle should not be treated as independent measures in the statistical evaluation of treatment effect, to avoid “pseudo-replication”.

2.3.36 If in any test cycle the average discharge results from the control water is a concentration less than or equal to 10 times the values in regulation D-2.1, the test cycle is invalid.

2.3.37 Statistical analysis of BWMS performance should consist of t-tests, or similar statistical tests, comparing control and treated water. The comparison between control and treated water will provide a test of unexpected mortality in the control water, indicating the effect of an uncontrolled source of mortality in the testing arrangement.

## **2.4 Reporting of test results**

2.4.1 After approval tests have been completed, a report should be submitted to the Administration. This report should include information regarding the test design, methods of analysis and the results of these analyses.

2.4.2 The results of biological efficacy testing of the BWMS should be accepted if during the land-based and shipboard testing conducted as specified in sections 2.2 and 2.3 of this annex it is shown that the system has met the standard in regulation D-2 in all test cycles as provided in paragraph 4.7 below.

## **PART 3 — SPECIFICATION FOR ENVIRONMENTAL TESTING FOR APPROVAL OF BALLAST WATER MANAGEMENT SYSTEMS**

### **Test specifications**

3.1 The electrical and electronic sections of BWMS in the standard production configuration should be subjected to the programme of environmental tests set out in this specification at a laboratory approved for the purpose by the Administration or by the competent authority of the manufacturer's home country.

3.2 Evidence of successful compliance with the environmental tests below should be submitted to the Administration by the manufacturer together with the application for type approval.

### **Test specification details**

3.3 Equipment should operate satisfactorily on completion of each of the operating environment tests listed below.

### **Vibration tests**

3.4 A resonance search should be made over the following ranges of oscillation frequency and amplitude:

- .1 2 to 13.3 Hz with a vibration amplitude of 1 mm; and
- .2 13.2 to 80 Hz with an acceleration amplitude of 0.7 g.

This search should be made in each of the three orthogonal planes at a rate sufficiently low to permit resonance detection.

3.5 The equipment should be vibrated in the above-mentioned planes at each major resonant frequency for a period of two hours.

3.6 In the absence of any resonant frequency, the equipment should be vibrated in each of the planes at 30 Hz with an acceleration of 0.7 g for a period of two hours.

3.7 After completion of the tests specified in paragraph 3.5 or 3.6 a search should again be made for resonance and there should be no significant change in the vibration pattern.

### **Temperature tests**

3.8 Equipment that may be installed in exposed areas on the open deck, or in an enclosed space not environmentally controlled should be subjected, for a period of not less than two hours, to:

- .1 a low temperature test at -25°C; and
- .2 a high temperature test at 55°C.

3.9 Equipment that may be installed in an enclosed space that is environmentally controlled including an engine-room should be subjected, for a period of not less than two hours, to:

- .1 a low temperature test at 0°C; and
- .2 a high temperature test at 55°C.

3.10 At the end of each of the tests referred to in the subparagraphs above, the equipment should be switched on and it should function normally under the test conditions.

### **Humidity tests**

3.11 Equipment should be left switched off for a period of two hours at a temperature of 55°C in an atmosphere with a relative humidity of 90%. At the end of this period, the equipment should be switched on and should operate satisfactorily for one hour under the test conditions.

### **Tests for protection against heavy seas**

3.12 Equipment that may be installed in exposed areas on the open deck should be subjected to tests for protection against heavy seas in accordance with 1P 56 of publication IEC 529 or its equivalent.

### **Fluctuation in power supply**

3.13 Equipment should operate satisfactorily with:

- .1 a voltage variation of +/- 10% together with a simultaneous frequency variation of +/- 5%; and

- .2 a transient voltage of +/- 20% together with a simultaneous frequency transient of +/- 10%, with a transient recovery time of three seconds.

### **Inclination test**

3.14 The BWMS should be designed to operate when the ship is upright and when inclined at any angle of list up to and including 15° either way under static conditions and 22.5° under dynamic conditions (rolling) either way and simultaneously inclined dynamically (pitching) 7.5° by bow or stern. The Administration may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship and operational functioning of the equipment. Any deviation permitted is to be documented in the Type Approval Certificate.

### **Reliability of electrical and electronic equipment**

3.15 The electrical and electronic components of the equipment should be of a quality guaranteed by the manufacturer and suitable for their intended purpose.

## **PART 4 – SAMPLE ANALYSIS METHODS FOR THE DETERMINATION OF BIOLOGICAL CONSTITUENTS IN BALLAST WATER**

### **Sample processing and analysis**

4.1 Samples taken during testing of BWMS are likely to contain a wide taxonomic diversity of organisms, varying greatly in size and susceptibilities to damage from sampling and analysis.

4.2 When available, widely accepted standard methods for the collection, handling (including concentration), storage, and analysis of samples should be used. These methods should be clearly cited and described in test plans and reports. This includes methods for detecting, enumerating, and identifying organisms and for determining viability (as defined in these Guidelines).

4.3 When standard methods are not available for particular organisms or taxonomic groups, methods that are developed for use should be described in detail in test plans and reports. The descriptive documentation should include any experiments needed to validate the use of the methods.

4.4 Given the complexity in samples of natural and treated water, the required rarity of organisms in treated samples under regulation D-2, and the expense and time requirements of current standard methods, it is likely that several new approaches will be developed for the analyses of the composition, concentration, and viability of organisms in samples of ballast water. Administrations/Parties are encouraged to share information concerning methods for the analysis of ballast water samples, using existing scientific venues, and papers distributed through the Organization.

### **Sample analysis for determining efficacy in meeting the discharge standard**

4.5 Sample analysis is meant to determine the species composition and the number of viable organisms in the sample. Different samples may be taken for determination of viability and for species composition.

4.6 Viability of an organism can be determined through live/dead judgement by appropriate methods including, but not limited to: morphological change, mobility, staining using vital dyes or molecular techniques.

4.7 A treatment test cycle should be deemed successful if:

- .1 it is valid in accordance with paragraph 2.2.2.5 or 2.3.36 as appropriate;
- .2 the average density of organisms greater than or equal to 50 micrometres in minimum diameter in the replicate samples is less than 10 viable organisms per cubic metre;
- .3 the average density of organisms less than 50 micrometres and greater than or equal to 10 micrometres in minimum diameter in the replicate samples is less than 10 viable organisms per millilitre;
- .4 the average density of *Vibrio cholerae* (serotypes O1 and O139) is less than 1 cfu per 100 millilitres, or less than 1 cfu per 1 gramme (wet weight) zooplankton samples;
- .5 the average density of *E. coli* in the replicate samples is less than 250 cfu per 100 millilitres; and
- .6 the average density of intestinal *Enterococci* in the replicate samples is less than 100 cfu per 100 millilitres.

4.8 It is recommended that a non-exhaustive list of standard methods and innovative research techniques be considered<sup>7</sup>.

*Sample analysis for determining eco-toxicological acceptability of discharge*

4.9 Toxicity tests of the treated water discharge should be conducted in accordance with paragraphs 5.2.3 to 5.2.7 of the Procedure for approval of ballast water management systems that make use of Active Substances, as revised (resolution MEPC.169(57)).

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<sup>7</sup> Suggested sources may include but not be limited to:

- .1 The Handbook of Standard Methods For the Analysis of Water and Waste Water.
- .2 ISO standard methods.
- .3 UNESCO standard methods.
- .4 World Health Organization.
- .5 American Society of Testing and Materials (ASTM) standard methods.
- .6 United States EPA standard methods.
- .7 Research papers published in peer-reviewed scientific journals.
- .8 MEPC documents.

**APPENDIX**

**BADGE OR CIPHER**

*NAME OF ADMINISTRATION*

**TYPE APPROVAL CERTIFICATE OF BALLAST WATER MANAGEMENT SYSTEM**

This is to certify that the ballast water management system listed below has been examined and tested in accordance with the requirements of the specifications contained in the Guidelines contained in IMO resolution MEPC...(..). This certificate is valid only for the ballast water management system referred to below.

Ballast water management system supplied by .....

under type and model designation .....  
and incorporating:

Ballast water management system manufactured by .....

to equipment/assembly drawing No. .... date .....

Other equipment manufactured by .....

to equipment/assembly drawing No. .... date .....

Treatment rated capacity ..... m<sup>3</sup>/h

A copy of this Type Approval Certificate, should be carried on board a vessel fitted with this ballast water management system at all times. A reference to the test protocol and a copy of the test results should be available for inspection on board the vessel. If the Type Approval Certificate is issued based on approval by another Administration, reference to that Type Approval Certificate shall be made.

Limiting Conditions imposed are described in the appendix to this document.

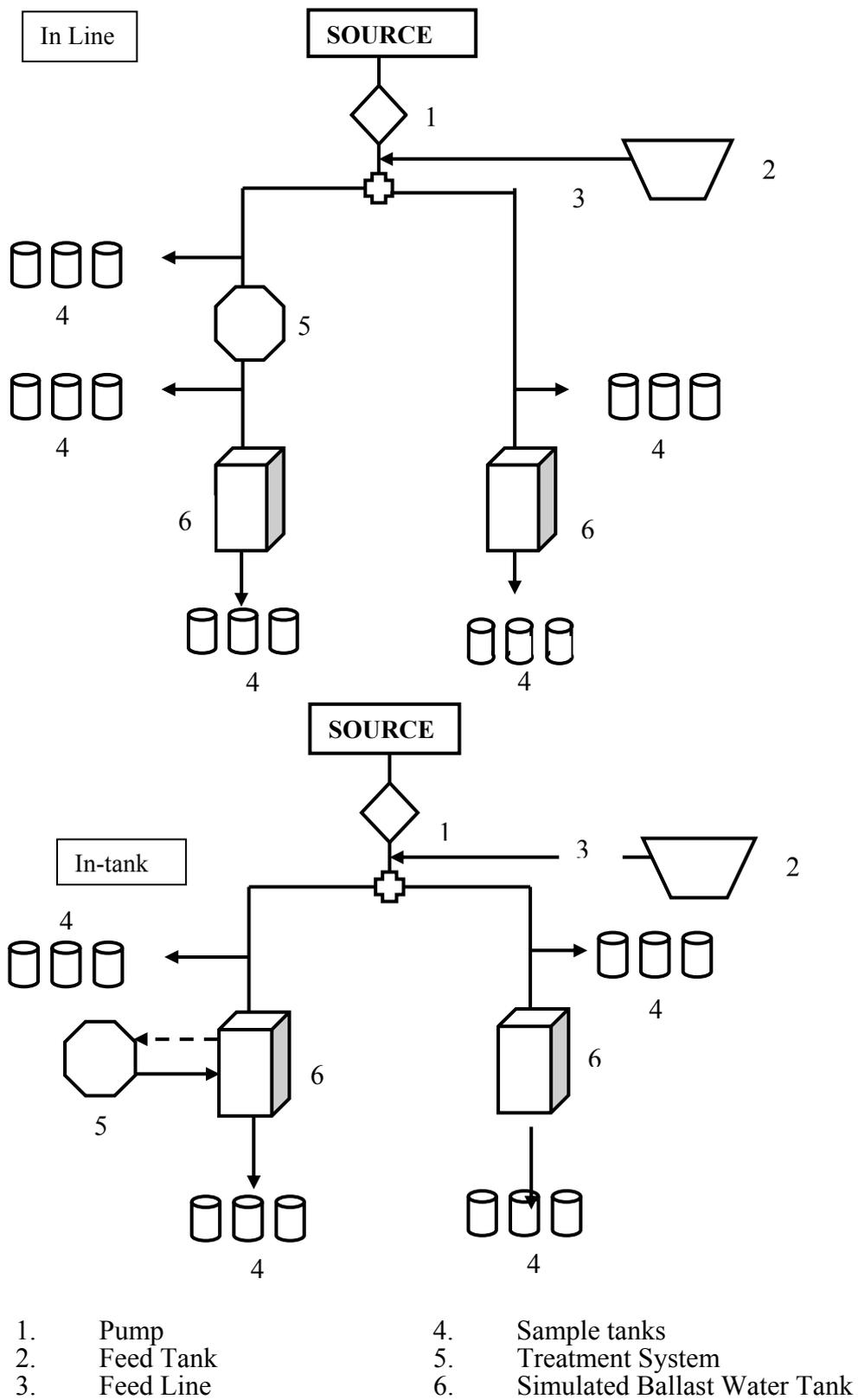
Official stamp                      Signed .....

   Administration of .....

   Dated this ..... day of ..... 20.....

Enc. Copy of the original test results.

Figure 1 Diagrammatic arrangement of possible land-based tests



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**ANNEX 5****Resolution MEPC.175(58)****Adopted on 10 October 2008****INFORMATION REPORTING ON  
TYPE APPROVED BALLAST WATER MANAGEMENT SYSTEMS**

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 the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on Ballast Water Management for Ships held in February 2004 adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Ballast Water Management Convention) together with four Conference resolutions,

RECALLING FURTHER that, on entry into force, the Ballast Water Management Convention will require ships to install ballast water management systems, which meet the D-2 standard stipulated therein,

RECOGNIZING that the collection and dissemination of accurate information on type-approved ballast water management systems (BWMS) will be beneficial for all interested stakeholders,

HAVING CONSIDERED the recommendation made by the Sub-Committee on Bulk Liquids and Gases at its twelfth session,

1. INVITES Member States, when approving a ballast water management system in accordance with the Guidelines for approval of ballast water management systems (G8), to report the following information to the Organization:

- .1 approval date;
- .2 name of the Administration;
- .3 name of the BWMS;
- .4 a copy of the Type Approval Certificate and any enclosures, including a copy of, or details about access to, the results from land-based and shipboard testing and the procedures used, including ecotoxicological test results from ballast water management systems approved through Guidelines (G8);

- .5 a description of the Active Substance(s), if employed; and
  - .6 identification of the specific MEPC report and paragraph number granting Final Approval in accordance with the Procedure for approval of ballast water management systems that make use of Active Substances (G9), adopted by resolution MEPC.169(57).
2. INSTRUCTS the Secretariat to make such information available by an appropriate means.

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**ANNEX 6****DRAFT INTERNATIONAL CONVENTION FOR THE SAFE AND ENVIRONMENTALLY SOUND RECYCLING OF SHIPS**

THE PARTIES TO THIS CONVENTION,

NOTING the growing concerns about safety, health, the environment and welfare matters in the ship recycling industry,

RECOGNIZING that recycling of ships contributes to sustainable development and, as such, is the best option for ships that have reached the end of their operating life,

RECALLING resolution A.962(23), adopted by the Assembly of the International Maritime Organization (Guidelines on Ship Recycling); amendments to the Guidelines adopted by resolution A.980(24); Decision VI/24 of the Sixth Meeting of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which adopted Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships; and the Guidelines approved by the 289th session of the Governing Body of the International Labour Office (Safety and Health in Shipbreaking: Guidelines for Asian countries and Turkey),

RECALLING ALSO resolution A.981(24), by which the Assembly of the International Maritime Organization requested the Organization's Marine Environment Protection Committee to develop a legally-binding instrument on ship recycling,

NOTING ALSO the role of the International Labour Organization in protecting the occupational safety and health of workers involved in ship recycling,

NOTING FURTHER the role of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in protecting human health and the environment against the adverse effects which may result from such wastes,

MINDFUL of the precautionary approach set out in Principle 15 of the Rio Declaration on Environment and Development and referred to in resolution MEPC.67(37), adopted by the Organization's Marine Environment Protection Committee on 15 September 1995,

MINDFUL ALSO of the need to promote the substitution of hazardous materials in the construction and maintenance of ships by less hazardous, or preferably, non-hazardous materials, without compromising the ships' safety, the safety and health of seafarers and the ships' operational efficiency,

RESOLVED to effectively address, in a legally-binding instrument, the environmental, occupational health and safety risks related to ship recycling, taking into account the particular characteristics of maritime transport and the need to secure the smooth withdrawal of ships that have reached the end of their operating lives,

CONSIDERING that these objectives may best be achieved by the conclusion of an International Convention for the Safe and Environmentally Sound Recycling of Ships,

HAVE AGREED as follows:

## **ARTICLE 1**

### **General obligations**

- 1 Each Party to this Convention undertakes to give full and complete effect to its provisions in order to prevent, reduce, minimize and, to the extent practicable, eliminate accidents, injuries and other adverse effects on human health and the environment caused by Ship Recycling, and enhance ship safety, protection of human health and the environment throughout a ship's operating life.
- 2 No provision of this Convention shall be interpreted as preventing a Party from taking, individually or jointly, more stringent measures consistent with international law with respect to safe and environmentally sound recycling of ships in order to prevent, reduce or minimize any adverse effects on human health and the environment.
- 3 Parties shall endeavour to co-operate for the purpose of effective implementation, compliance and enforcement of this Convention.
- 4 The Parties undertake to encourage the continued development of technologies and practices which will contribute to safe and environmentally sound Ship Recycling.
- 5 The Annex to this Convention forms an integral part of it. Unless expressly provided for otherwise, a reference to this Convention constitutes at the same time a reference to its Annex.

## **ARTICLE 2**

### **Definitions**

For the purposes of this Convention, unless expressly provided otherwise:

- 1 "Administration" means the Government of the State whose flag the ship is entitled to fly, or under whose authority it is operating.
- 2 "Committee" means the Marine Environment Protection Committee of the Organization.
- 3 "Competent Authority(ies)" means a governmental authority or authorities designated by a Party as responsible, within specified geographical area(s) or area(s) of expertise, for duties related to Ship Recycling Facilities operating within the jurisdiction of that Party as specified in this Convention.
- 4 "Convention" means the International Convention for the Safe and Environmentally Sound Recycling of Ships.
- 5 "Gross tonnage" means the gross tonnage (GT) calculated in accordance with the tonnage measurement regulations contained in Annex I to the International Convention on Tonnage Measurement of Ships, 1969 or any successor Convention.

6 “Hazardous Material” means any material or substance which is liable to create hazards to human health and/or the environment.

7 “Organization” means the International Maritime Organization.

8 “Recycling Company” means the owner of the Ship Recycling Facility or any other organization or person who has assumed the responsibility for operation of the Ship Recycling activity from the owner of the Ship Recycling Facility and who on assuming such responsibility has agreed to take over all duties and responsibilities imposed by this Convention.

9 “Secretary-General” means the Secretary-General of the Organization.

10 “Ship” means a vessel of any type whatsoever operating or having operated in the marine environment and includes submersibles, floating craft, floating platforms, self elevating platforms, Floating Storage Units (FSUs), and Floating Production Storage and Offloading Units (FPSOs), including a vessel stripped of equipment or being towed.

11 “Ship Recycling” means the activity of complete or partial dismantling of a ship at a Ship Recycling Facility in order to recover components and materials for reprocessing and re-use, whilst taking care of hazardous and other materials, and includes associated operations such as storage and treatment of components and materials on site, but not their further processing or disposal in separate Ship Recycling Facilities.

12 “Ship Recycling Facility” means a defined area that is a site, yard or facility used for the recycling of ships.

### **ARTICLE 3**

#### **Application**

1 Unless expressly provided otherwise in this Convention, this Convention shall apply to:

- .1 ships entitled to fly the flag of a Party or operating under its authority;
- .2 Ship Recycling Facilities operating under the jurisdiction of a Party.

2 This Convention shall not apply to any warships, naval auxiliary, or other ships owned or operated by a Party and used, for the time being, only on government non-commercial service. However, each Party shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with this Convention.

3 This Convention shall not apply to ships of less than 500 GT or to ships operating throughout their life only in waters subject to the sovereignty or jurisdiction of the State whose flag the ship is entitled to fly. However, each Party shall ensure, by the adoption of appropriate measures, that such ships act in a manner consistent with this Convention, so far as is reasonable and practicable.

4 With respect to ships entitled to fly the flag of non-Parties to this Convention, Parties shall apply the requirements of this Convention as may be necessary to ensure that no more favourable treatment is given to such ships.

#### **ARTICLE 4**

##### **Controls related to Ship Recycling**

1 Each Party shall require that ships entitled to fly its flag or operating under its authority comply with the requirements set forth in this Convention and shall take effective measures to ensure such compliance.

2 Each Party shall require that Ship Recycling Facilities under its jurisdiction comply with the requirements set forth in this Convention and shall take effective measures to ensure such compliance.

#### **ARTICLE 5**

##### **Survey and certification of ships**

Each Party shall ensure that ships flying its flag or operating under its authority and subject to survey and certification are surveyed and certified in accordance with the regulations in the Annex.

#### **ARTICLE 6**

##### **Authorization of Ship Recycling Facilities**

Each Party shall ensure that Ship Recycling Facilities that operate under its jurisdiction and that recycle ships to which this Convention applies, or ships treated similarly pursuant to Article 3.4 of this Convention, are authorized in accordance with the regulations in the Annex.

#### **ARTICLE 7**

##### **Exchange of information**

For the Ship Recycling Facilities authorized by a Party, such Party shall provide to the Organization if requested and those Parties which request it, relevant information, in regard to this Convention, on which its decision for authorization was based. The information shall be exchanged in a swift and timely manner.

#### **ARTICLE 8**

##### **Inspection of ships**

1 A ship to which this Convention applies may, in any port or offshore terminal of another Party, be subject to inspection by officers duly authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention. Except as provided in paragraph 2, any such inspection is limited to verifying that there is onboard either an

International Certificate on Inventory of Hazardous Materials, or an International Ready for Recycling Certificate, which, if valid, shall be accepted.

2 Where a ship does not carry a valid certificate or there are clear grounds for believing that:

- .1 the condition of the ship or its equipment does not correspond substantially with the particulars of the certificate, and/or the Inventory of Hazardous Materials Part I; or
- .2 there is no procedure implemented on board the ship for the maintenance of the inventory of Hazardous Materials Part I,

a detailed inspection may be carried out taking into account guidelines developed by the Organization.

## **ARTICLE 9**

### **Detection of violations**

1 Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Convention.

2 When there is sufficient evidence that a ship is operating, has operated or is about to operate in violation of a provision in this Convention, a Party holding the evidence may request an investigation of this ship when it enters the ports or offshore terminals under the jurisdiction of another Party. The report of such an investigation shall be sent to the Party requesting it and to the Administration of the ship concerned so that appropriate action may be taken.

3 If the ship is detected to be in violation of this Convention, the Party carrying out the inspection may take steps to warn, detain, dismiss, or exclude the ship from its ports. A Party taking such action shall immediately inform the Administration of the ship concerned and the Organization.

4 If a request for an investigation is received from any Party, together with sufficient evidence that a Ship Recycling Facility is operating, has operated or is about to operate in violation of any provision of this Convention, a Party should investigate this Ship Recycling Facility operating under its jurisdiction and make a report. The report of any such investigation shall be sent to the Party requesting it, including information on the appropriate action taken, or to be taken, if any.

## **ARTICLE 10**

### **Violations**

1 Any violation of the requirements of this Convention shall be prohibited by national laws and:

- .1 in the case of a ship concerned, sanctions shall be established under the law of the Administration, wherever the violation occurs. If the Administration is informed of such a violation, by a Party, it shall investigate the matter and may request the reporting Party to furnish additional evidence of the alleged violation. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken as soon as possible, in accordance with its law. The Administration shall promptly inform the Party that reported the alleged violation, as well as the Organization, of any action taken. If the Administration has not taken any action within one year after receiving the information, it shall so inform the Party which reported the alleged violation, and the Organization, of the reasons why no action has been taken;
  - .2 in the case of a Ship Recycling Facility concerned, sanctions shall be established under the law of the Party having jurisdiction over the Ship Recycling Facility. If the Party is informed of such a violation by another Party, it shall investigate the matter and may request the reporting Party to furnish additional evidence of the alleged violation. If the Party is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken as soon as possible, in accordance with its law. The Party shall promptly inform the Party that reported the alleged violation, as well as the Organization, of any action taken. If the Party has not taken any action within one year after receiving the information, it shall inform the Party which reported the alleged violation, and the Organization, of the reasons why no action has been taken.
- 2 Any violation of the requirements of this Convention within the jurisdiction of any Party shall be prohibited and sanctions shall be established under the law of that Party. Whenever such a violation occurs, that Party shall either:
- .1 cause proceedings to be taken in accordance with its law; or
  - .2 furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.
- 3 The sanctions provided for by the laws of a Party pursuant to this Article shall be adequate in severity to discourage violations of this Convention wherever they occur.

## **ARTICLE 11**

### **Undue delay or detention of ships**

- 1 All possible efforts shall be made to avoid a ship being unduly detained or delayed under Article 8, 9 or 10 of this Convention.
- 2 When a ship is unduly detained or delayed under Article 8,9 or 10 of this Convention, it shall be entitled to compensation for any loss or damage suffered.

## **ARTICLE 12**

### **Communication of information**

Each Party shall report to the Organization and the Organization shall disseminate, as appropriate, the following information:

- .1 a list of Ship Recycling Facilities authorized in accordance with this Convention and operating under the jurisdiction of that Party;
- .2 contact details for the Competent Authority(ies), including a contact point, of that Party;
- .3 a list of the recognized organizations and nominated surveyors which are authorized to act on behalf of that Party in the administration of matters relating to the control of Ship Recycling in accordance with this Convention, and the specific responsibilities and conditions of the authority delegated to the nominated surveyors or recognized organizations;
- .4 an annual list of ships recycled within the jurisdiction of that Party;
- .5 an annual list of ships flying the flag of that Party, deregistered in order to be recycled and the Recycling Company name and location of the Ship Recycling Facility where the recycling was undertaken and completed;
- .6 information concerning violations of this Convention; and
- .7 actions taken towards ships and Ship Recycling Facilities under the jurisdiction of that Party.

## **ARTICLE 13**

### **Technical assistance and co-operation**

1 Parties undertake, directly or through the Organization and other international bodies, as appropriate, in respect of the safe and environmentally sound recycling of ships, to provide support for those Parties which request technical assistance:

- .1 to train personnel;
- .2 to ensure the availability of relevant technology, equipment and facilities;
- .3 to initiate joint research and development programmes; and
- .4 to undertake other actions aimed at the effective implementation of this Convention and of guidelines developed by the Organization related thereto.

2 Parties undertake to co-operate actively, subject to their national laws, regulations and policies, in the transfer of management systems and technology in respect of the safe and environmentally sound recycling of ships.

**ARTICLE 14**  
**Dispute settlement**

Parties shall settle any dispute between them concerning the interpretation or application of this Convention by negotiation or any other peaceful means agreed upon [by them], which may include enquiry, mediation, conciliation, arbitration, judicial settlement, or resort to regional agencies or arrangements.

**ARTICLE 15**  
**Relationship with international law and other international agreements**

1 Nothing in this Convention shall prejudice the rights and obligations of any State under the United Nations Convention on the Law of the Sea, 1982, and under the customary international law of the sea.

2 Nothing in this Convention shall prejudice the rights and responsibilities of Parties under other relevant and applicable international agreements.

**ARTICLE 16**  
**Signature, ratification, acceptance, approval and accession**

1 This Convention shall be open for signature by any State at the Headquarters of the Organization from [date 20xx to date 20xx] and shall thereafter remain open for accession by any State.

2 States may become Parties to this Convention by:

- .1 signature not subject to ratification, acceptance, or approval; or
- .2 signature subject to ratification, acceptance, or approval, followed by ratification, acceptance or approval; or
- .3 accession.

3 Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General.

4 If a State comprises two or more territorial units in which different systems of law are applicable in relation to matters dealt with in this Convention, it may at the time of signature, ratification, acceptance, approval, or accession declare that this Convention shall extend to all its territorial units or only to one or more of them and may modify this declaration by submitting another declaration at any time.

5 A declaration under paragraph 4 shall be notified to the Secretary-General in writing and shall state expressly the territorial unit or units to which this Convention applies.

6 A State at the time it expresses its consent to be bound by this Convention, or thereafter by notification to the Secretary-General, may declare that it shall not require approval of a specific Ship Recycling Plan before a ship may be recycled in its authorized Ship Recycling Facility(ies).

## **ARTICLE 17**

### **Entry into force**

[1 This Convention shall enter into force [ ] months after the date on which not less than [ ] States, the combined merchant fleets of which constitute not less than [ ] per cent of the gross tonnage of the world's merchant shipping, [and the Ship Recycling capacity criterion], have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with Article 16.

2 For States which have deposited an instrument of ratification, acceptance, approval or accession in respect of this Convention after the requirements for entry into force thereof have been met, but prior to the date of entry into force, the ratification, acceptance, approval or accession shall take effect on the date of entry into force of this Convention, or three months after the date of deposit of the instrument, whichever is the later date.

3 Any instrument of ratification, acceptance, approval or accession deposited after the date on which this Convention enters into force shall take effect three months after the date of deposit.

4 After the date on which an amendment to this Convention is deemed to have been accepted under Article 18, any instrument of ratification, acceptance, approval or accession deposited shall apply to this Convention, as amended.]

## **ARTICLE 18**

### **Amendments**

1 This Convention may be amended by either of the procedures specified in the following paragraphs.

2 Amendments after consideration within the Organization:

- .1 Any Party may propose an amendment to this Convention. A proposed amendment shall be submitted to the Secretary-General, who shall then circulate it to the Parties and Members of the Organization at least six months prior to its consideration.
- .2 An amendment proposed and circulated as above shall be referred to the Committee for consideration. Parties, whether or not Members of the Organization, shall be entitled to participate in the proceedings of the Committee for consideration and adoption of the amendment.

- .3 Amendments shall be adopted by a two-thirds majority of the Parties present and voting in the Committee, on condition that at least one-third of the Parties shall be present at the time of voting.
- .4 Amendments adopted in accordance with subparagraph 3 shall be communicated by the Secretary-General to the Parties for acceptance.
- .5 An amendment shall be deemed to have been accepted in the following circumstances:
  - .5.1 An amendment to an article of this Convention shall be deemed to have been accepted on the date on which two-thirds of the Parties have notified the Secretary-General of their acceptance of it.
  - .5.2 An amendment to the Annex shall be deemed to have been accepted at the end of a period to be determined by the Committee at the time of its adoption, which period shall not be less than ten months after the date of adoption. However, if by that date more than one-third of the Parties notify the Secretary-General that they object to the amendment, it shall be deemed not to have been accepted.
- .6 An amendment shall enter into force under the following conditions:
  - .6.1 An amendment to an article of this Convention shall enter into force, for those Parties that have declared that they have accepted it, six months after the date on which it is deemed to have been accepted in accordance with subparagraph .5.1.
  - .6.2 An amendment to the Annex shall enter into force with respect to all Parties six months after the date on which it is deemed to have been accepted, except for any Party that has:
    - .6.2.1 notified its objection to the amendment in accordance with subparagraph .5.2 and that has not withdrawn such objection; or
    - .6.2.2 notified the Secretary-General, prior to the entry into force of such amendment, that the amendment shall enter into force for it only after a subsequent notification of its acceptance.
  - .6.3 A Party that has notified an objection under subparagraph .6.2.1 may subsequently notify the Secretary-General that it accepts the amendment. Such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.
  - .6.4 If a Party that has made a notification referred to in subparagraph .6.2.2 notifies the Secretary-General of its acceptance with respect to an amendment, such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.

- 3 Amendment by a Conference:
  - .1 Upon the request of a Party concurred in by at least one-third of the Parties, the Organization shall convene a Conference of Parties to consider amendments to this Convention.
  - .2 An amendment adopted by such a Conference by a two-thirds majority of the Parties present and voting shall be communicated by the Secretary-General to all Parties for acceptance.
  - .3 Unless the Conference decides otherwise, the amendment shall be deemed to have been accepted and shall enter into force in accordance with the procedures specified in paragraphs 2.5 and 2.6 respectively.
- 4 Any Party that has declined to accept an amendment to the Annex shall be treated as a non-Party only for the purpose of application of that amendment.
- 5 Any notification under this Article shall be made in writing to the Secretary-General.
- 6 The Secretary-General shall inform the Parties and Members of the Organization of:
  - .1 any amendment that enters into force and the date of its entry into force generally and for each Party; and
  - .2 any notification made under this Article.

#### **ARTICLE 19** **Denunciation**

- 1 This Convention may be denounced by any Party at any time after the expiry of two years from the date on which this Convention enters into force for that Party.
- 2 Denunciation shall be effected by written notification to the Secretary-General, to take effect one year after receipt or such longer period as may be specified in that notification.

#### **ARTICLE 20** **Depositary**

- 1 This Convention shall be deposited with the Secretary-General, who shall transmit certified copies of this Convention to all States which have signed this Convention or acceded thereto.
- 2 In addition to the functions specified elsewhere in this Convention, the Secretary-General shall:
  - .1 inform all States that have signed this Convention, or acceded thereto, of:

- .1.1 each new signature or deposit of an instrument of ratification, acceptance, approval or accession, together with the date thereof;
  - .1.2 the date of entry into force of this Convention;
  - .1.3 the deposit of any instrument of denunciation from this Convention, together with the date on which it was received and the date on which the denunciation takes effect; and
  - .1.4 other declarations and notifications received pursuant to this Convention; and
- .2 as soon as this Convention enters into force, transmit the text thereof to the Secretariat of the United Nations, for registration and publication in accordance with Article 102 of the Charter of the United Nations.

#### **ARTICLE 21** **Languages**

This Convention is established in a single original in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic.

DONE AT HONG KONG, CHINA, this [DD/MM/YYYY]

IN WITNESS WHEREOF the undersigned, being duly authorized by their respective Governments for that purpose, have signed this Convention.

ANNEX

**REGULATIONS FOR SAFE AND ENVIRONMENTALLY SOUND  
RECYCLING OF SHIPS**

**CHAPTER 1 – GENERAL PROVISIONS**

**Regulation 1 Definitions**

For the purposes of this Annex:

1 “Competent person” means a person with suitable qualifications, training, and sufficient knowledge, experience and skill, for the performance of the specific work. Specifically, a Competent person may be a trained worker or a managerial employee capable of recognizing and evaluating occupational hazards, risks, and employee exposure to potentially Hazardous Materials or unsafe conditions in a Ship Recycling Facility, and who is capable of specifying the necessary protection and precautions to be taken to eliminate or reduce those hazards, risks, or exposures. The Competent Authority may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

2 “Employer” means a natural or legal person that employs one or more workers engaged in Ship Recycling.

3 “Existing ship” means a ship which is not a new ship.

4 “Gas-free-for-hot-works condition” means a safe, non explosive condition for work requiring the use of electric arc or gas welding equipment, cutting burning equipment or other forms of naked flame, as well as heating or spark generating tools.

5 “New ship” means a ship:

- .1 for which the building contract is placed on or after the entry into force of this Convention; or
- .2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after six months after the entry into force of this Convention; or
- .3 the delivery of which is on or after 30 months after the entry into force of this Convention.

6 “New installation” means the installation of systems, equipment, insulation, or other material on a ship after the date on which this Convention enters into force.

7 “Shipowner” means the person or persons or company registered as the owner of the ship or, in the absence of registration, the person or persons or company owning the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the

responsibility for operation of the ship from the owner of the ship. However, in the case of a ship owned by a State and operated by a company which in that State is registered as the ship's operator, "owner" shall mean such company. This term also includes those who have ownership of the ship for a limited period pending its sale or handing over to a Ship Recycling Facility.

8 "Site inspection" means an inspection of the Ship Recycling Facility confirming the condition described by the verified documentation.

9 "Statement of Completion" means a confirmatory statement issued by the Ship Recycling Facility that the Ship Recycling has been completed in accordance with this Convention.

10 "Worker" means any person who performs work, either regularly or temporarily, in the context of an employment relationship including contractor personnel.

## **Regulation 2 General applicability**

Unless expressly provided otherwise, the design, construction, operation and recycling of ships shall be conducted in accordance with the provisions of this Annex.

## **Regulation 3 Relationship with other standards, recommendations and guidance**

Parties shall take measures to implement the requirements of the regulations of this Annex, taking into account relevant and applicable standards, recommendations and guidance developed by the International Labour Organization and the relevant and applicable technical standards, recommendations and guidance developed under the Basel Convention.

## **CHAPTER 2 – REQUIREMENTS FOR SHIPS**

### **Part A – Design, construction, operation and maintenance of ships**

#### **Regulation 4 Controls of ships' Hazardous Materials**

In accordance with the requirements specified in Appendix 1 to this Convention each Party:

- .1 shall prohibit and/or restrict the installation or use of Hazardous Materials listed in Appendix 1 on ships entitled to fly its flag or operating under its authority; and
- .2 shall prohibit and/or restrict the installation or use of such materials on ships, whilst in its ports, shipyards, ship repair yards, or offshore terminals,

and shall take effective measures to ensure that such ships comply with those requirements.

#### **Regulation 5 Inventory of Hazardous Materials**

1 Each new ship shall have onboard an Inventory of Hazardous Materials. The Inventory shall be verified either by the Administration or by any person or organization authorized by it taking into account guidelines developed by the Organization. The Inventory of Hazardous Materials shall be specific to each ship and shall at least:

- .1 identify as Part I, Hazardous Materials listed in Appendices 1 and 2 to this Convention and contained in ship's structure and equipment, their location and approximate quantities; and
- .2 clarify that the ship complies with regulation 4.

2 Existing ships shall comply as far as practicable with paragraph 1 not later than 5 years after the entry into force of this Convention, or before going for recycling if this is earlier, taking into account the guidelines developed by the Organization and the Organization's Harmonized System of Survey and Certification. The Hazardous Materials listed in Appendix 1, at least, shall be identified when the Inventory is developed. For existing ships a plan shall be prepared describing the visual/sampling check by which the Inventory of Hazardous Materials is developed, taking into account the guidelines developed by the Organization.

3 Part I of the Inventory of Hazardous Materials shall be properly maintained and updated throughout the operational life of the ship, reflecting new installations containing Hazardous Materials listed in Appendix 2 and relevant changes in ship structure and equipment, taking into account the guidelines developed by the Organization.

4 Prior to recycling the Inventory shall, in addition to the properly maintained and updated Part I, incorporate Part II for operationally generated wastes, and Part III for stores and be verified either by the Administration or by any person or organization authorized by it, taking into account the guidelines developed by the Organization.

## **Regulation 6 Procedure for proposing amendments to Appendices 1 and 2**

1 Any Party may propose an amendment to Appendix 1 and/or Appendix 2 in accordance with this regulation. The proposed amendment shall be considered within the Organization under Article 18 paragraph 2 and this regulation.

2 When the Organization receives a proposal, it shall also bring the proposal to the attention of the United Nations and its Specialized Agencies, intergovernmental organizations having agreements with the Organization and non-governmental organizations in consultative status with the Organization and shall make it available to them.

3 The Committee shall establish a technical group in accordance with regulation 7 to review proposals submitted in accordance with paragraph 1 of this regulation.

4 The technical group shall review the proposal along with any additional data, including decisions adopted by other international bodies regarding their lists of materials or hazardous substances, submitted by any interested entity and shall evaluate and report to the Committee whether the Hazardous Material in question is likely, in the context of this Convention, to lead to significant adverse effects on human health or the environment such that the amendment of Appendix 1 or Appendix 2 is warranted. In this regard:

- .1 The technical group's review shall include:
  - .1.1 an evaluation of the association between the Hazardous Material in question and the likelihood, in the context of this Convention, to lead to significant adverse effects on human health or the environment based on the submitted data or other relevant data brought to the attention of the group;
  - .1.2 an evaluation of the potential risk reduction attributable to the proposed control measures and any other control measures that may be considered by the technical group;
  - .1.3 consideration of available information on the technical feasibility of control measures;
  - .1.4 consideration of available information on other effects arising from the introduction of such control measures relating to:
    - the environment;
    - human health and safety including that of seafarers and workers; and
    - the cost to international shipping and other relevant sectors.
  - .1.5 consideration of the availability of suitable alternatives to the Hazardous Material to be controlled, including a consideration of the potential risks of alternatives;

- .1.6 consideration of the risks posed by the Hazardous Material during the recycling process; and
- .1.7 consideration of suitable threshold values and any useful or necessary exemptions.
- .2 If the technical group finds that the Hazardous Material in question is likely, in the context of this Convention, to lead to significant adverse effects on human health or the environment, lack of full scientific certainty shall not be used as a reason to prevent the group from proceeding with an evaluation of the proposal.
- .3 The technical group's report shall be in writing and shall take into account each of the evaluations and considerations referred to in subparagraph .1, except that the technical group may decide not to proceed with the evaluations and considerations described in subparagraph .1.2 through .1.7 if it determines after the evaluation in subparagraph .1.1 that the proposal does not warrant further consideration.
- .4 The technical group's report shall include, *inter alia*, a recommendation on whether international controls pursuant to this Convention are warranted on the Hazardous Material in question, on the suitability of the specific control measures suggested in the comprehensive proposal, or on other control measures which it believes to be more suitable.

5 The Committee shall decide whether to approve any proposal to amend Appendix 1 or Appendix 2, and any modifications thereto, if appropriate, taking into account the technical group's report. Any proposed amendment shall specify the application of the amendment for ships certified in accordance with this Convention before the entry into force of the amendment. If the report finds that the Hazardous Material in question is likely, in the context of this Convention, to lead to significant adverse effects on human health or the environment, lack of full scientific certainty shall not be used as a reason to prevent a decision from being taken to list a Hazardous Material in Appendix 1 or Appendix 2. A decision not to approve the proposal shall not preclude future submission of a new proposal with respect to a particular Hazardous Material if new information comes to light.

## **Regulation 7      Technical Groups**

1 The Committee may establish one or more technical groups pursuant to regulation 6 as needed. The technical group may comprise representatives of the Parties, Members of the Organization, the United Nations and its Specialized Agencies, intergovernmental organizations having agreements with the Organization, and non-governmental organizations in consultative status with the Organization, which should preferably include representatives of institutions and laboratories with expertise in environmental fate and effects of substances, toxicological effects, marine biology, human health, economic analysis, risk management, shipbuilding, international shipping, occupational health and safety or other fields of expertise necessary to objectively review the technical merits of a proposal.

2 The Committee shall decide on the terms of reference, organization, participation and operation of the technical groups. Such terms shall provide for protection of any confidential information that may be submitted. Technical groups may hold such meetings as required, but

shall endeavour to conduct their work through written or electronic correspondence or other media as appropriate.

3 Only the representatives of Parties may participate in formulating any recommendation to the Committee pursuant to regulation 6. A technical group shall endeavour to achieve unanimity among the representatives of the Parties. If unanimity is not possible, the technical group shall communicate any minority views of such representatives.

## **Part B – Preparation for Ship Recycling**

### **Regulation 8 General requirements**

Ships destined to be recycled shall:

- .1 only be recycled at Ship Recycling Facilities that are authorized in accordance with this Convention;
- .2 conduct operations in the period prior to entering the Ship Recycling Facility in order to minimize the amount of cargo residues, remaining fuel oil, and wastes remaining on board;
- .3 provide to the Ship Recycling Facility all available information relating to the ship for the development of the Ship Recycling Plan required by regulation 9;
- .4 complete the Inventory required by regulation 5; and
- .5 be certified as ready for recycling by the Administration or organization recognized by it, prior to any recycling activity taking place.

### **Regulation 9 Ship Recycling Plan**

A ship specific Ship Recycling Plan shall be developed by the Ship Recycling Facility(ies) prior to any recycling of a ship, taking into account the guidelines developed by the Organization. The Ship Recycling Plan shall:

- .1 be developed in consultation with the shipowner;
- .2 be developed in the language accepted by the Party authorizing the Ship Recycling Facility, and if the language used is neither English, French nor Spanish, the Ship Recycling Plan shall be translated into one of these languages, except where the Administration is satisfied that this is not necessary;
- .3 include information concerning *inter alia*, gas-free-for-hot-work and how the type and amount of materials including those identified in the Inventory of Hazardous Materials will be managed;
- .4 unless a Party has made a declaration pursuant to Article 16.6, be approved by the Competent Authority(ies) authorizing the Ship Recycling Facility. Approval of the Ship Recycling Plan will be deemed to have been given in circumstances where

no written objection to the Ship Recycling Plan has been issued 14 days after the Competent Authority(ies) of the recycling State(s) has received the notification in accordance with regulation 24;

- .5 once approved in accordance with paragraph .4, be made available for inspection by the Administration, or any nominated surveyors or organization recognized by it; and
- .6 where more than one Ship Recycling Facility is used, identify the Ship Recycling Facilities to be used and specify the recycling activities and the order in which they occur at each authorized Ship Recycling Facility.

## **Part C – Surveys and certification**

### **Regulation 10 Surveys**

- 1 Ships to which this Convention applies shall be subject to the surveys specified below:
  - .1 an initial survey before the ship is put in service, or before the International Certificate on Inventory of Hazardous Materials is issued. This survey shall verify that Part I of the Inventory required by regulation 5 is in accordance with the requirements of this Convention;
  - .2 a renewal survey at intervals specified by the Administration, but not exceeding five years. This survey shall verify that Part I of the Inventory of Hazardous Materials required by regulation 5, complies with the requirements of this Convention;
  - .3 an additional survey, either general or partial, according to the circumstances, may be made at the request of the shipowner after a change, replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material. The survey shall be such as to ensure that any such change, replacement, or significant repair has been made in the way that the ship continues complying with the requirements of this Convention, and that Part I of the Inventory is amended as necessary; and
  - .4 a final survey prior to the ship being taken out of service and before the recycling of the ship has started. This survey shall verify:
    - .1 that the Inventory of Hazardous Materials as required by regulation 5.4 is in accordance with the requirements of this Convention taking into account the guidelines developed by the Organization; and
    - .2 that the Ship Recycling Plan developed by the Ship Recycling Facility(ies) [complies with the requirements of this Convention], and, unless a Party has made a declaration pursuant to Article 16.6, has been approved by the Competent Authority(ies).

2 Surveys of ships for the purpose of enforcement of the provisions of this Convention shall be carried out by officers of the Administration, taking into account the guidelines developed by the Organization. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

3 An Administration nominating surveyors or recognizing organizations to conduct surveys, as described in paragraph 2 shall, as a minimum, empower such nominated surveyors or recognized organizations to:

- .1 require a ship that they survey to comply with the provisions of this Convention; and
- .2 carry out surveys and inspections if requested by the appropriate authorities of a port State that is a Party.

4 In every case, the Administration concerned shall be responsible to ensure the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.

5 The initial and renewal surveys should be harmonized with the surveys required by other applicable statutory instruments of the Organization.

#### **Regulation 11 Issuance and endorsement of certificates**

1 An International Certificate on Inventory of Hazardous Materials shall be issued either by the Administration or by any person or organization authorized by it after successful completion of an initial or renewal survey conducted in accordance with regulation 10, to any ships to which regulation 10 applies, except for existing ships for which both an initial survey and a final survey are conducted at the same time, taking into account the guidelines developed by the Organization.

2 The International Certificate on Inventory of Hazardous Materials issued under paragraph 1, at the request of the shipowner, shall be endorsed either by the Administration or by any person or organization authorized by it after successful completion of an additional survey conducted in accordance with regulation 10.

3 Notwithstanding the requirements of regulation 10.1.2, when the renewal survey is completed within three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate.

4 When the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate.

5 When the renewal survey is completed more than three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.

6 If a certificate is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in regulation 10.1.2.

7 If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period which shall not exceed five months from the expiry date.

8 If a ship at the time when a certificate expires is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

9 A certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

10 In special circumstances, as determined by the Administration, a new certificate need not be dated from the date of expiry of the existing certificate as required by paragraphs 4, 8 or 9 of this regulation. In these special circumstances, the new certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

11 An International Ready for Recycling Certificate shall be issued either by the Administration or by any person or organization authorized by it, after a final survey in accordance with the provisions of regulation 10, to any ships to which regulation 10 applies, taking into account the authorization of the Ship Recycling Facility and the guidelines developed by the Organization.

12 A certificate issued under the authority of a Party shall be accepted by the other Parties and regarded for all purposes covered by this Convention as having the same validity as a certificate issued by them. Certificates shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.

## **Regulation 12 Issuance or endorsement of a certificate by another Party**

1 At the request of the Administration, another Party may cause a ship to be surveyed and, if satisfied that the provisions of this Convention are complied with, shall issue or authorize the issuance of a certificate to the ship, and where appropriate, endorse or authorize the endorsement of that certificate on the ship, in accordance with this Annex.

2 A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

3 A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued by the Administration.

4 No certificate shall be issued to a ship entitled to fly the flag of a State which is not a Party.

### **Regulation 13 Form of the certificates**

The certificates shall be drawn up in the official language of the issuing Party, in the form set forth in Appendices 3 and 4. If the language used is neither English, French nor Spanish, the text shall include a translation into one of these languages. The Administration may, however, issue the International Certificate on Inventory of Hazardous Materials drawn up only in the official language of the issuing Party to ships not engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to this Convention and the International Ready for Recycling Certificate drawn up only in the official language of the issuing Party to ships recycled in Ship Recycling Facilities under the jurisdiction of the issuing Party.

### **Regulation 14 Duration and validity of the certificates**

1 An International Certificate on Inventory of Hazardous Materials issued under regulation 11 or 12 shall cease to be valid in any of the following cases:

- .1 if the condition of the ship does not correspond substantially with the particulars of the certificate, including where Part I of the Inventory of Hazardous Materials is not properly maintained and updated, reflecting changes in ship structure and equipment, in accordance with the guidelines developed by the Organization;
- .2 upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Party issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 10. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificates carried by the ship before the transfer and, if available, copies of the relevant survey reports;
- .3 if the renewal survey is not completed within the periods specified under regulations 10.1 and 11; or
- .4 if the certificate is not endorsed in accordance with regulation 11 or 12.

2 An International Ready for Recycling Certificate shall be issued for a period specified by the Administration that shall not exceed three months.

3 An International Ready for Recycling Certificate issued under regulation 11 or 12 shall cease to be valid if the condition of the ship does not correspond substantially with the particulars of the certificate.

4 The International Ready for Recycling Certificate may be extended by the Administration or by any person or organization authorized by it for a single point to point voyage to the Ship Recycling Facility.

## **CHAPTER 3 – REQUIREMENTS FOR SHIP RECYCLING FACILITIES**

### **Regulation 15 Controls on Ship Recycling Facilities**

1 Each Party shall establish legislation, regulations, and standards that are necessary to ensure that Ship Recycling Facilities are designed, constructed, and operated in a safe and environmentally sound manner in accordance with the regulations of this Convention.

2 Each Party shall establish a mechanism for authorizing Ship Recycling Facilities with appropriate conditions to ensure that such Ship Recycling Facilities meet the requirements of this Convention.

3 Each Party shall establish a mechanism for ensuring that Ship Recycling Facilities comply with the requirements of this chapter including the establishment and effective use of inspection, monitoring and enforcement provisions, including powers of entry and sampling. Such a mechanism may include an audit scheme to be carried out by the Competent Authority(ies) or an organization recognized by the Party, taking into account guidelines developed by the Organization, and the results of these audits should be communicated to the Organization.

4 Each Party shall designate one or more Competent Authorities and a contact point to be used by the Organization and Parties to this Convention, for matters related to Ship Recycling Facilities operating within the jurisdiction of that Party.

### **Regulation 16 Authorization of Ship Recycling Facilities**

1 Ship Recycling Facilities which recycle ships to which this Convention applies, or ships treated similarly pursuant to Article 3.4, shall be authorized by a Party taking into account the guidelines developed by the Organization.

2 The authorization shall be carried out by the Competent Authority(ies) and shall include verification of documentation required by this Convention and a site inspection. The Competent Authority(ies) may however entrust the authorization of Ship Recycling Facilities to organizations recognized by it.

3 The Party shall notify the Organization of the specific responsibilities and conditions of the authority delegated to the recognized organizations, for circulation to Parties. In every case, the Competent Authority(ies) retains full responsibility for the authorization issued.

4 The authorization shall be drawn up in the form set forth in Appendix 5. If the language used is neither English, French nor Spanish, the text shall include a translation into one of these languages.

5 The authorization shall be valid for a period specified by the Party but not exceeding 5 years. The Party shall identify the terms for which the authorization will be issued, withdrawn, suspended, amended and renewed, and communicate these terms to the Ship Recycling Facilities. If a Ship Recycling Facility refuses inspection by the Competent Authority(ies) or the recognized organization operating on its/their behalf, the authorization shall be suspended or withdrawn.

6 If incidents or actions taken at the Ship Recycling Facility have the effect that the conditions for the authorization are no longer fulfilled, the Ship Recycling Facility shall inform the Competent Authority(ies). The Competent Authority(ies) may accordingly decide to suspend or withdraw the authorization, or require corrective actions by the Ship Recycling Facility.

### **Regulation 17 General requirements**

1 Ship Recycling Facilities authorized by a Party shall establish management systems, procedures and techniques which do not pose health risks to the workers concerned or to the population in the vicinity of the Ship Recycling Facility and which will prevent, reduce, minimize and to the extent practicable eliminate adverse effects on the environment caused by Ship Recycling, taking into account guidelines developed by the Organization.

2 Ship Recycling Facilities authorized by a Party shall, for ships to which this Convention applies, or ships treated similarly pursuant to Article 3.4:

- .1 only accept ships that:
  - .1 comply with this Convention; or
  - .2 meet the requirements of this Convention;
- .2 only accept ships which it is authorized to recycle; and
- .3 have the documentation of its authorization available if such documentation is requested by a shipowner that is considering recycling a ship at that Ship Recycling Facility.

### **Regulation 18 Ship Recycling Facility Management Plan**

Ship Recycling Facilities authorized by a Party shall prepare a Ship Recycling Facility Management Plan. The Plan shall be adopted by the board or the appropriate governing body of the Recycling Company, and shall include:

- .1 a policy ensuring workers' safety and the protection of human health and the environment, including the establishment of objectives that lead to the minimization and elimination to the extent practicable of the adverse effects on human health and the environment caused by Ship Recycling;
- .2 a system for ensuring implementation of the requirements set out in this Convention, the achievement of the goals set out in the policy of the Recycling Company, and the continuous improvement of the procedures and standards used in the Ship Recycling operations;
- .3 identification of roles and responsibilities for employers and workers when conducting Ship Recycling operations;
- .4 a programme for providing appropriate information and training of workers for the safe and environmentally sound operation of the Ship Recycling Facilities;

- .5 an emergency preparedness and response plan;
- .6 a system for monitoring the performance of Ship Recycling;
- .7 a record-keeping system showing how Ship Recycling is carried out;
- .8 a system for reporting discharges, emissions, incidents and accidents causing damage, or with the potential of causing damage, to workers' safety, human health and the environment; and
- .9 a system for reporting occupational diseases, accidents, injuries and other adverse effects on workers' safety and human health,

taking into account guidelines developed by the Organization.

#### **Regulation 19 Prevention of adverse effects to human health and the environment**

Ship Recycling Facilities authorized by a Party shall establish and utilize procedures to:

- .1 prevent explosions and other unsafe conditions by ensuring that gas free for hot work conditions are maintained throughout Ship Recycling;
- .2 ensure safe entry procedures for confined and/or enclosed spaces by monitoring atmospheric conditions throughout Ship Recycling;
- .3 prevent other accidents, occupational diseases and injuries or other adverse effects on human health and the environment; and
- .4 prevent spills or emissions throughout Ship Recycling which may cause harm to human health and/or the environment,

taking into account guidelines developed by the Organization.

#### **Regulation 20 Safe and environmentally sound management of Hazardous Materials**

1 Ship Recycling Facilities authorized by a Party shall ensure safe and environmentally sound removal of any Hazardous Material contained in a ship certified in accordance with regulations 11 or 12. The person(s) in charge of the recycling operations and the workers shall be familiar with the requirements of this Convention relevant to their tasks and in particular actively use the Inventory of Hazardous Materials and the Ship Recycling Plan, prior to and during the removal of Hazardous Materials.

2 Ship Recycling Facilities authorized by a Party shall ensure that all Hazardous Materials detailed in the Inventory are identified, labelled, packaged and removed to the maximum extent possible prior to cutting by properly trained and equipped workers, taking into account the guidelines developed by the Organization, in particular:

- .1 hazardous liquids, residues and sediments;

- .2 substances or objects containing heavy metals such as lead, mercury, cadmium and hexavalent chromium;
- .3 paints and coatings that are highly flammable and/or lead to toxic releases;
- .4 asbestos and materials containing asbestos;
- .5 PCB and materials containing PCBs, ensuring that heat inducing equipment is avoided during such operations;
- .6 CFCs and halons; and
- .7 other Hazardous Materials not listed above and that are not a part of the ship structure.

3 Ship Recycling Facilities authorized by a Party shall provide for and ensure safe and environmentally sound management of all Hazardous Materials and wastes removed from the ship recycled at that Ship Recycling Facility. Waste management and disposal sites shall be identified to provide for the further safe and environmentally sound management of materials.

4 All wastes generated from the recycling activity shall be kept separate from recyclable materials and equipment, labelled, stored in appropriate conditions that do not pose a risk to the workers, human health or the environment and only transferred to a waste management facility authorized to deal with their treatment and disposal in a safe and environmentally sound manner.

#### **Regulation 21 Emergency preparedness and response**

Ship Recycling Facilities authorized by a Party shall establish and maintain an emergency preparedness and response plan. The plan shall be made having regard to the location and environment of the Ship Recycling Facility, and shall take into account the size and nature of activities associated with each Ship Recycling operation. The plan shall furthermore:

- .1 ensure that the necessary equipment and procedures to be followed in the case of an emergency are in place, and that drills are conducted on a regular basis;
- .2 ensure that the necessary information, internal communication and co-ordination are provided to protect all people and the environment in the event of an emergency at the Ship Recycling Facility;
- .3 provide for communication with, and information to, the relevant Competent Authority(ies), the neighbourhood and emergency response services;
- .4 provide for first-aid and medical assistance, fire-fighting and evacuation of all people at the Ship Recycling Facility, pollution prevention; and
- .5 provide for relevant information and training to all workers of the Ship Recycling Facility, at all levels and according to their competence, including regular exercises in emergency prevention, preparedness and response procedures.

## **Regulation 22 Worker safety and training**

1 Ship Recycling Facilities authorized by a Party shall provide for worker safety by measures including:

- .1 ensuring the availability, maintenance and use of personal protective equipment and clothing needed for all Ship Recycling operations;
- .2 ensuring that training programmes are provided to enable workers to safely undertake all Ship Recycling operations they are tasked to do; and
- .3 ensuring that all workers at the Ship Recycling Facility have been provided with appropriate training and familiarization prior to performing any Ship Recycling operation.

2 Ship Recycling Facilities authorized by a Party shall provide and ensure the use of personal protective equipment for operations requiring such use, including:

- .1 head protection;
- .2 face and eye protection;
- .3 hand and foot protection;
- .4 respiratory protective equipment;
- .5 hearing protection;
- .6 protectors against radioactive contamination;
- .7 protection from falls; and
- .8 appropriate clothing.

3 Ship Recycling Facilities authorized by a Party may co-operate in providing for training of workers. Taking into account the guidelines developed by the Organization, the training programmes set forth in paragraph 1.2 of this regulation shall:

- .1 cover all workers including contractor personnel and employees in the Ship Recycling Facility;
- .2 be conducted by Competent persons;
- .3 provide for initial and refresher training at appropriate intervals;
- .4 include participants' evaluation of their comprehension and retention of the training;
- .5 be reviewed periodically and modified as necessary; and
- .6 be documented.

**Regulation 23 Reporting on incidents, accidents, occupational diseases and chronic effects**

1 Ship Recycling Facilities authorized by a Party shall report to the Competent Authority(ies) any incident, accident, occupational diseases, or chronic effects causing, or with the potential of causing, risks to workers safety, human health and the environment.

2 Reports shall contain a description of the incident, accident, occupational disease, or chronic effect, its cause, the response action taken and the consequences and corrective actions to be taken.

## CHAPTER 4 – REPORTING REQUIREMENTS

### Regulation 24 Initial notification and reporting requirements

1 A shipowner shall notify the Administration in due time and in writing of the intention to recycle a ship in order to enable the Administration to prepare for the survey and certification required by this Convention.

2 A Ship Recycling Facility when preparing to receive a ship for recycling shall notify in due time and in writing its Competent Authority(ies) of the intent. The notification shall include at least the following ship details:

- .1 name of the State whose flag the ship is entitled to fly;
- .2 date on which the ship was registered with that State;
- .3 ship's identification number (IMO number);
- .4 hull number on new-building delivery;
- .5 name and type of the ship;
- .6 port at which the ship is registered;
- .7 name and address of the Shipowner as well as the IMO registered owner identification number;
- .8 name and address of the company as well as the IMO company identification number;
- .9 name of all classification society(ies) with which the ship is classed;
- .10 ship's main particulars (Length overall (LOA), Breadth (Moulded), Depth (Moulded), Lightweight, Gross and Net tonnage, and engine type and rating);
- .11 Inventory of Hazardous Materials; and
- .12 draft ship recycling plan for approval pursuant to regulation 9.

3 When the ship destined to be recycled has acquired the International Ready for Recycling Certificate, the Ship Recycling Facility shall report to its Competent Authority(ies) the planned start of the Ship Recycling. The report shall be in accordance with the reporting format in Appendix 7, and shall at least include a copy of the International Ready for Recycling Certificate. Recycling of the ship shall not start prior to the submission of the report.

**Regulation 25 Reporting upon completion**

When the partial or complete recycling of a ship is completed in accordance with the requirements of this Convention, a Statement of Completion shall be issued by the Ship Recycling Facility and reported to its Competent Authority(ies) and shall be copied to the Administration which issued the International Ready for Recycling Certificate for the ship. The Statement shall be issued within 14 days of the date of partial or completed Ship Recycling in accordance with the Ship Recycling Plan and shall include a report on incidents and accidents damaging human health and/or the environment if any.

## APPENDIX 1

### CONTROLS OF HAZARDOUS MATERIALS

Hazardous Material	Definitions	Control measures
Asbestos	Materials containing asbestos	For all ships, new installation of materials which contain asbestos shall be prohibited.
Ozone-depleting substances	<p>Ozone-depleting substances means controlled substances defined in paragraph 4 of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annexes A,B,C or E to the said Protocol in force at the time of application or interpretation of this Annex.</p> <p>Ozone-depleting substances that may be found on board ship include, but are not limited to:</p> <p>Halon 1211 Bromochlorodifluoromethane Halon 1301 Bromotrifluoromethane Halon 2402 1,2-Dibromo-1,1,2,2-tetrafluoroethane (also known as Halon 114B2) CFC-11 Trichlorofluoromethane CFC-12 Dichlorodifluoromethane CFC-113 1,1,2-Trichloro-1,2,2-trifluoroethane CFC-114 1,2-Dichloro-1,1,2,2-tetrafluoroethane CFC-115 Chloropentafluoroethane</p>	New installations which contain ozone-depleting substances shall be prohibited on all ships, except that new installations containing hydrochlorofluorocarbons (HCFCs) are permitted until 1 January 2020.
Polychlorinated biphenyls (PCB)	“Polychlorinated biphenyls” means aromatic compounds formed in such a manner that the hydrogen atoms on the biphenyl molecule (two benzene rings bonded together by a single carbon-carbon bond) may be replaced by up to ten chlorine atoms	For all ships, new installation of materials which contain Polychlorinated biphenyls shall be prohibited.
Organotin compounds (Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO))	Organotin compounds which act as biocides in anti-fouling systems	<p>All ships shall not apply or re-apply such compounds.</p> <p>All ships (except fixed and floating platforms, FSUs, and FPSOs that have been constructed prior to 1 January 2003 and that have not been in dry-dock on or after 1 January 2003):</p> <p>(1) shall not bear such compounds on their hulls or external parts or surface or</p>

<b>Hazardous Material</b>	<b>Definitions</b>	<b>Control measures</b>
		(2) shall bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.

## APPENDIX 2

### MINIMUM LIST OF ITEMS FOR THE INVENTORY OF HAZARDOUS MATERIALS (FOR NEW SHIPS AND NEW INSTALLATIONS)

Any Hazardous Materials listed in Appendix 1
Cadmium and Cadmium Compounds
Hexavalent Chromium and Hexavalent Chromium Compounds
Lead and Lead Compounds
Mercury and Mercury Compounds
Polybrominated Biphenyl (PBBs)
Polybrominated Diphenyl Ethers (PBDEs)
Polychlorinated Naphthalenes (more than 3 chlorine atoms)
Radioactive Substances
Certain Shortchain Chlorinated Paraffins (Alkanes, C10-C13, chloro)

**APPENDIX 3**

**FORM OF THE INTERNATIONAL CERTIFICATE ON INVENTORY OF  
HAZARDOUS MATERIALS**

INTERNATIONAL CERTIFICATE ON INVENTORY OF HAZARDOUS MATERIALS

(Note: This certificate shall be supplemented by Part I of the Inventory of Hazardous Materials)

*(Official seal)* \_\_\_\_\_ *(State)*

Issued under the provisions of the International Convention for the Safe and Environmentally Sound Recycling of Ships (hereinafter referred to as the Convention) under the authority of the Government of

.....  
*(full designation of the country)*

by .....  
*(full designation of the person or organization authorized under the provisions of the Convention)*

***Particulars of the Ship***

Name of Ship	
Distinctive number or letters	
Port of Registry	
Gross tonnage	
IMO number	
Name and address of shipowner	
IMO registered owner identification number	
IMO company identification number	
Date of Construction	

***Particulars of Part I of the Inventory of Hazardous Materials***

Part I of the Inventory of Hazardous Materials identification/verification number: .....

Note: Part I of the Inventory of Hazardous Materials, as required by regulation 5 of the Annex to the Convention, is an essential part of the International Certificate on Inventory of Hazardous Materials and must always accompany the International Certificate on Inventory of Hazardous Materials. Part I of the Inventory of Hazardous Materials should be compiled on the basis of the standard format shown in the guidelines developed by the Organization.

THIS IS TO CERTIFY:

1. that the ship has been surveyed in accordance with regulation 10 of the Annex to the Convention; and
2. that the survey shows that Part I of the Inventory of Hazardous Materials fully complies with the applicable requirements of the Convention.

Completion date of survey on which this certificate is based: .....(dd/mm/yyyy)

This certificate is valid until .....(dd/mm/yyyy)

Issued at .....  
(Place of issue of certificate)

(dd/mm/yyyy) .....  
(Date of issue) (Signature of duly authorized official issuing the certificate)

(Seal or stamp of the authority, as appropriate)

**ENDORSEMENT TO EXTEND THE CERTIFICATE IF VALID FOR  
LESS THAN FIVE YEARS WHERE REGULATION 11.6 APPLIES\***

The ship complies with the relevant provisions of the Convention, and this certificate shall, in accordance with regulation 11.6 of the Annex to the Convention, be accepted as valid until (dd/mm/yyyy): .....

Signed: .....  
*(Signature of duly authorized official)*

Place: .....

Date: (dd/mm/yyyy) .....

*(Seal or stamp of the authority, as appropriate)*

**ENDORSEMENT WHERE THE RENEWAL SURVEY HAS BEEN COMPLETED  
AND REGULATION 11.7 APPLIES\***

The ship complies with the relevant provisions of the Convention, and this certificate shall, in accordance with regulation 11.7 of the Annex to the Convention, be accepted as valid until (dd/mm/yyyy): .....

Signed: .....  
*(Signature of duly authorized official)*

Place: .....

Date: (dd/mm/yyyy) .....

*(Seal or stamp of the authority, as appropriate)*

---

\* This page of the endorsement at survey shall be reproduced and added to the certificate as considered necessary by the Administration.

**ENDORSEMENT TO EXTEND THE VALIDITY OF THE CERTIFICATE UNTIL  
REACHING THE PORT OF SURVEY OR FOR A PERIOD OF GRACE WHERE  
REGULATION 11.8 OR 11.9 APPLIES\***

This certificate shall, in accordance with regulation 11.8 or 11.9\*\* of the Annex to the Convention, be accepted as valid until (dd/mm/yyyy): .....

Signed: .....  
(Signature of duly authorized official)

Place: .....

Date: (dd/mm/yyyy) .....

*(Seal or stamp of the authority, as appropriate)*

**ENDORSEMENT FOR ADDITIONAL SURVEY\***

At an additional survey in accordance with regulation 10 of the Annex to the Convention, the ship was found to comply with the relevant provisions of the Convention.

Signed: .....  
(Signature of duly authorized official)

Place: .....

Date: (dd/mm/yyyy) .....

*(Seal or stamp of the authority, as appropriate)*

---

\* This page of the endorsement at survey shall be reproduced and added to the certificate as considered necessary by the Administration.

\*\* Delete as appropriate.

**APPENDIX 4**

**FORM OF THE INTERNATIONAL READY FOR RECYCLING CERTIFICATE**

INTERNATIONAL READY FOR RECYCLING CERTIFICATE

(Note: This certificate shall be supplemented by the Inventory of Hazardous Materials and the Ship Recycling Plan)

*(Official seal)* \_\_\_\_\_ *(State)*

Issued under the provisions of the International Convention for the Safe and Environmentally Sound Recycling of Ships (hereinafter referred to as the Convention) under the authority of the Government of

.....  
*(full designation of the country)*

by .....  
*(full designation of the person or organization authorized under the provisions of the Convention)*

***Particulars of the Ship***

Name of Ship	
Distinctive number or letters	
Port of Registry	
Gross tonnage	
IMO number	
Name and address of shipowner	
IMO registered owner identification number <sup>8</sup>	
IMO company identification number <sup>9</sup>	
Date of Construction	

<sup>8</sup> Adopted by resolution MSC.194(80).

<sup>9</sup> Adopted by resolution MSC.194(80).

***Particulars of the Ship Recycling Facility(ies)***

Name of Ship Recycling Facility	
Distinctive Recycling Company identity number*	
Full address	
Date of expiry of DASR	

\* This number is based on the Document of Authorization to conduct Ship Recycling (DASR).

***Particulars of the Inventory of Hazardous Materials***

Inventory of Hazardous Materials identification/verification number: .....

Note: The Inventory of Hazardous Materials, as required by regulation 5 of the Annex to the Convention, is an essential part of the International Ready for Recycling Certificate and must always accompany the International Ready for Recycling Certificate. The Inventory of Hazardous Materials should be compiled on the basis of the standard format shown in the guidelines developed by the Organization.

***Particulars of the Ship Recycling Plan***

Ship Recycling Plan identification/verification number: .....

Note: The Ship Recycling Plan, as required by regulation 9 of the Annex to the Convention, is an essential part of the International Ready for Recycling Certificate and must always accompany the International Ready for Recycling Certificate.

THIS IS TO CERTIFY:

- 1 that the ship has been surveyed in accordance with regulation 10 of the Annex to the Convention;
- 2 that the ship has a valid Inventory of Hazardous Materials in accordance with regulation 5 of the Annex to the Convention;
- 3 that a Ship Recycling Plan has been developed in accordance with the provisions of regulation 9 of the Annex to the Convention and, unless a Party has made a declaration pursuant to Article 16.6, has been approved by the Competent Authority(ies); and
- 4 that the Ship Recycling Facility where this ship is to be recycled holds a valid authorization in accordance with the Convention.

This certificate is valid until (dd/mm/yyyy) .....  
(Date)

Issued at .....  
(Place of issue of certificate)

(dd/mm/yyyy) .....  
(Date of issue)

.....  
(Signature of duly authorized official  
issuing the certificate)

(Seal or stamp of the authority, as appropriate)

**ENDORSEMENT TO EXTEND THE VALIDITY OF THE CERTIFICATE UNTIL  
REACHING THE PORT OF THE SHIP RECYCLING FACILITY FOR A PERIOD  
OF GRACE WHERE REGULATION 14.4 APPLIES\***

This certificate shall, in accordance with regulation 14.4 of the Annex to the Convention, be accepted as valid for a single point to point voyage

from the port of: .....

to the port of: .....

Signed: .....  
*(Signature of duly authorized official)*

Place: .....

Date: (dd/mm/yyyy) .....

*(Seal or stamp of the authority, as appropriate)*

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\* This page of the endorsement shall be reproduced and added to the certificate as considered necessary by the Administration.



**SUPPLEMENT TO:**

**Document of Authorization to undertake Ship Recycling (DASR) in accordance with the International Convention for the Safe and Environmentally Sound Recycling of Ships**

Notes:

- 1 This record shall be permanently attached to the DASR. The DASR shall be available at the Ship Recycling Facility at all times.
- 2 All procedures, plans and other documents produced by the Ship Recycling Facility and required under the terms to which the DASR has been issued shall be available in the working language of the Ship Recycling Facility and in either English, French or Spanish.
- 3 The authorization is subject to the limitations defined by this supplement.

**1 GENERAL TERMS**

**1.1 Requirements of the Convention**

The Ship Recycling Facility meets the requirements that it be designed, constructed, and operated in a safe and environmentally sound manner in accordance with the Convention, including meeting the relevant requirements of:

- Regulation 16 – Authorization of Ship Recycling Facilities
- Regulation 17 – General requirements
- Regulation 18 – Ship Recycling Facility Management Plan
- Regulation 19 – Prevention of adverse effects to human health and the environment
- Regulation 20 – Safe and environmentally sound management of Hazardous Materials
- Regulation 21 – Emergency preparedness and response
- Regulation 22 – Worker safety and training
- Regulation 23 – Reporting on incidents, accidents, occupational diseases and chronic effects
- Regulation 24 – Initial notification and reporting requirements
- Regulation 25 – Reporting upon completion

These requirements are imposed on the Ship Recycling Facility by way of

.....  
*(identify the permit, licence, authorization, legal standards, or other mechanism that applies)*

Ship Recycling Facility Management Plan identification/verification number: .....

## **1.2 Acceptance of ships**

For ships to which the Convention applies and ships treated similarly pursuant to Article 3.4 of the Convention, the Ship Recycling Facility can only accept a ship for recycling in accordance with regulation 17 of the Annex to the Convention.

## **1.3 Safe-for-hot-work**

The Ship Recycling Facility is capable to establish and maintain “gas-free-for-hot-work” conditions throughout the Ship Recycling process.

## **1.4 Management of Hazardous Materials**

The Ship Recycling Facility is designed, constructed, operated, and required to ensure that all Hazardous Materials’ management shall be safe and environmentally sound in compliance with the Convention and with all relevant local or national regulations/requirements.

## **1.5 Map and location of Ship Recycling operations**

A map of the boundary of the Ship Recycling Facility and the location of Ship Recycling operations within it, is attached.

# **2 CAPABILITY OF SHIP RECYCLING FACILITY**

## **2.1 Size of ships**

The Ship Recycling Facility is authorized to accept a ship for recycling subject to the following size limitations:

<b>Maximum Size</b>		<b>Other Limitations</b>
Length		
Breadth		
Lightweight		

## 2.2 Safe and Environmentally Sound Management of Hazardous Materials

The Ship Recycling Facility is authorized to accept a ship for recycling that contains Hazardous Materials as specified in the following table subject to the conditions noted below:

Hazardous Material	Management of Hazardous Materials			Authorization/Limitations
	Removal Y/N (*2)	Storage Y/N	Process (*1) Y/N (*3)	
<b>Appendix 1</b>				
Asbestos				
.....				
<b>Appendix 2</b>				
Cadmium and Cadmium Compounds				
.....				
<b>Regulation 20</b>				
2.1 hazardous liquids, residues and sediments				
2.3 paints and coatings that are highly flammable and/or leads to toxic release				
2.7 other Hazardous Materials not listed above and that are not a part of the ship structure (specify)				

Note: \*1 Process means the processing of Hazardous Materials in the Ship Recycling Facility, such as:

- a. incineration of Hazardous Materials;
- b. reclamation of Hazardous Materials; and
- c. treatment of oily residues

\*2 If Yes (Y), indicate in the Recycling Facility Management Plan the responsible personnel authorized to carry out the removal, with the certificate number or other relevant information.

\*3 If No (N), describe in the Ship Recycling Plan where the Hazardous Materials are to be processed/disposed.

**APPENDIX 6**

**FORM OF THE STATEMENT OF COMPLETION OF SHIP RECYCLING**

STATEMENT OF COMPLETION OF SHIP RECYCLING

This document is a statement of completion of Ship Recycling for

.....  
*(name of the ship when it was received for recycling/at the point of deregistration)*

***Particulars of the Ship as received for recycling***

Distinctive number or letters	
Port of Registry	
Gross tonnage	
IMO number	
Name and address of shipowner	
IMO registered owner identification number	
IMO company identification number	
Date of Construction	

THIS CONFIRMS THAT:

The ship has been recycled in accordance with the Ship Recycling Plan as part of the International Convention for the Safe and Environmentally Sound Recycling of Ships (hereinafter referred to as the Convention) at

.....  
*(Name and location of the authorized Ship Recycling Facility)*

and the recycling of the ship as required by the Convention was completed on:

(dd/mm/yyyy) .....  
*(Date of completion)*

Issued at .....  
*(Place of issue of the Statement of Completion)*

(dd/mm/yyyy) .....  
*(Date of issue)*

.....  
*(Signature of the owner of the Ship Recycling Facility or a representative acting on behalf of the owner)*

**APPENDIX 7**

**FORM OF REPORT OF PLANNED START OF SHIP RECYCLING**

The .....  
*(Name of Ship Recycling Facility)*

located at .....  
*(Full Ship Recycling Facility address)*

Authorized in accordance with the requirements of the International Convention for the Safe and Environmentally Sound Recycling of Ships (hereinafter referred to as the Convention) to conduct Ship Recycling under the authority of the Government of:

.....  
*(Full designation of country)*

as indicated in the Document of Authorization to conduct Ship Recycling issued at

.....  
*(Place of authorization)*

by .....  
*(Full designation of the Competent Authority under the Convention)*

on (dd/mm/yyyy) .....  
*(Date of issue)*

Hereby reports that the Ship Recycling Facility is ready in every respect to start the recycling of the vessel .....  
*(IMO number)*

The International Ready for Recycling Certificate issued under the provisions of the Convention under the authority of the Government of

.....  
*(Full designation of country)*

by .....  
*(Full designation of the person or organization authorized under the provisions of the Convention)*

on (dd/mm/yyyy) .....  
*(Date of issue)*

is enclosed.

Signed .....

\*\*\*

ANNEX 7

**DRAFT CONFERENCE RESOLUTION**

**CONTRIBUTION OF THE PARTIES TO THE BASEL CONVENTION AND  
THE INTERNATIONAL LABOUR ORGANIZATION IN THE DEVELOPMENT  
OF THE INTERNATIONAL CONVENTION FOR THE SAFE AND  
ENVIRONMENTALLY SOUND RECYCLING OF SHIPS**

THE CONFERENCE,

HAVING ADOPTED the International Convention for the Safe and Environmentally Sound Recycling of Ships,

BEING AWARE of the active and constructive participation and contribution of representatives of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and the International Labour Organization and their Secretariats at all stages of the development of the Convention,

RECOGNIZING the role and competencies of the Basel Convention and expertise of its representatives on matters relating to the transboundary movement and to the environmentally sound management of waste,

RECOGNIZING ALSO, the role, competencies and expertise of the International Labour Organization on matters relating to occupational safety and health of workers,

EXPRESSES its appreciation for the contribution made by the Basel Convention and the International Labour Organization during the development of this Convention.

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**ANNEX 8****STATEMENT BY THE DELEGATION OF TURKEY  
REGARDING A PILOT PROJECT ON SHIP RECYCLING**

The Committee will recall that during MEPC 55 Turkey informed the Working Group on Ship Recycling of its intention to submit a proposal to run a trial on recycling two ships in accordance with the provisions of the draft International Convention for the Safe and Environmentally Sound Recycling of Ships, utilizing its own facilities. The Working Group accepted the offer and the Committee at that session invited Turkey to provide further information.

Turkey submitted document MEPC-ISRWG 3/2/6 which was discussed during the 3rd ISRWG. This document outlined the proposal which intended to evaluate the provisions of the draft convention. It was the intention that the outcome of the Pilot Project would be a report relating to the recycling of ships with the aim of improving the draft convention.

The proposal was welcomed by many delegations and during the deliberations it was suggested that Turkey should either make a submission to the Committee detailing the resources needed and the proposed arrangements, or proceed with the project independently, or in co-operation with other interested States and organizations and submit its result to the Committee.

After further consultations it was considered that such a project might be easier to conduct in co-operation with other States, but in any case independent of the Organization.

It was the intention that following the completion of the project, all the participants would prepare and co-sponsor a document to MEPC stating the findings of the project and the relevant proposals for amendments both to the draft convention and to the associated guidelines, as applicable.

Following MEPC 57, an informal correspondence group was formed under the coordination of Turkey. Twenty-six Countries and organizations showed their interest and twenty-two of them wished to be listed in the group. However, only four wished to take part in the Steering Committee.

Until now, a vessel has not been provided for the benefit of the project and therefore it has not been possible yet for the project to get underway. However, bearing in mind the usefulness of the project when and if completed, and although it might be somewhat late for making any amendments to the draft convention, it would still be possible to obtain benefits from the outcome of the proposed project by incorporating the outcome in the associated guidelines which still need to be developed. Hence Turkey will continue to work on the Pilot Project as far as possible together with willing parties.

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## ANNEX 9

**STATEMENTS BY DELEGATIONS  
ON MATTERS OF PRINCIPLE OR POLICY CONCERNING THE GHG ISSUE**

(Listed in the order of interventions)

**Statement by the delegation of China**

On Monday morning, the Secretary-General delivered an ambitious opening speech which mainly focused on climate change. This reminds me of my Dutch friend, Mr. De Boer, the Executive Secretary of the UNFCCC, and the responsibility he is faced with, which, more and more people are willing to share it with him. Meanwhile, the speech of the Secretary-General is fully based on the political philosophy of international climate change negotiations. Hence, we believe, it is necessary to have a general debate on the issue of reduction of GHG emission from international shipping before we touch the details.

The negotiation on climate change is on a crucial stage, any organization, especially, intergovernmental organizations, are obligated to act constructively to create good atmosphere and foundation for the negotiation, rather than make difficulties and contradictions.

Environment and development are the issues of tremendous challenge faced by the human society. Fortunately, since the 1992 United Nations Conference on Environment and Development, the international community witnesses and harvests good and fruitful cooperation in this regard, which largely promote the world peace, development, environment protection and sustainable development. Based on this recognition, China would like to point out that all agreements in the sustainable development field including UNFCCC, Kyoto Protocol and their relevant decisions, are reached by consensus. Any decision on GHG of international shipping should also be made by unanimous agreement.

China appreciates the effort of IMO on GHG emission reduction from international shipping, and is willing to constructively cooperate with other Members in seeking an equitable solution. I would like to take this opportunity to stress the following:

1. The UNFCCC and its Kyoto Protocol have set fundamental principles and legal framework on climate change which should be the legal basis for IMO to address the issue of GHG emission reduction from international shipping.
2. Regarding our future work on GHG emission reduction from international shipping, China is of the view that this issue should be resolved through consultations by all Parties in the spirit of cooperation and based on the Principle of Common but Differentiated Responsibilities. China is against any kind of unilateral or arbitrary action. Furthermore, exploration of means to implement the Principle of Common but Differentiated Responsibilities in shipping sector should be considered by IMO while it considers the GHG emission reduction.

3. Article 2.2 of the Kyoto Protocol clearly requests that Annex I Parties, i.e., developed countries, to reduce their GHG emission from international shipping while the developing countries are not requested to do so, that was also confirmed by the Resolution 963(23) of IMO. China is seriously concerned with the totally different interpretation of this Article by the Legal Division of IMO. According to international law and practices, Article 2.2 shall only be interpreted by the competent body of the Protocol rather than any other body. China encourages IMO to formally seek legal opinions on this Article from the competent body of the Protocol, namely, the COP/MOP.
4. The international negotiations on climate change are now at a key juncture. Any radical action may constitute an obstacle to the negotiation process, which will not be the situation the Parties want to face. We go along with the dialogue on this matter in the context of IMO. At the same time, we believe strongly that the best way is that any conclusion should come out after COP15 of UNFCCC at Copenhagen while international community makes a comprehensive arrangement for Bali process which may cover some elements relating to the issue we debate today. At the same time, China encourages the member States of IMO and their experts to continue to carry out study on methodological and technical issues concerned.
5. Finally, China is of the view that most proposals on GHG emission reduction submitted to this MEPC meeting are premature and need further analysis and improvement. China is willing to cooperate with other Members of IMO to continue the consultation in future sessions. China would like to stress again that any decision on GHG issue should be taken by consensus.

### **Statement by the delegation of Brazil**

I would like to take this opportunity to stress the importance of the work in progress in this Organization and that Brazil is open to engage in technical discussion during the development of measures to reduce GHG emissions from international shipping. However, the technical discussions in this forum should take into account the legal framework set by the United Nations Convention on Climate Change. I would like to remind that the same States who now take part in this discussion within IMO have agreed to the guiding principles of the international climate change regime.

Although Brazil understands and respects the special nature of the international shipping sector, the commitments undertaken in the UNFCCC should also hold for the maritime sector. Also, under the international climate change regime, in line with their economic priorities, countries are free to decide in which sector they intend to undertake actions to reduce GHG emissions.

Furthermore, Brazil strongly believes that all international discussions regarding the environment should be based upon the Rio Declaration, from 1992. Its Principle 7 establishes that States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. This principle

was adopted by the UNFCCC and must be upheld in all international negotiations regarding climate change.

In this regard, Brazil is unable to agree to mandatory emission reductions measures applicable to either all Flag States or **all ships**. At this stage, developing countries cannot take on emission reduction commitments. For this reason, emission reductions on the part of developing countries should only be on a voluntary basis.

Brazil also wants to remind that Article 2.2 of the Kyoto Protocol is clear to state that only the Parties included in the Annex I of the Convention should pursue emission reductions working through IMO. Neither the Protocol nor the Convention allow for any discussion on mandatory actions by developing countries.

Brazil lends its support to the position presented by the Chinese delegation (and others) and would like to emphasize that our position remains uniform and coherent with the Brazilian position within the United Nations Framework Convention on Climate Change.

#### **Statement by the delegation of Saudi Arabia**

We have listened with great interest to the speech of the Secretary-General of this organization, which focused in the centre, namely in pages 3 of 4 of the English version of document MEPC 58/INF.24, on greenhouse gas emissions from ships - and this is when our interest turned to concern as we have sensed an attempt by the Secretary General to favour the view of many developed countries at the expense of developing countries' view regarding the application of the principle of common but differentiated responsibilities.

And when the Secretary-General dismissed the application of this principle as double standard, he unintentionally cast doubt on the credibility of the maritime transport industry and the credibility of developing flag states when he justified that dismissal by saying that such double standards would encourage flag-hopping of ships to countries where laws are not applied strictly.

For its part, the Kingdom of Saudi Arabia, and I hope of other developing flag countries to do likewise, stresses that the Kingdom of Saudi Arabia will not accept to be a safe haven for ships trying to circumvent the application of the regulations.

As everyone knows, developing countries are not at the same level of development and growth reached by industrialized nations. So, do we expect a young child with a small, growing body to compete with adults and call this a competition between equals? while developing countries are asking for the playing field to be levelled for fair competition by giving them the opportunity to grow, as provided for by the principle of common but differentiated responsibilities.

We therefore stress from this forum the importance of preserving this principle to emerge from the bottleneck. In the absence of this principle, we do not see how we can reach agreement before the Conference of the Parties to the Convention on Climate Change in its 15th session, to be held in Copenhagen in December 2009.

We agree with China in emphasizing that the special nature of international shipping should not be used as a pretext to push through unilateral actions in this area without deference to the authority of the Convention on Climate Change and the Kyoto Protocol on the issue of climate change.

#### **Statement by the delegation of India**

The issue of Global warming is a matter of serious concern for India and our Prime Minister has announced a National Policy to combat this important issue. This can be gauged by considering that India spends over 2.63% of its present GDP on Adaptation due to adverse affects of Climate change, as part of our National Development programme.

India is very committed in taking all necessary measures in prevention of pollution of the marine environment by shipping and is committed to discuss all technical and operational measures to reduce GHG emissions from ship operations including future ship designs and IMO's efforts in this aspect. However we would like to stress that any approach in International shipping to contain GHG emissions should be taken in seamless continuation with the Kyoto Protocol, taking its basic principle of Common but Differentiated Responsibilities of developing and developed countries.

The document MEPC 58/4/20 on legal aspects of GHG emissions in context of Kyoto protocol completely misses the point. The issue of how IMO deals with the question of GHG emissions is a matter for member countries to take and is not a mere legal issue.

In any case, what the legal decision clearly lays out is that any decision taken within IMO would be equally applicable to all parties. In that case, it would be, therefore, not right for IMO to take up an issue mandated by the UNFCCC and which clearly calls for a differentiation within countries, i.e. applicable only to Annex I Countries. The Kyoto Protocol clearly asks Annex I countries to work through IMO to address GHG reductions from marine bunker fuels. (Articles 2.2 and 2.3 of Kyoto Protocol)

In addition, it was the UNFCCC and the Kyoto Protocol which had its remit the question of GHG emissions. IMO's role in this regard was at a later stage. With membership of both UN Organizations being the same, it is but natural that the member countries address GHG emissions in the UNFCCC rather than in IMO!

If the IMO has to address GHG emissions from bunker fuels then the only possible way forward we can see is for the IMO to discuss in depth and give technical advice on how Annex I countries must reduce their GHG emissions from marine bunker fuels.

#### **Statement by the delegation of France**

We recognize the principle of "common but differentiated responsibilities and respective capabilities" as defined in the United Nations Framework Convention on Climate Change (UNFCCC) and would not wish in any circumstances to renounce our responsibilities in the fight against climate change. However, a misunderstanding appears to exist, for the UNFCCC does not stipulate that this principle is to be applied solely on the basis of differentiation between Annex I

and non-Annex I countries. It is true that this is how the Kyoto Protocol has been understood, but there is no doubt that new provisions will be necessary for the period beyond 2012, and difficult negotiations are taking place within the UNFCCC. It would be unfortunate if those discussions contaminated the debates here and hampered our work, particularly on technical solutions, an area in which this principle must not intervene.

The emissions from the maritime sector are of a specific kind, in the sense that they cannot be attributed to a particular territory, whereas the opposite is true when it comes to terrestrial emissions. Here, I should like to clarify a point of methodology: during the adoption of the initial texts on climate change, among several possible options it was decided to make each country responsible for all the emissions produced on its territory and only the emissions produced on its territory, irrespective of the producer's nationality. Thus, the emissions from a Chinese company located in France are counted as part of the emissions from France. This geographical distribution, which does not apply to international maritime transport, will not be changed. This is why we propose that maritime emissions should be subject to an overall sector-based approach and that policies for reducing emissions should be framed here at IMO, by stakeholders who understand the industry, and for all ships, in accordance with age-old principles adopted by IMO - which are not incompatible with UNFCCC principles.

#### **Statement by the delegation of Argentina**

The Argentine Republic wishes to associate itself with the comments made by the distinguished delegations of Brazil, India and China, among others.

We should also like to add our own comments, which we preface with the statement that Argentina believes in and acknowledges the competence of the International Maritime Organization on the topic under discussion.

We consider that, as the Secretary-General said in his opening statement, the responsibilities of IMO, in general, and the MEPC, in particular, in this matter cannot be delegated.

We thus support all the efforts aimed at perfecting and harmonizing methodologies for calculating the greenhouse gas emissions from maritime transport in collaboration with the United Nations Framework Convention on Climate Change.

We believe that, as the Secretary-General indicated, the Organization must produce viable and reasonable regulations in coordination with the United Nations Climate Change, and submit appropriate advice to the next meetings of the Parties to the Convention.

The measures developed within IMO must be viable and reasonable not only from the technical viewpoint but also from the political and legal perspectives.

We will not expand on the reasons, already given by various delegations, why we believe that this Committee's work must be aligned with the principles established by the United Nations Framework Convention on Climate Change and the Kyoto Protocol. The relevance of the "common but differentiated responsibilities" principle – set out with clarity and precision by the distinguished delegation of Brazil and by others – is an issue of fundamental importance to Argentina.

In this sense we consider article 2.2 of the Kyoto Protocol to be sufficiently clear, particularly concerning the role assigned to the Annex I countries. Consequently, any proposal put forward by the MEPC concerning technical and operational mechanisms for reducing greenhouse gas emissions should comply with the above-mentioned provisions and principles.

It is also vitally important that this meeting recognize existing differences, and the concerns expressed by many delegations that those should be overcome through a consensus-based approach. In this regard, we consider that document MEPC 58/4/32, submitted by China and India, provides an excellent basis to begin working towards such consensus.

That document recognizes the difficulty that exists in drawing a clear line between the ships of Annex I countries and those of non-Annex I countries, owing to the complexity of the issues relating to ships' ownership and registration.

We thus support China and India's proposal to carry out a comprehensive study on the application of the "common but differentiated responsibilities" principle to the reduction of GHG emissions from international shipping, on the basis of the Genuine Control Approach.

We are not here facing a technical debate which can be resolved by the efforts of working groups alone; rather, we are facing substantive political differences deriving from differing interpretations among States Parties to the United Nations Framework Convention on Climate Change and to the Kyoto Protocol, concerning the connections between those instruments and the work of IMO. It is up to the States Parties to a convention to interpret it.

We consider that the only way to resolve this debate is to take into account both the specific nature of international maritime transport and the concerns of developing countries, while also keeping in mind the risk of creating precedents that erode principles which were established only after arduous negotiations in the framework of United Nations debates on climate change.

### **Statement by the delegation of Hong Kong, China**

The Hong Kong delegation fully supports IMO in playing an active role in reducing greenhouse gas (GHG) emissions from ships. However, as a subsidiary of the United Nations (UN), IMO should act in accordance with the decisions of UN.

IMO will be aware that the UNFCCC's "common but differentiated responsibilities" are consensus of the international community with respect to addressing climate change, consequently these provisions and principles in all cases need to be universally recognized and duly respected. In addressing GHG emissions, IMO should take into account of the social-economic conditions and other relevant factors of both developed and developing countries, and avoid hasty or arbitrary decisions.

In this respect, Hong Kong fully supports the submission by China and India in having a comprehensive study on this matter. In conclusion, Hong Kong must again emphasize that all delegations are duty bound to respect the decisions of the United Nations.

### **Statement by the delegation of Italy**

Italy has followed with great interest the progresses so far reached in this lengthy debate we are handling and welcomes the statements recently submitted by South Africa, China, Brazil, India, and others.

In particular this delegation appreciated the general calls for unity and balanced compromise solutions in favour of an international climate protection which includes reducing GHG emissions from international shipping.

In this respect, in our opinion the speeches delivered have provided a glimpse of light in the tunnel of the discussions which have involved the international community, even though under differentiated perspectives.

On this basis, if facts will concretely follow speeches, as pledges in the various interventions made on this so sensitive issue, it is our hope that this Committee will be allowed to continue its commitment in progressing the pertinent works towards satisfactory and agreed outcomes which, if globally adopted, will mark an new era in the maritime transport and trade and, in more general , in the environmental protection of the whole Planet, aims which is in the more intimate cords of our wishes.

### **Statement by the delegation of Mexico**

This delegation welcomes the comments expressed by the delegations which spoke before us, and those of the Secretary-General, all of which we endorse.

This delegation considers IMO to be the competent body to pursue the objective of reducing greenhouse gas emissions from fuel used in maritime transport.

In carrying out this task, IMO must take into account the provisions of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

The UNFCCC recognizes that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capacities and social and economic conditions.

The UNFCCC also recognizes that States should enact effective environmental legislation, that environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply, and that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

This delegation considers that any regulatory framework which this organization may adopt in relation to the greenhouse gas emissions from maritime transport must take into account the principles acknowledged in the United Nations Framework Convention on Climate Change.

That differentiation of responsibilities, recognized by the instruments in force, must include differentiation as to forms of commitment and time frame, on an equitable basis.

### **Statement by the delegation of the Democratic People's Republic of Korea**

The delegation of the Democratic People's Republic of Korea listened carefully to the statements made by China, Brazil and other delegations on the issue of the GHG reduction from International shipping.

The issue of climate change has been not only a serious challenge to humankind in the protection of the Global environment but also so dedicated and complicated one in addressing the matter.

However, we have the UNFCCC and the Kyoto Protocol to deal with the matter.

Therefore, my delegation is of the view that any discussion on the issue of GHG reduction from international shipping should be consistent with the internationally agreed and concluded Convention which is the UNFCCC and its' protocol, respecting the principles of "Common but differentiated responsibilities".

This delegation fully support, in this regard, the position expressed by China, Brazil and India.

As for the unity of this organization, this delegation does believe that the Secretary-General of IMO would be successful IMO united club manager, although he faces difficult issue.

### **Statement by the delegation of Greece**

In the climate change debate shipping should be regarded as the best available solution to the global need for transportation. Shipping is the most energy efficient mode of transport and the backbone of global trade, annually transporting 7.5 bn tonnes of cargo. The demand for sea transportation determines the volume of shipping and is therefore the key factor that influences the overall Green House Gas (GHG) emissions from shipping. Seen in light of the enormous volume of goods carried by ships, the CO<sub>2</sub> emissions from shipping are small (in terms of g CO<sub>2</sub>/ton-mile). This conclusion was also confirmed very recently by the outcome of the updated IMO Greenhouse Gases Study, the first phase of which was presented at the first Intersessional Meeting of the Working Group on Greenhouse Gas Emissions from Ships in Oslo in June 2008 and reproduced in doc MEPC 58/INF.6.

The reason for this is that for many decades shipping - even without specific regulation on this issue - has had a strong market driven incentive to focus on reduction of fuel consumption.

Greece fully acknowledges the need for further reduction of air emissions from shipping in terms of emissions per unit of transport work, in particular in view of the projected growth in

world trade and thus seaborne transportation, and is of the opinion that the way to achieve environmental protection must be found in a holistic manner. To be successful, such an approach should take into consideration the availability of technology to reduce emissions, the need to encourage innovation and the economics of world trade.

Any future regulatory regime must be so designed that international shipping as such is not capped and thus causes severe disruption to global trade and development. It is also important to have a **holistic** view on the regulation of the transport mode in order not to stimulate a modal **shift** in Europe from waterborne transport to a less environmentally credible mode of transport such as road, air or rail transport.

The future regulatory regime must also be goal-based in the sense that it will encourage innovation and the development of new and more CO<sub>2</sub> efficient technical and operational solutions, thus ensuring implementation of the most cost-effective solutions.

Against this background, Greece advocates that the following fundamental principles be applied in relation to any future climate regulation on shipping:

- .1 Regulation must be flag neutral to ensure a level playing field for shipping and agreed internationally to ensure consistency.
- .2 Regulation must focus on relative reduction with a view to continuously improving efficiency of the individual ship and realize that absolute reduction objectives are not within reach given the growth in world trade.
- .3 Regulation must ensure the free choice of method via goal based standards to promote innovation and cost effective solutions.

Global warming is, by definition, a global problem and shipping is the most global of all industries.

The international community must work for international solutions via IMO applicable to all ships regardless of flag. This is necessary in order to establish a level playing field; otherwise, ships with the highest and most costly standard will lose out to ships operating in registers with a lower standard, which again will result in higher global emissions.

IMO, being the specialized agency of the United Nations with 167 Member States, is the most appropriate forum for addressing all issues relating to the global shipping industry. The rules developed through the Organization's efficient and comprehensive procedures are based on its extensive technical and scientific expertise and enjoy global application.

We are convinced that the IMO will produce tangible results before the 2009 UNFCCC Conference in Copenhagen. Greece believes that the Member States of the IMO should on the one hand oppose any attempt to jeopardize IMO's work on this issue and on the other support the idea that it is IMO that should set the targets, develop the rules and finally ensure their implementation through its well established procedures and structures (flag and port State control, non-favorable treatment, Technical Cooperation Programme).

Greece is against and reserves its position on market based proposals, such as ETS for shipping and a cap-on-levy, until their added value on energy efficiency to be achieved by the world fleet, their multifaceted impact on international shipping and their indiscriminate and smooth implementation, are demonstrated under a scientific, technical, operational and political background. We would like also to express our concerns for modal shift to less efficient transport modes if an such economic instrument imposes a significant economic burden on the shipping industry compared to other transport modes, especially in Short Sea Shipping.

### **Statement by the delegation of the United States**

We are faced with a difficult and critical decision today and one that has a profound impact on IMO and its future direction, not just for greenhouse gases, but potentially for other important issues.

By calling for differentiated action, some countries are advocating an approach that is completely opposite to the principles of IMO and fundamentally threatens how we, as IMO, efficiently provide for maritime safety, security and environmental protection and the integrity, efficiency and health of the maritime industry which is *more and more vital* in an ever increasing global economy.

Here in IMO, we have always come together and worked as a *global* community to solve the important issues facing international shipping. Later in this session we will adopt to new standards for air pollution. These amendments to Annex VI are the latest shining example of the success that IMO can achieve through global technical regulations.

Indeed, IMO's global approach is what has made it one of the most successful and productive international bodies.

IMO and MEPC's success is good for the marine environment but more importantly it is good for international shipping. Across the globe, it is the consistency of standards for all ships, which has provided certainty and allowed for greater trade and greater economic development throughout the world. All countries, but particularly those who economies have grown quickly over the last ten years, have greatly benefited from this approach. Why would we want to change this successful approach now?

The United States, of course, supports the principle of common but differentiated responsibilities and respective capabilities in the United Nations Framework Convention on Climate Change. However, that principle has no place in the IMO and would, in fact, be inconsistent with the actions taken by IMO, which are non-discriminatory and non-differentiated to all ships and countries. In fact, that is our obligation. The IMO constitution clearly states that the purpose of the IMO is to "remove discriminatory action" and to promote commerce "without discrimination".

We are also puzzled to hear some countries assert that common but differentiated responsibilities must be applied in IMO because of Article 2.2 of the Kyoto Protocol. We fundamentally disagree with this view.

I don't think I have to remind this group that the UNFCCC and the IMO are separate legal instruments with separate mandates and memberships. IMO is not subservient to the UNFCCC. It is important to note that IMO's mandate on GHG emissions from shipping predates, and does not derive from, the Kyoto Protocol.

I believe the reason countries are advocating for a differentiated approach, which we all know is inconsistent with IMO, is because of the ongoing negotiations in the United Nations Framework Convention on Climate Change. It is unfortunate that this body is being held hostage to the contentious discussions that are taking place elsewhere. This delegation and many others have clearly expressed the view that agreeing to take action here in IMO will **NOT** require States to take similar action in other fora.

So far, the focus of this discussion has been on principles, which is extremely unfortunate as it is detracting us from fulfilling our responsibility and mandate to protect the environment. We must move beyond this debate. IMO is the appropriate body to address this issue, why are we contemplating a differentiated formulation that will prevent us from carrying out our mission?

This delegation believes the main decision that needs to be placed before the Air Pollution Working group on greenhouse gases is how to move forward on an efficiency index for new ships. A technical energy efficiency index, applicable to all ships, is entirely consistent with IMO's approach and within IMO's mandate. This is not contentious and it is constructive. Further, it leads to sustainable development which some of our colleagues mentioned should be a pre-requisite, and which they agreed to negotiate. We certainly appreciate the flexibility.

Mr. Chairman and distinguished delegates, let's get past these unrealistic and divisive debate and focus on what IMO does best, solving problems and helping ensure the shipping industry grows.

### **Statement by the delegation of Singapore**

Thus far, it appears that each of us have arrived at our own views of this GHG issue without the benefit of exchanging and sharing in depth over how we have each arrived at them.

Given the unique nature, as well as complexity, of international shipping, and the relevant expertise residing here, we share the view that the IMO issue of GHG emission reduction from international shipping should be best and most appropriately discussed and deliberated at the IMO.

At the same time, Singapore also understands the developing countries' concerns on the need to take into account differing conditions amongst countries when deciding on measures to reduce GHG emissions.

Hence, the Singapore delegation is of the view that it is important for the IMO to develop, as soon as possible, a framework to address the reduction of GHG emission from shipping. In particular, we look forward to the development of robust GHG reduction measures, namely the CO<sub>2</sub> design index for new ships, guidelines for the CO<sub>2</sub> operational index, and the guidance on best practices for fuel-efficient operations.

Concurrent to these efforts, the Singapore delegation further takes the view the IMO should also address the differing views amongst the members on the issue of application of the CBDR principle or, specifically, the feasibility of its application in international shipping in a way that is practical and effective.

In this light, the study proposed by China and India, as raised by the Secretary-General's opening address yesterday, could provide an opportunity for the IMO to address these differing views in a joint, concerted and objective manner, without prejudice or pre-judgement of its outcome, by a group consisting of experts from both Annex I and non-Annex I IMO Member States as well as the industry.

Without prejudging the merits or demerits of the application of CBDR, we further take the view that the study on the feasibility of applying CBDR in international shipping should explore all possible options, in addition to the concept of "genuine ownership" which, as I recall, had been proposed by China and India in their study.

Singapore is committed to work with all IMO members to move this issue forward in unity.

#### **Statement of the delegation of the Republic of Korea**

The matter of GHG reduction is believed a highly important issue which we can not avoid to solve. The Korean Government would like to congratulate on the progress made so far within IMO circle for the purpose.

Korean Government, in principle, support the outcome so far by the intercessional WG even though we need more consideration in detail with respect to Design Index, Operational Index, market based measures and best practices, etc.

Regarding the issue of CBDR, which we believe is a very important and political matter which needs deep consideration. We believe that the matter would be solved by various options, i.e. financial arrangement for technical cooperation and capacity building for less developed countries.

#### **Statement by the delegation of Venezuela**

The Bolivarian Republic of Venezuela is well aware of the serious threat to mankind posed by climate change, and sees it as a problem which afflicts all countries, large and small, rich and poor.

Nevertheless, with reference to the principle of "common but differentiated responsibilities", Bolivia believes that while there is a common responsibility to promote agreements and arrangements of an inclusive nature in order to reduce the impact of climate change, we cannot overlook the differentiated responsibility that exists when one takes into account factors which since the industrial revolution have been harmful to the environment, as well as States' capacity to address that challenge.

With regard to GHG emissions from the international maritime sector, Venezuela rejects any provision advocating the application of equal treatment or non-differentiated action in measures to reduce emissions from shipping and thus affecting the interests of countries which are not party to Annex I of the United Nations Framework Convention on Climate Change, since the contrary approach would establish international obligations that currently do not exist and would ignore the decisions taken by the natural forum for addressing the problem of reducing greenhouse gases in general.

Accordingly, Bolivia supports the comments made by China, Brazil, Saudi Arabia, India and others to the effect that the decisions to be taken on this matter in this forum should be guided by the “common but differentiated responsibilities” principle, since it is one that reflects the consensus of the international community.

### **Statement by the delegation of Peru**

The delegation of Peru wishes to associate itself with the statements made by the delegations of China, India, Brazil, Saudi Arabia and others, which we feel reflect a large sector of opinion – perhaps even the majority – among the developing countries.

We are aware of the importance of adopting measures that will be conducive to relieving or reducing the causes of the climate change that affects us all, and we are confident that every country will show both the goodwill and the determination needed to achieve specific targets for reduction of greenhouse gas emissions.

We are aware of the efforts being made by the Secretary-General and by IMO as a whole to achieve tangible results, and we consider IMO to be the appropriate body to discuss matters relating to the pollution produced by global maritime transport, but we also believe that the measures which are adopted must be agreed by consensus and in accordance with the principle of “common but differentiated responsibilities” as established by the United Nations Global Conference on Climate Change and the Kyoto Protocol.

### **Statement by the delegation of the Philippines**

The Philippines recognizes the very important and central role that the IMO plays in respect of greenhouse gas emissions from international shipping. The Philippines recognizes the special nature of international shipping and believes that the IMO should endeavour to have a global approach on this issue rather than unilateral or regional actions.

Having said this, the Philippines believes that the IMO should fully respect the fundamental principle of common but differentiated responsibilities, as enshrined in the United Nations Framework Convention on Climate Change and its Kyoto Protocol. The UNFCCC is a legally-binding agreement, with a near-universal membership, including most, if not all, Member States of the IMO.

The Philippines agrees with the Secretary General and with other delegations who have spoken earlier that this issue should be resolved through consultations and consensus, in the spirit of co-operation. The Philippines is ready to work with all concerned States in seeking a

compromise solution that would address the issue of GHG from international shipping that respects the fundamental principles under the UNFCCC and its Kyoto Protocol.

### **Statement by the delegation of Norway**

We have studied all documents and listen to the arguments presented regarding the possible introduction of the principle of common but differentiated responsibilities on future measures for control of GHG emissions from international shipping. As we see it, the situation is very clear:

The work this Committee does on GHG is mandated by the Assembly; it is a follow-up of the Assembly resolution A.963(23). Nothing in this resolution mandates the Committee to apply the principle of common but differentiated responsibilities (CBDR). It is correct that the resolution refers to the Kyoto Protocol in a preambular paragraph, but delegates should recall how carefully this is drafted. Allow me to quote:

*“THE ASSEMBLY BEING AWARE ALSO that the Kyoto Protocol, which was adopted ....”*

This paragraph in the resolution is simply an awareness of one specific article of the Kyoto Protocol. By just being aware of Article 2.2 of the Kyoto Protocol, the IMO Assembly does not adopt the principle of differentiated approach. On the contrary, the resolution does not single out any particular group of IMO Member States or any other group. The resolution clearly states that the Organization should take the lead in developing GHG limitation and reduction strategies and mechanisms for international shipping. The resolution clearly addresses emissions from international shipping, not parts of international shipping. The resolution clearly gives tasks to the Marine Environment Protection Committee.

These are normal elements in policy resolutions, and in the view of this delegation, the text of the resolution gives no other signal than that of using the normal IMO principle of equal application in the further work on GHG emissions.

If it was meant by the Assembly that the Committee should deviate from the normal IMO principle of equal application, and apply the CBDR on the issue of GHG, it would have been clearly addressed in the Resolution. In preparing the Assembly resolution, the MEPC did discuss how Article 2.2 of Kyoto Protocol should be understood, and which principle should be the basis for the IMO policy on GHG emissions from ships. Two documents, MEPC 49/4/4 by the United Kingdom and MEPC 49/4/6 by Norway, were submitted on that topic. Paragraph 4.9 of the report of MEPC 49 reflects the outcome of that discussion. The Committee: “agreed that the draft Assembly resolution on IMO Policies and Practices related to reduction of greenhouse gas emissions from ships should be based on a common policy applicable to all ships, rather than based on the provisions of Kyoto Protocol which states that the reduction of greenhouse gas emissions is under the responsibility of the Annex I countries of the Protocol”.

We see no reason to present further arguments than those of MEPC 49/4/6 on the understanding of Article 2.2 of the Kyoto Protocol. There is however reason to note the fundamental difference between the Kyoto Protocol and the traditional IMO regime:

The obligation of a party to the Kyoto Protocol relates to the domestic emissions of that party. That gives reason for a differentiated approach. The IMO policy on GHG emissions from ships addresses emissions from international shipping which due to the characteristics of international shipping gives strong reasons for using the principle of equal application to parties.

In addition, we have other examples which set precedence. There are several international environmental agreements which have a differentiated approach, yet when the IMO deals with the same issues, the principle of differentiated approach is not taken on board. Previously Norway has presented several examples, but in order to save time allow me to just mention one: The Montreal Protocol on Substances that Deplete the Ozone Layer. The Montreal Protocol aims at protecting the ozone layer by the control of ozone depleting substances. The differentiated approach is embedded in Article 2 Control Measures and Article 5 Special Situation for Developing Countries of the Protocol. Yet, when the same issue is dealt with by the IMO, i.e. in Annex VI to MARPOL 73/78 (regulation 12), the differentiated approach is not being used.

Before I conclude, I want to underline that Norway supports the inclusion of CBDR in international agreements it is needed, such as the Montreal Protocol and the Basel Convention. It is often a criterion for success in international legal agreements such as the UNFCCC. Equally, we should recognize that the principle of equal application for all ships regardless of their flag has been the key for success in IMO Conventions.

In our view, future requirements on control of GHG emission from international shipping must apply equally to all ships (regardless of their flag). This principle will be crucial for a successful IMO response to the challenge of climate change.

### **Statement by the delegation of Egypt**

Egypt greatly supports every international effort to control GHG emissions across all sectors, *inter alia*, maritime transport, provided that such measure does not harm developing economics that need gradual GHG emission control transition.

To this end, Egypt deems emission Control Technologies to be incorporated into the currently operating fleets a possible short-term solution. On the long term, new cleaner technologies will enable full replacement of timeworn vessels and environment-polluting technologies.

Concerning market-based instruments for controlling GHGs emissions from international maritime shipping, Egypt has fears of their uncertain influences.

As per accrediting new standards and regulations for controlling air-born emissions resulting from international shipping, Egypt considers that they should follow a mechanism which enables gradual transition, especially for the developing countries.

Any proposed control on air-born emissions, which could result in harmful burdens should be gradually applied in a manner that avoids or eliminates such harmful burdens.

The Egyptian delegation very much supports China, India, Saudi Arabia and many others concerning the subject of controlling GHGs emissions.

Any rules or principles might have been reached through the work of IMO will have a great influence on all countries in relation to Kyoto Protocol and associated procedures and modalities.

In the context of outlining its stance on reducing GHGs emissions in the global maritime transport sector, Egypt very much supports the change which could have been achieved under the Leadership and Guidance of the IMO.

#### **Statement by the delegation of Finland**

- The presentation yesterday of the GHG Study was very useful in highlighting the future trends in shipping and future emissions from shipping. We should bear this in mind in our work.
- Finland supports the work within the IMO in order to develop regimes to reduce greenhouse gas emissions from INTERNATIONAL shipping – and in accordance with IMO principles, in the same way as for the other regulations of IMO.
- We want to work together with all delegations with the aim to present in Copenhagen in December 2009 a solution: a “road map” or “navigation chart” how international shipping should contribute to the reduction of greenhouse gas emissions.
- At this session we should continue our work on technical issues, such as the ship design index.

#### **Statement by the delegation of Belgium**

This delegation agrees with what has been said by China and Brazil: the maritime sector has special characteristics and problems, meaning: complex and global aspects. Special problems require a specialized body. The only body specialized in this matter is the IMO. The main principle of this body is no more favourable treatment. Shipping, which is an environmental friendly transport mode, is at stake and must be protected. A global, non-discriminatory and binding solution to the GHG issue should therefore be found within the IMO.

#### **Statement by the delegation of Ghana**

Encouraging the adoption of uniform application of the practicable highest standards in order to achieve the objectives of the IMO as re-echoed by USA, notwithstanding this laudable principle, the reality is that in exceptional cases there may be the need to consider the respective capabilities of contracting Parties to the IMO Convention. It is in the light of this respect that some compromises and understanding regarding the needs and predicaments of the poorly resourced countries need to be considered.

In this connection we wish to associate ourselves with statements made by Brazil, China, India and many others.

We particularly wish to emphasize the call of Mr. Ntuli of South Africa, endorsed by the Secretary-General, for some consensus building regarding GHG emissions as in Annex VI.

### **Statement by the delegation of Chile**

This delegation would like first to state its acknowledgement that IMO continues to be the competent forum to discuss the topic of reducing the greenhouse gas emissions from international maritime transport.

We are convinced that the Organization will be capable of finding effective technical solutions to tackle this problem.

Likewise, we support what has been said by Brazil, China and others about the importance of those solutions being consistent with the principles agreed in the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

Chile reiterates its firm commitment to the International Maritime Organization and to continuing to work with it towards a solution that is satisfactory to us all, in accordance with the spirit of consensus within the Organization.

### **Statement by the delegation of Namibia**

This delegation would like to take this opportunity to first of all welcome the Kook Islands as a member of IMO.

Secondly, we would like to state that, the issue of Green House Gas Emission (GHG) is a really challenge to the world in general and IMO in particular. Hence, common approach and consensus are required. This delegation is equally aware that, GHG is not only the complicated subject matter that IMO and MPC had or has to deal with. There are a number of such issues e.g. UNCLOS and ILO emanated matters that we successfully handled.

The issue at hand require similar approach by the IMO. Thus, the work of an intersessional meeting of the working group on GHG held in Oslo this year be continued. Also, we propose for a formal and permanent joint IMO-UNFCCC Session.

Having said that, this delegation would like to associate itself with the views expressed by distinguished delegates of Brazil, India China and others.

### **Statement by the delegation of The Netherlands**

The Netherlands can support the views that IMO measures on Greenhouse Gases will not be in conflict with the Kyoto Protocol and that the IMO measures should be developed on the basis of universal rules which should apply without discrimination to all ships engaged in international trade – the “*no more favourable treatment*” principle, and therefore the documents of China, Brazil and India regarding the application of the Kyoto Protocol principle “*common but differentiated responsibilities*” can not be supported. We also do not foresee the need for further studies on this topic in the coming period.

If reductions in Greenhouse Gases emissions from ships are to benefit the environment as a whole, the IMO measures to reduce these emissions should apply globally to all ships, regardless of their flag.

Our view can maybe illustrated by an example already used earlier in this debate: If the Kyoto Protocol principle will be used the following situation can be encountered: two exactly identical sister ships, same company but one flying the flag of an Annex I country and, the other that of a non-Annex I country, loaded in the same port, sailing at the same speed, emitting the same amount of CO<sub>2</sub> and having the same destination will be treated differently because they are registered under two different flags?  
And another example:

How to apply a mandatory CO<sub>2</sub> design Index which should then differentiate between Annex I and non-Annex I flags, when the at the time of construction of a ship it is unclear which flag will be selected or later will sail?

Therefore if the IMO measures are applied only to ships flying the flag of an Annex I country, representing approximately a quarter to a third of the worlds' fleet, the contribution of the shipping industry to reduce global Greenhouse Gases emissions would be minimal and that should not be our objective.

Finally, we very much welcome that China and India want to continue the dialogue here at MEPC to reach consensus, which is also the wish of my delegation.

#### **Statement by the delegation of Australia**

- Australia would like to support the views put forward by the delegation of the United States, Norway, Finland, Netherlands and others.
- Australia respects the principle of common but differentiated responsibilities as it applies in the context of UNFCCC.
- But Australia would question the effectiveness of applying a principle that would exclude more than 70 per cent of the worlds shipping fleet from having to reduce emissions.
- The IMO has the responsibility for addressing emissions from this sector because of the global nature of the international shipping industry – it therefore requires action that is global and non-discriminatory.
- The unique and integrated global nature of international shipping means that there are no apparent equity grounds for discrimination based on the national origin of the carrier.
- Effective international action on this issue requires all countries to make a concerted effort to act to mitigate emissions. Any other approach risks the distortion of international markets for no environmental benefit.

### **Statement by the delegation of the Russian Federation**

The Russian Federation shares the international community's concern at the problem of climate change, and supports IMO's efforts to take measures to reduce GHG emissions from ships.

We consider that IMO, as the specialized body in the UN system, should first develop technical rules applicable to all shipping at the global level. These rules should be transparent, practicable and effective. Of course, they should not contradict other international instruments.

The Russian Federation supports the development of technical regulations and rules to limit GHG emissions from ships; these should be applicable to all ships, regardless of flag in the context of individual IMO instruments.

As to Article 2.2 of the Kyoto Protocol, we understand China's concern regarding the scope of application and the need to have a more precise mandate from the Kyoto Protocol.

At the same time, in seeking to achieve IMO's objectives we must act in unison and not hamper the process of establishing efficient global and other mechanisms in the framework of the Organization.

### **Statement by the delegation of Uruguay**

This delegation supports the comments of Brazil, China, India and others and shares that UNFCCC and the Kyoto Protocol are the appropriate instruments for general consensus to reduce the greenhouse gas (GHG) emissions and underlines the importance of technical discussions to address the issue of reducing the GHG emissions from shipping.

### **Statement by the delegation of Japan**

My intervention is mostly in the same line as USA delegates elaborated. Japan respects CBDR in UNFCCC. However, at IMO, we have to stick to the principle of no more favourable treatment. That means no discrimination among IMO Member States. There may be other ways to reflect upon CBDR including Technical Cooperation. However, when it comes to mandatory requirements at the IMO, we need equal treatment of all ships. This does not require Member States to use the same principle in other forum. I hope we can clarify this point, and I sincerely hope that we can go ahead and start discussion on the technical issues.

### **Statement by the delegation of Iran (Islamic Republic of)**

There is no doubt that GHG from the ships constitutes of a great concern and therefore something should be done to reduce it in global level. That is why we are sitting here and hearing interesting debates among us Member States in a friendly atmosphere. However, there are some substantial questions, doubts and concerns regarding technical, legal and practical aspects which have to be carefully addressed by this Organization. We think that what actually have been

stated by distinguished delegations of China, Brazil, Saudi Arabia and many others are clear enough to express the challenges we are facing now. The Islamic Republic of Iran also supports them. We hope the Committee could solve the problems and difficulties associated with GHG and reach a consensus solution.

### **Statement by the delegation of the United Kingdom**

The United Kingdom accepts and totally agrees that this Organization must take action on the subject of Greenhouse Gas emissions from shipping. We believe that parties within IMO should agree on a package of technological and operational measures to reduce greenhouse gas emissions from ships at the IMO Assembly in late 2009 and that the IMO should then be able to report good progress to the UNFCCC Conference of the Parties in Copenhagen in December 2009.

The United Kingdom unequivocally supports the Secretary-General's goal to deliver a global solution. That solution must apply irrespective of the nationality (i.e. flag) of a particular ship. Any system must limit the risks of "carbon leakage" and trade distortion by the transfer of goods to shipping not covered by the system or to alternative less efficient transport modes. The process must provide incentives to the shipping industry to improve its carbon efficiency, reduce emissions at minimum cost, and send a message to the world that the industry is serious about making its fair contribution to combating climate change. As a result, we are firmly of the opinion that a global greenhouse emissions trading scheme for ships may best provide these incentives. Any proposed regional action should not be an end in itself but a step towards the global solution. We believe that discussions on the benefits of economic instruments should continue within IMO, with the ultimate goal a new legal instrument, to be developed under the auspices of IMO, which would be separate from the existing MARPOL 73/78.

In respect of the proposed CO<sub>2</sub> design index for new ships, the United Kingdom will support its mandatory application to new ships.

Turning now to the difficult subject of "common but differentiated responsibilities" (CBDR). Whilst the United Kingdom supports the principle of CBDR and respective capabilities in general, we do not accept that CBDR excludes Non-Annex I parties to the UNFCCC from taking action to reduce GHG emissions from shipping.

This delegation believes that CBDR should be applied on the basis of respective capabilities. This is because the shipping industry in many non-Annex I countries is as developed as those in Annex I Countries. In many cases there is no link between the nationality of the owner of a vessel and a flag state, so differentiation between ships in a global scheme on the basis of nationality of ownership is inappropriate.

Finally whilst the United Kingdom is not opposed in principle to the concept of a levy on marine bunker fuels we do have our concerns that it would not sufficiently achieve the overall objective of reducing GHG emissions from shipping. Furthermore, as the United Kingdom, we are unable to support a fund for which revenues are raised by other bodies and from which revenues are specifically allocated because this conflicts with the United Kingdom national taxation policy.

The United Kingdom believes that it is imperative that the IMO are seen to be taking action on this politically sensitive issue. We would strongly urge the Committee to push for a global solution.

#### **Statement by the delegation of Bolivia**

This delegation wishes first to express its appreciation for IMO's efforts to reduce greenhouse gas emissions from ships by various methods, under the slogan "IMO's response to current environmental challenges". This work was carried out mainly through the Marine Environment Division and the Marine Environment Protection Committee; the impressive volume of documents submitted for the latter's regular sessions indicates in a clear and unmistakable manner the extent of the efforts that have been made.

This delegation also recognizes and supports the proposal submitted by the delegations of India, China, Brazil and seconded by others including Argentina, namely that, without question, the measures devised must be in accordance with the principle of "common but differentiated responsibilities" under the Kyoto Protocol, since that is an international legal instrument in force which in its wisdom commits the industrialized countries to an international agreement to take a genuine leading role in implementing measures which are effective but in no way impinge on the interests of the developing countries; we thus do not agree with the application of economic and financial measures but with technical procedures devised through IMO which genuinely help to reduce the pollution levels from ships.

#### **Statement by the delegation of the Marshall Islands**

This delegation has noted with interest the debate this morning, and would also like to see the technical issues advanced here, as IMO is the competent forum for discussing such issues for the reduction of emissions from maritime transport.

Marshall Islands is also a co-sponsor of the submission to this session which supports the principle that any IMO instrument concerning Green House Gas reduction should be binding and equally applicable to all ships without requiring States to adopt similar regulations or standards in other fora.

Accordingly we would also associate ourselves with the comments of the United States and others.

#### **Statement by the delegation of Vanuatu**

Pacific Micro States are already and will be among the first countries impacted by sea rise level direct consequence of global warming.

Some Pacific Micro States are already scheduled to disappear. This is the reason why Vanuatu, although classified as a least developing state, is in favour of a global solution.

Excluding more than 65% of the world fleet will not enable us to meet the expected targets.

### **Statement by the delegation of New Zealand**

On the matter at hand, and in the interests of time, so that we move on to the technical discussions as soon as possible, New Zealand would like to associate itself with the comments of the United States, the Netherlands, Australia and others. We thank the Secretary-General for his focus on this important subject and we agree with your proposal, Mr Chair, that the discussion on the design and operational indices should be with a view to reaching agreement on the technical aspects, and that the discussion on application should take place separately. In addition, it would be desirable if the Working Group could prepare for this Committee a programme of future work outputs.

### **Statement by the delegation of Ecuador**

After listening to the general declarations and the statements mentioned by the distinguish delegations of China, Brazil and India, this delegation considers that the International Maritime Organization (IMO) has to take notice of the principle of Common but Differentiated Responsibilities; and also believes that the United Nations Convention on Climate Change and the Kyoto Protocol are binding instruments, equally considers of great importance to come to an agreement base on consensus.

### **Statement by the delegation of Denmark**

I will refrain from making a general statement, as our views have already been covered by the statements of France and USA. However, I need to make a few points on the statements so far on this issue.

IMO is not an organization acting on a mandate from a “superior body”. IMO is the superior body when it comes to regulating international shipping.

The Kyoto Protocol Article 2.2 is clear. It is a political commitment for Annex I countries to pursue limitations on reductions of Green House Gases from marine bunkers in general working through the IMO. This should, however, not be perceived as a commitment in respect of ships flying the flag of an Annex I country only. If that was the case, it would mean that 168 Member States assembled in the IMO would draft regulations covering only 38 Member States. That would be a very odd situation and really makes no sense.

Furthermore, we do not see any need for further studies on the principle of Common but Differentiated Responsibilities.

Finally, in the view of this delegation it seems that the timing *vis-à-vis* COP15 seems to be the key to a compromise.

### **Statement by the delegation of Sweden**

UNFCCC sets out global GHG reduction objectives which have to be accomplished by industry sectors through implementing reduction measures. Maritime transport has as well a responsibility to reduce its greenhouse gas emissions. The work itself according to the Kyoto Protocol (Article 2.2) shall be done within the IMO – the only proper forum to discuss and regulate questions related to the maritime industry. Consequently this work shall be conducted according to the IMO's working principles.

Up to date IMO regulations have been applied to all ships regardless their flag and without exemptions. There are exemptions from some rules. Those, however, are based on parameters such as year of construction of a ship, technical characteristics or ship types. There are no grounds for differentiation of ships based on their nationality or ownership or other similar factors while discussing potential IMO instruments to reduce greenhouse gas emissions. The fundamental principle of “no favourable treatment” shall always apply within IMO.

The task of IMO is to regulate international shipping and not other sectors. Thus commitments to reduce greenhouse gas emissions from shipping shall not be seen as a precedent for countries' commitments in other fora.

Time has now come to move ahead and discuss concrete global measure for the short as well as the long perspective.

### **Statement by the delegation of Spain**

After listening carefully the views from 38 countries, I would not make a global statement and I will just state that:

Firstly, Spain recognizes the very important and central role that the IMO plays in respect of greenhouse gas emissions from international shipping.

Secondly, this issue should be resolved through consensus from all States Members.

Thirdly, a global approach on this issue rather than differentiated actions.

### **Statement by the delegation of Indonesia**

First of all, this delegation would like to express our appreciation to all effort has been made by all member states to achieve best solution in the matter arise.

With regards to Green House Gas emission reduction from the international shipping, Indonesia is of the view that these are tasks of all nations, and we should share responsibilities in addressing this challenge. Therefore, the efforts in doing so should be collective and global ones.

However, Indonesia is also of the view that the efforts taken by the member countries of the IMO should also be part of the endeavour carried out by the UNFCCC and in accordance with the principle of common but differentiated responsibilities and respected capabilities. This is a fundamental principle which has been accepted by world community since

Rio Summit 16 years ago and has been guiding our collective and global endeavour in tackling climate change issue under the framework of UNFCCC.

The Bali Conference that successfully produced the Road Map to 2012 regime which was agreed by developing and developed countries was made possible because this very important principle provides guidance in formulating the best, fair and yet workable method in sharing the burden of tackling the climate change, which requires an enormous reduction of green house gas emission and carbon sinks. The principle is not assigning blame upon nations, but instead, underlines that each nation has responsibilities to address the issue of climate change while also urges partnership among nations and encourages each of nations to contribute according to their capabilities.

Hence it is very pivotal that member countries of IMO, in our effort to formulate the best and workable way to contribute in our global effort to reduce the green house gas emission from international shipping should also taking into serious account the critical and important ongoing international negotiation on climate change that is currently being carried out. Any attempt that is not in accordance with the agreed principle of the state parties to the UNFCCC and its Protocol would not only hampering the process for concluding the negotiation for creating a post Kyoto regime, but also undoing all the hard work that has been done in tackling the climate change.

Having said that, this delegation would like to associate with intervention made by China, India, Brazil and others.

#### **Statement by the delegation of Colombia**

This delegation supports the comments made by the delegations of China, Brazil, India and others, and wishes to emphasize that this is a matter which must be addressed in a comprehensive manner involving the UNFCCC, the Kyoto Protocol and IMO. We also wish to emphasize the importance of the “common but differentiated responsibilities” principle as a matter of priority, and that relevant account must be taken of Article 4.7 of the UNFCCC.

#### **Statement by Friends of the Earth International (FOEI)**

FOEI is puzzled by the discussion on the reduction of GHG emissions from shipping so far. Are we discussing Common but Differentiated interests today? It almost seems as if GHG emissions is someone else’s problem. However, each year more alarming information is coming in on the devastating effects of CO<sub>2</sub> emissions.

We should stop passing on the problems we have created to next generations. We should guarantee our children and grandchildren that this planet in the future will be a clean and safe home for all.

Finally, I would like to wish the Secretary General and you Mr. Chairman strength and wisdom in solving this problem.

### **Statement by International Association of Classification Societies (IACS)**

Briefly, Sir, IACS will provide its input to this week's discussions with the aim that the Organization is in the best possible position to report positively to the 2009 Copenhagen Conference. Indeed, supporting the work of the IMO in addressing GHG emissions from ships has been recognized as a priority at the highest level within IACS. As a "technical" Association, the Committee will not be surprised to hear that our input will be "technically-based" – a rationale that we believe is entirely consistent with the "technically-based" decision-making process that is so well established in this Organization.

In particular, IACS believes that it can facilitate the development of a technically robust, effective in terms of addressing greenhouse gas emissions, and practically implementable Design CO<sub>2</sub> Index for new ships.

However, to assist in achieving this objective of reporting positively to the Copenhagen Conference as to what our industry has agreed it will do to address greenhouse gas emissions from ships, IACS stands ready to provide whatever advice and assistance we can to the Committee.

### **Statement by World Wide Fund Nature (WWF)**

Distinguished delegates, ladies and gentlemen, WWF is dedicated to securing a global climate change deal in Copenhagen that is effective and comprehensive, that is, one that covers all sources, including international aviation and shipping.

The inclusion of international shipping means finding a way to resolve the UNFCCC principle of Common but Differentiated Responsibilities and Respective Capabilities with IMO globally applicable regulations and it is clear that members currently disagree on how this could be done.

WWF seeks solutions that benefit the environment. A differentiated deal is better for the environment than no deal at all, and time is short if the Committee is to present options in time for the UNFCCC's COP 15 in Copenhagen. Therefore we would like the committee to explore ways to break the current deadlock and request the opportunity to present a new framework that would respect both principles, in line with the requests raised by the distinguished delegates of China, Brazil, India, and the others that have spoken this morning.

Very briefly – our document, MEPC 58/4/39, explored methods for differentiating commitments between Annex I and non-Annex I, and found that the only promising method is to apply a scheme to all ships on routes to Annex I ports. However, a possibility of evasion through extra port calls in non-Annex I countries was raised.

Since our paper was submitted a new option has emerged which we believe merits detailed considerations this week.

This option is global but differentiated. It is for a market-based scheme only. Therefore it does not apply to technical and operational measures.

Policy differentiation is based on cargo imported and applies to all ships, irrespective of flag or nationality.

A ship transporting goods to both Annex I and non-Annex I countries is partially included, in proportion to the percentage of goods that it transports to Annex I countries. This means that only a share of a ship's CO<sub>2</sub> emissions is scope.

Finally, the proposed policy will also deliver on the seven GHG principles discussed at the MEPC 57.

We, therefore, request that an appropriate group be given the chance to discuss this new proposal that could potentially resolve the deadlock on “global but differentiated rules” in the area of market-based instruments, and respect an important principle raised by the Secretary-General, namely that regulation of GHG from shipping remain the responsibility of IMO.

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**ANNEX 10****STATEMENTS BY THE DELEGATIONS OF INDIA AND GREECE  
ON MARKET-BASED MEASURES TO CONTROL GHG EMISSIONS FROM SHIPS****Statement by the delegation of India**

In order to address climate change, one has to be serious about changing the way the world generates and uses its energy. The rich world has talked about “decarbonization” of its economy, but it has done little to reinvent its energy system.

We are working overtime to shift the burden of reducing the emissions to the developing world. It is appropriate that we channel this energy to put forward a framework for an effective climate agreement for the entire world. The framework must be based on two principles: one to share the global commons equitably, because we know that co-operation is not possible without justice; two, to create conditions so that the world, particularly the energy deprived world, can make the transition to a low carbon economy.

The root of this problem is the fact that atmospheric common has been the lack of rights to this global ecological niche. Countries drew heavily, without control, emitted greenhouse gases far in excess to what the earth can withstand. This was because of careless free use of this ecological niche. Some researchers have called this the natural debt of the North against the financial debt of the South. In this situation, curtailing the emissions can only be done through the creation of rights and entitlements of each nation to the atmosphere, so that the future responsibilities are clearly demarcated. In other words, the world needs to adopt the concept of equal per capita entitlements on GHG Emissions.

Climate change is a make or break challenge before the world. It forces us, perhaps for the first time in our history to realize that we exist as one in one Earth. It tells us that there are limits to growth, and growth will have to be shared among all. The big question is how we address this challenge in an equitable way keeping the interest of all nations and people.

The feasibility of market-based measures as proposed are still immature and further studies need to be carried out to address all contentious issues with respect to shipping.

Therefore it is proposed that:

IMO to establish a Techno-Economic independent group of Experts on Maritime Affairs and the Environment which will carry out an in-depth study on how the Principles of Common but Differentiated Responsibility as mentioned in the Kyoto Protocol of the UNFCCC can be applied to international shipping with respect to reduction and control of GHG emissions from bunker fuels used on ships. The impact on the industries concerned and safety of the vessels built under the context of Energy Efficiency Design Index. They must report back to IMO within six months.

The Group should have equal representations from both Annex I and the non-Annex I countries and all Member States should be invited to nominate their experts for the Group.

**Statement by the delegation of Greece on document MEPC 58/4/25 (France, Germany and Norway)**

Greece has very serious concerns and opposes to market-based proposals, such as ETS for shipping and a cap-on-levy, until their added value on energy efficiency to be achieved by world fleet, their multifaceted impact on international shipping and their indiscriminate and smooth implementation are demonstrated under a scientific, technical, operational and political background. We would like also to express our concerns for modal shift to less efficient transport industry compared to other transport modes, especially in Short Sea Shipping.

We would like also to recall that at the 1st Intersessional meeting of the GHG Working Group in Oslo in June 2008 the conclusion was that *“it was not possible to develop further the ETS proposal at this meeting and that interested parties should co-operate in submitting refined proposals”*.

Regrettably to say, the joint submission MEPC 58/4/25 by the three countries does not provide such a refined proposal. On the contrary, new information came into light recently from very reliable sources, such as the very interesting and informative paper prepared by DNV and LRS and presented by Norway at the present session as MEPC 58/INF.14, where proposed measures to reduce CO<sub>2</sub> emissions could grab most of emissions from international shipping, despite the anticipated growth in seaborne trade, at least by 2008 emissions baseline, even with technology which is available today.

In addition, the recent study commissioned by WWF/UK to the renewed Dutch Institute, CE Delft, a member of the international consortium, who is currently carrying out the IMO updated study, also revealed very important results that cannot be ignored. This Study has not yet disseminated officially for information at this MEPC meeting, but it has already been finalized.

One of its main conclusions is that a Maritime Emission Reduction Scheme, whether international or specific, is in fact rather ineffective, since it does provide possibility for evasion by shipowners, and has a mitigated impact on subsistence in developing countries in terms of food imports, tourism, and adaptation costs.

In view of the above-mentioned reasons, we are against this proposal and we would like this statement to be reflected in the report of this meeting.

**Statement by the delegation of Greece on document MEPC 58/4/22 (Denmark)**

We would like to recall our previous statement towards the document MEPC 58/4/25 and to kindly remind the distinguished delegates that during the Oslo meeting a number of delegates viewed global levy on maritime bunker fuel as an international tax and strongly opposed its implementation as it entailed a range of difficult legal issues, and they continue to review it so at MEPC 58.

The imposition of a global levy would eventually lead in the increase of cost for seaborne trade which in turn will be passing on to the “end-consumers” without benefiting the environment as long as fuel prices remain at today’s high.

Therefore, we are against and we reserve our position towards the Danish proposal.

We would like this statement to be reflected in the report of this meeting.

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## ANNEX 11

**DRAFT INTERIM GUIDELINES ON THE METHOD OF CALCULATION OF  
THE ENERGY EFFICIENCY DESIGN INDEX FOR NEW SHIPS**

The attained new ship Energy Efficiency Design Index is a measure of ships CO<sub>2</sub> efficiency and is:

$$\frac{\left( \prod_{j=1}^M f_j \right) \left( \sum_{i=1}^{nME} C_{FMEi} SFC_{MEi} P_{MEi} \right) + P_{AE} C_{FAE} SFC_{AE}^* + \left( \sum_{i=1}^{nP_{TI}} P_{PTi} - \sum_{i=1}^{nWHR} P_{WHRi} \right) C_{FAE} SFC_{AE} - \left( \sum_{i=1}^{neff} f_{eff} P_{eff} C_{FMEi} SFC_{MEi} \right)}{f_i \text{ Capacity } V_{ref} f_w}$$

- \* If a shaft generator is provided, the Normal Maximum Sea Load can be calculated using SFC<sub>ME</sub> instead of SFC<sub>AE</sub>

Where:

1  $C_F$  is a non-dimensional conversion factor between fuel consumption measured in g and CO<sub>2</sub> emission also measured in g based on carbon content. The subscripts <sub>MEi</sub> and <sub>AEi</sub> refer to the main and auxiliary engine respectively.

(Refer to the 2006 IPCC Guidelines and paragraph 15 of MEPC 58/4/3)

2  $V_{ref}$  is the ship speed, measured in nautical miles per hour (knot), on deep water in the maximum design load condition (*Capacity*) as defined in paragraph 3 at the output of the engine(s) as defined in paragraph 5 and assuming the weather is calm with no wind and no waves. The maximum design load condition shall be defined by the deepest draught with its associated trim, at which the ship is allowed to operate. This condition is obtained from the stability booklet approved by the Administration.

3 *Capacity* is defined as follows:

- .1 For dry cargo carriers, tankers, gas tankers, container ships, ro-ro cargo and passenger ships and general cargo ships, deadweight should be used as *Capacity*.
- .2 For passenger ships, gross tonnage in accordance with the International Convention on Tonnage<sup>10</sup> measurement of ships 1969, Annex I, regulation 3 should be used as *Capacity*.

4 *Deadweight* means the difference in tonnes between the displacement of a ship in water of relative density of 1.025 at the deepest operational draught and the lightweight of the ship.

5  $P$  is the power of the main and auxiliary engines, measured in kW. The subscripts <sub>ME</sub> and <sub>AE</sub> refer to main and auxiliary engine, respectively. The summation on  $i$  is for all engines with the number of main engines ( $nME$ ).

<sup>10</sup> Displacement can also be used.

- .1  $P_{ME(i)}$  is 75% of the rated installed power (MCR) for each main engine (i).
- .2  $P_{PTI(i)}$  is 75% of the rated power consumption of shaft motors.
- .3  $P_{WHR}$  is the rated electrical power generation of waste heat recovery system at  $P_{ME(i)}$ .
- .4  $P_{eff}$  is the main engine power reduction due to innovative energy efficient technology.
- .5  $P_{AE}$  is the required auxiliary engine power to supply normal maximum sea load including necessary power for machinery, systems, equipment and living on board in the condition where the ship engaged in voyage at the speed ( $V_{ref}$ ) under the design loading condition of *Capacity*.

- .1 For ships with a main engine power of 10000 kW or above  $P_{AE}$ , is defined as:

$$P_{AE(MCRME>10000KW)} = \left( 0,025 \times \sum_{i=1}^{nME} MCR_{MEi} \right) + 250$$

- .2 For ships with a main engine power below 10000 kW  $P_{AE}$ , is defined as:

$$P_{AE(MCRME<10000KW)} = 0,05 \times \sum_{i=1}^{nME} MCR_{MEi}$$

6  $V_{ref}$ , *Capacity*, and  $P$  should be consistent with each other.

7  $SFC$  is the designed specific fuel consumption, measured in g/kWh, of the engines at the power output of  $P$  determined by paragraph 5. The subscripts  $ME_i$  and  $AE_i$  refer to the main and auxiliary engine, including any boilers, respectively. The auxiliary engine Specific Fuel Consumption ( $SFC_{AE}$ ) is that recorded on the EIAPP Certificate<sup>11</sup> at the engines 50% of  $P_{AE}$  MCR power or torque rating.

8  $f_j$  are corrections to account for ship specific-design elements:

The  $f_j$  coefficient for ice-classed ships is determined by the standard  $f_j$  “table/curve” which is to be contained in the Guidelines.

9  $f_w$  is a non-dimensional coefficient indicating the decrease of speed in representative sea conditions of wave height, wave frequency and wind speed (e.g., Beaufort Scale 6), and should be determined as follows:

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<sup>11</sup> EIAPP Certificate is the Engine International Air Pollution Prevention Certificate which relates to NO<sub>x</sub> emissions.

- .1 It can be determined by conducting the ship-specific simulation of its performance at representative sea conditions. The simulation methodology should be prescribed in the Guidelines developed by the Organization and the method and outcome for an individual ship shall be verified by the Administration or an organization recognized by the Administration.
  - .2 In case that the simulation is not conducted,  $f_W$  value should be taken from the “standard  $f_W$ ” table/curve. A “Standard  $f_W$ ” table/curve, which is to be contained in the Guidelines, is given by ship type (the same ship as the “baseline” below), and expressed in a function of the parameter of *Capacity* (e.g., DWT). The “Standard  $f_W$ ” table/curve is to be determined by conservative approach, i.e. based on data of actual speed reduction of as many existing ships as possible under representative sea conditions.
  - .3  $f_W$  should be taken as 1.0 until the Guidelines for the ship-specific simulation (paragraph .1) or  $f_W$  table/curve (paragraph .2) becomes available.
- 10  $f_{eff}$  is the availability factor of any innovative energy efficient technology.
- 11  $f_i$  is the capacity factor for any technical/regulatory limitation on capacity, and can be assumed one (1.0) if no necessity of the factor is granted.

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**ANNEX 12****TERMS OF REFERENCE FOR THE SECOND INTERSESSIONAL MEETING OF THE WORKING GROUP ON GHG EMISSIONS FROM SHIPS**

Taking into account submissions for the intersessional meeting and relevant background documents, the second Intersessional Meeting of the Working Group on Greenhouse Gas Emissions from Ships is instructed to:

Taking into account the outcome of MEPC 58:

- .1 regarding the Energy Efficiency Design Index for new ships, consider towards finalization:
  - .1 the Energy Efficiency Design Index formula taking into account any trial application of the Index by calculation;
  - .2 the regulatory text using annex 6 to document MEPC 58/4 as a basis, including baseline (MEPC 58/4/8 and MEPC 58/4/34);
  - .3 the verification procedure; and
  - .4 any necessary associated guidelines;
- .2 consider towards finalization the review of the interim guidelines on the Energy Efficiency operational index (MEPC/Circ.471);
- .3 consider towards finalization the introduction of a management tool for all ships, taking into account the Ship Efficiency Management Plan considered during MEPC 58;
- .4 consider towards finalization the guidance on best practices and other voluntary operational measures including reference text to be incorporated in the regulatory framework;
- .5 consider possible impacts on the shipping sector from the measures envisaged; and
- .6 present a written report to MEPC 59.

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**ANNEX 13**

**RESOLUTION MEPC.176(58)**

**Adopted on 10 October 2008**

**AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1997 TO AMEND THE  
INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM  
SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO  
(REVISED MARPOL ANNEX VI)**

[See MEPC 58/23/Add.1]

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**ANNEX 14**

**RESOLUTION MEPC.177(58)**

**Adopted on 10 October 2008**

**AMENDMENTS TO THE TECHNICAL CODE ON CONTROL OF EMISSION OF  
NITROGEN OXIDES FROM MARINE DIESEL ENGINES  
(NO<sub>x</sub> TECHNICAL CODE 2008)**

[See MEPC 58/23/Add.1]

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**ANNEX 15****TERMS OF REFERENCE FOR THE BLG SUB-COMMITTEE TO UPDATE OR DEVELOP GUIDELINES REQUIRED UNDER THE REVISED MARPOL ANNEX VI AND THE NO<sub>x</sub> TECHNICAL CODE 2008**

In view of the adoption of revised Annex VI and the NO<sub>x</sub> Technical Code 2008 at MEPC 58, the BLG Sub-Committee is instructed, taking into account any relevant submissions to MEPC 58 and to BLG 13, to:

- .1 update the following guidelines, taking into account any documents submitted to MEPC 58 and the discussions at MEPC 58 which are reflected in its report, with a view to adoption at the 59th or 60th session of the Committee:
  - .1 Guidelines for monitoring the world-wide average sulphur content of residual fuel oils supplied for use onboard ships (resolution MEPC.82(43));
  - .2 Guidelines for the sampling of fuel oil for determination of compliance with MARPOL Annex VI (resolution MEPC.96(47));
  - .3 Amendments to the revised survey guidelines under the Harmonized System of Survey and Certification (resolution MEPC.128(53)); and
  - .4 Guidelines for port State control under MARPOL Annex VI (resolution MEPC.129(53));
- .2 develop the following draft guidelines, with a view of adoption at the 59th or 60th session of the Committee:
  - .1 Guidelines for replacement engines not required to meet the Tier III limit, as required under regulation 13.2.2;
  - .2 Guidelines on the provision of reception facilities, as required by regulation 17.2;
  - .3 Any relevant guidelines pertaining to the equivalents set forth in regulation 4 and not covered by other guidelines such as the Guidelines for Exhaust Gas Cleaning System (MEPC.170(57));
  - .4 Guidelines for the development of a VOC management plan, as required by regulation 15.6; and
  - .5 Guidelines called for under paragraph 2.2.5.6 of the revised NO<sub>x</sub> Technical Code 2008;

- .3 taking into account future developments, consider what guidance, if any, should be developed by the Committee on the following issues, including the form that such guidance should take:
  - .1 water as a primary control measure, emulsification, charge air humidification or direct injection;
  - .2 selective catalytic reduction units or other secondary NO<sub>x</sub> control devices;
  - .3 gas fuels, natural gas or other gases as well as NO<sub>x</sub> Technical Code calculation factors and specific issues relating to the testing of engines so fuelled;
  - .4 fuel oils from non-conventional or non-petroleum sources; tar sands, shales, synthetic fuels or bio-diesels from various source materials as well as NO<sub>x</sub> Technical Code calculation factors and specific issues relating to the testing of engines so fuelled and the variations resulting from fuels derived from different sources and/or processing methods; and
  - .5 any procedures concerning approval of the Approved Methods (regulation 13.7 of the revised MARPOL Annex VI) which refer to the revised NO<sub>x</sub> Technical Code 2008;
- .4 submit a written report to MEPC 59.

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## ANNEX 16

**RESPONSE TO GESAMP REGARDING EGCS INTERIM  
WASHWATER GUIDELINES**

**BACKGROUND**

During development of the guidelines it was assumed that 45 m<sup>3</sup>/MWh would be the typical discharge rate of a sea water scrubber. Hence the discharge rate of pH, PAH and turbidity are based on this flow rate.

Ship type	Auxiliary engine load in port	EGCS running in port
Container ship, 8,000 TEU	4,000 kW, HFO	Yes
Container ship, 1,000 TEU	300 kW, MGO	No
Roro	600 kW, MGO	No
Roro	600 kW, HFO	Yes
Product tanker, 40,000 dwt	1,000...2,000 kW, HFO	Yes
Ferry, large	2,500 kW, HFO	Yes

Table 1. This table shows some indicative engine loads for some selected ship types. Considerable variation may exist between individual ships.

- 1 GESAMP assumes that the washwater discharge will be continuous, while the ships engines are running; is this correct? What are the total quantities of washwater envisaged to be discharged per day on a range of ships? Is there any difference in discharge rate with different engine loads?**

There are sea water (SW) and fresh water (FW) scrubbers. Sea water scrubbers typically have a continuous discharge, while freshwater scrubbers often do not. Both types of scrubbers can be turned off while the engine is operating. There are different scrubber technologies, some of which have a low discharge rate of wash water. For these FW systems a holding tank can be arranged, permitting the engines and EGC systems to be operated with a zero discharge of wash water for a limited period of time. Sea water scrubbers have a typical discharge rate of 45 m<sup>3</sup>/MWh, while fresh water scrubbers have around 0.1-0.3 m<sup>3</sup>/MWh. For an average ship power of perhaps 10 MW, this corresponds to 450 m<sup>3</sup>/h for SW scrubbers and 1-3 m<sup>3</sup>/h for FW scrubbers, in sea-going conditions. In ports, harbours and estuaries the continuous engine power is considerably lower (see table above), and some ships do not use scrubbers at all in ports. Main engines are typically used at reduced load only during arrivals and departures. It is expected that some systems will operate with reduced flow when operating the engine at low load. Other systems operated at constant flow will obviously discharge a cleaner effluent at reduced engine load.

- 2 10.1.2.1(i). The washwater discharge water should have a pH limit of no less than 6.5 at the overboard discharge [when static] with the exception that during maneuvering or transit the maximum difference between inlet and outlet of 2 pH units is allowed.**

**Presumably intake seawater, brackish or freshwater would have a pH of between 7.0 to 8.3 meaning that the outlet could be at a minimum pH of 5.0 to 6.3. GESAMP questioned why two different criteria were necessary here and if one could suffice, especially when more rapid dilution would be available with a moving ship? Some clarification of the underlying reasoning would be appreciated.**

**What action should be taken should these and any other monitored values be exceeded?**

10.1.2.1(i): The background for two different criteria is the possibility to adopt a more stringent criterion for stationary ships in ports when the main engine is not running, while still having an appropriate criterion for moving ships considering the dilution effect. Potential reasons for not achieving required pH values in the discharge water could either be a technical failure or setting in the system, or low alkalinity in the sea inlet water. In the scrubber manufacturer's manual, recommendations on corrective actions would be provided. These could include using a different fuel, reducing engine power, inspection of wash water treatment systems for malfunctions etc.

**3 10.1.2.1(ii) Please explain the significance of measuring pH at 4 m from the ship during commissioning?**

10.1.2.1(ii): The regulation offers two alternative compliance methods for pH, one of which is measuring the pH at a distance of 4 m, considered the boundary of an initial mixing zone as per the CORMIX (used e.g., by United States EPA) principle.

**4 10.1.5 This section refers to nitrate measurements etc. However, section 10.2 on monitoring does not say how this will be achieved – please clarify.**

10.1.5: The rationale of the nitrate limit differs from other criteria. The nitrate criterion was established to limit the amount of nitrate permitted to be discharged in case of a hypothetical scrubber also removing extensive amounts of NO<sub>x</sub> beyond the soluble NO<sub>2</sub> fraction likely to be at least partly removed. The role of the other criteria is to monitor the performance of the wash water treatment system during its lifetime. The manufacturer should demonstrate compliance with the nitrate criterion in the certification phase based on a sample to be analysed in laboratory conditions. The main point is to mitigate the risk of eutrophication.

**5 10.2 Washwater monitoring.**

**Which measurements are envisaged for measurement onboard (in-line or stand alone) and which on land at a laboratory?**

**Bearing in mind that some measurements will need to be carried out onboard, how will analytical instruments be adequately maintained and calibrated, including any in-line sensors, as well as measurement and recording units?**

**In general, the group wondered why simple water quality measurements such as temperature and dissolved oxygen had been omitted. Monitoring for oxygen depletion could provide additional environmental protection.**

10.2: Required online monitoring requirements are specified in section 10.2, being pH, PAH and turbidity. Instrument maintenance and calibration requirements are to be described in the mandatory Onboard Monitoring Manual (OMM) to the satisfaction of the Administration (Section 8). Nitrate is to be sampled and analysed in lab conditions in the certification stage. Dissolved oxygen and temperature of the discharge water were initially considered. However, it was determined after reviewing plume test measurements and following extensive discussions through IMO working groups, that the effects of temperature and oxygen depletion were negligible.

**6 In Appendix 11, it is unclear when sampling should take place, please specify for the sake of clarity for operators.**

Appendix II: Sampling could be made during approval testing and at about twelve-month intervals for a period of two years.

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## ANNEX 17

**UNIFIED INTERPRETATION TO PARAGRAPHS 6, 7, 8 AND 11.8  
OF REGULATION 12A OF MARPOL ANNEX I**

1 The distance “h” should be measured from the moulded line of the bottom shell plating at right angle to it (regulation 12A, Figure 1).

1.1 For vessels designed with a skeg, the skeg should not be considered as offering protection for the FO tanks. For the area within skeg’s width the distance “h” should be measured perpendicular to a line parallel to the baseline at the intersection of the skeg and the moulded line of the bottom shell plating as indicated in Figure A.

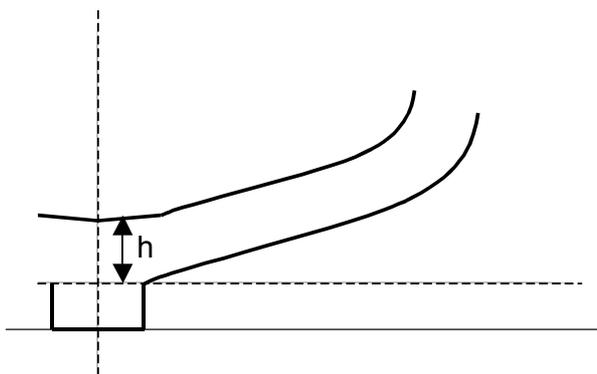


Figure A

1.2 For vessels designed with a permanent trim, the baseline should not be used as a reference point. The distance “h” should be measured perpendicular to the moulded line of the bottom shell plating at the relevant frames where fuel tanks are to be protected.

2 For vessels designed with deadrising bottom, the distance “1.5h” should be measured from the moulded line of the bottom shell plating but at right angle to the baseline, as indicated in Figure B.

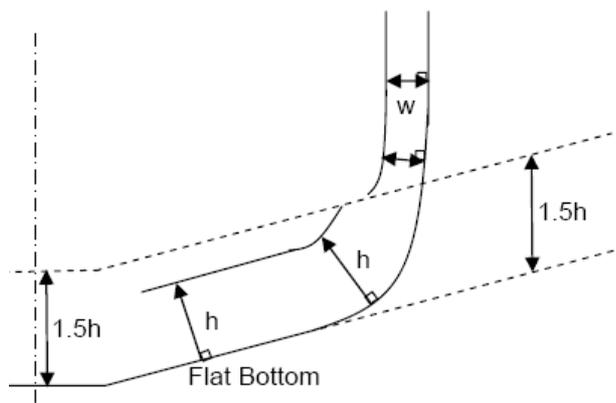


Figure B

3 Paragraphs 1 and 2, above also apply to the reference to the distance “h” in regulation 12A-11.8.

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**ANNEX 18****UNIFIED INTERPRETATION TO REGULATION 23.7.3.2 (ACCIDENTAL OIL  
OUTFLOW PERFORMANCE) OF MARPOL ANNEX I**

The pressure “ $p$ ” is to be taken as the maximum static inert gas pressure that is obtained at the discharge side of the non-return device fitted forward of the deck water seal or 5 kPa, whichever is greater. However,  $p$  need not be taken more than the maximum tank pressure corresponding to the P/V valve set-point.

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## ANNEX 19

**DRAFT AMENDMENTS TO SECTION 5.8 OF THE SUPPLEMENT TO  
THE IOPP CERTIFICATE (FORM B) OF MARPOL ANNEX I**

*Note: Additions/Deletions*

5.8 Double-hull construction

5.8.1 The ship is required to be constructed in accordance with regulation 19 and complies with the requirements of:

- .1 paragraph (3) (double-hull construction)
- .2 paragraph (4) (mid-height deck tankers with double side construction)
- .3 paragraph (5) (alternative method approved by the Marine Environment Protection Committee)

5.8.2 The ship is required to be constructed in accordance to and complies with the requirements of regulation 19.6 ~~(double bottom requirements)~~

5.8.3 The ship is not required to comply with the requirements of regulation 19

5.8.4 The ship is subject to regulation 20 and:

- .1 is required to comply with paragraphs 2 to 5, 7 and 8 of regulation 19 and regulation 28 in respect of paragraph 28.6 not later than: \_\_\_\_\_
- .2 is allowed to continue operation in accordance with regulation 20.5 until \_\_\_\_\_
- .3 is allowed to continue operation in accordance with regulation 20.7 until \_\_\_\_\_

5.8.9 The ship is not subject to regulation 20:

- .1 The ship is less than 5,000 tonnes deadweight
- .2 The ship complies with regulation 20.1.2
- .3 The ship complies with regulation 20.1.3

5.8.9 The ship is subject to regulation 21 and:

- .1 is required to comply with regulation 21.4 not later than: \_\_\_\_\_
- .2 is allowed to continue operation in accordance with regulation 21.5 until \_\_\_\_\_
- .3 is allowed to continue operation in accordance with regulation 21.6.1 until \_\_\_\_\_
- .4 is allowed to continue operation in accordance with regulation 21.6.2 until \_\_\_\_\_
- .5 is exempted from the provisions of regulation 21 in accordance with regulation 21.7.2.

5.8.9 The ship is not subject to regulation 21:

- .1 The ship is less than 600 tonnes deadweight
- .2 The ship complies with regulation 19 (Deadweight tonnes  $\geq$  5,000)
- .3 The ship complies with regulation 21.1.2
- .4 The ship complies with regulation 21.4.2 (600  $\leq$  Deadweight tonnes  $<$  5,000)
- .5 The ship does not carry "heavy grade oil" as defined in regulation 21.2 of MARPOL Annex I

5.8.9 The ship is subject to regulation 22 and:

- .1 complies with the requirements of regulation 22.2
- .2 complies with the requirements of regulation 22.3
- .3 complies with the requirements of regulation 22.5

5.8.9 The ship is not subject to regulation 22

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**ANNEX 20****TERMS OF REFERENCE FOR THE OPRC-HNS TECHNICAL GROUP**

1 The OPRC-HNS Technical Group, hereafter called the Technical Group, has been established as a subsidiary body of MEPC pursuant to a decision taken by the Committee at its forty-eighth session (MEPC 48/21, paragraph 18.12).

2 Under the direct instructions of the Marine Environment Protection Committee, the Technical Group will consider matters related to the following subjects, including the development of any necessary amendments to relevant conventions and other mandatory and non-mandatory instruments, preparation of guidelines and recommendations, for consideration by the Committee as appropriate, and the role of such measures for the protection of the marine environment:

- .1 technical matters related to oil and HNS pollution preparedness, response and co-operation, which impact or have the potential to impact the marine environment, including the development of manuals, guidance documents and training material;
- .2 sharing and lessons learned from the response to incidents involving oil and/or HNS and identification of best practices;
- .3 keeping abreast of and sharing information on research and development and state-of-the-art technologies and information related to oil and HNS pollution preparedness and response; and
- .4 assisting the Organization in performing the functions placed on it, in particular, under article 12 of the OPRC Convention and article 10 of the OPRC-HNS Protocol.

3 The conventions and other mandatory instruments referred to above include, as a minimum:

- .1 the OPRC Convention 1990 and OPRC-HNS Protocol 2000; and
- .2 MARPOL 73/78, in particular, regulations 37 and 17 of Annexes I and II, respectively.

4 The non-mandatory instruments, referred to in paragraph 2 above, which the Technical Group may be called on to review include, as a minimum:

- .1 recommendations and guidelines relevant to preparedness for and response to pollution incidents involving oil and/or HNS.

5 The working arrangements of subsidiary bodies as defined in the “Guidelines on the organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies” shall apply to the Technical Group. In particular, the Committee shall approve the work programme of the Technical Group

and decide whether a new item should be included. When a Member Government considers a matter is of sufficient urgency and importance, a well-documented proposal may be submitted simultaneously to the Committee and to the Technical Group; however, any further work by the Technical Group on such a proposal should be subject to the approval of the Committee.

6 The Technical Group shall normally meet the week prior to MEPC and shall report back to the Committee at its subsequent session.

7 The Technical Group shall elect its Chairman and Vice-Chairman, for a renewable period of one year.

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## ANNEX 21

## WORK PROGRAMME OF THE OPRC-HNS TECHNICAL GROUP

Priority	Title and reference to strategic directions, high-level actions and planned outputs for 2008-2009	Target completion date/number of sessions needed for completion	Reference
1	<b>Co-operation with other organizations</b> <i>Strategic direction: 1.1</i> <i>High-level action: 1.1.2</i> <i>Planned output: 1.1.2.1</i>	Continuous	MEPC 57/WP.1, section 6
2	<b>Technical Co-operation implementation on OPRC and HNS</b> <i>Strategic direction: 7.2</i> <i>High-level action: 7.2.3</i> <i>Planned output: 7.2.3.1</i>	Continuous	MEPC 57/WP.1, section 7
	<b>Manual and guidance documents</b>		
H.1	<ul style="list-style-type: none"> <li><b>Manual on chemical pollution to address legal and administrative aspects of HNS incidents</b>  <i>Strategic direction: 7.1</i>  <i>High-level action: 7.1.2</i>  <i>Planned output: 7.1.2.9</i></li> </ul>	2011 5 sessions	MEPC 55/23, paragraph 7.19;  MEPC 57/WP.1, paragraph 3.22
H.2	<ul style="list-style-type: none"> <li><b>Manual on oil pollution: Section I – Prevention</b>  <i>Strategic direction: 7.2</i>  <i>High-level action: 7.2.3</i>  <i>Planned output: 7.1.2.12</i></li> </ul>	2010 4 sessions	MEPC 54/WP.1, paragraph 9.5;  MEPC 57/WP.1, paragraph 3.6
H.3	<ul style="list-style-type: none"> <li><b>Guidance document on identification and observation of spilled oil</b>  <i>Strategic direction: 7.1</i>  <i>High-level action: 7.1.2</i>  <i>Planned output: -</i></li> </ul>	2010 4 sessions	MEPC 52/24, paragraph 7.10.3;  MEPC 56/WP.1, paragraph 9.5
H.4	<ul style="list-style-type: none"> <li><b>Technical guidelines on sunken oil assessment and removal techniques</b>  <i>Strategic direction: 7.1</i>  <i>High-level action: 7.1.2</i>  <i>Planned output: -</i></li> </ul>	2010 4 sessions	MEPC 56/23, paragraph 7.12.9;  MEPC 57/WP.1, paragraph 3.39

Priority	Title and reference to strategic directions, high-level actions and planned outputs for 2008-2009	Target completion date/number of sessions needed for completion	Reference
H.5	<ul style="list-style-type: none"> <li>• <b>Manual on Incident Command System during oil spill response</b>  <i>Strategic direction:</i> 7.2  <i>High-level action:</i> 7.2.3  <i>Planned output:</i> -</li> </ul>	2010 4 sessions	MEPC 56/23, paragraph 7.6;  MEPC 56/WP.1, paragraph 9.6.2
H.6	<ul style="list-style-type: none"> <li>• <b>Guideline for oil spill response in fast currents</b>  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2010 4 sessions	MEPC 56/23, paragraph 7.6;  MEPC 56/WP.1, paragraph 9.6.1
L.1	<ul style="list-style-type: none"> <li>• Oil Spill Response in Ice and Snow Conditions  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2012	MEPC 56/23, paragraph 7.6;  MEPC 56/WP.1, paragraph 9.6.3
L.2	<ul style="list-style-type: none"> <li>• Guideline for oil spill response – offshore <i>in-situ</i> burning  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2012	MEPC 57/21, paragraph 6.8
L.3	<ul style="list-style-type: none"> <li>• Updating of IMO Dispersant Guidelines  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2012	MEPC 57/21, paragraph 6.8
	<b>Training</b>		
H.7	<ul style="list-style-type: none"> <li>• <b>Introductory IMO model courses on preparedness and response to HNS pollution incidents in the marine environment</b>  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> 7.1.2.10</li> </ul>	2009 2 sessions	MEPC 51/22, paragraph 7.4.1;  MEPC 57/WP.1, section 4
H.8	<ul style="list-style-type: none"> <li>• <b>OPRC Train-the-Trainer Course</b>  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> 7.1.2.11</li> </ul>	2009 1 session	MEPC 54/WP.1, paragraph 4.14;  MEPC 57/WP.1, section 4

Priority	Title and reference to strategic directions, high-level actions and planned outputs for 2008-2009	Target completion date/number of sessions needed for completion	Reference
	<b>Information services and exchange</b>		
3	<ul style="list-style-type: none"> <li>• <b>Summary of incidents involving HNS and lessons learnt</b>  <i>Strategic direction:</i> 4.2 ,7.1, 13.2  <i>High-level action:</i> 4.2.1, 7.1.4, 13.2.1  <i>Planned output:</i> 4.2.1.1, 7.1.1.2, 13.2.1.2</li> </ul>	Continuous	MEPC 56, paragraph 7.12.15;  MEPC 57/WP.1, paragraph 5.11
H.9	<ul style="list-style-type: none"> <li>• <b>Comparative study and development of guidelines on shoreline clean-up assessment</b>  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2009 2 sessions	MEPC 56/23, paragraph 7.12.9;  MEPC 5/WP.1, paragraph 3.24
H.10	<ul style="list-style-type: none"> <li>• <b>Evaluation of the Fourth R&amp;D Forum on HNS in the marine environment</b>  <i>Strategic direction:</i> 7.2, 13.2  <i>High-level action:</i> 7.2.3, 13.2.1  <i>Planned output:</i> -</li> </ul>	2010 3 sessions	MEPC 55/23, paragraph 7.2.3;  MEPC 55/WP.1, paragraph 5.5
L.4	<ul style="list-style-type: none"> <li>• Technical guidelines on waste management (based on the Mediterranean Waste Management Study)  <i>Strategic direction:</i> 7.1  <i>High-level action:</i> 7.1.2  <i>Planned output:</i> -</li> </ul>	2010	

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**ANNEX 22****PROVISIONAL AGENDA FOR TG 9**

- Opening of the session
- 1 Adoption of the agenda
  - 2 Decisions of other bodies
  - 3 Manuals and guidance documents
    - .1 Manual on chemical pollution to address legal and administrative aspects of HNS incidents;
    - .2 Manual on oil pollution, Section I – Prevention;
    - .3 Guidance document on the identification and observation of spilled oil;
    - .4 Technical guidelines on sunken oil assessment and removal techniques;
    - .5 Manual on Incident Command System during oil spill response; and
    - .6 Guideline for oil spill response in fast currents.
  - 4 Training
  - 5 Information services and exchange
    - .1 Evaluation of the Fourth R&D Forum on HNS in the marine environment;
    - .2 Summary of incidents involving HNS and lessons learnt; and
    - .3 Comparative study and development of guidelines on shoreline clean-up assessment.
  - 6 Co-operation with other organizations
  - 7 Technical co-operation implementation on OPRC and HNS
  - 8 Work programme and provisional agenda for TG 10
  - 9 Any other business
  - 10 Report to the Committee

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**ANNEX 23****STATEMENT BY THE DELEGATION OF CUBA  
ON RECEPTION FACILITIES**

We had looked forward to coming to this fifty-eighth session of the MEPC to report to IMO not only on Cuba's incorporation into its national legislation of MARPOL Annex V, to which Cuba became a State Party in July 2008, but also on the arrangements and equipment we had put in place to ensure the adequacy of our reception facilities for MARPOL wastes at our main ports. However, hurricanes Gustav and Ike, which devastated the whole of our national territory, passing one after the other within the space of seven days, have severely damaged the results of all those efforts to bring our reception facilities into compliance with the MARPOL regulations, just as they were about to become operational.

We recognize the dedicated work that IMO has devoted, since its inception, to improving the infrastructures of maritime administrations in developing countries, through assistance, by assigning experts, and by promoting project funding together with donor countries.

The aim of this intervention, therefore, is to request IMO, in principle, for technical assistance that would enable us together to find a viable way to make good those reception facilities. On our return to Cuba, we will submit an official request to IMO.

The Cuban Government is also offering IMO the use of Cuban experts with many years' experience in all areas of maritime administration, for the benefit of developing countries.

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## ANNEX 24

**DRAFT AMENDMENTS TO MARPOL ANNEX I TO ADD  
CHAPTER 8 – PREVENTION OF POLLUTION DURING TRANSFER OF  
OIL CARGO BETWEEN OIL TANKERS AT SEA**

1 *The following chapter 8 is added:*

**“CHAPTER 8 – PREVENTION OF POLLUTION DURING TRANSFER OF OIL  
CARGO BETWEEN OIL TANKERS AT SEA**

***Regulation 40***

*Scope of application*

1 The regulations contained in this chapter apply to any oil tanker of 150 gross tonnage and above engaged in transfer of oil cargo between oil tankers at sea (STS operations) and their STS operations conducted on or after [15 months after the date the newly added chapter 8 will enter into force]. However, STS operations conducted before that date but after the provision of STS Plan required in regulation 41.1 shall be in accordance with the STS Plan as far as possible.

2 The regulations contained in this chapter shall not apply to oil transfer operations associated with fixed or floating platforms including drilling rigs, floating production, storage and offloading facilities (FPSOs) used for the offshore production storage, or transfer of oil, and floating storage units (FSUs) used for the storage or transfer of produced oil<sup>1</sup>.

3 The regulations contained in this chapter shall not apply to bunkering operations.

4 The regulations contained in this chapter shall not apply to STS operations necessary for the purpose of securing the safety of a ship or saving life at sea, or for combating specific pollution incidents in order to minimize the damage from pollution.

5 The regulations contained in this chapter shall not apply to STS operations where either of the ships involved is a warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. However, each State shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities that the STS operations are conducted in a manner consistent, so far as is reasonable and practicable, with this chapter.

***Regulation 41***

*General Rules on safety and environmental protection*

1 Any oil tanker involved in STS operations shall carry on board a Plan prescribing how to conduct STS operations (STS Plan) not later than the date of the first annual, intermediate or renewal survey of the ship to be carried out on or after [the date the newly

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<sup>1</sup> *Revised Annex I of MARPOL, chapter 7 (resolution MEPC.117(52)) and UNCLOS article 56 are applicable and address these operations.*

added chapter 8 will enter into force]. Each oil tanker's STS Plan shall be approved by its Administration. The STS Plan shall be written in the working language of the ship.

2 The STS Plan shall be developed taking into account information contained in best practice guidelines for STS operations identified by the Organization.<sup>2</sup> The STS Plan may be incorporated into an existing Safety Management System required by chapter IX of the International Convention for the Safety of Life at Sea, 1974, as amended, if that requirement is applicable to the oil tanker in question.

3 Any oil tanker subject to this chapter and engaged in STS operations shall comply with its STS Plan.

4 The person in overall advisory control of STS operations shall be qualified to perform all relevant duties, taking into account the qualifications contained in best practice guidelines for STS operations identified by the Organization.<sup>3</sup>

5 Records<sup>4</sup> of STS operations, shall be retained on board for three years and be readily available for inspection by a Party to the present Convention.

#### **Regulation 42**

##### *Notification*

1 Any oil tanker subject to this chapter that plans STS operations within the territorial sea [, or the exclusive economic zone] of a Party to the present Convention shall notify the relevant Coastal State Party not less than 48 hours in advance, of the scheduled STS operations.

2 Notification shall be given to the Coastal State Party specified in paragraph 1 of this regulation<sup>5</sup>, and shall include at least the following:

- .1 name, flag, call sign, IMO Number and estimated time of arrival (ETA) of the oil tankers involved in the STS operations;
- .2 date, time and geographical location at the commencement of the planned STS operations;
- .3 whether STS operations are to be conducted at anchor or underway;
- .4 oil type and quantity;
- .5 planned duration of operation;

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<sup>2</sup> IMO's "Manual on Oil Pollution, Section I, Prevention" as amended, and the ICS and OCIMF "Ship-to-ship Transfer Guide, Petroleum", fourth edition, 2005.

<sup>3</sup> IMO's "Manual on Oil Pollution, Section I, Prevention" as amended, and the ICS and OCIMF "Ship-to-ship Transfer Guide, Petroleum", fourth edition, 2005.

<sup>4</sup> Revised Annex I of MARPOL chapters 3 and 4 (resolution MEPC.117(52)); requirements for recording bunkering and oil cargo transfer operations in the Oil Record Book, and any records required by the STS Plan.

<sup>5</sup> The national operational contact point as listed in document MSC-MEPC.6/Circ.4 of 31 December 2007 or its subsequent amendments.

- .6 identification of Ship-to-Ship provider or person in overall advisory control and contact information; and
- .7 confirmation that the oil tanker has on board an STS Plan meeting the requirements of regulation 41.

3 If the ETA of an oil tanker at an STS operations' location or area changes by more than six hours, the master, owner or agent of that oil tanker shall provide a revised ETA to the relevant Coastal State Party to the present Convention specified in paragraph 1 of this regulation."

2 *In the Record of Construction and Equipment for Oil Tankers, Form B, new section 8A is added as follows:*

**"8A Ship-to-ship oil transfer operations at sea**  
(regulation 41)

8A.1 The oil tanker is provided with an STS Plan in compliance with regulation 41

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## ANNEX 25

DRAFT AMENDMENTS TO REGULATIONS 1, 12, 13, 17  
AND 38 OF MARPOL ANNEX I**Regulation 1 – Definitions**

1 The following new subparagraphs .31, .32, .33 and .34 are added after existing subparagraph .30:

- “.31 **Oil residue (sludge)** is the residual waste oil products generated during the normal operation of a ship such as those resulting from the purification of fuel or lubricating oil for main or auxiliary machinery or separated waste oil from oil filtering equipment or waste oil collected in drip trays, and waste hydraulic and lubricating oils.
- .32 **Oil residue (sludge) tanks** are the tanks which hold oil residue (sludge) directly from which sludge may be disposed through the standard discharge connection or any other approved means of disposal
- .33 **Oily bilge water** means water which may be contaminated by oil resulting e.g., from leakage or maintenance work in machinery spaces. Any liquid entering the bilge system including bilge wells, bilge piping, tank top or bilge holding tanks is considered oily bilge water.
- .34 **Oily bilge water holding tanks** are tanks collecting oily bilge water prior to its discharge, transfer or disposal.”

**Regulation 12 – Tanks for oil residues (sludge)**

2 Paragraph 1 is amended to read as follows:

- 1 Every ship of 400 gross tonnage and above shall be provided with a tank or tanks of adequate capacity, having regard to the type of machinery and length of voyage, to receive the oil residues (sludge) which cannot be dealt with otherwise in accordance with the requirements of this Annex.

3 The following new paragraph 2 is inserted, after the existing paragraph 1:

- “2 Oil residues (sludge) may be disposed of directly from the oil residue (sludge) tank(s) through the standard discharge connection referred to in regulation 13, or any other approved means of disposal. The tank(s):
- .1 shall be provided with a designated pump for disposal that is capable of taking suction from the oil residue (sludge) tank(s);
- .2 shall have no discharge connections to bilge system, oily bilge water holding tanks, tank top or oily water separators other than the tank(s) may be fitted with drains, with manually operated self-closing valves, for the collection of settled water or an alternative arrangement, provided such arrangement does not connect directly to the bilge piping system.”

4 Existing paragraphs 2 and 3 are renumbered 3 and 4, respectively.

**Regulations 12, 13, 17 and 38**

5 The word “sludge” in regulations 12.2, 13, 17.2.3, 38.2 and 38.7 is replaced by the words “oil residue (sludge)”.

6 The words “and other oil residues” in regulation 17.2.3 are deleted.

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**ANNEX 26**

**DRAFT AMENDMENTS TO THE IOPP CERTIFICATE FORM A (SHIPS OTHER THAN OIL TANKERS) AND FORM B (OIL TANKERS)**

The existing Section 3 of the Supplement to the IOPP Certificate, Form A and Form B, is replaced by the following:

**“3 Means for retention and disposal of oil residues (sludge) (regulation 12) and oily bilge water holding tank(s)\***

3.1 The ship is provided with oil residue (sludge) tanks for retention of oil residues (sludge) on board as follows:

Tank identification	Tank location		Volume (m <sup>3</sup> )
	Frames (from)-(to)	Lateral position	
Total volume: ..... m <sup>3</sup>			

3.2 Means for the disposal of oil residues (sludge) retained in oil residues (sludge) tanks:

- 3.2.1 Incinerator for oil residues, maximum capacity      kW or kcal/h (delete as appropriate)  
 .....
- 3.2.2 Auxiliary boiler suitable for burning oil residues .....
- 3.2.3 Other acceptable means, state which .....

3.3 The ship is provided with holding tank(s) for the retention on board of oily bilge water as follows:

Tank identification	Tank location		Volume (m <sup>3</sup> )
	Frames (from)-(to)	Lateral position	
Total volume: ..... m <sup>3</sup>			

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\* Oily bilge water holding tank(s) are not required by the Convention, if such tank(s) are provided they shall be listed in table 3.3.



## ANNEX 27

**DRAFT AMENDMENTS TO THE OIL RECORD BOOK PARTS I AND II**

1 Sections (A) to (H) of the Oil Record Book Part I are replaced by the following:

**“(A) Ballasting or cleaning of oil fuel tanks**

1 Identity of tank(s) ballasted.

2 Whether cleaned since they last contained oil and, if not, type of oil previously carried.

3 Cleaning process:

.1 position of ship and time at the start and completion of cleaning;

.2 identify tank(s) in which one or another method has been employed (rinsing through, steaming, cleaning with chemicals; type and quantity of chemicals used, in m<sup>3</sup>);

.3 identity of tank(s) into which cleaning water was transferred and the quantity in m<sup>3</sup>.

4 Ballasting:

.1 position of ship and time at start and end of ballasting;

.2 quantity of ballast if tanks are not cleaned, in m<sup>3</sup>.

**(B) Discharge of dirty ballast or cleaning water from oil fuel tanks referred to under Section A)**

5 Identity of tank(s).

6 Position of ship at start of discharge.

7 Position of ship on completion of discharge.

8 Ship's speed(s) during discharge.

9 Method of discharge:

.1 through 15 ppm equipment;

.2 to reception facilities.

10 Quantity discharged, in m<sup>3</sup>.

**(C) Collection, transfer and disposal of oil residues (sludge)**

11 Collection of oil residues (sludge).

Quantities of oil residues (sludge) retained on board. The quantity should be recorded weekly<sup>1</sup>: (this means that the quantity must be recorded once a week even if the voyage lasts more than one week):

.1 – identity of tank(s)

.2 – capacity of tank(s) ..... m<sup>3</sup>

.3 – total quantity of retention ..... m<sup>3</sup>

.4 – quantity of residue collected by manual operation ..... m<sup>3</sup>

(Operator initiated manual collections where oil residue (sludge) is transferred into the oil residue (sludge) holding tank(s).)

12 Methods of disposal or transfer of residue.

State quantity of oil residues transferred or disposed of, the tank(s) emptied and the quantity of contents retained in m<sup>3</sup>:

<sup>1</sup> Only those tanks listed in item 3.1 of form A and B of the supplement in the IOPP Certificate used for oil residues (sludge).

- .1 to reception facilities (identify port)<sup>2</sup>;
- .2 to another (other) tank(s) (indicate tank(s) and the total content of tank(s));
- .3 incinerated (indicate total time of operation);
- .4 other method (state which).

**(D) Non-automatic starting of discharge overboard, transfer or disposal otherwise of bilge water which has accumulated in machinery spaces**

- 13 Quantity discharged, transferred or disposed of, in cubic metres.<sup>3</sup>
- 14 Time of discharge transfer or disposal (starts and stop).
- 15 Method of discharge transfer, or disposal:
- .1 through 15 ppm equipment (state position at start and end);
  - .2 to reception facilities (identify port)<sup>2</sup>;
  - .3 to slop tank or holding tank or other tank(s) (indicate tank(s); state quantity retained in tank(s), in cubic metres).

**(E) Automatic starting of discharge overboard, transfer or disposal otherwise of bilge water which has accumulated in machinery spaces**

- 16 Time and position of ship at which the system has been put into automatic mode of operation for discharge overboard, through 15 ppm equipment.
- 17 Time when the system has been put into automatic mode of operation for transfer of bilge water to holding tank (identify tank).
- 18 Time when the system has been put into manual operation.

**(F) Condition of the oil filtering equipment**

- 19 Time of system failure<sup>4</sup>.
- 20 Time when system has been made operational.
- 21 Reasons for failure.

**(G) Accidental or other exceptional discharges of oil**

- 22 Time of occurrence.
- 23 Place or position of ship at time of occurrence.
- 24 Approximate quantity and type of oil.
- 25 Circumstances of discharge or escape, the reasons therefore and general remarks.

**(H) Bunkering of fuel or bulk lubricating oil**

- 26 Bunkering:
- .1 Place of bunkering.
  - .2 Time of bunkering.
  - .3 Type and quantity of fuel oil and identity of tank(s) (state quantity added, in tonnes and total content of tank(s)).

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<sup>2</sup> Ship's masters should obtain from the operator of the reception facilities, which includes barges and tank trucks, a receipt or certificate detailing the quantity of tank washings, dirty ballast, residues or oily mixtures transferred, together with the time and date of the transfer. This receipt or certificate, if attached to the Oil Record Book Part I, may aid the master of the ship in proving that his ship was not involved in an alleged pollution incident. The receipt or certificate should be kept together with the Oil Record Book Part I.

<sup>3</sup> In case of discharge or disposal of bilge water from holding tank(s), state identity and capacity of holding tank(s) and quantity retained in holding tank.

<sup>4</sup> The condition of the oil filtering equipment covers also the alarm and automatic stopping devices, if applicable.

- .4 Type and quantity of lubricating oil and identity of tank(s) (state quantity added, in tonnes and total content of tank(s)).

2 Section (J) of the Oil Record Book Part II is replaced by the following:

**“(J) Collection, transfer and disposal of residues and oily mixtures not otherwise dealt with**

55 Identity of tanks.

56 Quantity transferred or disposed of from each tank. (State the quantity retained, in m<sup>3</sup>.)

57 Method of transfer or disposal:

- .1 disposal to reception facilities (identify port and quantity involved);
- .2 mixed with cargo (state quantity);
- .3 transferred to or from (an)other tank(s) including transfer from machinery space oil residue (sludge) and oily bilge water tanks (identify tank(s); state quantity transferred and total quantity in tank(s), in m<sup>3</sup>); and
- .4 other method (state which); state quantity disposed of, in m<sup>3</sup>.”

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## ANNEX 28

## UNIFIED INTERPRETATION TO REGULATION 12.1 OF MARPOL ANNEX I

The current Unified Interpretation 15.1.5 to regulation 12.1 of MARPOL Annex I is replaced by the following:

**“15 Capacity of sludge tanks**

15.1.5 For ships where the building contract is placed, or in the absence of a building contract, the keel of which is laid before 1 July 2010, and which are fitted with homogenizers, sludge incinerators or other recognized means on board for the control of sludge, the minimum sludge tank capacity should be:

- .5.1 50% of the value calculated according to item .4 above;  
or
- .5.2 1 m<sup>3</sup> for ships of 400 gross tonnage and above but less than 4,000 gross tonnage or 2 m<sup>3</sup> for ships of 4,000 gross tonnage and above; whichever is the greater.”

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## ANNEX 29

**REVISED WORK PROGRAMME OF THE BLG SUB-COMMITTEE  
AND PROVISIONAL AGENDA FOR BLG 13**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
1	<p><b>Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments</b></p> <p><i>Strategic direction: 7.2 and 1.3</i>  <i>High-level action: 7.2.2 and 1.3.3</i>  <i>Planned output: 7.2.2.1 and 1.3.3.1</i></p>	Continuous	BLG 10/19, section 3; BLG 11/16, section 3
2	<p><b>Casualty analysis</b> (coordinated by FSI)</p> <p><i>Strategic direction: 12.1</i>  <i>High-level action: 12.1.2</i>  <i>Planned output: 12.1.2.1 to .2</i></p>	Continuous	MSC 70/23, paragraphs 9.17 and 20.4; MSC 80/24, paragraph 21.6; BLG 12/17, section 9
3	<p><b>Consideration of IACS Unified Interpretations</b></p> <p><i>Strategic direction: 1.1</i>  <i>High-level action: 1.1.2</i>  <i>Planned output: 1.1.2.1</i></p>	Continuous	MSC 78/26, paragraph 22.12; BLG 12/17, section 10
H.1	<p>Environmental and safety aspects of alternative tanker designs under MARPOL, Annex I, regulation 19</p> <p><i>Strategic direction: 7.2</i>  <i>High-level action: 7.2.2</i>  <i>Planned output: 7.2.2.1</i></p>		BLG 3/18, paragraph 15.7
	.1 assessment of alternative tanker designs, if any (as necessary)	Continuous	BLG 1/20, section 16; BLG 4/18, paragraph 15.3

**Notes:** 1 “H” means a high priority item and “L” means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.

2 Items printed in bold letters have been selected for the provisional agenda for BLG 13.

**Sub-Committee on Bulk Liquids and Gases (BLG) (continued)**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
H.2	<p><b>Development of provisions for gas-fuelled ships</b> (in cooperation with FP and DE)</p> <p><i>Strategic direction: 5.2</i> <i>High-level action: 5.2.1</i> <i>Planned output: 5.2.1.1</i></p>	2009	MSC 78/26, paragraph 24.11; BLG 12/17, section 7
H.3	<p><b>Development of guidelines and other documents for uniform implementation of the 2004 BWM Convention</b></p> <p><i>Strategic direction: 7.1</i> <i>High-level action: 7.1.2</i> <i>Planned output: 7.1.2.2 to .5</i></p>	2010	MEPC 52/24, paragraph 2.21.6; BLG 12/17, section 5
H.4	<p><b>Application of the requirements for the carriage of bio-fuels and bio-fuel blends</b></p> <p><i>Strategic direction: 7.2</i> <i>High-level action: 7.2.2</i> <i>Planned output: 7.2.2.1</i></p>	2009	MEPC 55/23, paragraphs 19.4 and 19.5; BLG 12/17, section 4
H.5	<p><b>Development of international measures for minimizing the transfer of invasive aquatic species through bio-fouling of ships</b></p> <p><i>Strategic direction: 7.1</i> <i>High-level action: 7.1.1</i> <i>Planned output: -</i></p>	2010	MEPC 56/23, paragraph 19.12; BLG 12/17, section 11
H.6	<p><b>Review of the Recommendation for material safety data sheets for MARPOL Annex I cargoes and marine fuel oils</b></p> <p><i>Strategic direction: 5.2</i> <i>High-level action: 5.2.3</i> <i>Planned output: 5.2.3.1</i></p>	2009	BLG 11/16, paragraph 14.14; MSC 83/28, paragraph 25.8; BLG 12/17, section 12

**Sub-Committee on Bulk Liquids and Gases (BLG) (continued)**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
H.7	<p><b>Revision of the IGC Code</b> (in cooperation with FP, DE, SLF and STW as necessary) <i>Strategic direction:</i> 5.2 <i>High-level action:</i> 5.2.1 <i>Planned output:</i> -</p>	2010	MSC 83/28, paragraph 25.7; BLG 12/17, section 13
H.8	<p><b>Safety requirements for natural gas hydrate pellet carriers</b> <i>Strategic direction:</i> 5.2 <i>High-level action:</i> 5.2.1 <i>Planned output:</i> -</p>	2011	MSC 83/28, paragraph 25.6
H.9	<p><b>Review of relevant non-mandatory instruments as a consequence of the amended MARPOL Annex VI and the NO<sub>x</sub> Technical Code</b> <i>Strategic direction:</i> 7.3 <i>High-level action:</i> 7.3.1 <i>Planned output:</i> 7.3.1.1 +</p>	2010	BLG 12/17, paragraph 6.88.9
H.10	<p><b>Amendments to MARPOL Annex I on the use and carriage of heavy grade oil on ships in the Antarctic area</b> <i>Strategic direction:</i> 7.2 <i>High-level action:</i> 7.2.2 <i>Planned output:</i> -</p>	2010	BLG 12/17, paragraph 16.12

**REVISED PROVISIONAL AGENDA FOR BLG 13\***

- Opening of the session
- 1 Adoption of the agenda
  - 2 Decisions of other IMO bodies
  - 3 Evaluation of safety and pollution hazards of chemicals and preparation of consequential amendments
  - 4 Application of the requirements for the carriage of bio-fuels and bio-fuel blends
  - 5 Development of guidelines and other documents for uniform implementation of the 2004 BWM Convention
  - 6 Development of provisions for gas-fuelled ships
  - 7 Casualty analysis
  - 8 Consideration of IACS Unified Interpretations
  - 9 Development of international measures for minimizing the transfer of invasive aquatic species through bio-fouling of ships
  - 10 Review of the Recommendation for material safety data sheets for MARPOL Annex I cargoes and marine fuel oils
  - 11 Revision of the IGC Code
  - 12 Safety requirements for natural gas hydrate pellet carriers
  - 13 Review of relevant non-mandatory instruments as a consequence of the amended MARPOL Annex VI and the NO<sub>x</sub> Technical Code
  - 14 Amendments to MARPOL Annex I on the use and carriage of heavy grade oil on ships in the Antarctic area
  - 15 Work programme and agenda for BLG 14
  - 16 Election of Chairman and Vice-Chairman for 2010
  - 17 Any other business
  - 18 Report to the Committees

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\* Agenda item numbers do not necessarily indicate priority.

## ANNEX 30

**REVISED WORK PROGRAMME OF THE FSI SUB-COMMITTEE  
AND PROVISIONAL AGENDA FOR FSI 17**

	<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
<p>1     <b>Mandatory reports under MARPOL</b>  <i>Strategic direction: 2</i>  <i>High-level action: 2.1.1</i>  <i>Planned output: 2.1.1.6</i></p>	Continuous	MSC 70/23, paragraph 20.12.1; MEPC 56/23, paragraph 14.4; FSI 16/18, section 4
<p>2     <b>Casualty statistics and investigations</b>  <i>Strategic direction: 1.1 / 2 / 4 / 5.3 12.1 / 12.3</i>  <i>High-level action: 1.1.2 / 2.1.1 / 4.2.1 / 5.3.1 / 12.1.2 / 12.3.1</i>  <i>Planned output: 1.1.2.1 / 2.1.1.1 / 4.2.1.1 / 4.2.1.3 / 5.3.1.5 / 12.1.2.1 / 12.1.2.2 12.3.1.1</i></p>	Continuous	MSC 68/23, paragraphs 7.16 to 7.24; FSI 16/18, section 6
<p>3     <b>Harmonization of port State control activities</b>  <i>Strategic direction: 1.1 / 2 / 4 / 5.3/ 12.3</i>  <i>High-level action: 1.1.2 / 2.1.1 / 4.2.1 / 5.3.1 / 12.3.1</i>  <i>Planned output: 1.1.2.1 / 2.1.1.7 / 4.2.1.1 / 4.2.1.3/ 5.3.1.2 / 5.3.1.3 / 5.3.1.4 / 5.3.1.5 / 12.3.1.2</i></p>	Continuous	MSC 71/23, paragraph 20.16; MSC 80/24, paragraph 21.16; FSI 16/18, section 7
<p>4     <b>Responsibilities of Governments and measures to encourage flag State compliance</b>  <i>Strategic direction: 2 / 4 / 5.3</i>  <i>High-level action: 2.1.1 / 4.2.1 / 5.3.1</i>  <i>Planned output: 2.1.1.5 / 4.2.1.2 / 5.3.1.5</i></p>	Continuous	MSC 68/23, paragraphs 7.2 to 7.8; FSI 16/18, section 3

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- Notes:**
- 1     “H” means a high priority item and “L” means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.
  - 2     Items printed in bold letters have been selected for the provisional agenda for FSI 17.

**Sub-Committee on Flag State Implementation (FSI) (continued)**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
5	<b>Comprehensive analysis of difficulties encountered in the implementation of IMO instruments</b> <i>Strategic direction: 2</i> <i>High-level action: 2.1.1</i> <i>Planned output: 2.1.1.5</i>	Continuous	MSC 69/22, paragraph 20.28; FSI 8/19, paragraph 4.3; FSI 16/18, section 10
6	<b>Review of the Survey Guidelines under the HSSC</b> <i>Strategic direction: 5.2</i> <i>High-level action: 5.2.1</i> <i>Planned output: 5.2.1.2</i>	Continuous	MSC 72/23, paragraph 21.27; FSI 16/18, section 11
7	<b>Consideration of IACS Unified Interpretations</b> <i>Strategic direction: 1.1</i> <i>High-level action: 1.1.2</i> <i>Planned output: 1.1.2.1</i>	Continuous	MSC 78/26, paragraph 22.12; FSI 16/18, section 12
8	<b>Review of the Code for the Implementation of Mandatory IMO Instruments</b> <i>Strategic direction: 2</i> <i>High-level action: 2.1.1 / 2.2.1</i> <i>Planned output: 2.1.1.5 / 2.1.1.7 / 2.2.1.1 / 2.2.1.2</i>	Continuous	MSC 83/28, paragraph 25.27; FSI 16/18, section 14
H.1	<b>PSC guidelines on seafarers' working hours and PSC guidelines in relation to the Maritime Labour Convention, 2006</b> <i>Strategic direction: 1.1</i> <i>High-level action: 1.1.2</i> <i>Planned output: 1.1.2.1</i>	2009	MSC 70/23, paragraph 20.12.3; FSI 16/18, section 9
H.2	<b>Development of guidelines on port State control under the 2004 BWM Convention</b> <i>Strategic direction: 2 / 5.3</i> <i>High-level action: 2.1.1 / 5.3.1</i> <i>Planned output: 2.1.1.2 / 5.3.1.2</i>	2010	MEPC 52/24, paragraph 2.21.2; FSI 16/18, section 8

**Sub-Committee on Flag State Implementation (FSI) (continued)**

	<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
<p>H.3 <b>Port reception facilities-related issues</b>  <i>Strategic direction: 7.1 / 13.2</i>  <i>High-level action: 7.1.3 / 13.2.1</i>  <i>Planned output: 7.1.3.1 / 7.1.3.2 / 13.2.1.1 / 13.2.1.2</i></p>	2010	MEPC 53/24, paragraph 9.7; FSI 16/18, section 5
<p>H.4 <b>Development of a Code for Recognized Organizations</b>  <i>Strategic direction: 2</i>  <i>High-level action: 2.1.1</i>  <i>Planned output: 2.1.1.1</i></p>	2010	MSC 84/24, section 22 paragraph 22.27; FSI 16/18, section 15
<p>H.5 <b>Measures to protect the safety of persons rescued at sea</b>  <i>Strategic direction: 5.1</i>  <i>High-level action: 5.1.2</i>  <i>Planned output: -</i></p>	2010	MSC 84/24, section 22; FSI 16/18, section 15
<p>H.6 Code of conduct during demonstrations/ campaigns against ships on high seas (coordinated by NAV)  <i>Strategic direction: 5.2</i>  <i>High-level action: 5.2.4</i>  <i>Planned output: 5.2.4.2</i></p>	2 sessions	MSC 82/24, section 22

## PROVISIONAL AGENDA FOR FSI 17

- Opening of the session
- 1 Adoption of the agenda
  - 2 Decisions of other IMO bodies
  - 3 Responsibilities of Governments and measures to encourage flag State compliance
  - 4 Mandatory reports under MARPOL
  - 5 Port reception facilities-related issues
  - 6 Casualty statistics and investigations
  - 7 Harmonization of port State control activities
  - 8 PSC guidelines on seafarers' working hours and PSC guidelines in relation to the Maritime Labour Convention, 2006
  - 9 Development of guidelines on port State control under the 2004 BWM Convention
  - 10 Comprehensive analysis of difficulties encountered in the implementation of IMO instruments
  - 11 Review of the Survey Guidelines under the HSSC
  - 12 Consideration of IACS Unified Interpretations
  - 13 Review of the Code for the Implementation of Mandatory IMO Instruments
  - 14 Development of a Code for Recognized Organizations
  - 15 Measures to protect the safety of persons rescued at sea
  - 16 Work programme and agenda for FSI 18
  - 17 Election of Chairman and Vice-Chairman for 2010
  - 18 Any other business
  - 19 Report to the Committees

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## ANNEX 31

**WORK PROGRAMMES OF THE DSC, NAV AND DE SUB-COMMITTEES  
WHICH RELATE TO ENVIRONMENTAL ISSUES**

**SUB-COMMITTEE ON DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS (DSC)**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
2	<b>Reports on incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas</b> <i>Strategic direction: 12.3</i> <i>High-level action: 12.3.1</i> <i>Planned output: -</i>	Continuous	CDG 45/22, section 11 and paragraph 20.2; DSC 11/19, section 6
H.1	<b>Amendments (35-10) to the IMDG Code and supplements</b> <i>Strategic direction: 5.2</i> <i>High-level action: 5.2.3</i> <i>Planned output: 5.2.3.1</i>	2009	DSC 3/15, paragraph 12.6; DSC 12/19, section 3

**SUB-COMMITTEE ON SAFETY OF NAVIGATION (NAV)**

1	<b>Routeing of ships, ship reporting and related matters</b> <i>Strategic direction: 5.2</i> <i>High-level action: 5.2.4</i> <i>Planned output: 5.2.4.1</i>	Continuous	MSC 72/23, paragraphs 10.69 to 10.71, 20.41 and 20.42; NAV 53/22, section 3
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**SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT (DE)**

H.1	<b>Amendments to resolution A.744(18)</b> <i>Strategic direction: 5.2</i> <i>High-level action: 5.2.1</i> <i>Planned output: 5.2.1.1</i>	2009	DE 45/27, paragraphs 7.18 and 7.19; DE 51/28, section 9
L.3	Guidelines on equivalent methods to reduce onboard NO <sub>x</sub> emission	2 sessions	MEPC 41/20, paragraph 8.22.1; BLG 10/19, paragraph 12.3; MEPC 55/23, paragraph 19.9

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## ANNEX 32

**ITEMS TO BE INCLUDED IN THE AGENDAS  
FOR MEPC 59, MEPC 60 AND MEPC 61**

<b>No.</b>	<b>Item</b>	<b>MEPC 59 July 2009</b>	<b>MEPC 60 March 2010</b>	<b>MEPC 61 October 2010</b>
1	Harmful aquatic organisms in ballast water	RG X	X	X
2	Recycling of ships	WG X	X	X
3	Prevention of air pollution from ships	WG X	[WG] X	[WG] X
4	Consideration and adoption of amendments to mandatory instruments	DG X	[X]	[X]
5	Interpretations of and amendments to MARPOL and related instruments	X	X	X
6	Implementation of the OPRC Convention and the OPRC-HNS Protocol and relevant Conference resolutions	X	X	X
7	Identification and protection of Special Areas and PSSAs	X	X	X
8	Inadequacy of reception facilities	X	X	X
9	Reports of sub-committees	X	X	X
10	Work of other bodies	X	X	X
11	Status of Conventions	X	X	X

No.	Item	MEPC 59 July 2009	MEPC 60 March 2010	MEPC 61 October 2010
12	Harmful anti-fouling systems for ships	X	X	X
13	Promotion of implementation and enforcement of MARPOL and related instruments	X	X	X
14	Technical Co-operation Sub-programme for the Protection of the Marine Environment	X	X	X
15	Role of the human element	WG X	X	X
16	Formal safety assessment	X	[X]	[X]
17	Development of a guidance document for minimizing the risk of ship strikes with cetaceans	X	X	[X]
18	Noise from commercial shipping and its adverse impacts on marine life	X	X	X
19	Work programme of the Committee and subsidiary bodies	X	X	X
20	Application of the Committees' Guidelines	X	[X]	[X]
21	Election of the Chairman and Vice-Chairman	X		X
22	Any other business	X	X	X



MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
58th session  
Agenda item 23

MEPC 58/23/Add.1  
17 October 2008  
Original: ENGLISH

**REPORT OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE ON  
ITS FIFTY-EIGHTH SESSION**

Attached are annexes 13 and 14 to the report of the Marine Environment Protection Committee on its fifty-eighth session (MEPC 58/23).

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**ANNEX 13**

**RESOLUTION MEPC.176(58)**

**Adopted on 10 October 2008**

**AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1997 TO AMEND THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO**

**(Revised MARPOL Annex VI)**

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,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1973 Convention”), article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1978 Protocol”) and article 4 of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (herein after referred to as the “1997 Protocol”), which together specify the amendment procedure of the 1997 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 and 1997 Protocols,

NOTING ALSO that, by the 1997 Protocol, Annex VI entitled Regulations for the Prevention of Air Pollution from Ships is added to the 1973 Convention (hereinafter referred to as “Annex VI”),

HAVING CONSIDERED the draft amendments to MARPOL Annex VI,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to Annex VI, the text of which is set out at Annex to the present resolution;
2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on 1 January 2010, unless prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world’s merchant fleet, have communicated to the Organization their objection to the amendments;
3. INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the said amendments shall enter into force on 1 July 2010 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, certified copies of the present resolution and the text of the amendments contained in the Annex;

5. REQUESTS FURTHER the Secretary-General to transmit to the Members of the Organization which are not Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, copies of the present resolution and its Annex; and

6. INVITES the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to MARPOL Annex VI to the attention of shipowners, ship operators, shipbuilders, marine diesel engine manufacturers, marine fuel suppliers and any other interested groups.

ANNEX

REVISED MARPOL ANNEX VI

Regulations for the Prevention of Air Pollution from Ships

CHAPTER I

GENERAL

**Regulation 1**

***Application***

The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 16 and 18 of this Annex.

**Regulation 2**

***Definitions***

For the purpose of this Annex:

1 *Annex* means Annex VI to the International Convention for the Prevention of Pollution from Ships 1973 (MARPOL), as modified by the Protocol of 1978 relating thereto, and as modified by the Protocol of 1997, as amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the present Convention.

2 *A similar stage of construction* 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 tons or one per cent of the estimated mass of all structural material, whichever is less.

3 *Anniversary date* means the day and the month of each year which will correspond to the date of expiry of the International Air Pollution Prevention Certificate.

4 *Auxiliary control device* means a system, function, or control strategy installed on a marine diesel engine that is used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure, or that is used to facilitate the starting of the engine. An auxiliary control device may also be a strategy or measure that has been satisfactorily demonstrated not to be a defeat device.

5 *Continuous feeding* is defined as the process whereby waste is fed into a combustion chamber without human assistance while the incinerator is in normal operating conditions with the combustion chamber operative temperature between 850°C and 1,200°C.

6 *Defeat device* means a device which measures, senses, or responds to operating variables (e.g., engine speed, temperature, intake pressure or any other parameter) for the purpose of activating, modulating, delaying or deactivating the operation of any component or the function of the emission control system such that the effectiveness of the emission control system is reduced under conditions encountered during normal operation, unless the use of such a device is substantially included in the applied emission certification test procedures.

7 *Emission* means any release of substances, subject to control by this Annex, from ships into the atmosphere or sea.

8 *Emission Control Area* means an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution from NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions and their attendant adverse impacts on human health and the environment. Emission Control Areas shall include those listed in, or designated under, regulations 13 and 14 of this Annex.

9 *Fuel oil* means any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including distillate and residual fuels.

10 *Gross tonnage* means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in Annex I to the International Convention on Tonnage Measurements of Ships, 1969 or any successor Convention.

11 *Installations* in relation to regulation 12 of this Annex means the installation of systems, equipment including portable fire-extinguishing units, insulation, or other material on a ship, but excludes the repair or recharge of previously installed systems, equipment, insulation, or other material, or the recharge of portable fire-extinguishing units.

12 *Installed* means a marine diesel engine that is or is intended to be fitted on a ship, including a portable auxiliary marine diesel engine, only if its fuelling, cooling, or exhaust system is an integral part of the ship. A fuelling system is considered integral to the ship only if it is permanently affixed to the ship. This definition includes a marine diesel engine that is used to supplement or augment the installed power capacity of the ship and is intended to be an integral part of the ship.

13 *Irrational emission control strategy* means any strategy or measure that, when the ship is operated under normal conditions of use, reduces the effectiveness of an emission control system to a level below that expected on the applicable emission test procedures.

14 *Marine diesel engine* means any reciprocating internal combustion engine operating on liquid or dual fuel, to which regulation 13 of this Annex applies, including booster/compound systems if applied.

15 *NO<sub>x</sub> Technical Code* means the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines adopted by resolution 2 of the 1997 MARPOL Conference, as amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the present Convention.

16 *Ozone depleting substances* means controlled substances defined in paragraph (4) of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annexes A, B, C or E to the said Protocol in force at the time of application or interpretation of this Annex.

Ozone depleting substances that may be found on board ship include, but are not limited to:

Halon 1211 Bromochlorodifluoromethane

Halon 1301 Bromotrifluoromethane

Halon 2402 1, 2-Dibromo -1, 1, 2, 2-tetrafluoroethane (also known as Halon 114B2)

CFC-11 Trichlorofluoromethane

CFC-12 Dichlorodifluoromethane

CFC-113 1, 1, 2 – Trichloro – 1, 2, 2 – trifluoroethane

CFC-114 1, 2 – Dichloro –1, 1, 2, 2 – tetrafluoroethane

CFC-115 Chloropentafluoroethane

17 *Shipboard incineration* means the incineration of wastes or other matter on board a ship, if such wastes or other matter were generated during the normal operation of that ship.

18 *Shipboard incinerator* means a shipboard facility designed for the primary purpose of incineration.

19 *Ships constructed* means ships the keels of which are laid or which are at a similar stage of construction.

20 *Sludge oil* means sludge from the fuel oil or lubricating oil separators, waste lubricating oil from main or auxiliary machinery, or waste oil from bilge water separators, oil filtering equipment or drip trays.

21 *Tanker* means an oil tanker as defined in regulation 1 of Annex I or a chemical tanker as defined in regulation 1 of Annex II of the present Convention.

### **Regulation 3** ***Exceptions and Exemptions***

#### **General**

1 Regulations of this Annex shall not apply to:

- .1 any emission necessary for the purpose of securing the safety of a ship or saving life at sea; or

- .2 any emission resulting from damage to a ship or its equipment:
  - .2.1 provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the emission for the purpose of preventing or minimizing the emission; and
  - .2.2 except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result.

### **Trials for Ship Emission Reduction and Control Technology Research**

2 The Administration of a Party may, in co-operation with other Administrations as appropriate, issue an exemption from specific provisions of this Annex for a ship to conduct trials for the development of ship emission reduction and control technologies and engine design programmes. Such an exemption shall only be provided if the applications of specific provisions of the Annex or the revised NO<sub>x</sub> Technical Code 2008 could impede research into the development of such technologies or programmes. A permit for such an exemption shall only be provided to the minimum number of ships necessary and be subject to the following provisions:

- .1 for marine diesel engines with a per cylinder displacement up to 30 litres, the duration of the sea trial shall not exceed 18 months. If additional time is required, a permitting Administration or Administrations may permit a renewal for one additional 18-month period; or
- .2 for marine diesel engines with a per cylinder displacement at or above 30 litres, the duration of the ship trial shall not exceed 5 years and shall require a progress review by the permitting Administration or Administrations at each intermediate survey. A permit may be withdrawn based on this review if the testing has not adhered to the conditions of the permit or if it is determined that the technology or programme is not likely to produce effective results in the reduction and control of ship emissions. If the reviewing Administration or Administrations determine that additional time is required to conduct a test of a particular technology or programme, a permit may be renewed for an additional time period not to exceed five years.

### **Emissions from Sea-bed Mineral Activities**

3.1 Emissions directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources are, consistent with article 2(3)(b)(ii) of the present Convention, exempt from the provisions of this Annex. Such emissions include the following:

- .1 emissions resulting from the incineration of substances that are solely and directly the result of exploration, exploitation and associated offshore processing of sea-bed mineral resources, including but not limited to the flaring of hydrocarbons and the burning of cuttings, muds, and/or stimulation fluids during well completion and testing operations, and flaring arising from upset conditions;
- .2 the release of gases and volatile compounds entrained in drilling fluids and cuttings;

- .3 emissions associated solely and directly with the treatment, handling, or storage of sea-bed minerals; and
- .4 emissions from marine diesel engines that are solely dedicated to the exploration, exploitation and associated offshore processing of sea-bed mineral resources.

3.2 The requirements of regulation 18 of this Annex shall not apply to the use of hydrocarbons which are produced and subsequently used on site as fuel, when approved by the Administration.

#### **Regulation 4** ***Equivalents***

1 The Administration of a Party may allow any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Annex if such fitting, material, appliance or apparatus or other procedures, alternative fuel oils, or compliance methods are at least as effective in terms of emissions reductions as that required by this Annex, including any of the standards set forth in regulations 13 and 14.

2 The Administration of a Party which allows a fitting, material, appliance or apparatus or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Annex shall communicate to the Organization for circulation to the Parties particulars thereof, for their information and appropriate action, if any.

3 The Administration of a Party should take into account any relevant guidelines developed by the Organization pertaining to the equivalents provided for in this regulation.

4 The Administration of a Party which allows the use of an equivalent as set forth in paragraph 1 of this regulation shall endeavour not to impair or damage its environment, human health, property, or resources or those of other States.

## CHAPTER II

### SURVEY, CERTIFICATION AND MEANS OF CONTROL

#### **Regulation 5** ***Surveys***

1 Every ship of 400 gross tonnage and above and every fixed and floating drilling rig and other platforms shall be subject to the surveys specified below:

- .1 An initial survey before the ship is put into service or before the certificate required under regulation 6 of this Annex is issued for the first time. This survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex;
- .2 A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation 9.2, 9.5, 9.6 or 9.7 of this Annex is applicable. The renewal survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with applicable requirements of this Annex;
- .3 An intermediate survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the certificate which shall take the place of one of the annual surveys specified in paragraph 1.4 of this regulation. The intermediate survey shall be such as to ensure that the equipment and arrangements fully comply with the applicable requirements of this Annex and are in good working order. Such intermediate surveys shall be endorsed on the certificate issued under regulation 6 or 7 of this Annex;
- .4 An annual survey within three months before or after each anniversary date of the certificate, including a general inspection of the equipment, systems, fittings, arrangements and material referred to in paragraph 1.1 of this regulation to ensure that they have been maintained in accordance with paragraph 4 of this regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the certificate issued under regulation 6 or 7 of this Annex; and
- .5 An additional survey either general or partial, according to the circumstances, shall be made whenever any important repairs or renewals are made as prescribed in paragraph 4 of this regulation or after a repair resulting from investigations prescribed in paragraph 5 of this regulation. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory and that the ship complies in all respects with the requirements of this Annex.

2 In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of this Annex are complied with.

3 Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration.

- .1 The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it. Such organizations shall comply with the guidelines adopted by the Organization;<sup>1</sup>
- .2 The survey of marine diesel engines and equipment for compliance with regulation 13 of this Annex shall be conducted in accordance with the revised NO<sub>x</sub> Technical Code 2008;
- .3 When a nominated surveyor or recognized organization determines that the condition of the equipment does not correspond substantially with the particulars of the certificate, they shall ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken, the certificate shall be withdrawn by the Administration. If the ship is in a port of another Party, the appropriate authorities of the port State shall also be notified immediately. When an officer of the Administration, a nominated surveyor or recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this regulation; and
- .4 In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.

4 The equipment shall be maintained to conform with the provisions of this Annex and no changes shall be made in the equipment, systems, fittings, arrangements, or material covered by the survey, without the express approval of the Administration. The direct replacement of such equipment and fittings with equipment and fittings that conform with the provisions of this Annex is permitted.

5 Whenever an accident occurs to a ship or a defect is discovered which substantially affects the efficiency or completeness of its equipment covered by this Annex, the master or owner of the ship shall report at the earliest opportunity to the Administration, a nominated surveyor, or recognized organization responsible for issuing the relevant certificate.

## **Regulation 6**

### ***Issue or endorsement of a Certificate***

1 An International Air Pollution Prevention Certificate shall be issued, after an initial or renewal survey in accordance with the provisions of regulation 5 of this Annex, to:

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<sup>1</sup> Refer to the Guidelines for the authorization of organizations acting on behalf of the Administration, adopted by the Organization by resolution A.739(18), as may be amended by the Organization, and the Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration, adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

- .1 any ship of 400 gross tonnage and above engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties; and
- .2 platforms and drilling rigs engaged in voyages to waters under the sovereignty or jurisdiction of other Parties.

2 A ship constructed before the date of entry into force of Annex VI for such ship's Administration shall be issued with an International Air Pollution Prevention Certificate in accordance with paragraph 1 of this regulation no later than the first scheduled dry-docking after the date of such entry into force, but in no case later than three years after this date.

3 Such certificate shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.

### **Regulation 7**

#### ***Issue of a Certificate by another Party***

1 A Party may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issuance of an International Air Pollution Prevention Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that certificate on the ship, in accordance with this Annex.

2 A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

3 A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued under regulation 6 of this Annex.

4 No International Air Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

### **Regulation 8**

#### ***Form of Certificate***

The International Air Pollution Prevention Certificate shall be drawn up in a form corresponding to the model given in appendix I to this Annex and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.

### **Regulation 9**

#### ***Duration and Validity of Certificate***

1 An International Air Pollution Prevention Certificate shall be issued for a period specified by the Administration, which shall not exceed five years.

- 2 Notwithstanding the requirements of paragraph 1 of this regulation:
  - .1 when the renewal survey is completed within three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate;
  - .2 when the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate; and
  - .3 when the renewal survey is completed more than three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.
- 3 If a certificate is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in paragraph 1 of this regulation, provided that the surveys referred to in regulations 5.1.3 and 5.1.4 of this Annex applicable when a certificate is issued for a period of five years are carried out as appropriate.
- 4 If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period which shall not exceed five months from the expiry date.
- 5 If a ship, at the time when a certificate expires, is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.
- 6 A certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.
- 7 In special circumstances, as determined by the Administration, a new certificate need not be dated from the date of expiry of the existing certificate as required by paragraph 2.1, 5 or 6 of this regulation. In these special circumstances, the new certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

8 If an annual or intermediate survey is completed before the period specified in regulation 5 of this Annex, then:

- .1 the anniversary date shown on the certificate shall be amended by endorsement to a date which shall not be more than three months later than the date on which the survey was completed;
- .2 the subsequent annual or intermediate survey required by regulation 5 of this Annex shall be completed at the intervals prescribed by that regulation using the new anniversary date; and
- .3 the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation 5 of this Annex are not exceeded.

9 A certificate issued under regulation 6 or 7 of this Annex shall cease to be valid in any of the following cases:

- .1 if the relevant surveys are not completed within the periods specified under regulation 5.1 of this Annex;
- .2 if the certificate is not endorsed in accordance with regulation 5.1.3 or 5.1.4 of this Annex; and
- .3 upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 5.4 of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

## **Regulation 10**

### ***Port State Control on Operational Requirements***

1 A ship, when in a port or an offshore terminal under the jurisdiction of another Party, is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution from ships.

2 In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as to ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Annex.

3 Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.

4 Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

## **Regulation 11**

### ***Detection of Violations and Enforcement***

1 Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Annex, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.

2 A ship to which this Annex applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has emitted any of the substances covered by this Annex in violation of the provision of this Annex. If an inspection indicates a violation of this Annex, a report shall be forwarded to the Administration for any appropriate action.

3 Any Party shall furnish to the Administration evidence, if any, that the ship has emitted any of the substances covered by this Annex in violation of the provisions of this Annex. If it is practicable to do so, the competent authority of the former Party shall notify the master of the ship of the alleged violation.

4 Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the other Party to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with its law as soon as possible. The Administration shall promptly inform the Party which has reported the alleged violation, as well as the Organization, of the action taken.

5 A Party may also inspect a ship to which this Annex applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party together with sufficient evidence that the ship has emitted any of the substances covered by the Annex in any place in violation of this Annex. The report of such investigation shall be sent to the Party requesting it and to the Administration so that the appropriate action may be taken under the present Convention.

6 The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in force at the time of application or interpretation of this Annex, applies, *mutatis mutandis*, to the rules and standards set forth in this Annex.

## CHAPTER III

### REQUIREMENTS FOR CONTROL OF EMISSIONS FROM SHIPS

#### Regulation 12

#### *Ozone Depleting Substances*

1 This regulation does not apply to permanently sealed equipment where there are no refrigerant charging connections or potentially removable components containing ozone depleting substances.

2 Subject to the provisions of regulation 3.1, any deliberate emissions of ozone depleting substances shall be prohibited. Deliberate emissions include emissions occurring in the course of maintaining, servicing, repairing or disposing of systems or equipment, except that deliberate emissions do not include minimal releases associated with the recapture or recycling of an ozone depleting substance. Emissions arising from leaks of an ozone depleting substance, whether or not the leaks are deliberate, may be regulated by Parties.

3.1 Installations which contain ozone depleting substances, other than hydro-chlorofluorocarbons, shall be prohibited:

- .1 on ships constructed on or after 19 May 2005; or
- .2 in the case of ships constructed before 19 May 2005, which have a contractual delivery date of the equipment to the ship on or after 19 May 2005 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 19 May 2005.

3.2 Installations which contain hydro-chlorofluorocarbons shall be prohibited:

- .1 on ships constructed on or after 1 January 2020; or
- .2 in the case of ships constructed before 1 January 2020, which have a contractual delivery date of the equipment to the ship on or after 1 January 2020 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 1 January 2020.

4 The substances referred to in this regulation, and equipment containing such substances, shall be delivered to appropriate reception facilities when removed from ships.

5 Each ship subject to regulation 6.1 shall maintain a list of equipment containing ozone depleting substances.<sup>2</sup>

6 Each ship subject to regulation 6.1 which has rechargeable systems that contain ozone depleting substances shall maintain an Ozone Depleting Substances Record Book. This Record Book may form part of an existing log-book or electronic recording system as approved by the Administration.

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<sup>2</sup> See Appendix I, Supplement to International Air Pollution Prevention Certificate (IAPP Certificate), section 2.1.

7 Entries in the Ozone Depleting Substances Record Book shall be recorded in terms of mass (kg) of substance and shall be completed without delay on each occasion, in respect of the following:

- .1 recharge, full or partial, of equipment containing ozone depleting substances;
- .2 repair or maintenance of equipment containing ozone depleting substances;
- .3 discharge of ozone depleting substances to the atmosphere:
  - .3.1 deliberate; and
  - .3.2 non-deliberate;
- .4 discharge of ozone depleting substances to land-based reception facilities; and
- .5 supply of ozone depleting substances to the ship.

**Regulation 13**  
***Nitrogen Oxides (NO<sub>x</sub>)***

**Application**

1.1 This regulation shall apply to:

- .1 each marine diesel engine with a power output of more than 130 kW installed on a ship; and
- .2 each marine diesel engine with a power output of more than 130 kW which undergoes a major conversion on or after 1 January 2000 except when demonstrated to the satisfaction of the Administration that such engine is an identical replacement to the engine which it is replacing and is otherwise not covered under paragraph 1.1.1 of this regulation.

1.2 This regulation does not apply to:

- .1 a marine diesel engine intended to be used solely for emergencies, or solely to power any device or equipment intended to be used solely for emergencies on the ship on which it is installed, or a marine diesel engine installed in lifeboats intended to be used solely for emergencies; and
- .2 a marine diesel engine installed on a ship solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly, provided that such engine is subject to an alternative NO<sub>x</sub> control measure established by the Administration.

1.3 Notwithstanding the provisions of subparagraph 1.1 of this paragraph, the Administration may provide an exclusion from the application of this regulation for any marine diesel engine which is installed on a ship constructed, or for any marine diesel engine which undergoes a major conversion, before 19 May 2005, provided that the ship on which the engine is installed is solely engaged in voyages to ports or offshore terminals within the State the flag of which the ship is entitled to fly.

## Major Conversion

2.1 For the purpose of this regulation, *major conversion* means a modification on or after 1 January 2000 of a marine diesel engine that has not already been certified to the standards set forth in paragraph 3, 4, or 5.1.1 of this regulation where:

- .1 the engine is replaced by a marine diesel engine or an additional marine diesel engine is installed, or
- .2 any substantial modification, as defined in the revised NO<sub>x</sub> Technical Code 2008, is made to the engine, or
- .3 the maximum continuous rating of the engine is increased by more than 10% compared to the maximum continuous rating of the original certification of the engine.

2.2 For a major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine or the installation of an additional marine diesel engine, the standards in this regulation in force at the time of the replacement or addition of the engine shall apply. On or after 1 January 2016, in the case of replacement engines only, if it is not possible for such a replacement engine to meet the standards set forth in paragraph 5.1.1 of this regulation (Tier III), then that replacement engine shall meet the standards set forth in paragraph 4 of this regulation (Tier II). Guidelines are to be developed by the Organization to set forth the criteria of when it is not possible for a replacement engine to meet the standards in subparagraph 5.1.1 of this regulation.

2.3 A marine diesel engine referred to in paragraph 2.1.2 or 2.1.3 shall meet the following standards:

- .1 for ships constructed prior to 1 January 2000, the standards set forth in paragraph 3 of this regulation shall apply; and
- .2 for ships constructed on or after 1 January 2000, the standards in force at the time the ship was constructed shall apply.

## Tier I

3 Subject to regulation 3 of this Annex, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2000 and prior to 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

- .1 17.0 g/kWh when n is less than 130 rpm;
- .2  $45 \cdot n^{(-0.2)}$  g/kWh when n is 130 or more but less than 2,000 rpm;
- .3 9.8 g/kWh when n is 2,000 rpm or more.

## Tier II

4 Subject to regulation 3 of this Annex, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

- .1 14.4 g/kWh when n is less than 130 rpm;
- .2  $44 \cdot n^{(-0.23)}$  g/kWh when n is 130 or more but less than 2,000 rpm;
- .3 7.7 g/kWh when n is 2,000 rpm or more.

## Tier III

5.1 Subject to regulation 3 of this Annex, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2016:

- .1 is prohibited except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):
  - .1.1 3.4 g/kWh when n is less than 130 rpm;
  - .1.2  $9 \cdot n^{(-0.2)}$  g/kWh when n is 130 or more but less than 2,000 rpm; and
  - .1.3 2.0 g/kWh when n is 2,000 rpm or more;
- .2 is subject to the standards set forth in subparagraph 5.1.1 of this paragraph when the ship is operating in an Emission Control Area designated under paragraph 6 of this regulation; and
- .3 is subject to the standards set forth in paragraph 4 of this regulation when the ship is operating outside of an Emission Control Area designated under paragraph 6 of this regulation.

5.2 Subject to the review set forth in paragraph 10 of this regulation, the standards set forth in paragraph 5.1.1 of this regulation shall not apply to:

- .1 a marine diesel engine installed on a ship with a length (L), as defined in regulation 1.19 of Annex I to the present Convention, less than 24 metres when it has been specifically designed, and is used solely, for recreational purposes; or
- .2 a marine diesel engine installed on a ship with a combined nameplate diesel engine propulsion power of less than 750 kW if it is demonstrated, to the satisfaction of the Administration, that the ship cannot comply with the standards set forth in paragraph 5.1.1 of this regulation because of design or construction limitations of the ship.

## **Emission Control Area**

6 For the purpose of this regulation, an Emission Control Area shall be any sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in appendix III to this Annex.

### **Marine Diesel Engines Installed on a Ship Constructed Prior to 1 January 2000**

7.1 Notwithstanding paragraph 1.1.1 of this regulation, a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 litres installed on a ship constructed on or after 1 January 1990 but prior to 1 January 2000 shall comply with the emission limits set forth in subparagraph 7.4 of this paragraph, provided that an Approved Method for that engine has been certified by an Administration of a Party and notification of such certification has been submitted to the Organization by the certifying Administration. Compliance with this paragraph shall be demonstrated through one of the following:

- .1 installation of the certified Approved Method, as confirmed by a survey using the verification procedure specified in the Approved Method File, including appropriate notation on the ship's International Air Pollution Prevention Certificate of the presence of the Approved Method; or
- .2 certification of the engine confirming that it operates within the limits set forth in paragraph 3, 4, or 5.1.1 of this regulation and an appropriate notation of the engine certification on the ship's International Air Pollution Prevention Certificate.

7.2 Subparagraph 7.1 shall apply no later than the first renewal survey that occurs 12 months or more after deposit of the notification in subparagraph 7.1. If a shipowner of a ship on which an Approved Method is to be installed can demonstrate to the satisfaction of the Administration that the Approved Method was not commercially available despite best efforts to obtain it, then that Approved Method shall be installed on the ship no later than the next annual survey of that ship which falls after the Approved Method is commercially available.

7.3 With regard to a ship with a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 litres installed on a ship constructed on or after 1 January 1990 but prior to 1 January 2000, the International Air Pollution Prevention Certificate shall, for a marine diesel engine to which paragraph 7.1 of this regulation applies, indicate that either an Approved Method has been applied pursuant to paragraph 7.1.1 of this regulation or the engine has been certified pursuant to paragraph 7.1.2 of this regulation or that an Approved Method does not yet exist or is not yet commercially available as described in subparagraph 7.2 of this regulation.

7.4 Subject to regulation 3 of this Annex, the operation of a marine diesel engine described in subparagraph 7.1 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

- .1 17.0 g/kWh when n is less than 130 rpm;
- .2  $45 \cdot n^{(-0.2)}$  g/kWh when n is 130 or more but less than 2,000 rpm; and
- .3 9.8 g/kWh when n is 2,000 rpm or more.

7.5 Certification of an Approved Method shall be in accordance with chapter 7 of the revised NO<sub>x</sub> Technical Code 2008 and shall include verification:

- .1 by the designer of the base marine diesel engine to which the Approved Method applies that the calculated effect of the Approved Method will not decrease engine rating by more than 1.0%, increase fuel consumption by more than 2.0% as measured according to the appropriate test cycle set forth in the revised NO<sub>x</sub> Technical Code 2008, or adversely affect engine durability or reliability; and
- .2 that the cost of the Approved Method is not excessive, which is determined by a comparison of the amount of NO<sub>x</sub> reduced by the Approved Method to achieve the standard set forth in subparagraph 7.4 of this paragraph and the cost of purchasing and installing such Approved Method.<sup>3</sup>

### **Certification**

8 The revised NO<sub>x</sub> Technical Code 2008 shall be applied in the certification, testing, and measurement procedures for the standards set forth in this regulation.

9 The procedures for determining NO<sub>x</sub> emissions set out in the revised NO<sub>x</sub> Technical Code 2008 are intended to be representative of the normal operation of the engine. Defeat devices and irrational emission control strategies undermine this intention and shall not be allowed. This regulation shall not prevent the use of auxiliary control devices that are used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure or that are used to facilitate the starting of the engine.

### **Review**

10 Beginning in 2012 and completed no later than 2013, the Organization shall review the status of the technological developments to implement the standards set forth in paragraph 5.1.1 of this regulation and shall, if proven necessary, adjust the time periods set forth in that subparagraph.

## **Regulation 14**

### ***Sulphur Oxides (SO<sub>x</sub>) and Particulate Matter***

#### **General Requirements**

1 The sulphur content of any fuel oil used on board ships shall not exceed the following limits:

- .1 4.50% m/m prior to 1 January 2012;

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<sup>3</sup> The cost of an Approved Method shall not exceed 375 Special Drawing Rights/metric ton NO<sub>x</sub> calculated in accordance with the Cost-Effectiveness formula below:

$$C_e = \frac{\text{Cost of Approved Method} \cdot 10^6}{P(\text{kW}) \cdot 0.768 \cdot 6000(\text{hours/year}) \cdot 5 (\text{years}) \cdot \Delta \text{NO}_x(\text{g/kWh})}$$

- .2 3.50% m/m on and after 1 January 2012; and
- .3 0.50% m/m on and after 1 January 2020.

2 The worldwide average sulphur content of residual fuel oil supplied for use on board ships shall be monitored taking into account guidelines developed by the Organization.<sup>4</sup>

### **Requirements within Emission Control Areas**

3 For the purpose of this regulation, Emission Control Areas shall include:

- .1 the Baltic Sea area as defined in regulation 1.11.2 of Annex I, the North Sea as defined in regulation 5(1)(f) of Annex V; and
- .2 any other sea area, including port areas, designated by the Organization in accordance with criteria and procedures set forth in appendix III to this Annex.

4 While ships are operating within an Emission Control Area, the sulphur content of fuel oil used on board ships shall not exceed the following limits:

- .1 1.50% m/m prior to 1 July 2010;
- .2 1.00% m/m on and after 1 July 2010; and
- .3 0.10% m/m on and after 1 January 2015.

5 The sulphur content of fuel oil referred to in paragraph 1 and paragraph 4 of this regulation shall be documented by its supplier as required by regulation 18 of this Annex.

6 Those ships using separate fuel oils to comply with paragraph 4 of this regulation and entering or leaving an Emission Control Area set forth in paragraph 3 of this regulation shall carry a written procedure showing how the fuel oil change-over is to be done, allowing sufficient time for the fuel oil service system to be fully flushed of all fuel oils exceeding the applicable sulphur content specified in paragraph 4 of this regulation prior to entry into an Emission Control Area. The volume of low sulphur fuel oils in each tank as well as the date, time, and position of the ship when any fuel-oil-change-over operation is completed prior to the entry into an Emission Control Area or commenced after exit from such an area, shall be recorded in such log-book as prescribed by the Administration.

7 During the first twelve months immediately following an amendment designating a specific Emission Control Area under paragraph 3.2 of this regulation, ships operating in that Emission Control Area are exempt from the requirements in paragraphs 4 and 6 of this regulation and from the requirements of paragraph 5 of this regulation insofar as they relate to paragraph 4 of this regulation.

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<sup>4</sup> MEPC.82(43), "Guidelines for Monitoring the World-wide Average Sulphur Content of Residual Fuel Oils Supplied for Use On Board Ships".

## Review Provision

8 A review of the standard set forth in subparagraph 1.3 of this regulation shall be completed by 2018 to determine the availability of fuel oil to comply with the fuel oil standard set forth in that paragraph and shall take into account the following elements:

- .1 the global market supply and demand for fuel oil to comply with paragraph 1.3 of this regulation that exist at the time that the review is conducted;
- .2 an analysis of the trends in fuel oil markets; and
- .3 any other relevant issue.

9 The Organization shall establish a group of experts, comprising of representatives with the appropriate expertise in the fuel oil market and appropriate maritime, environmental, scientific, and legal expertise, to conduct the review referred to in paragraph 8 of this regulation. The group of experts shall develop the appropriate information to inform the decision to be taken by the Parties.

10 The Parties, based on the information developed by the group of experts, may decide whether it is possible for ships to comply with the date in paragraph 1.3 of this regulation. If a decision is taken that it is not possible for ships to comply, then the standard in that subparagraph shall become effective on 1 January 2025.

## Regulation 15

### *Volatile Organic Compounds (VOCs)*

1 If the emissions of VOCs from a tanker are to be regulated in a port or ports or a terminal or terminals under the jurisdiction of a Party, they shall be regulated in accordance with the provisions of this regulation.

2 A Party regulating tankers for VOC emissions shall submit a notification to the Organization. This notification shall include information on the size of tankers to be controlled, the cargoes requiring vapour emission control systems, and the effective date of such control. The notification shall be submitted at least six months before the effective date.

3 A Party which designates ports or terminals at which VOCs emissions from tankers are to be regulated shall ensure that vapour emission control systems, approved by that Party taking into account the safety standards for such systems developed by the Organization<sup>5</sup>, are provided in any designated port and terminal and are operated safely and in a manner so as to avoid undue delay to a ship.

4 The Organization shall circulate a list of the ports and terminals designated by Parties to other Parties and Member States of the Organization for their information.

5 A tanker to which paragraph 1 of this regulation applies shall be provided with a vapour emission collection system approved by the Administration taking into account the safety standards for such systems developed by the Organization<sup>5</sup>, and shall use this system during the

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<sup>5</sup> MSC/Circ.585, Standards for vapour emission control systems.

loading of relevant cargoes. A port or terminal which has installed vapour emission control systems in accordance with this regulation may accept tankers which are not fitted with vapour collection systems for a period of three years after the effective date identified in paragraph 2 of this regulation.

6 A tanker carrying crude oil shall have on board and implement a VOC Management Plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organization. The plan shall be specific to each ship and shall at least:

- .1 provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo;
- .2 give consideration to the additional VOC generated by crude oil washing;
- .3 identify a person responsible for implementing the plan; and
- .4 for ships on international voyages, be written in the working language of the master and officers and, if the working language of the master and officers is not English, French, or Spanish, include a translation into one of these languages.

7 This regulation shall also apply to gas carriers only if the type of loading and containment systems allow safe retention of non-methane VOCs on board or their safe return ashore.<sup>6</sup>

## **Regulation 16**

### ***Shipboard Incineration***

1 Except as provided in paragraph 4 of this regulation, shipboard incineration shall be allowed only in a shipboard incinerator.

2 Shipboard incineration of the following substances shall be prohibited:

- .1 residues of cargoes subject to Annex I, II or III or related contaminated packing materials;
- .2 polychlorinated biphenyls (PCBs);
- .3 garbage, as defined by Annex V, containing more than traces of heavy metals;
- .4 refined petroleum products containing halogen compounds;
- .5 sewage sludge and sludge oil either of which are not generated on board the ship; and
- .6 exhaust gas cleaning system residues.

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<sup>6</sup> MSC.30(61), "International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk", chapter 5.

3 Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerator for which an IMO Type Approval Certificate<sup>7</sup> has been issued.

4 Shipboard incineration of sewage sludge and sludge oil generated during normal operation of a ship may also take place in the main or auxiliary power plant or boilers, but in those cases, shall not take place inside ports, harbours and estuaries.

5 Nothing in this regulation neither:

- .1 affects the prohibition in, or other requirements of, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended, and the 1996 Protocol thereto, nor
- .2 precludes the development, installation and operation of alternative design shipboard thermal waste treatment devices that meet or exceed the requirements of this regulation.

6.1 Except as provided in subparagraph 6.2 of this paragraph, each incinerator on a ship constructed on or after 1 January 2000 or incinerator which is installed on board a ship on or after 1 January 2000 shall meet the requirements contained in appendix IV to this Annex. Each incinerator subject to this subparagraph shall be approved by the Administration taking into account the standard specification for shipboard incinerators developed by the Organization<sup>8</sup>; or

6.2 The Administration may allow exclusion from the application of subparagraph 6.1 of this paragraph to any incinerator which is installed on board a ship before 19 May 2005, provided that the ship is solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly.

7 Incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation shall be provided with a manufacturer's operating manual which is to be retained with the unit and which shall specify how to operate the incinerator within the limits described in paragraph 2 of appendix IV of this Annex.

8 Personnel responsible for the operation of an incinerator installed in accordance with the requirements of paragraph 6.1 of this regulation shall be trained to implement the guidance provided in the manufacturer's operating manual as required by paragraph 7 of this regulation.

9 For incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation the combustion chamber gas outlet temperature shall be monitored at all times the unit is in operation. Where that incinerator is of the continuous-feed type, waste shall not be fed into the unit when the combustion chamber gas outlet temperature is below 850°C. Where that incinerator is of the batch-loaded type, the unit shall be designed so that the combustion chamber gas outlet temperature shall reach 600°C within five minutes after start-up and will thereafter stabilize at a temperature not less than 850°C.

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<sup>7</sup> Type Approval Certificates issued in accordance with resolution MEPC.59(33) or MEPC.76(40).

<sup>8</sup> Refer to resolution MEPC.76(40), Standard specification for shipboard incinerators.

**Regulation 17**  
***Reception Facilities***

- 1 Each Party undertakes to ensure the provision of facilities adequate to meet the:
  - .1 needs of ships using its repair ports for the reception of ozone depleting substances and equipment containing such substances when removed from ships;
  - .2 needs of ships using its ports, terminals or repair ports for the reception of exhaust gas cleaning residues from an exhaust gas cleaning system,  
without causing undue delay to ships; and
  - .3 needs in ship-breaking facilities for the reception of ozone depleting substances and equipment containing such substances when removed from ships.
- 2 If a particular port or terminal of a Party is – taking into account the guidelines to be developed by the Organization – remotely located from, or lacking in, the industrial infrastructure necessary to manage and process those substances referred to in paragraph 1 of this regulation and therefore cannot accept such substances, then the Party shall inform the Organization of any such port or terminal so that this information may be circulated to all Parties and Member States of the Organization for their information and any appropriate action. Each Party that has provided the Organization with such information shall also notify the Organization of its ports and terminals where reception facilities are available to manage and process such substances.
- 3 Each Party shall notify the Organization for transmission to the Members of the Organization of all cases where the facilities provided under this regulation are unavailable or alleged to be inadequate.

**Regulation 18**  
***Fuel Oil Availability and Quality***

**Fuel Oil Availability**

- 1 Each Party shall take all reasonable steps to promote the availability of fuel oils which comply with this Annex and inform the Organization of the availability of compliant fuel oils in its ports and terminals.
  - 2.1 If a ship is found by a Party not to be in compliance with the standards for compliant fuel oils set forth in this Annex, the competent authority of the Party is entitled to require the ship to:
    - .1 present a record of the actions taken to attempt to achieve compliance; and
    - .2 provide evidence that it attempted to purchase compliant fuel oil in accordance with its voyage plan and, if it was not made available where planned, that attempts were made to locate alternative sources for such fuel oil and that despite best efforts to obtain compliant fuel oil, no such fuel oil was made available for purchase.

2.2 The ship should not be required to deviate from its intended voyage or to delay unduly the voyage in order to achieve compliance.

2.3 If a ship provides the information set forth in subparagraph 2.1 of this paragraph, a Party shall take into account all relevant circumstances and the evidence presented to determine the appropriate action to take, including not taking control measures.

2.4 A ship shall notify its Administration and the competent authority of the relevant port of destination when it cannot purchase compliant fuel oil.

2.5 A Party shall notify the Organization when a ship has presented evidence of the non-availability of compliant fuel oil.

### **Fuel Oil Quality**

3 Fuel oil for combustion purposes delivered to and used on board ships to which this Annex applies shall meet the following requirements:

- .1 except as provided in subparagraph 3.2:
  - .1.1 the fuel oil shall be blends of hydrocarbons derived from petroleum refining. This shall not preclude the incorporation of small amounts of additives intended to improve some aspects of performance;
  - .1.2 the fuel oil shall be free from inorganic acid; and
  - .1.3 the fuel oil shall not include any added substance or chemical waste which:
    - .1.3.1 jeopardizes the safety of ships or adversely affects the performance of the machinery, or
    - .1.3.2 is harmful to personnel, or
    - .1.3.3 contributes overall to additional air pollution.
- .2 fuel oil for combustion purposes derived by methods other than petroleum refining shall not:
  - .2.1 exceed the applicable sulphur content set forth in regulation 14 of this Annex;
  - .2.2 cause an engine to exceed the applicable NO<sub>x</sub> emission limit set forth in paragraphs 3, 4, 5.1.1 and 7.4 of regulation 13;
  - .2.3 contain inorganic acid; or
  - .2.4.1 jeopardize the safety of ships or adversely affect the performance of the machinery, or

.2.4.2 be harmful to personnel, or

.2.4.3 contribute overall to additional air pollution.

4 This regulation does not apply to coal in its solid form or nuclear fuels. Paragraphs 5, 6, 7.1, 7.2, 8.1, 8.2, 9.2, 9.3, and 9.4 of this regulation do not apply to gas fuels such as Liquefied Natural Gas, Compressed Natural Gas or Liquefied Petroleum Gas. The sulphur content of gas fuels delivered to a ship specifically for combustion purposes on board that ship shall be documented by the supplier.

5 For each ship subject to regulations 5 and 6 of this Annex, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Annex.

6 The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board.

7.1 The competent authority of a Party may inspect the bunker delivery notes on board any ship to which this Annex applies while the ship is in its port or offshore terminal, may make a copy of each delivery note, and may require the master or person in charge of the ship to certify that each copy is a true copy of such bunker delivery note. The competent authority may also verify the contents of each note through consultations with the port where the note was issued.

7.2 The inspection of the bunker delivery notes and the taking of certified copies by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

8.1 The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered taking into account guidelines developed by the Organization.<sup>9</sup> The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.

8.2 If an Administration requires the representative sample to be analysed, it shall be done in accordance with the verification procedure set forth in appendix VI to determine whether the fuel oil meets the requirements of this Annex.

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

- .1 maintain a register of local suppliers of fuel oil;
- .2 require local suppliers to provide the bunker delivery note and sample as required by this regulation, certified by the fuel oil supplier that the fuel oil meets the requirements of regulations 14 and 18 of this Annex;

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<sup>9</sup> Refer to MEPC.96(47), "Guidelines for the Sampling of Fuel Oil for Determination of Compliance with Annex VI of MARPOL 73/78".

- .3 require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the port State as necessary;
- .4 take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the bunker delivery note;
- .5 inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulation 14 or 18 of this Annex; and
- .6 inform the Organization for transmission to Parties and Member States of the Organization of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations 14 or 18 of this Annex.

10 In connection with port State inspections carried out by Parties, the Parties further undertake to:

- .1 inform the Party or non-Party under whose jurisdiction a bunker delivery note was issued of cases of delivery of noncompliant fuel oil, giving all relevant information; and
- .2 ensure that remedial action as appropriate is taken to bring noncompliant fuel oil discovered into compliance.

11 For every ship of 400 gross tonnage and above on scheduled services with frequent and regular port calls, an Administration may decide after application and consultation with affected States that compliance with paragraph 6 of this regulation may be documented in an alternative manner which gives similar certainty of compliance with regulations 14 and 18 of this Annex.

**APPENDIX I**

**Form of International Air Pollution Prevention (IAPP) Certificate  
(Regulation 8)**

**INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE**

Issued under the provisions of the Protocol of 1997, as amended by resolution MEPC.xx(58) in 2008, to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as “the Convention”) under the authority of the Government of:

.....  
*(full designation of the country)*

by .....  
*(full designation of the competent person or organization  
authorized under the provisions of the Convention)*

**Particulars of ship\***

Name of ship.....

Distinctive number or letters.....

Port of registry.....

Gross tonnage.....

IMO Number<sup>+</sup>.....

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\* Alternatively, the particulars of the ship may be placed horizontally in boxes.

<sup>+</sup> In accordance with IMO ship identification number scheme, adopted by the Organization by resolution A.600(15).

THIS IS TO CERTIFY:

- 1 That the ship has been surveyed in accordance with regulation 5 of Annex VI of the Convention; and
- 2 That the survey shows that the equipment, systems, fittings, arrangements and materials fully comply with the applicable requirements of Annex VI of the Convention.

Completion date of survey on which this Certificate is based: ..... (dd/mm/yyyy)

This Certificate is valid until .....\* subject to surveys in accordance with regulation 5 of Annex VI of the Convention.

Issued at .....  
(Place of issue of certificate)

(dd/mm/yyyy): .....  
(Date of issue) (Signature of authorized official issuing the certificate)

(Seal or stamp of the authority, as appropriate)

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\* Insert the date of expiry as specified by the Administration in accordance with regulation 9.1 of Annex VI of the Convention. The day and the month of this date correspond to the anniversary date as defined in regulation 2.3 of Annex VI of the Convention, unless amended in accordance with regulation 9.8 of Annex VI of the Convention.

**Endorsement for annual and intermediate surveys**

THIS IS TO CERTIFY that at a survey required by regulation 5 of Annex VI of the Convention the ship was found to comply with the relevant provisions of that Annex:

Annual survey: Signed: .....  
(Signature of authorized official)  
Place: .....  
Date (dd/mm/yyyy): .....  
(Seal or stamp of the authority, as appropriate)

Annual/Intermediate\* survey: Signed: .....  
(Signature of authorized official)  
Place: .....  
Date (dd/mm/yyyy): .....  
(Seal or stamp of the authority, as appropriate)

Annual/Intermediate\* survey: Signed: .....  
(Signature of authorized official)  
Place: .....  
Date (dd/mm/yyyy): .....  
(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: .....  
(Signature of authorized official)  
Place: .....  
Date (dd/mm/yyyy): .....  
(Seal or stamp of the authority, as appropriate)

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\* Delete as appropriate.

**Annual/intermediate survey in accordance with regulation 9.8.3**

THIS IS TO CERTIFY that, at an annual/intermediate\* survey in accordance with regulation 9.8.3 of Annex VI of the Convention, the ship was found to comply with the relevant provisions of that Annex:

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

**Endorsement to extend the certificate if valid for less than 5 years where regulation 9.3 applies**

The ship complies with the relevant provisions of the Annex, and this certificate shall, in accordance with regulation 9.3 of Annex VI of the Convention, be accepted as valid until (dd/mm/yyyy): .....

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

**Endorsement where the renewal survey has been completed and regulation 9.4 applies**

The ship complies with the relevant provisions of the Annex, and this certificate shall, in accordance with regulation 9.4 of Annex VI of the Convention, be accepted as valid until (dd/mm/yyyy): .....

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

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\* Delete as appropriate.

**Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation 9.5 or 9.6 applies**

This certificate shall, in accordance with regulation 9.5 or 9.6\* of Annex VI of the Convention, be accepted as valid until (dd/mm/yyyy):.....

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

**Endorsement for advancement of anniversary date where regulation 9.8 applies**

In accordance with regulation 9.8 of Annex VI of the Convention, the new anniversary date is (dd/mm/yyyy): .....

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

In accordance with regulation 9.8 of Annex VI of the Convention, the new anniversary date is (dd/mm/yyyy): .....

Signed: .....  
(Signature of authorized official)

Place: .....

Date (dd/mm/yyyy): .....

*(Seal or stamp of the authority, as appropriate)*

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\* Delete as appropriate.

**SUPPLEMENT TO  
INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE  
(IAPP CERTIFICATE)**

**RECORD OF CONSTRUCTION AND EQUIPMENT**

*Notes:*

- 1 This Record shall be permanently attached to the IAPP Certificate. The IAPP Certificate shall be available on board the ship at all times.
- 2 The Record shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.
- 3 Entries in boxes shall be made by inserting either a cross (x) for the answer “yes” and “applicable” or a (-) for the answers “no” and “not applicable” as appropriate.
- 4 Unless otherwise stated, regulations mentioned in this Record refer to regulations of Annex VI of the Convention and resolutions or circulars refer to those adopted by the International Maritime Organization.

**1 Particulars of ship**

- 1.1 Name of ship .....
- 1.2 IMO number .....
- 1.3 Date on which keel was laid or ship was at a similar stage of construction .....
- 1.4 Length (L) # metres .....

# Completed only in respect of ships constructed on or after 1 January 2016, which are specially designed, and used solely, for recreational purposes and to which, in accordance with regulation 13.5.2.1, the NO<sub>x</sub> emission limit as given by regulation 13.5.1.1 will not apply.

**2 Control of emissions from ships**

2.1 *Ozone depleting substances (regulation 12)*

2.1.1 The following fire-extinguishing systems, other systems and equipment containing ozone depleting substances, other than hydro-chlorofluorocarbons, installed before 19 May 2005 may continue in service:

System or equipment	Location on board	Substance

2.1.2 The following systems containing hydro-chlorofluorocarbons (HCFCs) installed before 1 January 2020 may continue in service:

System or equipment	Location on board	Substance

2.2 *Nitrogen oxides (NO<sub>x</sub>) (regulation 13)*

2.2.1 The following marine diesel engines installed on this ship comply with the applicable emission limit of regulation 13 in accordance with the revised NO<sub>x</sub> Technical Code 2008:

	Engine #1	Engine #2	Engine #3	Engine #4	Engine #5	Engine #6
<b>Manufacturer and model</b>						
<b>Serial number</b>						
<b>Use</b>						
<b>Power output (kW)</b>						
<b>Rated speed (RPM)</b>						
<b>Date of installation (dd/mm/yyyy)</b>						
<b>Date of major conversion (dd/mm/yyyy)</b>	According to Reg. 13.2.2					
	According to Reg. 13.2.3					
<b>Exempted by regulation 13.1.1.2</b>	<input type="checkbox"/>					
<b>Tier I Reg.13.3</b>	<input type="checkbox"/>					
<b>Tier II Reg.13.4</b>	<input type="checkbox"/>					
<b>Tier II Reg. 13.2.2 or 13.5.2</b>	<input type="checkbox"/>					
<b>Tier III Reg.13.5.1.1</b>	<input type="checkbox"/>					
<b>Approved Method exists</b>	<input type="checkbox"/>					
<b>Approved Method not commercially available</b>	<input type="checkbox"/>					
<b>Approved Method installed</b>	<input type="checkbox"/>					

2.3 *Sulphur oxides (SO<sub>x</sub>) and particulate matter (regulation 14)*

2.3.1 When the ship operates within an Emission Control Area specified in regulation 14.3, the ship uses:

- .1 fuel oil with a sulphur content that does not exceed the applicable limit value as documented by bunker delivery notes; or.....
- .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in 2.6 .....

2.4 *Volatile organic compounds (VOCs) (regulation 15)*

2.4.1 The tanker has a vapour collection system installed and approved in accordance with MSC/Circ.585. ....

2.4.2.1 For a tanker carrying crude oil, there is an approved VOC Management Plan .....

2.4.2.2 VOC Management Plan approval reference: .....

2.5 *Shipboard incineration (regulation 16)*

The ship has an incinerator:

- .1 installed on or after 1 January 2000 which complies with resolution MEPC.76(40) as amended .....
- .2 installed before 1 January 2000 which complies with:
  - .2.1 resolution MEPC.59(33) .....
  - .2.2 resolution MEPC.76(40) .....

2.6 *Equivalentents (regulation 4)*

The ship has been allowed to use the following fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Annex:

System or equipment	Equivalent used	Approval reference

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at .....  
*(Place of issue of the Record)*

(dd/mm/yyyy): .....  
*(Date of issue)* .....  
*(Signature of duly authorized official  
issuing the Record)*

*(Seal or stamp of the authority, as appropriate)*

## APPENDIX II

### TEST CYCLES AND WEIGHTING FACTORS (Regulation 13)

The following test cycles and weighing factors shall be applied for verification of compliance of marine diesel engines with the applicable NO<sub>x</sub> limit in accordance with regulation 13 of this Annex using the test procedure and calculation method as specified in the revised NO<sub>x</sub> Technical Code 2008.

- .1 For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 shall be applied;
- .2 For controllable-pitch propeller sets test cycle E2 shall be applied;
- .3 For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied;
- .4 For constant-speed auxiliary engines test cycle D2 shall be applied; and
- .5 For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

Test cycle for *constant speed main propulsion* application  
(including diesel-electric drive and all controllable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Test cycle for *propeller-law-operated main* and *propeller-law-operated auxiliary engine* application

Test cycle type E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Test cycle for *constant-speed auxiliary engine* application

Test cycle type D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

Test cycle for *variable-speed and load auxiliary engine* application

Test cycle type C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15

In the case of an engine to be certified in accordance with subparagraph 5.1.1 of regulation 13, the specific emission at each individual mode point shall not exceed the applicable NO<sub>x</sub> emission limit value by more than 50% except as follows:

- .1 The 10% mode point in the D2 test cycle.
- .2 The 10% mode point in the C1 test cycle.
- .3 The idle mode point in the C1 test cycle.

## APPENDIX III

### CRITERIA AND PROCEDURES FOR DESIGNATION OF EMISSION CONTROL AREAS (Regulation 13.6 and regulation 14.3)

#### 1 OBJECTIVES

1.1 The purpose of this appendix is to provide the criteria and procedures to Parties for the formulation and submission of proposals for the designation of Emission Control Areas and to set forth the factors to be considered in the assessment of such proposals by the Organization.

1.2 Emissions of NO<sub>x</sub>, SO<sub>x</sub> and particulate matter from ocean-going ships contribute to ambient concentrations of air pollution in cities and coastal areas around the world. Adverse public health and environmental effects associated with air pollution include premature mortality, cardiopulmonary disease, lung cancer, chronic respiratory ailments, acidification and eutrophication.

1.3 An Emission Control Area should be considered for adoption by the Organization if supported by a demonstrated need to prevent, reduce, and control emissions of NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions (hereinafter emissions) from ships.

#### 2 PROCESS FOR THE DESIGNATION OF EMISSION CONTROL AREAS

2.1 A proposal to the Organization for designation of an Emission Control Area for NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions may be submitted only by Parties. Where two or more Parties have a common interest in a particular area, they should formulate a coordinated proposal.

2.2 A proposal to designate a given area as an Emission Control Area should be submitted to the Organization in accordance with the rules and procedures established by the Organization.

#### 3 CRITERIA FOR DESIGNATION OF AN EMISSION CONTROL AREA

3.1 The proposal shall include:

- .1 a clear delineation of the proposed area of application, along with a reference chart on which the area is marked;
- .2 the type or types of emission(s) that is or are being proposed for control (i.e. NO<sub>x</sub> or SO<sub>x</sub> and particulate matter or all three types of emissions);
- .3 a description of the human populations and environmental areas at risk from the impacts of ship emissions;
- .4 an assessment that emissions from ships operating in the proposed area of application are contributing to ambient concentrations of air pollution or to adverse environmental impacts. Such assessment shall include a description of the impacts of the relevant emissions on human health and the environment, such

as adverse impacts to terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The sources of relevant data including methodologies used shall be identified;

- .5 relevant information pertaining to the meteorological conditions in the proposed area of application to the human populations and environmental areas at risk, in particular prevailing wind patterns, or to topographical, geological, oceanographic, morphological, or other conditions that contribute to ambient concentrations of air pollution or adverse environmental impacts;
- .6 the nature of the ship traffic in the proposed Emission Control Area, including the patterns and density of such traffic;
- .7 a description of the control measures taken by the proposing Party or Parties addressing land-based sources of NO<sub>x</sub>, SO<sub>x</sub> and particulate matter emissions affecting the human populations and environmental areas at risk that are in place and operating concurrent with the consideration of measures to be adopted in relation to provisions of regulations 13 and 14 of Annex VI; and
- .8 the relative costs of reducing emissions from ships when compared with land-based controls, and the economic impacts on shipping engaged in international trade.

3.2 The geographical limits of an Emission Control Area will be based on the relevant criteria outlined above, including emissions and deposition from ships navigating in the proposed area, traffic patterns and density, and wind conditions.

#### **4 PROCEDURES FOR THE ASSESSMENT AND ADOPTION OF EMISSION CONTROL AREAS BY THE ORGANIZATION**

4.1 The Organization shall consider each proposal submitted to it by a Party or Parties.

4.2 In assessing the proposal, the Organization shall take into account the criteria which are to be included in each proposal for adoption as set forth in section 3 above.

4.3 An Emission Control Area shall be designated by means of an amendment to this Annex, considered, adopted and brought into force in accordance with article 16 of the present Convention.

#### **5 OPERATION OF EMISSION CONTROL AREAS**

5.1 Parties which have ships navigating in the area are encouraged to bring to the Organization any concerns regarding the operation of the area.

## APPENDIX IV

### TYPE APPROVAL AND OPERATING LIMITS FOR SHIPBOARD INCINERATORS (Regulation 16)

1 Ships incinerators described in regulation 16.6.1 on board shall possess an IMO type approval certificate for each incinerator. In order to obtain such certificate, the incinerator shall be designed and built to an approved standard as described in regulation 16.6.1. Each model shall be subject to a specified type approval test operation at the factory or an approved test facility, and under the responsibility of the Administration, using the following standard fuel/waste specification for the type approval test for determining whether the incinerator operates within the limits specified in paragraph 2 of this appendix:

Sludge Oil Consisting of:	75% Sludge oil from HFO; 5% waste lubricating oil; and 20% emulsified water.
Solid waste consisting of:	50% food waste; 50% rubbish containing; approx. 30% paper, " 40% cardboard, " 10% rags, " 20% plastic The mixture will have up to 50% moisture and 7% incombustible solids.

2 Incinerators described in regulation 16.6.1 shall operate within the following limits:

O <sub>2</sub> in combustion chamber:	6 – 12%
CO in flue gas maximum average:	200 mg/MJ
Soot number maximum average:	Bacharach 3 or Ringelman 1 (20% opacity) (A higher soot number is acceptable only during very short periods such as starting up)
Unburned components in ash residues:	Maximum 10% by Weight
Combustion chamber flue gas outlet temperature range:	850 – 1200°C

## APPENDIX V

### INFORMATION TO BE INCLUDED IN THE BUNKER DELIVERY NOTE (Regulation 18.5)

Name and IMO Number of receiving ship

Port

Date of commencement of delivery

Name, address, and telephone number of marine fuel oil supplier

Product name(s)

Quantity in metric tons

Density at 15°C, kg/m<sup>3</sup>\*

Sulphur content (%m/m)\*\*

A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with the applicable subparagraph of regulation 14.1 or 14.4 and regulation 18.3 of this Annex.

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\* Fuel oil shall be tested in accordance with ISO 3675:1998 or ISO 12185:1996.

\*\* Fuel oil shall be tested in accordance with ISO 8754:2003.

## APPENDIX VI

### FUEL VERIFICATION PROCEDURE FOR MARPOL ANNEX VI FUEL OIL SAMPLES (Regulation 18.8.2)

The following procedure shall be used to determine whether the fuel oil delivered to and used on board ships is compliant with the sulphur limits required by regulation 14 of Annex VI.

#### 1 General Requirements

1.1 The representative fuel oil sample, which is required by paragraph 8.1 of regulation 18 (the “MARPOL sample”) shall be used to verify the sulphur content of the fuel oil supplied to a ship.

1.2 An Administration, through its competent authority, shall manage the verification procedure.

1.3 The laboratories responsible for the verification procedure set forth in this appendix shall be fully accredited\* for the purpose of conducting the tests.

#### 2 Verification Procedure Stage 1

2.1 The MARPOL sample shall be delivered by the competent authority to the laboratory.

2.2 The laboratory shall:

- .1 record the details of the seal number and the sample label on the test record;
- .2 confirm that the condition of the seal on the MARPOL sample has not been broken; and
- .3 reject any MARPOL sample where the seal has been broken.

2.3 If the seal of the MARPOL sample has not been broken, the laboratory shall proceed with the verification procedure and shall:

- .1 ensure that the MARPOL sample is thoroughly homogenized;
- .2 draw two sub-samples from the MARPOL sample; and
- .3 reseal the MARPOL sample and record the new reseal details on the test record.

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\* Accreditation is in accordance with ISO 17025 or an equivalent standard.

2.4 The two sub-samples shall be tested in succession, in accordance with the specified test method referred to in appendix V. For the purposes of this verification procedure, the results of the test analysis shall be referred to as “A” and “B”:

- .1 If the results of “A” and “B” are within the repeatability (r) of the test method, the results shall be considered valid.
- .2 If the results of “A” and “B” are not within the repeatability (r) of the test method, both results shall be rejected and two new sub-samples should be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 2.3.3 above after the new sub-samples have been taken.

2.5 If the test results of “A” and “B” are valid, an average of these two results should be calculated thus giving the result referred to as “X”:

- .1 If the result of “X” is equal to or falls below the applicable limit required by Annex VI, the fuel oil shall be deemed to meet the requirements.
- .2 If the result of “X” is greater than the applicable limit required by Annex VI, Verification Procedure Stage 2 should be conducted; however, if the result of “X” is greater than the specification limit by  $0.59R$  (where R is the reproducibility of the test method), the fuel oil shall be considered non-compliant and no further testing is necessary.

### **3 Verification Procedure Stage 2**

3.1 If Stage 2 of the verification procedure is necessary in accordance with paragraph 2.5.2 above, the competent authority shall send the MARPOL sample to a second accredited laboratory.

3.2 Upon receiving the MARPOL sample, the laboratory shall:

- .1 record the details of the reseal number applied in accordance with 2.3.3 and the sample label on the test record;
- .2 draw two sub-samples from the MARPOL sample; and
- .3 reseal the MARPOL sample and record the new reseal details on the test record.

3.3 The two sub-samples shall be tested in succession, in accordance with the test method specified in appendix V. For the purposes of this verification procedure, the results of the test analysis shall be referred to as “C” and “D”:

- .1 If the results of “C” and “D” are within the repeatability (r) of the test method, the results shall be considered valid.

- .2 If the results of “C” and “D” are not within the repeatability (r) of the test method, both results shall be rejected and two new sub-samples shall be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 3.2.3 after the new sub-samples have been taken.
- 3.4 If the test results of “C” and “D” are valid, and the results of “A”, “B”, “C”, and “D” are within the reproducibility (R) of the test method then the laboratory shall average the results, which is referred to as “Y”:
- .1 If the result of “Y” is equal to or falls below the applicable limit required by Annex VI, the fuel oil shall be deemed to meet the requirements.
  - .2 If the result of “Y” is greater than the applicable limit required by Annex VI, then the fuel oil fails to meet the standards required by Annex VI.
- 3.5 If the result of “A”, “B”, “C” and “D” are not within the reproducibility (R) of the test method then the Administration may discard all of the test results and, at its discretion, repeat the entire testing process.
- 3.6 The results obtained from the verification procedure are final.

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**ANNEX 14**

**RESOLUTION MEPC.177(58)**

**Adopted on 10 October 2008**

**AMENDMENTS TO THE TECHNICAL CODE ON CONTROL OF EMISSION OF  
NITROGEN OXIDES FROM MARINE DIESEL ENGINES**

**(NO<sub>x</sub> Technical Code 2008)**

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,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1973 Convention”), article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1978 Protocol”) and article 4 of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (herein after referred to as the “1997 Protocol”), which together specify the amendment procedure of the 1997 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 and 1997 Protocols,

NOTING ALSO that, by the 1997 Protocol, Annex VI entitled Regulations for the Prevention of Air Pollution from Ships is added to the 1973 Convention (hereinafter referred to as “Annex VI”),

NOTING FURTHER regulation 13 of MARPOL Annex VI which makes the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NO<sub>x</sub> Technical Code) mandatory under that Annex,

HAVING CONSIDERED the draft amendments to the NO<sub>x</sub> Technical Code,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to the NO<sub>x</sub> Technical Code, as set out at annex to the present resolution;
2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on 1 January 2010, unless prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world’s merchant fleet, have communicated to the Organization their objection to the amendments;
3. INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the said amendments shall enter into force on 1 July 2010 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, certified copies of the present resolution and the text of the amendments contained in the Annex;

5. REQUESTS FURTHER the Secretary-General to transmit to the Members of the Organization which are not Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, copies of the present resolution and its Annex;

6. INVITES the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the NO<sub>x</sub> Technical Code to the attention of shipowners, ship operators, shipbuilders, marine diesel engine manufacturers and any other interested groups.

## **NO<sub>x</sub> TECHNICAL CODE (2008)**

### **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

#### **Introduction**

##### **Foreword**

On 26 September 1997, the Conference of Parties to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) adopted, by Conference resolution 2, the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NO<sub>x</sub> Technical Code). Following the entry into force, on 19 May 2005, of MARPOL Annex VI – Regulations for the Prevention of Air Pollution from Ships, each marine diesel engine to which regulation 13 of that Annex applies, must comply with the provisions of this Code. MEPC 53 in July 2005 agreed to the revision of MARPOL Annex VI and the NO<sub>x</sub> Technical Code. That review was concluded at MEPC 58 in October 2008 and this version of the NO<sub>x</sub> Technical Code, hereunder referred to as the Code, is an outcome of that process.

As general background information, the precursors to the formation of nitrogen oxides during the combustion process are nitrogen and oxygen. Together these compounds comprise 99% of the engine intake air. Oxygen will be consumed during the combustion process, with the amount of excess oxygen available being a function of the air/fuel ratio which the engine is operating under. The nitrogen remains largely unreacted in the combustion process; however, a small percentage will be oxidized to form various oxides of nitrogen. The nitrogen oxides (NO<sub>x</sub>) which can be formed include nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), while the amounts are primarily a function of flame or combustion temperature and, if present, the amount of organic nitrogen available from the fuel, NO<sub>x</sub> formation is also a function of the time the nitrogen and the excess oxygen are exposed to the high temperatures associated with the diesel engine's combustion process. In other words, the higher the combustion temperature (e.g., high-peak pressure, high-compression ratio, high rate of fuel delivery, etc.), the greater the amount of NO<sub>x</sub> formation. A slow-speed diesel engine, in general, tends to have more NO<sub>x</sub> formation than a high speed engine. NO<sub>x</sub> has an adverse effect on the environment causing acidification, formation of tropospheric ozone, nutrient enrichment and contributes to adverse health effects globally.

The purpose of this Code is to provide mandatory procedures for the testing, survey and certification of marine diesel engines which will enable engine manufacturers, shipowners and Administrations to ensure that all applicable marine diesel engines comply with the relevant limiting emission values of NO<sub>x</sub> as specified within regulation 13 of Annex VI. The difficulties of establishing with precision, the actual weighted average NO<sub>x</sub> emission of marine diesel engines in service on ships have been recognized in formulating a simple, practical set of requirements in which the means to ensure compliance with the allowable NO<sub>x</sub> emissions, are defined.

Administrations are encouraged to assess the emissions performance of marine propulsion and auxiliary diesel engines on a test bed where accurate tests can be carried out under properly controlled conditions. Establishing compliance with regulation 13 of Annex VI at this initial stage is an essential feature of this Code. Subsequent testing on board the ship may inevitably be

limited in scope and accuracy and its purpose shall be to infer or deduce the emission performance and to confirm that engines are installed, operated and maintained in accordance with the manufacturer's specifications and that any adjustments or modifications do not detract from the emissions performance established by initial testing and certification by the manufacturer.

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## Abbreviations, Subscripts and Symbols

Tables 1, 2, 3 and 4 below summarize the abbreviations, subscripts and symbols used throughout the Code, including specifications for the analytical instruments in appendix 3, calibration requirements for the analytic instruments contained in appendix 4, the formulae for calculation of gas mass flow as contained in chapter 5 and appendix 6 of this Code and the symbols used in respect of data for onboard verification surveys in chapter 6.

- .1 Table 1: symbols used to represent the chemical components of diesel engine gas emissions and calibration and span gases addressed throughout this Code;
- .2 Table 2: abbreviations for the analysers used in the measurement of gas emissions from diesel engines as specified in appendix 3 of this Code;
- .3 Table 3: symbols and subscripts of terms and variables used in chapter 5, chapter 6, appendix 4 and appendix 6 of this Code; and
- .4 Table 4: symbols for fuel composition used in chapter 5 and chapter 6 and appendix 6 of this Code.

*Table 1*  
*Symbols and abbreviations for the chemical components*

<b>Symbol</b>	<b>Definition</b>
CH <sub>4</sub>	Methane
C <sub>3</sub> H <sub>8</sub>	Propane
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
HC	Hydrocarbons
H <sub>2</sub> O	Water
NO	Nitric oxide
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides
O <sub>2</sub>	Oxygen

*Table 2*  
*Abbreviations for Analysers for measurement of diesel engine gaseous emissions*  
(refer to appendix 3 of this Code)

CLD	Chemiluminescent detector
ECS	Electrochemical sensor
HCLD	Heated chemiluminescent detector
HFID	Heated flame ionization detector
NDIR	Non-dispersive infrared analyser
PMD	Paramagnetic detector
ZRDO	Zirconium dioxide sensor

*Table 3*  
*Symbols and subscripts for terms and variables*  
(refer to chapter 5, chapter 6, appendix 4 and appendix 6 of this Code)

<b>Symbol</b>	<b>Term</b>	<b>Unit</b>
$A/F_{st}$	Stoichiometric air to fuel ratio	1
$c_x$	Concentration in the exhaust (with suffix of the component nominating, d=dry or w=wet)	ppm/% (V/V)
$E_{CO_2}$	CO <sub>2</sub> quench of NO <sub>x</sub> analyser	%
$E_{H_2O}$	Water quench of NO <sub>x</sub> analyser	%
$E_{NO_x}$	Efficiency of NO <sub>x</sub> converter	%
$E_{O_2}$	Oxygen analyser correction factor	1
$\lambda$	Excess air factor: kg dry air/(kg fuel · A/F <sub>st</sub> )	1
$f_a$	Test condition parameter	1
$f_c$	Carbon factor	1
$f_{fd}$	Fuel specific factor for exhaust flow calculation on dry basis	1
$f_{fw}$	Fuel specific factor for exhaust flow calculation on wet basis	1
$H_a$	Absolute humidity of the intake air (g water / kg dry air)	g/kg
$H_{SC}$	Humidity of the charge air	g/kg
$i$	Subscript denoting an individual mode	1
$k_{hd}$	Humidity correction factor for NO <sub>x</sub> for diesel engines	1
$k_{wa}$	Dry to wet correction factor for the intake air	1
$k_{wr}$	Dry to wet correction factor for the raw exhaust gas	1
$n_d$	Engine speed	min <sup>-1</sup>
$n_{turb}$	Turbocharger speed	min <sup>-1</sup>
$\%O_2I$	HC analyser percentage oxygen interference	%
$p_a$	Saturation vapour pressure of the engine intake air determined using a temperature value for the intake air measured at the same physical location as the measurements for $p_b$ and $R_a$	kPa
$p_b$	Total barometric pressure	kPa
$p_c$	Charge air pressure	kPa
$p_r$	Water vapour pressure after cooling bath of the analysis system	kPa
$p_s$	Dry atmospheric pressure calculated by the following formula: $p_s = p_b - R_a \cdot p_a / 100$	kPa
$p_{SC}$	Saturation vapour pressure of the charge air	kPa
$P$	Uncorrected brake power	kW
$P_{aux}$	Declared total power absorbed by auxiliaries fitted for the test and not required by ISO 14396	kW
$P_m$	Maximum measured or declared power at the test engine speed under test conditions	kW
$q_{mad}$	Intake air mass flow rate on dry basis	kg/h

Symbol	Term	Unit
$q_{maw}$	Intake air mass flow rate on wet basis	kg/h
$q_{mew}$	Exhaust gas mass flow rate on wet basis	kg/h
$q_{mf}$	Fuel mass flow rate	kg/h
$q_{mgas}$	Emission mass flow rate of individual gas	g/h
$R_a$	Relative humidity of the intake air	%
$r_h$	Hydrocarbon response factor	1
$\rho$	Density	kg/m <sup>3</sup>
$s$	Fuel rack position	
$T_a$	Intake air temperature determined at the engine intake	K
$T_{caclin}$	Charge air cooler, coolant inlet temperature	°C
$T_{caclout}$	Charge air cooler, coolant outlet temperature	°C
$T_{Exh}$	Exhaust gas temperature	°C
$T_{Fuel}$	Fuel oil temperature	°C
$T_{Sea}$	Seawater temperature	°C
$T_{SC}$	Charge air temperature	K
$T_{SCRef}$	Charge air reference temperature	K
$u$	Ratio of exhaust component and exhaust gas densities	1
$W_F$	Weighting factor	1

*Table 4  
Symbols for fuel composition*

Symbol	Definition
$w_{ALF}$	H content of fuel, % m/m
$w_{BET}$	C content of fuel, % m/m
$w_{GAM}$	S content of fuel, % m/m
$w_{DEL}$	N content of fuel, % m/m
$w_{EPS}$	O content of fuel, % m/m
$\alpha$	molar ratio (H/C)

## Chapter 1

### *General*

#### 1.1 Purpose

1.1.1 The purpose of this Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines, hereunder referred to as the Code, is to specify the requirements for the testing, survey and certification of marine diesel engines to ensure they comply with the nitrogen oxides (NO<sub>x</sub>) emission limits of regulation 13 of Annex VI. All references to regulations within this Code refer to Annex VI.

#### 1.2 Application

1.2.1 This Code applies to all marine diesel engines with a power output of more than 130 kW which are installed, or are designed and intended for installation, on board any ship subject to Annex VI and to which regulation 13 applies. Regarding the requirements for survey and certification under regulation 5, this Code addresses only those requirements applicable to an engine's compliance with the applicable NO<sub>x</sub> emission limit.

1.2.2 For the purpose of the application of this Code, Administrations are entitled to delegate all functions required of an Administration by this Code to an organization authorized to act on behalf of the Administration<sup>1</sup>. In every case, the Administration assumes full responsibility for the survey and certificate.

1.2.3 For the purpose of this Code, an engine shall be considered to be operated in compliance with the applicable NO<sub>x</sub> limit of regulation 13 if it can be demonstrated that the weighted NO<sub>x</sub> emissions from the engine are within those limits at the initial certification, annual, intermediate and renewal surveys and such other surveys as are required.

#### 1.3 Definitions

1.3.1 *Nitrogen Oxide (NO<sub>x</sub>) emissions* means the total emission of nitrogen oxides, calculated as the total weighted emission of NO<sub>2</sub> and determined using the relevant test cycles and measurement methods as specified in this Code.

1.3.2 *Substantial modification* of a marine diesel engine means:

- .1 For engines installed on ships constructed on or after 1 January 2000, *substantial modification* means any modification to an engine that could potentially cause the engine to exceed the applicable emission limit set out in regulation 13. Routine replacement of engine components by parts specified in the Technical File that do not alter emission characteristics shall not be considered a "substantial modification" regardless of whether one part or many parts are replaced.

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<sup>1</sup> Refer to the Guidelines for the Authorization of Organizations Acting on Behalf of Administrations adopted by the Organization by resolution A.739(18) and to the Specifications on the Survey and Certification Functions of Recognized Organizations Acting on Behalf of the Administration adopted by the Organization by resolution A.789(19).

- .2 For engines installed on ships constructed before 1 January 2000, *substantial modification* means any modification made to an engine which increases its existing emission characteristics established by the Simplified Measurement method as described in 6.3 in excess of the allowances set out in 6.3.11. These changes include, but are not limited to, changes in its operations or in its technical parameters (e.g., changing camshafts, fuel injection systems, air systems, combustion chamber configuration, or timing calibration of the engine). The installation of a certified Approved Method pursuant to regulation 13.7.1.1 or certification pursuant to regulation 13.7.1.2 is not considered to be a substantial modification for the purpose of the application of regulation 13.2 of the Annex.

1.3.3 *Components* are those interchangeable parts which influence the NO<sub>x</sub> emissions performance, identified by their design/parts number.

1.3.4 *Setting* means adjustment of an adjustable feature influencing the NO<sub>x</sub> emissions performance of an engine.

1.3.5 *Operating values* are engine data, like cylinder peak pressure, exhaust gas temperature, etc., from the engine log which are related to the NO<sub>x</sub> emission performance. These data are load-dependent.

1.3.6 The *EIAPP Certificate* is the Engine International Air Pollution Prevention Certificate which relates to NO<sub>x</sub> emissions.

1.3.7 The *IAPP Certificate* is the International Air Pollution Prevention Certificate.

1.3.8 *Administration* has the same meaning as article 2, subparagraph (5) of MARPOL 73.

1.3.9 *Onboard NO<sub>x</sub> verification procedures* mean a procedure, which may include an equipment requirement, to be used on board at initial certification survey or at the renewal, annual or intermediate surveys, as required, to verify compliance with any of the requirements of this Code, as specified by the applicant for engine certification and approved by the Administration.

1.3.10 *Marine diesel engine* means any reciprocating internal combustion engine operating on liquid or dual fuel, to which regulation 13 applies, including booster/compound systems if applied.

Where an engine is intended to be operated normally in the gas mode, i.e. with the main fuel gas and only a small amount of liquid pilot fuel, the requirements of regulation 13 have to be met only for this operation mode. Operation on pure liquid fuel resulting from restricted gas supply in cases of failures shall be exempted for the voyage to the next appropriate port for the repair of the failure.

1.3.11 *Rated power* means the maximum continuous rated power output as specified on the nameplate and in the Technical File of the marine diesel engine to which regulation 13 and the Code apply.

1.3.12 *Rated speed* is the crankshaft revolutions per minute at which the rated power occurs as specified on the nameplate and in the Technical File of the marine diesel engine.

1.3.13 *Brake power* is the observed power measured at the crankshaft or its equivalent, the engine being equipped only with the standard auxiliaries necessary for its operation on the test bed.

1.3.14 *Onboard conditions* mean that an engine is:

- .1 installed on board and coupled with the actual equipment which is driven by the engine; and
- .2 under operation to perform the purpose of the equipment.

1.3.15 A *Technical File* is a record containing all details of parameters, including components and settings of an engine, which may influence the NO<sub>x</sub> emission of the engine, in accordance with 2.4 of this Code.

1.3.16 A *Record Book of Engine Parameters* is the document used in connection with the Engine Parameter Check method for recording all parameter changes, including components and engine settings, which may influence NO<sub>x</sub> emission of the engine.

1.3.17 An *Approved Method* is a method for a particular engine, or a range of engines, which, when applied to the engine, will ensure that the engine complies with the applicable NO<sub>x</sub> limit as detailed in regulation 13.7.

1.3.18 An *Existing Engine* is an engine which is subject to regulation 13.7.

1.3.19 An *Approved Method File* is a document which describes an Approved Method and its means of survey.

## Chapter 2

### *Surveys and certification*

#### 2.1 General

2.1.1 Each marine diesel engine specified in 1.2, except as otherwise permitted by this Code, shall be subject to the following surveys:

- .1 A pre-certification survey which shall be such as to ensure that the engine, as designed and equipped, complies with the applicable NO<sub>x</sub> emission limit contained in regulation 13. If this survey confirms compliance, the Administration shall issue an Engine International Air Pollution Prevention (EIAPP) Certificate.
- .2 An initial certification survey which shall be conducted on board a ship after the engine is installed but before it is placed in service. This survey shall be such as to ensure that the engine, as installed on board the ship, including any modifications and/or adjustments since the pre-certification, if applicable, complies with the applicable NO<sub>x</sub> emission limit contained in regulation 13. This survey, as part of the ship's initial survey, may lead to either the issuance of a ship's initial International Air Pollution Prevention (IAPP) Certificate or an amendment of a ship's valid IAPP Certificate reflecting the installation of a new engine.
- .3 Renewal, annual and intermediate surveys, which shall be conducted as part of a ship's surveys required by regulation 5, to ensure the engine continues to fully comply with the provisions of this Code.
- .4 An initial engine certification survey which shall be conducted on board a ship every time a major conversion, as defined in regulation 13, is made to an engine to ensure that the engine complies with the applicable NO<sub>x</sub> emission limit contained in regulation 13. This will result in the issue, if applicable, of an EIAPP Certificate and the amendment of the IAPP Certificate.

2.1.2 To comply with the various survey and certification requirements described in 2.1.1, there are methods included in this Code from which the engine manufacturer, shipbuilder or shipowner, as applicable, can choose to measure, calculate, test or verify an engine for its NO<sub>x</sub> emissions, as follows:

- .1 test-bed testing for the pre-certification survey in accordance with chapter 5;
- .2 onboard testing for an engine not pre-certificated for a combined pre certification and initial certification survey in accordance with the full test-bed requirements of chapter 5;
- .3 onboard Engine Parameter Check method, using the component data, engine settings and engine performance data as specified in the Technical File, for confirmation of compliance at initial, renewal, annual and intermediate surveys for pre-certified engines or engines that have undergone modifications or

adjustments to NO<sub>x</sub> critical components, settings and operating values, since they were last surveyed, in accordance with 6.2;

- .4 onboard Simplified Measurement method for confirmation of compliance at renewal, annual and intermediate surveys or confirmation of pre-certified engines for initial certification surveys, in accordance with 6.3 when required; or
- .5 onboard Direct Measurement and Monitoring method for confirmation of compliance at renewal, annual and intermediate surveys only, in accordance with 6.4.

## **2.2 Procedures for pre-certification of an engine**

2.2.1 Prior to installation on board, every marine diesel engine (Individual Engine), except as allowed by 2.2.2 and 2.2.4, shall:

- .1 be adjusted to meet the applicable NO<sub>x</sub> emission limit,
- .2 have its NO<sub>x</sub> emissions measured on a test bed in accordance with the procedures specified in chapter 5 of this Code, and
- .3 be pre-certified by the Administration, as documented by issuance of an EIAPP Certificate.

2.2.2 For the pre-certification of serially manufactured engines, depending on the approval of the Administration, the Engine Family or the Engine Group concept may be applied (see chapter 4). In such a case, the testing specified in 2.2.1.2 is required only for the Parent Engine(s) of an Engine Family or Engine Group.

2.2.3 The method of obtaining pre-certification for an engine is for the Administration to:

- .1 certify a test of the engine on a test bed;
- .2 verify that all engines tested, including, if applicable, those to be delivered within an Engine Family or Engine Group, meet the applicable NO<sub>x</sub> limit; and
- .3 if applicable, verify that the selected Parent Engine(s) is representative of an Engine Family or Engine Group.

2.2.4 There are engines which, due to their size, construction and delivery schedule, cannot be pre-certified on a test bed. In such cases, the engine manufacturer, shipowner or shipbuilder shall make application to the Administration requesting an onboard test (see 2.1.2.2). The applicant must demonstrate to the Administration that the onboard test fully meets all of the requirements of a test-bed procedure as specified in chapter 5 of this Code. Such a survey may be accepted for an Individual Engine or for an Engine Group represented by the Parent Engine only, but it shall not be accepted for an Engine Family certification. In no case shall an allowance be granted for possible deviations of measurements if an initial survey is carried out on board a ship without any valid pre-certification test. For engines undergoing an onboard certification test, in order to be issued with an EIAPP Certificate, the same procedures apply as if the engine had been pre-certified on a test bed.

### 2.2.5 NO<sub>x</sub> reducing devices

- .1 Where a NO<sub>x</sub> reducing device is to be included within the EIAPP certification, it must be recognized as a component of the engine and its presence shall be recorded in the engine's Technical File. The engine shall be tested, at the pre-certification test, with the NO<sub>x</sub> reducing device fitted.
- .2 In those cases where a NO<sub>x</sub> reducing device has been fitted due to failure to meet the required emission value at the pre-certification test, in order to receive an EIAPP Certificate for this assembly, the engine, including the reducing device, as installed, must be re-tested to show compliance with the applicable NO<sub>x</sub> emission limit. However, in this case, the assembly may be re-tested in accordance with the Simplified Measurement method in accordance with 6.3. In no case shall the allowances given in 6.3.11 be granted.
- .3 Where, in accordance with 2.2.5.2, the effectiveness of the NO<sub>x</sub> reducing device is verified by use of the Simplified Measurement method, that test report shall be added as an adjunct to the pre-certification test report which demonstrated the failure of the engine alone to meet the required emission value. Both test reports shall be submitted to the Administration, and test report data, as detailed in 2.4.1.5, covering both tests shall be included in the engine's Technical File.
- .4 The Simplified Measurement method used as part of the process to demonstrate compliance in accordance with 2.2.5.2 may only be accepted in respect of the engine and NO<sub>x</sub> reducing device on which its effectiveness was demonstrated, and it shall not be accepted for Engine Family or Engine Group certification.
- .5 In both cases as given in 2.2.5.1 and 2.2.5.2, the NO<sub>x</sub> reducing device shall be included on the EIAPP Certificate together with the emission value obtained with the device in operation and all other records as required by the Administration. The engine's Technical File shall also contain onboard NO<sub>x</sub> verification procedures for the device to ensure it is operating correctly.
- .6 Notwithstanding 2.2.5.3 and 2.2.5.4, a NO<sub>x</sub> reducing device may be approved by the Administration taking into account guidelines to be developed by the Organization.

2.2.6 Where, due to changes of component design, it is necessary to establish a new Engine Family or Engine Group but there is no available Parent Engine the engine builder may apply to the Administration to use the previously obtained Parent Engine test data modified at each specific mode of the applicable test cycle so as to allow for the resulting changes in NO<sub>x</sub> emission values. In such cases, the engine used to determine the modification emission data shall correspond in accordance with the requirements of 4.4.6.1, 4.4.6.2 and 4.4.6.3 to the previously used Parent Engine. Where more than one component is to be changed the combined effect resulting from those changes is to be demonstrated by a single set of test results.

2.2.7 For pre-certification of engines within an Engine Family or Engine Group, an EIAPP Certificate shall be issued in accordance with procedures established by the Administration to the Parent Engine(s) and to every Member Engine produced under this certification to accompany the engines throughout their life whilst installed on ships under the authority of that Administration.

## 2.2.8 Issue of certification by the Administration of the country in which the engine is built

- .1 When an engine is manufactured outside the country of the Administration of the ship on which it will be installed, the Administration of the ship may request the Administration of the country in which the engine is manufactured to survey the engine. Upon satisfaction that the applicable requirements of regulation 13 are complied with pursuant to this Code, the Administration of the country in which the engine is manufactured shall issue or authorize the issuance of the EIAPP Certificate.
- .2 A copy of the certificate(s) and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.
- .3 A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration.

2.2.9 Guidance in respect of the pre-certification survey and certification of marine diesel engines, as described in chapter 2 of this Code, is given in the relevant flowchart in appendix 2 of this Code. Where discrepancies exist, the text of chapter 2 takes precedence.

2.2.10 A model form of an EIAPP Certificate is attached as appendix 1 to this Code.

## 2.3 Procedures for certification of an engine

2.3.1 For those engines which have not been adjusted or modified relative to the original specification of the manufacturer, the provision of a valid EIAPP Certificate should suffice to demonstrate compliance with the applicable NO<sub>x</sub> limits.

2.3.2 After installation on board, it shall be determined to what extent an engine has been subjected to further adjustments and/or modifications which could affect the NO<sub>x</sub> emission. Therefore, the engine, after installation on board, but prior to issuance of the IAPP Certificate, shall be inspected for modifications and be approved using the onboard NO<sub>x</sub> verification procedures and one of the methods described in 2.1.2.

2.3.3 There are engines which, after pre-certification, need final adjustment or modification for performance. In such a case, the Engine Group concept could be used to ensure that the engine still complies with the applicable limit.

2.3.4 Every marine diesel engine installed on board a ship shall be provided with a Technical File. The Technical File shall be prepared by the applicant for engine certification and approved by the Administration, and is required to accompany an engine throughout its life on board ships. The Technical File shall contain the information as specified in 2.4.1.

2.3.5 Where a NO<sub>x</sub> reducing device is installed and needed to comply with the NO<sub>x</sub> limits, one of the options providing a ready means for verifying compliance with regulation 13 is the Direct Measurement and Monitoring method in accordance with 6.4. However, depending on the technical possibilities of the device used, subject to the approval of the Administration, other relevant parameters could be monitored.

2.3.6 Where, for the purpose of achieving NO<sub>x</sub> compliance, an additional substance is introduced, such as ammonia, urea, steam, water, fuel additives, etc., a means of monitoring the consumption of such substance shall be provided. The Technical File shall provide sufficient information to allow a ready means of demonstrating that the consumption of such additional substances is consistent with achieving compliance with the applicable NO<sub>x</sub> limit.

2.3.7 Where the Engine Parameter Check method in accordance with 6.2 is used to verify compliance, if any adjustments or modifications are made to an engine after its pre-certification, a full record of such adjustments or modifications shall be recorded in the engine's Record Book of Engine Parameters.

2.3.8 If all of the engines installed on board are verified to remain within the parameters, components, and adjustable features recorded in the Technical File, the engines should be accepted as performing within the applicable NO<sub>x</sub> limit specified in regulation 13. In this case, provided all other applicable requirements of the Annex are complied with, an IAPP Certificate should then be issued to the ship.

2.3.9 If any adjustment or modification is made which is outside the approved limits documented in the Technical File, the IAPP Certificate may be issued only if the overall NO<sub>x</sub> emission performance is verified to be within the required limits by: onboard Simplified Measurement in accordance with 6.3; or, reference to the test-bed testing for the relevant Engine Group approval showing that the adjustments or modifications do not exceed the applicable NO<sub>x</sub> emission limit. At surveys after the initial engine survey, the Direct Measurement and Monitoring method in accordance with 6.4, as approved by the Administration, may alternatively be used.

2.3.10 The Administration may, at its own discretion, abbreviate or reduce all parts of the survey on board, in accordance with this Code, to an engine which has been issued an EIAPP Certificate. However, the entire survey on board must be completed for at least one cylinder and/or one engine in an Engine Family or Engine Group, if applicable, and the abbreviation may be made only if all the other cylinders and/or engines are expected to perform in the same manner as the surveyed engine and/or cylinder. As an alternative to the examination of fitted components, the Administration may conduct that part of the survey on spare parts carried on board provided they are representative of the components fitted.

2.3.11 Guidance in respect of the survey and certification of marine diesel engines at initial, renewal, annual and intermediate surveys, as described in chapter 2 of this Code, is given in the flowcharts in appendix 2 of this Code. Where discrepancies exist, the text of chapter 2 takes precedence.

## **2.4 Technical File and onboard NO<sub>x</sub> verification procedures**

2.4.1 To enable an Administration to perform the engine surveys described in 2.1, the Technical File required by 2.3.4 shall, at a minimum, contain the following information:

- .1 identification of those components, settings and operating values of the engine which influences its NO<sub>x</sub> emissions including any NO<sub>x</sub> reducing device or system;
- .2 identification of the full range of allowable adjustments or alternatives for the components of the engine;

- .3 full record of the relevant engine's performance, including the engine's rated speed and rated power;
- .4 a system of onboard NO<sub>x</sub> verification procedures to verify compliance with the NO<sub>x</sub> emission limits during onboard verification surveys in accordance with chapter 6;
- .5 a copy of the relevant Parent Engine test data, as given in section 2 of appendix 5 of this Code;
- .6 if applicable, the designation and restrictions for an engine which is an engine within an Engine Family or Engine Group;
- .7 specifications of those spare parts/components which, when used in the engine, according to those specifications, will result in continued compliance of the engine with the applicable NO<sub>x</sub> emission limit; and
- .8 the EIAPP Certificate, as applicable.

2.4.2 As a general principle, onboard NO<sub>x</sub> verification procedures shall enable a surveyor to easily determine if an engine has remained in compliance with the applicable requirements of regulation 13. At the same time, it shall not be so burdensome as to unduly delay the ship or to require in-depth knowledge of the characteristics of a particular engine or specialist measuring devices not available on board.

2.4.3 The onboard NO<sub>x</sub> verification procedure shall be one of the following methods:

- .1 Engine Parameter Check method in accordance with 6.2 to verify that an engine's component, setting and operating values have not deviated from the specifications in the engine's Technical File;
- .2 Simplified Measurement method in accordance with 6.3; or
- .3 Direct Measurement and Monitoring method in accordance with 6.4.

2.4.4 When considering which onboard NO<sub>x</sub> verification procedures should be included in an engine's Technical File to verify whether an engine complies with the applicable NO<sub>x</sub> emission limit during the required onboard verification surveys, other than at an engine's initial onboard survey, any of the three onboard NO<sub>x</sub> verification procedures as specified in 6.1 may be applied. However, the procedures associated with the method applied are to be approved by the Administration. If the method differs from the verification procedure method specified in the Technical File as originally approved, the procedure of the method needs to be either added as an amendment to the Technical File or appended as an alternative to the procedure given in the Technical File. Thereafter the shipowner may choose which of the methods approved in the Technical File is to be used to demonstrate compliance.

2.4.5 In addition to the method specified by the engine manufacturer and given in the Technical File, as approved by the Administration for the initial certification in the engine, the shipowner shall have the option of direct measurement of NO<sub>x</sub> emissions in accordance with 6.4. Such data may take the form of spot checks logged with other engine operating data on a regular basis and over the full range of engine operation or may result from continuous monitoring and data

storage. Data must be current (taken within the last 30 days) and must have been acquired using the test procedures cited in this Code. These monitoring records shall be kept on board for three months for verification purposes by a Party in accordance with regulation 10. Data shall also be corrected for ambient conditions and fuel specification, and measuring equipment must be checked for correct calibration and operation, in accordance with the approved procedures given in the Onboard Operating Manual. Where exhaust gas after-treatment devices are fitted which influence the NO<sub>x</sub> emissions, the measuring point(s) must be located downstream of such devices.

## Chapter 3

### *Nitrogen oxides emission standards*

#### **3.1 Maximum allowable NO<sub>x</sub> emission limits for marine diesel engines**

3.1.1 The maximum allowable NO<sub>x</sub> emission limit values are given by paragraphs 3, 4, 5.1.1 and 7.4 of regulation 13 as applicable. The total weighted NO<sub>x</sub> emissions, as measured and calculated, rounded to one decimal place, in accordance with the procedures in this Code, shall be equal to or less than the applicable calculated value corresponding to the rated speed of the engine.

3.1.2 When the engine operates on test fuel oils in accordance with 5.3, the total emission of nitrogen oxides (calculated as the total weighted emission of NO<sub>2</sub>) shall be determined using the relevant test cycles and measurement methods as specified in this Code.

3.1.3 An engine's exhaust emissions limit value, given from the formulae included in paragraph 3, 4 or 5.1.1 of regulation 13 as applicable, and the actual calculated exhaust emissions value, rounded to one decimal place for the engine, shall be stated on the engine's EIAPP Certificate. If an engine is a Member Engine of an Engine Family or Engine Group, it is the relevant Parent Engine emission value that is compared to the applicable limit value for that Engine Family or Engine Group. The limit value given here shall be the limit value for the Engine Family or Engine Group based on the highest engine speed to be included in that Engine Family or Engine Group, in accordance with paragraph 3, 4 or 5.1.1 of regulation 13, irrespective of the rated speed of the Parent Engine or the rated speed of the particular engine as given on the engine's EIAPP certificate.

3.1.4 In the case of an engine to be certified in accordance with paragraph 5.1.1 of regulation 13 the specific emission at each individual mode point shall not exceed the applicable NO<sub>x</sub> emission limit value by more than 50% except as follows:

- .1 The 10% mode point in the D2 test cycle specified in 3.2.5.
- .2 The 10% mode point in the C1 test cycle specified in 3.2.6.
- .3 The idle mode point in the C1 test cycle specified in 3.2.6.

#### **3.2 Test cycles and weighting factors to be applied**

3.2.1 For every Individual Engine or Parent Engine of an Engine Family or Engine Group, one or more of the relevant test cycles specified in 3.2.2 to 3.2.6 shall be applied for verification of compliance with the applicable NO<sub>x</sub> emission limit contained in regulation 13.

3.2.2 For constant speed marine diesel engines for ship main propulsion, including diesel electric drive, test cycle E2 shall be applied in accordance with table 1.

3.2.3 For an engine connected to a controllable pitch propeller, irrespective of combinator curve, test cycle E2 shall be applied in accordance with table 1.

*Table 1*  
Test cycle for “Constant-speed main propulsion” application  
(including diesel-electric drive and all controllable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100% <sup>2</sup>
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

3.2.4 For propeller law operated main and propeller law operated auxiliary engines, test cycle E3 shall be applied in accordance with table 2.

*Table 2*  
Test cycle for  
“Propeller-law-operated main and propeller-law-operated auxiliary engine” application

Test cycle type E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

3.2.5 For constant speed auxiliary engines, test cycle D2 shall be applied in accordance with table 3.

*Table 3*  
Test cycle for “Constant-speed auxiliary engine” application

Test cycle type D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

3.2.6 For variable speed, variable load auxiliary engines, not included above, test cycle C1 shall be applied in accordance with table 4.

<sup>2</sup> There are exceptional cases, including large bore engines intended for E2 applications, in which, due to their oscillating masses and construction, engines cannot be run at low load at nominal speed without the risk of damaging essential components. In such cases, the engine manufacturer shall make application to the Administration that the test cycle as given in table 1 above may be modified for the 25% power mode with regard to the engine speed. The adjusted engine speed at 25% power, however, shall be as close as possible to the rated engine speed, as recommended by the engine manufacturer and approved by the Administration. The applicable weighting factors for the test cycle shall remain unchanged.

*Table 4*  
 Test cycle for “Variable-speed, variable-load auxiliary engine” application

Test cycle type C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15

3.2.7 The torque figures given in test cycle C1 are percentage values which represent for a given test mode the ratio of the required torque to the maximum possible torque at this given speed.

3.2.8 The intermediate speed for test cycle C1 shall be declared by the manufacturer, taking into account the following requirements:

- .1 For engines which are designed to operate over a speed range on a full load torque curve, the intermediate speed shall be the declared maximum torque speed if it occurs between 60% and 75% of rated speed.
- .2 If the declared maximum torque speed is less than 60% of rated speed, then the intermediate speed shall be 60% of the rated speed.
- .3 If the declared maximum torque speed is greater than 75% of the rated speed, then the intermediate speed shall be 75% of rated speed.
- .4 For engines which are not designed to operate over a speed range on the full load torque curve at steady state conditions, the intermediate speed will typically be between 60% and 70% of the maximum rated speed.

3.2.9 If an engine manufacturer applies for a new test cycle application on an engine already certified under a different test cycle specified in 3.2.2 to 3.2.6, then it may not be necessary for that engine to undergo the full certification process for the new application. In this case, the engine manufacturer may demonstrate compliance by recalculation, by applying the measurement results from the specific modes of the first certification test to the calculation of the total weighted emissions for the new test cycle application, using the corresponding weighting factors from the new test cycle.

## Chapter 4

### *Approval for serially manufactured engines: Engine Family and Engine Group concepts*

#### **4.1 General**

4.1.1 To avoid certification testing of every engine for compliance with the NO<sub>x</sub> emission limits, one of two approval concepts may be adopted, namely the Engine Family or the Engine Group concept.

4.1.2 The Engine Family concept may be applied to any series produced engines which, through their design are proven to have similar NO<sub>x</sub> emission characteristics, are used as produced, and, during installation on board, require no adjustments or modifications which could adversely affect the NO<sub>x</sub> emissions.

4.1.3 The Engine Group concept may be applied to a smaller series of engines produced for similar engine application and which require minor adjustments and modifications during installation or in service on board.

4.1.4 Initially the engine manufacturer may, at its discretion, determine whether engines should be covered by the Engine Family or Engine Group concept. In general, the type of application shall be based on whether the engines will be modified, and to what extent, after testing on a test bed.

#### **4.2 Documentation**

4.2.1 All documentation for certification must be completed and suitably stamped by the duly authorized Authority as appropriate. This documentation shall also include all terms and conditions, including replacement of spare parts, to ensure that an engine is maintained in compliance with the applicable NO<sub>x</sub> emission limit.

4.2.2 For an engine within an Engine Family or Engine Group, the required documentation for the Engine Parameter Check method is specified in 6.2.2.

#### **4.3 Application of the Engine Family concept**

4.3.1 The Engine Family concept provides the possibility of reducing the number of engines which must be submitted for approval testing, while providing safeguards that all engines within the Engine Family comply with the approval requirements. In the Engine Family concept, engines with similar emission characteristics and design are represented by a Parent Engine.

4.3.2 Engines that are series produced and not intended to be modified may be covered by the Engine Family concept.

4.3.3 The selection procedure for the Parent Engine is such that the selected engine incorporates those features which will most adversely affect the NO<sub>x</sub> emission level. This engine, in general, shall have the highest NO<sub>x</sub> emission level among all of the engines in the Engine Family.

4.3.4 On the basis of tests and engineering judgement, the manufacturer shall propose which engines belong to an Engine Family, which engine(s) produce the highest NO<sub>x</sub> emissions, and which engine(s) should be selected for certification testing.

4.3.5 The Administration shall review for certification approval the selection of the Parent Engine within the Engine Family and shall have the option of selecting a different engine, either for approval or production conformity testing, in order to have confidence that all engines within the Engine Family comply with the applicable NO<sub>x</sub> emission limit.

4.3.6 The Engine Family concept does allow minor adjustments to the engines through adjustable features. Marine diesel engines equipped with adjustable features must comply with all requirements for any adjustment within the physically available range. A feature is not considered adjustable if it is permanently sealed or otherwise not normally accessible. The Administration may require that adjustable features be set to any specification within its adjustable range for certification or in-use testing to determine compliance with the requirements.

4.3.7 Before granting an Engine Family approval, the Administration shall take the necessary measures to verify that adequate arrangements have been made to ensure effective control of the conformity of production. This may include, but is not limited to:

- .1 the connection between the NO<sub>x</sub> critical component part or identification numbers as proposed for the Engine Family and the drawing numbers (and revision status if applicable) defining those components;
- .2 the means by which the Administration will be able, at the time of a survey, to verify that the drawings used for the production of the NO<sub>x</sub> critical components correspond to the drawings established as defining the Engine Family;
- .3 drawing revision control arrangements. Where it is proposed by a manufacturer that revisions to the NO<sub>x</sub> critical component drawings defining an Engine Family may be undertaken through the life of an engine, then the conformity of production scheme would need to demonstrate the procedures to be adopted to cover the cases where revisions will, or will not, affect NO<sub>x</sub> emissions. These procedures shall cover drawing number allocation, effect on the identification markings on the NO<sub>x</sub> critical components and the provision for providing the revised drawings to the Administration responsible for the original Engine Family approval, where these revisions may affect the NO<sub>x</sub> emissions the means to be adopted to assess or verify performance against the Parent Engine performance are to be stated together with the subsequent actions to be taken regarding advising the Administration and, where necessary, the declaration of a new Parent Engine prior to the introduction of those modifications into service;
- .4 the implemented procedures that ensure any NO<sub>x</sub> critical component spare parts supplied to a certified engine will be identified as given in the approved Technical File and hence will be produced in accordance with the drawings as defining the Engine Family; or
- .5 equivalent arrangements as approved by the Administration.

#### 4.3.8 *Guidance for the selection of an Engine Family*

4.3.8.1 The Engine Family shall be defined by basic characteristics which must be common to all engines within the Engine Family. In some cases there may be interaction of parameters; these effects must also be taken into consideration to ensure that only engines with similar exhaust emission characteristics are included within an Engine Family, e.g., the number of cylinders may become a relevant parameter on some engines due to the charge air or fuel system used, but with other designs, exhaust emissions characteristics may be independent of the number of cylinders or configuration.

4.3.8.2 The engine manufacturer is responsible for selecting those engines from their different models of engines that are to be included in an Engine Family. The following basic characteristics, but not specifications, shall be common among all engines within an Engine Family:

- .1 combustion cycle:
  - 2-stroke cycle
  - 4-stroke cycle
- .2 cooling medium:
  - air
  - water
  - oil
- .3 individual cylinder displacement:
  - to be within a total spread of 15%
- .4 number of cylinders and cylinder configuration:
  - applicable in certain cases only, e.g., in combination with exhaust gas cleaning devices
- .5 method of air aspiration:
  - naturally aspirated
  - pressure charged
- .6 fuel type:
  - distillate/residual fuel oil
  - dual fuel
- .7 combustion chamber
  - open chamber
  - divided chamber
- .8 valve and porting, configuration, size and number:
  - cylinder head
  - cylinder wall

- .9 fuel system type:
  - pump-line-injector
  - in-line
  - distributor
  - single element
  - unit injector
  - gas valve
  
- .10 miscellaneous features:
  - exhaust gas re-circulation
  - water/emulsion injection
  - air injection
  - charge cooling system
  - exhaust after-treatment
  - reduction catalyst
  - oxidation catalyst
  - thermal reactor
  - particulates trap.

4.3.8.3 If there are engines which incorporate other features which could be considered to affect NO<sub>x</sub> exhaust emissions, these features must be identified and taken into account in the selection of the engines to be included in the Engine Family.

#### 4.3.9 *Guidance for selecting the Parent Engine of an Engine Family*

4.3.9.1 The method of selection of the Parent Engine for NO<sub>x</sub> measurement shall be agreed to and approved by the Administration. The method shall be based upon selecting an engine which incorporates engine features and characteristics which, from experience, are known to produce the highest NO<sub>x</sub> emissions expressed in grams per kilowatt hour (g/kWh). This requires detailed knowledge of the engines within the Engine Family. Under certain circumstances, the Administration may conclude that the worst case NO<sub>x</sub> emission rate of the Engine Family can best be characterized by testing a second engine. Thus, the Administration may select an additional engine for test based upon features which indicate that it may have the highest NO<sub>x</sub> emission levels of the engines within that Engine Family. If the range of engines within the Engine Family incorporate other variable features which could be considered to affect NO<sub>x</sub> emissions, these features must also be identified and taken into account in the selection of the Parent Engine.

4.3.9.2 The Parent Engine shall have the highest emission value for the applicable test cycle.

#### 4.3.10 *Certification of an Engine Family*

4.3.10.1 The certification shall include a list, to be prepared and maintained by the engine manufacturer and approved by the Administration, of all engines and their specifications accepted under the same Engine Family, the limits of their operating conditions and the details and limits of engine adjustments that may be permitted.

4.3.10.2 A pre-certificate, or EIAPP Certificate, shall be issued for a Member Engine of an Engine Family in accordance with this Code which certifies that the Parent Engine meets the applicable NO<sub>x</sub> limit specified in regulation 13. Where Member Engine pre-certification requires

the measurement of some performance values, the calibration of the equipment used for those measurements shall be in accordance with the requirements of 1.3 of appendix 4 of this Code.

4.3.10.3 When the Parent Engine of an Engine Family is tested and gaseous emissions measured under the most adverse conditions specified within this Code and confirmed as complying with the applicable maximum allowable emission limits as given in 3.1, the results of the test and NO<sub>x</sub> measurement shall be recorded in the EIAPP Certificate issued for the particular Parent Engine and for all Member Engines of the Engine Family.

4.3.10.4 If two or more Administrations agree to accept each other's EIAPP Certificates, then an entire Engine Family, certified by one of these Administrations, shall be accepted by the other Administrations which entered into that agreement with the original certifying Administration, unless the agreement specified otherwise. Certificates issued under such agreements shall be acceptable as *prima facie* evidence that all engines included in the certification of the Engine Family comply with the specific NO<sub>x</sub> emission requirements. There is no need for further evidence of compliance with regulation 13 if it is verified that the installed engine has not been modified and the engine adjustment is within the range permitted in the Engine Family certification.

4.3.10.5 If the Parent Engine of an Engine Family is to be certified in accordance with an alternative standard or a different test cycle than allowed by this Code, the manufacturer must prove to the Administration that the weighted average NO<sub>x</sub> emissions for the appropriate test cycles fall within the relevant limit values under regulation 13 and this Code before the Administration may issue an EIAPP Certificate.

#### **4.4 Application of the Engine Group concept**

4.4.1 Engine Group engines normally require adjustment or modification to suit the onboard operating conditions but these adjustments or modifications shall not result in NO<sub>x</sub> emissions exceeding the applicable limits in regulation 13.

4.4.2 The Engine Group concept also provides the possibility for a reduction in approval testing for modifications to engines in production or in service.

4.4.3 In general, the Engine Group concept may be applied to any engine type having the same design features as specified in 4.4.6, but individual engine adjustment or modification after test-bed measurement is allowed. The range of engines in an Engine Group and choice of Parent Engine shall be agreed to and approved by the Administration.

4.4.4 The application for the Engine Group concept, if requested by the engine manufacturer or another party, shall be considered for certification approval by the Administration. If the engine owner, with or without technical support from the engine manufacturer, decides to perform modifications on a number of similar engines in the owner's fleet, the owner may apply for an Engine Group certification. The Engine Group may be based on a Parent Engine which is a test engine on the test bench. Typical applications are similar modifications of similar engines in similar operational conditions. If a party other than the engine manufacturer applies for engine certification, the applicant for the engine certification takes on the responsibilities of the engine manufacturer as elsewhere given within this Code.

4.4.5 Before granting an initial Engine Group approval for serially produced engines, the Administration shall take the necessary measures to verify that adequate arrangements have been made to ensure effective control of the conformity of production. The requirements of 4.3.7 apply *mutatis mutandis* to this section. This requirement may not be necessary for Engine Groups

established for the purpose of engine modification on board after an EIAPP Certificate has been issued.

#### 4.4.6 *Guidance for the selection of an Engine Group*

4.4.6.1 The Engine Group may be defined by basic characteristics and specifications in addition to the parameters defined in 4.3.8 for an Engine Family.

4.4.6.2 The following parameters and specifications shall be common to engines within an Engine Group:

- .1 bore and stroke dimensions;
- .2 method and design features of pressure charging and exhaust gas system:
  - constant pressure;
  - pulsating system;
- .3 method of charge air cooling system:
  - with/without charge air cooler;
- .4 design features of the combustion chamber that effect NO<sub>x</sub> emission;
- .5 design features of the fuel injection system, plunger and injection cam which may profile basic characteristics that effect NO<sub>x</sub> emission; and
- .6 rated power at rated speed. The permitted ranges of engine power (kW/cylinder) and/or rated speed are to be declared by the manufacturer and approved by the Administration.

4.4.6.3 Generally, if the criteria required by 4.4.6.2 are not common to all engines within a prospective Engine Group, then those engines may not be considered as an Engine Group. However, an Engine Group may be accepted if only one of those criteria is not common for all of the engines within a prospective Engine Group.

#### 4.4.7 *Guidance for allowable adjustment or modification within an Engine Group*

4.4.7.1 Minor adjustments and modifications in accordance with the Engine Group concept are allowed after pre-certification or final test-bed measurement within an Engine Group upon agreement of the parties concerned and approval of the Administration, if:

- .1 an inspection of emission-relevant engine parameters and/or provisions of the onboard NO<sub>x</sub> verification procedures of the engine and/or data provided by the engine manufacturer confirm that the adjusted or modified engine complies with the applicable NO<sub>x</sub> emission limit. The engine test-bed results in respect of NO<sub>x</sub> emissions may be accepted as an option for verifying onboard adjustments or modifications to an engine within an Engine Group; or
- .2 onboard measurement confirms that the adjusted or modified engine complies with the applicable NO<sub>x</sub> emission limit.

4.4.7.2 Examples of adjustments and modifications within an Engine Group that may be permitted, but are not limited to those described below:

- .1 For onboard conditions, adjustment of:
  - injection timing for compensation of fuel property differences,
  - injection timing for maximum cylinder pressure,
  - fuel delivery differences between cylinders.
  
- .2 For performance, modification of:
  - turbocharger,
  - injection pump components,
  - plunger specification,
  - delivery valve specification,
  - injection nozzles,
  - cam profiles,
  - intake and/or exhaust valve,
  - injection cam,
  - combustion chamber.

4.4.7.3 The above examples of modifications after a test-bed trial concern essential improvements of components or engine performance during the life of an engine. This is one of the main reasons for the existence of the Engine Group concept. The Administration, upon application, may accept the results from a demonstration test carried out on one engine, possibly a test engine, indicating the effects of the modifications on NO<sub>x</sub> emissions which may be accepted for all engines within that Engine Group without requiring certification measurements on each Member Engine of the Engine Group.

#### 4.4.8 *Guidance for the selection of the Parent Engine of an Engine Group*

4.4.8.1 The selection of the Parent Engine shall be in accordance with the criteria in 4.3.9, as applicable. It is not always possible to select a Parent Engine from small-volume production engines in the same way as the mass-produced engines (Engine Family). The first engine ordered may be registered as the Parent Engine. Furthermore at the pre-certification test where a Parent Engine is not adjusted to the engine builder defined reference or maximum tolerance operating conditions (which may include, but not limited to, maximum combustion pressure, compression pressure, exhaust back pressure, charge air temperature) for the Engine Group, the measured NO<sub>x</sub> emission values shall be corrected to the defined reference and maximum tolerance conditions on the basis of emission sensitivity tests on other representative engines. The resulting corrected average weighted NO<sub>x</sub> emission value under reference conditions is to be stated in 1.9.6 of the Supplement to the EIAPP Certificate. In no case is the effect of the reference condition tolerances to result in an emission value which would exceed the applicable NO<sub>x</sub> emission limit as required by regulation 13. The method used to select the Parent Engine to represent the Engine Group, the reference values and the applied tolerances shall be agreed to and approved by the Administration.

#### 4.4.9 *Certification of an Engine Group*

4.4.9.1 The requirements of 4.3.10 apply *mutatis mutandis* to this section.

## Chapter 5

### *Procedures for NO<sub>x</sub> emission measurements on a test bed*

#### 5.1 General

5.1.1 This procedure shall be applied to every initial approval testing of a marine diesel engine regardless of the location of that testing (the methods described in 2.1.2.1 and 2.1.2.2).

5.1.2 This chapter specifies the measurement and calculation methods for gaseous exhaust emissions from reciprocating internal-combustion engines under steady-state conditions, necessary for determining the average weighted value for the NO<sub>x</sub> exhaust gas emission.

5.1.3 Many of the procedures described below are detailed accounts of laboratory methods, since determining an emissions value requires performing a complex set of individual measurements, rather than obtaining a single measured value. Thus, the results obtained depend as much on the process of performing the measurements as they depend on the engine and test method.

5.1.4 This chapter includes the test and measurement methods, test run and test report as a procedure for a test-bed measurement.

5.1.5 In principle, during emission tests, an engine shall be equipped with its auxiliaries in the same manner as it would be used on board.

5.1.6 For many engine types within the scope of this Code, the auxiliaries which may be fitted to the engine in service may not be known at the time of manufacture or certification. It is for this reason that the emissions are expressed on the basis of brake power as defined in 1.3.13.

5.1.7 When it is not appropriate to test the engine under the conditions as defined in 5.2.3, e.g., if the engine and transmission form a single integral unit, the engine may only be tested with other auxiliaries fitted. In this case the dynamometer settings shall be determined in accordance with 5.2.3 and 5.9. The auxiliary losses shall not exceed 5% of the maximum observed power. Losses exceeding 5% shall be approved by the Administration involved prior to the test.

5.1.8 All volumes and volumetric flow rates shall be related to 273 K (0°C) and 101.3 kPa.

5.1.9 Except as otherwise specified, all results of measurements, test data or calculations required by this chapter shall be recorded in the engine's test report in accordance with 5.10.

5.1.10 References in this Code to the term "charge air" apply equally to scavenge air.

#### 5.2 Test conditions

##### *5.2.1 Test condition parameter and test validity for Engine Family approval*

5.2.1.1 The absolute temperature  $T_a$  of the engine intake air expressed in Kelvin shall be measured, and the dry atmospheric pressure  $p_s$ , expressed in kPa, shall be measured or calculated as follows:

$$p_s = p_b - 0.01 \cdot R_a \cdot p_a$$

$p_a$  according to formula (10)

5.2.1.2 For naturally aspirated and mechanically pressure charged engines the parameter  $f_a$  shall be determined according to the following:

$$f_a = \left( \frac{99}{p_s} \right) \cdot \left( \frac{T_a}{298} \right)^{0.7} \quad (1)$$

5.2.1.3 For turbocharged engines with or without cooling of the intake air the parameter  $f_a$  shall be determined according to the following:

$$f_a = \left( \frac{99}{p_s} \right)^{0.7} \cdot \left( \frac{T_a}{298} \right)^{1.5} \quad (2)$$

5.2.1.4 For a test to be recognized as valid for Engine Family approval, the parameter  $f_a$  shall be such that:

$$0.93 \leq f_a \leq 1.07 \quad (3)$$

## 5.2.2 Engines with charge air cooling

5.2.2.1 The temperature of the cooling medium and the charge air temperature shall be recorded.

5.2.2.2 All engines when equipped as intended for installation on board ships must be capable of operating within the applicable NO<sub>x</sub> emission limit of regulation 13 at an ambient seawater temperature of 25°C. This reference temperature shall be considered in accordance with the charge air cooling arrangement applicable to the individual installation as follows:

- .1 Direct seawater cooling to engine charge air coolers. Compliance with the applicable NO<sub>x</sub> limit shall be demonstrated with a charge air cooler coolant inlet temperature of 25°C.
- .2 Intermediate freshwater cooling to engine charge air coolers. Compliance with the applicable NO<sub>x</sub> limit shall be demonstrated with the charge air cooling system operating with the designed in service coolant inlet temperature regime corresponding to an ambient seawater temperature of 25°C.

*Note:* Demonstration of compliance at a Parent Engine test for a direct seawater cooled system, as given by (.1) above, does not demonstrate compliance in accordance with the higher charge air temperature regime inherent with an intermediate freshwater cooling arrangement as required by this section.

- .3 For those installations incorporating no seawater cooling, either direct or indirect, to the charge air coolers, e.g., radiator cooled freshwater systems, air/air charge air coolers, compliance with the applicable NO<sub>x</sub> limit shall be demonstrated with the engine and charge air cooling systems operating as specified by the manufacturer with 25°C air temperature.

5.2.2.3 Compliance with the applicable NO<sub>x</sub> emission limit as defined by regulation 13 shall be demonstrated either by testing or by calculation using the charge air reference temperatures ( $T_{SCRref}$ ) specified and justified by the manufacturer, if applicable.

### 5.2.3 *Power*

5.2.3.1 The basis of specific emissions measurement is uncorrected brake power as defined in 1.3.11 and 1.3.13. The engine shall be submitted with auxiliaries needed for operating the engine (e.g., fan, water pump, etc.). If it is impossible or inappropriate to install the auxiliaries on the test bench, the power absorbed by them shall be determined and subtracted from the measured engine power.

5.2.3.2 Auxiliaries not necessary for the operation of the engine and which may be mounted on the engine may be removed for the test. See also 5.1.5 and 5.1.6.

5.2.3.3 Where auxiliaries have not been removed, the power absorbed by them at the test speeds shall be determined in order to calculate the dynamometer settings, except for engines where such auxiliaries form an integral part of the engine (e.g., cooling fans for air cooled engines).

### 5.2.4 *Engine air inlet system*

5.2.4.1 An engine air intake system or a test shop system shall be used presenting an air intake restriction within  $\pm 300$  Pa of the maximum value specified by the manufacturer for a clean air cleaner at the speed of rated power and full-load.

5.2.4.2 If the engine is equipped with an integral air inlet system, it shall be used for testing.

### 5.2.5 *Engine exhaust system*

5.2.5.1 An engine exhaust system or a test shop system shall be used which presents an exhaust backpressure within  $\pm 650$  Pa of the maximum value specified by the manufacturer at the speed of rated power and full load. The exhaust system shall conform to the requirements for exhaust gas sampling, as set out in 5.9.3.

5.2.5.2 If the engine is equipped with an integral exhaust system, it shall be used for testing.

5.2.5.3 If the engine is equipped with an exhaust after-treatment device, the exhaust pipe shall have the same diameter as found in-use for at least 4 pipe diameters upstream to the inlet of the beginning of the expansion section containing the after-treatment device. The distance from the exhaust manifold flange or turbocharger outlet to the exhaust after-treatment device shall be the same as in the onboard configuration or within the distance specifications of the manufacturer. The exhaust backpressure or restriction shall follow the same criteria as above, and may be set with a valve.

5.2.5.4 Where test-bed installation prevents adjustment to the exhaust gas backpressure as required, the effect on the NO<sub>x</sub> emissions shall be demonstrated by the engine builder and, with the approval of the Administration, the emission value duly corrected as necessary.

### 5.2.6 *Cooling system*

5.2.6.1 An engine cooling system with sufficient capacity to maintain the engine at normal operating temperatures prescribed by the manufacturer shall be used.

## 5.3 **Test fuel oils**

5.3.1 Fuel oil characteristics may influence the engine exhaust gas emission; in particular, some fuel bound nitrogen can be converted to NO<sub>x</sub> during combustion. Therefore, the characteristics of the fuel oil used for the test are to be determined and recorded. Where a reference fuel oil is used, the reference code or specifications and the analysis of the fuel oil shall be provided.

5.3.2 The selection of the fuel oil for the test depends on the purpose of the test. If a suitable reference fuel oil is not available, it is recommended to use a DM-grade marine fuel specified in ISO 8217:2005, with properties suitable for the engine type. In case a DM-grade fuel oil is not available, a RM-grade fuel oil according to ISO 8217:2005 shall be used. The fuel oil shall be analysed for its composition of all components necessary for a clear specification and determination of DM- or RM-grade. The nitrogen content shall also be determined. The fuel oil used during the Parent Engine test shall be sampled during the test.

5.3.3 The fuel oil temperature shall be in accordance with the manufacturer's recommendations. The fuel oil temperature shall be measured at the inlet to the fuel injection pump, or as specified by the manufacturer, and the temperature and location of measurement recorded.

5.3.4 Dual fuel engines using liquid fuel as pilot fuel shall be tested using maximum liquid to gas fuel ratio. The liquid fraction of the fuel shall comply with 5.3.1, 5.3.2 and 5.3.3.

## 5.4 **Measurement equipment and data to be measured**

5.4.1 The emission of gaseous components by the engine submitted for testing shall be measured by the methods described in appendix 3 of this Code which describe the recommended analytical systems for the gaseous emissions.

5.4.2 Other systems or analysers may, subject to the approval of the Administration, be accepted if they yield equivalent results to that of the equipment referenced in 5.4.1. In establishing equivalency it shall be demonstrated that the proposed alternative systems or analysers would, as qualified by using recognized national or international standards, yield equivalent results when used to measure diesel engine exhaust emission concentrations in terms of the requirements referenced in 5.4.1.

5.4.3 For introduction of a new system the determination of equivalency shall be based upon the calculation of repeatability and reproducibility, as described in ISO 5725-1 and ISO 5725-2, or any other comparable recognized standard.

5.4.4 This Code does not contain details of flow, pressure, and temperature measuring equipment. Instead, only the accuracy requirements of such equipment necessary for conducting an emissions test are given in 1.3.1 of appendix 4 of this Code.

#### 5.4.5 *Dynamometer specification*

5.4.5.1 An engine dynamometer with adequate characteristics to perform the appropriate test cycle described in 3.2 shall be used.

5.4.5.2 The instrumentation for torque and speed measurement shall allow the measurement accuracy of the shaft power within the given limits. Additional calculations may be necessary.

5.4.5.3 The accuracy of the measuring equipment shall be such that the maximum permissible deviations given in 1.3.1 of appendix 4 of this Code are not exceeded.

### 5.5 **Determination of exhaust gas flow**

5.5.1 The exhaust gas flow shall be determined by one of the methods specified in 5.5.2, 5.5.3 or 5.5.4.

#### 5.5.2 *Direct measurement method*

5.5.2.1 This method involves the direct measurement of the exhaust flow by flow nozzle or equivalent metering system and shall be in accordance with a recognized international standard.

*Note:* Direct gaseous flow measurement is a difficult task. Precautions shall be taken to avoid measurement errors which will result in emission value errors.

#### 5.5.3 *Air and fuel measurement method*

5.5.3.1 The method for determining exhaust emission flow using the air and fuel measurement method shall be conducted in accordance with a recognized international standard.

5.5.3.2 This involves measurement of the air flow and the fuel flow. Air flow-meters and fuel flow-meters with an accuracy defined in 1.3.1 of appendix 4 of this Code shall be used.

5.5.3.3 The exhaust gas flow shall be calculated as follows:

$$q_{mew} = q_{maw} + q_{mf} \quad (4)$$

5.5.3.4 The air flow-meter shall meet the accuracy specifications of appendix 4 of this Code, the CO<sub>2</sub> analyser used shall meet the specifications of appendix 3 of this Code, and the total system shall meet the accuracy specifications for the exhaust gas flow as given in appendix 4 of this Code.

#### 5.5.4 *Fuel flow and carbon balance method*

5.5.4.1 This involves exhaust mass flow rate calculation from fuel consumption, fuel composition and exhaust gas concentrations using the carbon balance method, as specified in appendix 6 of this Code.

## **5.6 Permissible deviations of instruments for engine-related parameters and other essential parameters**

5.6.1 The calibration of all measuring instruments including both the measuring instruments as detailed under appendix 4 of this Code and additional measuring instruments required in order to define an engine's NO<sub>x</sub> emission performance, for example the measurement of peak cylinder or charge air pressures, shall be traceable to standards recognized by the Administration and shall comply with the requirements as set out in 1.3.1 of appendix 4 of this Code.

## **5.7 Analysers for determination of the gaseous components**

5.7.1 The analysers to determine the gaseous emissions shall meet the specifications as set out in appendix 3 of this Code.

## **5.8 Calibration of the analytical instruments**

5.8.1 Each analyser used for the measurement of an engine's gaseous emissions shall be calibrated in accordance with the requirements of appendix 4 of this Code.

## **5.9 Test run**

### *5.9.1 General*

5.9.1.1 Detailed descriptions of the recommended sampling and analysing systems are contained in 5.9.2 to 5.9.4 and appendix 3 of this Code. Since various configurations may produce equivalent results, exact conformance with these figures is not required. Additional components, such as instruments, valves, solenoids, pumps, and switches, may be used to provide additional information and coordinate the functions of the component systems. Other components which are not needed to maintain the accuracy on some systems may, with the agreement of the Administration, be excluded if their exclusion is based upon good engineering judgement.

5.9.1.2 The treatment of inlet restriction (naturally aspirated engines) or charge air pressure (turbo-charged engines) and exhaust back pressure shall be in accordance with 5.2.4 and 5.2.5 respectively.

5.9.1.3 In the case of a pressure charged engine, the inlet restriction conditions shall be taken as the condition with a clean air inlet filter and the pressure charging system working within the bounds as declared, or to be established, for the Engine Family or Engine Group to be represented by the Parent Engine test result.

### *5.9.2 Main exhaust components: CO, CO<sub>2</sub>, HC, NO<sub>x</sub> and O<sub>2</sub>*

5.9.2.1 An analytical system for the determination of the gaseous emissions in the raw exhaust gas shall be based on the use of analysers given in 5.4.

5.9.2.2 For the raw exhaust gas, the sample for all components may be taken with one sampling probe or with two sampling probes located in close proximity and internally split to the different analysers. Care must be taken that no condensation of exhaust components (including water and sulphuric acid) occurs at any point of the analytical system.

5.9.2.3 Specifications and calibration of these analysers shall be as set out in appendices 3 and 4 of this Code, respectively.

### 5.9.3 *Sampling for gaseous emissions*

5.9.3.1 The sampling probes for the gaseous emissions shall be fitted at least 10 pipe diameters after the outlet of the engine, turbocharger, or last after-treatment device, whichever is furthest downstream, but also at least 0.5 m or 3 pipe diameters upstream of the exit of the exhaust gas system, whichever is greater. For a short exhaust system that does not have a location that meets both of these specifications, an alternative sample probe location shall be subject to approval by the Administration.

5.9.3.2 The exhaust gas temperature shall be at least 190°C at the HC sample probe, and at least 70°C at the sample probes for other measured gas species where they are separate from the HC sample probe.

5.9.3.3 In the case of a multi-cylinder engine with a branched exhaust manifold, the inlet of the probe shall be located sufficiently far downstream so as to ensure that the sample is representative of the average exhaust emissions from all cylinders. In the case of a multi-cylinder engine having distinct groups of manifolds, it is permissible to acquire a sample from each group individually and calculate an average exhaust emission. Alternatively, it would also be permissible to acquire a sample from a single group to represent the average exhaust emission provided that it can be justified to the Administration that the emissions from other groups are identical. Other methods, subject to the approval of the Administration, which have been shown to correlate with the above methods may be used. For exhaust emission calculation, the total exhaust mass flow shall be used.

5.9.3.4 The exhaust gas sampling system shall be leakage tested in accordance with section 4 of appendix 4 of this Code.

5.9.3.5 If the composition of the exhaust gas is influenced by any exhaust after-treatment system, the exhaust gas sample shall be taken downstream of that device.

5.9.3.6 The inlet of the probe shall be located as to avoid ingestion of water which is injected into the exhaust system for the purpose of cooling, tuning or noise reduction.

### 5.9.4 *Checking of the analysers*

5.9.4.1 The emission analysers shall be set at zero and spanned in accordance with section 6 of appendix 4 of this Code.

### 5.9.5 *Test cycles*

5.9.5.1 An engine shall be tested in accordance with the test cycles as defined in 3.2. This takes into account the variations in engine application.

#### 5.9.6 *Test sequence*

5.9.6.1 After the procedures in 5.9.1 to 5.9.5 have been completed, the test sequence shall be started. The engine shall be operated in each mode, in any order, in accordance with the appropriate test cycles defined in 3.2.

5.9.6.2 During each mode of the test cycle after the initial transition period, the specified speed shall be held within  $\pm 1\%$  of the rated speed or  $\pm 3 \text{ min}^{-1}$  whichever is greater except for low idle which shall be within the tolerances declared by the manufacturer. The specified torque shall be held so that the average over the period during which the measurements are being taken is within  $\pm 2\%$  of the rated torque at the engine's rated speed.

#### 5.9.7 *Analyser response*

5.9.7.1 When stabilized, the output of the analysers shall be recorded both during the test and during all zero and span response checks, using a data acquisition system or a strip chart recorder. The recording period shall not be less than 10 minutes when analysing exhaust gas or not less than 3 minutes for each zero and span response check. For data acquisition systems, a minimum sampling frequency of 3 per minute shall be used. Measured concentrations of CO, HC and NO<sub>x</sub> are to be recorded in terms of, or equivalent to, ppm to at least the nearest whole number. Measured concentrations of CO<sub>2</sub> and O<sub>2</sub> are to be recorded in terms of, or equivalent to, % to not less than two decimal places.

#### 5.9.8 *Engine conditions*

5.9.8.1 The engine speed, load and other essential parameters shall be measured at each mode point only after the engine has been stabilized. The exhaust gas flow shall be measured or calculated and recorded.

#### 5.9.9 *Re-checking the analysers*

5.9.9.1 After the emission test, the zero and span responses of the analysers shall be re-checked using a zero gas and the same span gas as used prior to the measurements. The test shall be considered acceptable if:

- .1 the difference between the responses to the zero gas before and after the test is less than 2% of the initial span gas concentration; and
- .2 the difference between the responses to the span gas before and after the test is less than 2% of the initial span gas concentration.

5.9.9.2 Zero and span drift correction shall not be applied to the analyser responses recorded in accordance with 5.9.7.

### **5.10 Test report**

5.10.1 For every Individual Engine or Parent Engine tested to establish an Engine Family or Engine Group, the engine manufacturer shall prepare a test report which shall contain the necessary data to fully define the engine performance and enable calculation of the gaseous emissions including the data as set out in section 1 of appendix 5 of this Code. The original of the

test report shall be maintained on file with the engine manufacturer and a certified true copy shall be maintained on file by the Administration.

## 5.11 Data evaluation for gaseous emissions

5.11.1 For the evaluation of the gaseous emissions, the data recorded for at least the last 60 seconds of each mode shall be averaged, and the concentrations of CO, CO<sub>2</sub>, HC, NO<sub>x</sub>, and O<sub>2</sub> during each mode shall be determined from the averaged recorded data and the corresponding zero and span check data. The averaged results shall be given in terms of % to not less than two decimal places for CO<sub>2</sub> and O<sub>2</sub> species and in terms of ppm to at least the nearest whole number for CO, HC and NO<sub>x</sub> species.

## 5.12 Calculation of the gaseous emissions

5.12.1 The final results for the test report shall be determined by following the steps in 5.12.2 to 5.12.6.

### 5.12.2 Determination of the exhaust gas flow

5.12.2.1 The exhaust gas flow rate ( $q_{mew}$ ) shall be determined for each mode in accordance with one of the methods described in 5.5.2 to 5.5.4.

### 5.12.3 Dry/wet correction

5.12.3.1 If the emissions are not measured on a wet basis, the measured concentration shall be converted to a wet basis according to either of the following formulae:

$$c_w = k_w \cdot c_d \quad (5)$$

5.12.3.2 For the raw exhaust gas:

- .1 Complete combustion where exhaust gas flow is to be determined in accordance with direct measurement method in 5.5.2 or air and fuel measurement method in 5.5.3 either of the following formulae shall be used:

$$k_{wr1} = \left( 1 - \frac{1.2442 \cdot H_a + 111.19 \cdot w_{ALF} \cdot \frac{q_{mf}}{q_{mad}}}{773.4 + 1.2442 \cdot H_a + \frac{q_{mf}}{q_{mad}} \cdot f_{fw} \cdot 1000} \right) \cdot 1.008 \quad (6)$$

or

$$k_{wr1} = \left( 1 - \frac{1.2442 \cdot H_a + 111.19 \cdot w_{ALF} \cdot \frac{q_{mf}}{q_{mad}}}{773.4 + 1.2442 \cdot H_a + \frac{q_{mf}}{q_{mad}} \cdot f_{fw} \cdot 1000} \right) / \left( 1 - \frac{p_r}{p_b} \right) \quad (7)$$

with:

$$f_{fw} = 0.055594 \cdot w_{ALF} + 0.0080021 \cdot w_{DEL} + 0.0070046 \cdot w_{EPS} \quad (8)$$

$H_a$  is the absolute humidity of intake air, in g water per kg dry air

*Note:*  $H_a$  may be derived from relative humidity measurement, dewpoint measurement, vapour pressure measurement or dry/wet bulb measurement using the generally accepted formulae.

$$H_a = 6.22 \cdot p_a \cdot R_a / (p_b - 0.01 \cdot R_a \cdot p_a) \quad (9)$$

where:

$$p_a = \text{saturation vapour pressure of the intake air, kPa}$$

$$p_a = (4.856884 + 0.2660089 \cdot t_a + 0.01688919 \cdot t_a^2 - 7.477123 \cdot 10^{-5} \cdot t_a^3 + 8.10525 \cdot 10^{-6} \cdot t_a^4 - 3.115221 \cdot 10^{-8} \cdot t_a^5) \cdot (101.32 / 760) \quad (10)$$

with:

$$t_a = \text{temperature of the intake air, } ^\circ\text{C}; t_a = T_a - 273.15$$

$$p_b = \text{total barometric pressure, kPa}$$

$$p_r = \text{water vapour pressure after cooling bath of the analysis system, kPa}$$

$$p_r = 0.76 \text{ kPa for cooling bath temperature } 3^\circ\text{C}$$

- .2 Incomplete combustion, CO more than 100 ppm or HC more than 100 ppmC at one or more mode points, where exhaust gas flow is determined in accordance with direct measurement method 5.5.2, air and fuel measurement method 5.5.3 and in all cases where the carbon-balance method 5.5.4 is used the following equation shall be used:

*Note:* The unit for the CO and CO<sub>2</sub> concentrations in (11) and (13) is %.

$$k_{w2} = \frac{1}{1 + \alpha \cdot 0.005 \cdot (c_{CO2d} + c_{COd}) - 0.01 \cdot c_{H2d} + k_{w2} \cdot \frac{p_r}{p_b}} \quad (11)$$

with:

$$\alpha = 11.9164 \cdot \frac{w_{ALF}}{w_{BET}} \quad (12)$$

$$c_{H2d} = \frac{0.5 \cdot \alpha \cdot c_{COd} \cdot (c_{COd} + c_{CO2d})}{c_{COd} + 3 \cdot c_{CO2d}} \quad (13)$$

$$k_{w2} = \frac{1.608 \cdot H_a}{1000 + (1.608 \cdot H_a)} \quad (14)$$

5.12.3.3 For the intake air:

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

#### 5.12.4 *NO<sub>x</sub> correction for humidity and temperature*

5.12.4.1 As the NO<sub>x</sub> emission depends on ambient air conditions, the NO<sub>x</sub> concentration shall be corrected for ambient air temperature and humidity with the factors in accordance with 5.12.4.5 or 5.12.4.6 as applicable.

5.12.4.2 Other reference values for humidity instead of 10.71 g/kg at the reference temperature of 25°C shall not be used.

5.12.4.3 Other correction formulae may be used if they can be justified, validated and are approved by the Administration.

5.12.4.4 Water or steam injected into the charge air (air humidification) is considered an emission control device and shall therefore not be taken into account for humidity correction. Water that condensates in the charge cooler will change the humidity of the charge air and therefore shall be taken into account for humidity correction.

5.12.4.5 For compression ignition engines:

$$k_{hd} = \frac{1}{1 - 0.0182 \cdot (H_a - 10.71) + 0.0045 \cdot (T_a - 298)} \quad (16)$$

where:

$T_a$  = is the temperature of the air at the inlet to the air filter in K;

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

5.12.4.6 For compression ignition engines with intermediate air cooler the following alternative equation shall be used:

$$k_{hd} = \frac{1}{1 - 0.012 \cdot (H_a - 10.71) - 0.00275 \cdot (T_a - 298) + 0.00285 \cdot (T_{SC} - T_{SCRef})} \quad (17)$$

where:

$T_{SC}$  is the temperature of the charge air;

$T_{SCRef}$  is the temperature of the charge air at each mode point corresponding to a seawater temperature of 25°C as specified in 5.2.2.  $T_{SCRef}$  is to be specified by the manufacturer.

To take the humidity in the charge air into account, the following consideration is added:

$H_{SC}$  = humidity of the charge air, g water per kg dry air in which:

$$H_{SC} = 6.22 \cdot p_{SC} \cdot 100 / (p_C - p_{SC})$$

where:

$p_{SC}$  = saturation vapour pressure of the charge air, kPa

$p_C$  = charge air pressure, kPa

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

5.12.5 Calculation of the emission mass flow rates

5.12.5.1 The emission mass flow rate of the respective component in the raw exhaust gas for each mode shall be calculated in accordance with 5.12.5.2 from the measured concentration as obtained in accordance with 5.11.1, the applicable  $u_{\text{gas}}$  value from table 5 and the exhaust gas mass flow rate in accordance with 5.5.

Table 5  
Coefficient  $u_{\text{gas}}$  and fuel specific parameters for raw exhaust gas

Gas		NO <sub>x</sub>	CO	HC	CO <sub>2</sub>	O <sub>2</sub>
$\rho_{\text{gas}}$	kg/m <sup>3</sup>	2.053	1.250	a)	1.9636	1.4277
	$\rho_e$	Coefficient $u_{\text{gas}}$ <sup>b)</sup>				
Fuel oil	1.2943	0.001586	0.000966	0.000479	0.001517	0.001103

(a) depending on fuel

(b) at  $\lambda = 2$ , wet air, 273 K, 101.3 kPa

Values for  $u$  given in table 5 are based on ideal gas properties.

5.12.5.2 The following formulae shall be applied:

$$q_{\text{mgas}} = u_{\text{gas}} \cdot c_{\text{gas}} \cdot q_{\text{mew}} \cdot k_{\text{hd}} \text{ (for NO}_x\text{)} \quad (18)$$

$$q_{\text{mgas}} = u_{\text{gas}} \cdot c_{\text{gas}} \cdot q_{\text{mew}} \text{ (for other gases)} \quad (18a)$$

where:

$q_{\text{mgas}}$  = emission mass flow rate of individual gas, g/h

$u_{\text{gas}}$  = ratio between density of exhaust component and density of exhaust gas, see table 5

$c_{\text{gas}}$  = concentration of the respective component in the raw exhaust gas, ppm, wet

$q_{\text{mew}}$  = exhaust mass flow, kg/h, wet

$k_{\text{hd}}$  = NO<sub>x</sub> humidity correction factor

*Note:* In the case of CO<sub>2</sub> and O<sub>2</sub> measurement, the concentration will normally be reported in terms of %. With regard to the application of formula 18a, these concentrations will need to be expressed in ppm. 1.0 % = 10000 ppm.

5.12.5.3 For the calculation of NO<sub>x</sub>, the humidity correction factor  $k_{\text{hd}}$  as determined according to 5.12.4 shall be used.

5.12.5.4 The measured concentration shall be converted to a wet basis according to 5.12.3 if not already measured on a wet basis.

### 5.12.6 Calculation of the specific emission

5.12.6.1 The emission shall be calculated for all individual components in accordance with the following:

$$1. \quad \text{gas}_x = \frac{\sum_{i=1}^{i=n} (q_{\text{mgasi}} \cdot W_{\text{Fi}})}{\sum_{i=1}^{i=n} (P_i \cdot W_{\text{Fi}})} \quad (19)$$

where:

$$2. \quad P = P_m + P_{\text{aux}} \quad (20)$$

and

$q_{\text{mgas}}$  is the mass flow of individual gas;

$P_m$  is the measured power of the individual mode;

$P_{\text{aux}}$  is the power of the auxiliaries fitted to the engine of the individual mode.

5.12.6.2 The weighting factors and the number of modes (n) used in the above calculation shall be according to the provisions of 3.2.

5.12.6.3 The resulting average weighted NO<sub>x</sub> emission value for the engine as determined by formula (19) shall then be compared to the applicable emission limit given in regulation 13 to determine if the engine is in compliance.

## Chapter 6

### *Procedures for demonstrating compliance with NO<sub>x</sub> emission limits on board*

#### **6.1 General**

6.1.1 After installation of a pre-certificated engine on board a ship, every marine diesel engine shall have an onboard verification survey conducted as specified in 2.1.1.2 to 2.1.1.4 to verify that the engine continues to comply with the applicable NO<sub>x</sub> emission limit contained in regulation 13. Such verification of compliance shall be determined by using one of the following methods:

- .1 Engine Parameter Check method in accordance with 6.2 to verify that an engine's component, settings and operating values have not deviated from the specifications in the engine's Technical File;
- .2 Simplified Measurement method in accordance with 6.3; or
- .3 Direct Measurement and Monitoring method in accordance with 6.4.

#### **6.2 Engine Parameter Check method**

##### *6.2.1 General*

6.2.1.1 Engines that meet the following conditions shall be eligible for an Engine Parameter Check method:

- .1 engines that have received a pre-certificate (EIAPP Certificate) on the test bed and those that received a certificate (EIAPP Certificate) following an initial certification survey in accordance with 2.2.4; and
- .2 engines that have undergone modifications or adjustments to the designated engine components and adjustable features since they were last surveyed.

6.2.1.2 When a diesel engine is designed to run within the applicable NO<sub>x</sub> emission limit, it is most likely that within the marine life of the engine, the NO<sub>x</sub> emission limit may be adhered to. The applicable NO<sub>x</sub> emission limit may, however, be contravened by adjustments or modification to the engine. Therefore, an Engine Parameter Check method shall be used to verify whether the engine is still within the applicable NO<sub>x</sub> emission limit.

6.2.1.3 Engine component checks, including checks of settings and an engine's operating values, are intended to provide an easy means of deducing the emissions performance of the engine for the purpose of verification that an engine with no, or minor, adjustments or modifications complies with the applicable NO<sub>x</sub> emission limit. Where the measurement of some operating values is required, the calibration of the equipment used for those measurements shall be in accordance with the requirements of appendix 4 of this Code.

6.2.1.4 The purpose of such checks is to provide a ready means of determining that an engine is correctly adjusted in accordance with the manufacturer's specification and remains in a condition of adjustment consistent with the initial certification by the Administration as being in compliance with regulation 13 as applicable.

6.2.1.5 If an electronic engine management system is employed, this shall be evaluated against the original settings to ensure that appropriate parameters are operating within "as-built" limits.

6.2.1.6 For the purpose of assessing compliance with regulation 13, it is not always necessary to measure the NO<sub>x</sub> emissions to know that an engine, not equipped with an after-treatment device, is likely to comply with the applicable NO<sub>x</sub> emission limit. It may be sufficient to know that the present state of the engine corresponds to the specified components, calibration or parameter adjustment state at the time of initial certification. If the results of an Engine Parameter Check method indicate the likelihood that the engine complies with the applicable NO<sub>x</sub> emission limit, the engine may be re-certified without direct NO<sub>x</sub> measurement.

6.2.1.7 For an engine equipped with a NO<sub>x</sub> reducing device, it will be necessary to check the operation of the device as part of the Engine Parameter Check method.

## 6.2.2 *Documentation for an Engine Parameter Check method*

6.2.2.1 Every marine diesel engine shall have a Technical File as required in 2.3.4 which identifies the engine's components, settings or operating values which influence exhaust emissions and must be checked to ensure compliance.

6.2.2.2 An engine's Technical File shall contain all applicable information, relevant to the NO<sub>x</sub> emission performance of the engine, on the designated engines components, adjustable features and parameters at the time of the engine's pre-certification or onboard certification, whichever occurred first.

6.2.2.3 Dependent on the specific design of the particular engine, different onboard NO<sub>x</sub> influencing modifications and adjustments are possible and usual. These include the engine parameters as follows:

- .1 injection timing,
- .2 injection nozzle,
- .3 injection pump,
- .4 fuel cam,
- .5 injection pressure for common rail systems,
- .6 combustion chamber,
- .7 compression ratio,
- .8 turbocharger type and build,
- .9 charge air cooler, charge air pre-heater,
- .10 valve timing,
- .11 NO<sub>x</sub> abatement equipment "water injection",
- .12 NO<sub>x</sub> abatement equipment "emulsified fuel" (fuel water emulsion),
- .13 NO<sub>x</sub> abatement equipment "exhaust gas recirculation",
- .14 NO<sub>x</sub> abatement equipment "selective catalytic reduction", or
- .15 other parameter(s) specified by the Administration.

6.2.2.4 The actual Technical File of an engine may, based on the recommendations of the applicant for engine certification and the approval of the Administration, include less components and/or parameters than discussed in section 6.2.2.3 depending on the particular engine and the specific design.

6.2.2.5 For some parameters, different survey possibilities exist. As approved by the Administration, the shipowner, supported by the applicant for engine certification, may choose what method is applicable. Any one of, or a combination of, the methods listed in the check list for the Engine Parameter Check method given in appendix 7 of this Code may be sufficient to show compliance.

6.2.2.6 Technical documentation in respect of engine component modification for inclusion in an engine's Technical File shall include details of that modification and its influence on NO<sub>x</sub> emissions, and it shall be supplied at the time when the modification is carried out. Test-bed data obtained from a later engine, which is within the applicable range of the Engine Group concept, may be accepted.

6.2.2.7 The shipowner or person responsible for a ship equipped with a marine diesel engine required to undergo an Engine Parameter Check method shall maintain on board the following documentation in relation to the onboard NO<sub>x</sub> verification procedures:

- .1 a Record Book of Engine Parameters for recording all changes, including like for like replacements, and adjustments within the approved ranges made relative to an engine's components and settings;
- .2 an engine parameter list of an engine's designated components and settings and/or the documentation of an engine's load-dependent operating values submitted by an applicant for engine certification and approved by the Administration; and
- .3 technical documentation of an engine component modification when such a modification is made to any of the engine's designated engine components.

6.2.2.8 Descriptions of any changes affecting the designated engine parameters, including adjustments, parts replacements and modifications to engine parts, shall be recorded chronologically in the Record Book of Engine Parameters. These descriptions shall be supplemented with any other applicable data used for the assessment of the engine's NO<sub>x</sub> emissions.

### 6.2.3 *Procedures for an Engine Parameter Check method*

6.2.3.1 An Engine Parameter Check method shall be carried out using the two procedures as follows:

- .1 a documentation inspection of engine parameter(s) shall be carried out in addition to other inspections and include inspection of the Record Book of Engine Parameters and verification that engine parameters are within the allowable range specified in the engine's Technical File; and
- .2 an actual inspection of engine components and adjustable features shall be carried out as necessary. It shall then be verified, also referring to the results of the documentation inspection, that the engine's adjustable features are within the allowable range specified in the engine's Technical File.

6.2.3.2 The surveyor shall have the option of checking one or all of the identified components, settings or operating values to ensure that the engine with no, or minor, adjustments or modifications complies with the applicable NO<sub>x</sub> emission limit and that only components of the approved specification, as given by 2.4.1.7, are being used. Where adjustments and/or modifications in a specification are referenced in the Technical File, they must fall within the range recommended by the applicant for engine certification and approved by the Administration.

### **6.3 Simplified Measurement method**

#### *6.3.1 General*

6.3.1.1 The following simplified test and measurement procedure specified in this section shall be applied only for onboard confirmation tests and renewal, annual and intermediate surveys when required. Every first engine testing on a test bed shall be carried out in accordance with the procedure specified in chapter 5. Corrections for ambient air temperature and humidity in accordance with 5.12.4 are essential as ships are sailing in cold/hot and dry/humid climates, which may cause a difference in NO<sub>x</sub> emissions.

6.3.1.2 To gain meaningful results for onboard confirmation tests and onboard renewal, annual and intermediate surveys, as an absolute minimum, the gaseous emission concentrations of NO<sub>x</sub> and CO<sub>2</sub> shall be measured in accordance with the appropriate test cycle. The weighting factors ( $W_F$ ) and the number of modes ( $n$ ) used in the calculation shall be in accordance with 3.2.

6.3.1.3 The engine torque and engine speed shall be measured but, to simplify the procedure, the permissible deviations of instruments (see 6.3.7) for measurement of engine-related parameters for onboard verification purposes is different than from those permissible deviations allowed under the test-bed testing method. If it is difficult to measure the torque directly, the brake power may be estimated by any other means recommended by the applicant for engine certification and approved by the Administration.

6.3.1.4 In practical cases, it is often impossible to measure the fuel oil consumption once an engine has been installed on board a ship. To simplify the procedure on board, the results of the measurement of the fuel oil consumption from an engine's pre-certification test-bed testing may be accepted. In such cases, especially concerning residual fuel oil operation (RM-grade fuel oil according to ISO 8217:2005), an estimation with a corresponding estimated error shall be made. Since the fuel oil flow rate used in the calculation ( $q_{mf}$ ) must relate to the fuel oil composition determined in respect of the fuel sample drawn during the test, the measurement of  $q_{mf}$  from the test-bed testing shall be corrected for any difference in net calorific values between the test bed and test fuel oils. The consequences of such an error on the final emissions shall be calculated and reported with the results of the emission measurement.

6.3.1.5 Except as otherwise specified, all results of measurements, test data or calculations required by this chapter shall be recorded in the engine's test report in accordance with 5.10.

#### *6.3.2 Engine parameters to be measured and recorded*

6.3.2.1 Table 6 lists the engine parameters that shall be measured and recorded during onboard verification procedures.

*Table 6*  
Engine parameters to be measured and recorded

Symbol	Parameter	Dimension
$H_a$	Absolute humidity (mass of engine intake air water content related to mass of dry air)	g/kg
$n_{d,i}$	Engine speed (at the $i^{\text{th}}$ mode during the cycle)	$\text{min}^{-1}$
$n_{\text{turb},i}$	Turbocharger speed (if applicable) (at the $i^{\text{th}}$ mode during the cycle)	$\text{min}^{-1}$
$p_b$	Total barometric pressure (in ISO 3046-1, 1995: $p_x = P_x =$ site ambient total pressure)	kPa
$p_{C,i}$	Charge air pressure after the charge air cooler (at the $i^{\text{th}}$ mode during the cycle)	kPa
$P_i$	Brake power (at the $i^{\text{th}}$ mode during the cycle)	kW
$q_{mf,i}$	Fuel oil flow (at the $i^{\text{th}}$ mode during the cycle)	kg/h
$s_i$	Fuel rack position (of each cylinder, if applicable) (at the $i^{\text{th}}$ mode during the cycle)	
$T_a$	Intake air temperature at air inlet (in ISO 3046-1, 1995: $T_x = TT_x =$ site ambient thermodynamic air temperature)	K
$T_{SC,i}$	Charge air temperature after the charge air cooler (if applicable) (at the $i^{\text{th}}$ mode during the cycle)	K
$T_{\text{caclin}}$	Charge air cooler, coolant inlet temperature	$^{\circ}\text{C}$
$T_{\text{caclout}}$	Charge air cooler, coolant outlet temperature	$^{\circ}\text{C}$
$T_{\text{Exh},i}$	Exhaust gas temperature at the sampling point (at the $i^{\text{th}}$ mode during the cycle)	$^{\circ}\text{C}$
$T_{\text{Fuel}}$	Fuel oil temperature before the engine	$^{\circ}\text{C}$
$T_{\text{Sea}}$	Seawater temperature	$^{\circ}\text{C}$

### 6.3.3 Brake power

6.3.3.1 The point regarding the ability to obtain the required data during onboard  $\text{NO}_x$  testing is particularly relevant to brake power. Although the case of directly coupled gearboxes is considered in chapter 5, an engine, as may be presented on board, could in many applications, be arranged such that the measurements of torque (as obtained from a specially installed strain gauge) may not be possible due to the absence of a clear shaft. Principal in this group would be generators, but engines may also be coupled to pumps, hydraulic units, compressors, etc.

6.3.3.2 The engines driving the machinery given in 6.3.3.1 would typically have been tested against a water brake at the manufacture stage prior to the permanent connection of the power consuming unit when installed on board. For generators this should not pose a problem to use voltage and amperage measurements together with a manufacturer's declared generator efficiency. For propeller law governed equipment, a declared speed power curve may be applied together with ensured capability to measure engine speed, either from the free end or by ratio of, for example, the camshaft speed.

#### 6.3.4 *Test fuel oils*

6.3.4.1 Generally all emission measurements shall be carried out with the engine running on marine diesel fuel oil of an ISO 8217:2005, DM-grade.

6.3.4.2 To avoid an unacceptable burden to the shipowner, the measurements for confirmation tests or re-surveys may, based on the recommendation of the applicant for engine certification and the approval of the Administration, be allowed with an engine running on residual fuel oil of an ISO 8217:2005, RM-grade. In such a case the fuel bound nitrogen and the ignition quality of the fuel oil may have an influence on the NO<sub>x</sub> emissions of the engine.

#### 6.3.5 *Sampling for gaseous emissions*

6.3.5.1 The general requirements described in 5.9.3 shall be also applied for onboard measurements.

6.3.5.2 The installation on board of all engines shall be such that these tests may be performed safely and with minimal interference to the engine. Adequate arrangements for the sampling of the exhaust gas and the ability to obtain the required data shall be provided on board a ship. The uptakes of all engines shall be fitted with an accessible standard sampling point. An example of a sample point connecting flange is given in section 5 of appendix 8 of this Code.

#### 6.3.6 *Measurement equipment and data to be measured*

6.3.6.1 The emission of gaseous pollutants shall be measured by the methods described in chapter 5.

#### 6.3.7 *Permissible deviation of instruments for engine related parameters and other essential parameters*

6.3.7.1 Tables 3 and 4 contained in section 1.3 of appendix 4 of this Code list the permissible deviation of instruments to be used in the measurement of engine-related parameters and other essential parameters during onboard verification procedures.

#### 6.3.8 *Determination of the gaseous components*

6.3.8.1 The analytical measuring equipment and the methods described in chapter 5 shall be applied.

#### 6.3.9 *Test cycles*

6.3.9.1 Test cycles used on board shall conform to the applicable test cycles specified in 3.2.

6.3.9.2 Engine operation on board under a test cycle specified in 3.2 may not always be possible, but the test procedure shall, based on the recommendation of the engine manufacturer and approval by the Administration, be as close as possible to the procedure defined in 3.2. Therefore, values measured in this case may not be directly comparable with test-bed results because measured values are very much dependent on the test cycles.

6.3.9.3 If the number of measuring points on board is different than those on the test bed, the measuring points and the weighting factors shall be in accordance with the recommendations of the applicant for engine certification and approved by the Administration taking into account the provisions of 6.4.6.

#### 6.3.10 *Calculation of gaseous emissions*

6.3.10.1 The calculation procedure specified in chapter 5 shall be applied, taking into account the special requirements of this Simplified Measurement procedure.

#### 6.3.11 *Allowances*

6.3.11.1 Due to the possible deviations when applying the simplified measurement procedures of this chapter on board a ship, an allowance of 10% of the applicable limit value may be accepted for confirmation tests and renewal, annual and intermediate surveys only.

6.3.11.2 The NO<sub>x</sub> emission of an engine may vary depending on the ignition quality of the fuel oil and the fuel bound nitrogen. If there is insufficient information available on the influence of the ignition quality on the NO<sub>x</sub> formation during the combustion process and the fuel bound nitrogen conversion rate also depends on the engine efficiency, an allowance of 10% may be granted for an onboard test run carried out on a RM-grade fuel oil (ISO 8217:2005) except that there will be no allowance for the pre-certification test on board. The fuel oil used shall be analysed for its composition of carbon, hydrogen, nitrogen, sulphur and, to the extent given in ISO 8217:2005, any additional components necessary for a clear specification of the fuel oil.

6.3.11.3 In no case shall the total granted allowance for both the simplification of measurements on board and the use of residual fuel oil of an ISO 8217:2005, RM-grade fuel oil, exceed 15% of the applicable limit value.

### **6.4 Direct Measurement and Monitoring method**

#### 6.4.1 *General*

6.4.1.1 The following Direct Measurement and Monitoring procedure may be applied for onboard verification at renewal, annual and intermediate surveys.

6.4.1.2 Due attention is to be given to the safety implications related to the handling and proximity of exhaust gases, the measurement equipment and the storage and use of cylindered pure and calibration gases. Sampling positions and access staging shall be such that this monitoring may be performed safely and will not interfere with the engine.

#### 6.4.2 *Emission species measurement*

6.4.2.1 Onboard NO<sub>x</sub> monitoring includes, as an absolute minimum, the measurement of gaseous emission concentrations of NO<sub>x</sub> (as NO + NO<sub>2</sub>).

6.4.2.2 If exhaust gas mass flow is to be determined in accordance with the carbon balance method in accordance with appendix 6 of this Code, then CO<sub>2</sub> shall also be measured. Additionally CO, HC and O<sub>2</sub> may be measured.

### 6.4.3 Engine performance measurements

6.4.3.1 Table 7 lists the engine performance parameters that shall be measured, or calculated, and recorded at each mode point during onboard NO<sub>x</sub> monitoring.

*Table 7*  
Engine parameters to be measured and recorded

<b>Symbol</b>	<b>Parameter</b>	<b>Dimension</b>
$n_d$	Engine speed	min <sup>-1</sup>
$p_C$	Charge air pressure at receiver	kPa
$P$	Brake power (as specified below)	kW
$P_{aux}$	Auxiliary power (if relevant)	kW
$T_{sc}$	Charge air temperature at receiver (if applicable)	K
$T_{caclin}$	Charge air cooler, coolant inlet temperature (if applicable)	°C
$T_{caclout}$	Charge air cooler, coolant outlet temperature (if applicable)	°C
$T_{Sea}$	Seawater temperature (if applicable)	°C
$q_{mf}$	Fuel oil flow (as specified below)	kg/h

6.4.3.2 Other engine settings necessary to define engine-operating conditions, e.g., waste-gate, charge air bypass, turbocharger status, shall be determined and recorded.

6.4.3.3 The settings and operating conditions of any NO<sub>x</sub> reducing devices shall be determined and recorded.

6.4.3.4 If it is difficult to measure power directly, uncorrected brake power may be estimated by any other means as approved by the Administration. Possible methods to determine brake power include, but are not limited to:

- .1 indirect measurement in accordance with 6.3.3; or
- .2 by estimation from nomographs.

6.4.3.5 The fuel oil flow (actual consumption rate) shall be determined by:

- .1 direct measurement; or
- .2 test-bed data in accordance with 6.3.1.4

### 6.4.4 Ambient condition measurements

6.4.4.1 Table 8 lists the ambient condition parameters that shall be measured, or calculated, and recorded at each mode point during onboard NO<sub>x</sub> monitoring.

*Table 8*  
Ambient condition parameters to be measured and recorded

<b>Symbol</b>	<b>Parameter</b>	<b>Dimension</b>
$H_a$	absolute humidity (mass of engine intake air water content related to mass of dry air)	g/kg
$p_b$	total barometric pressure (in ISO 3046-1, 1995: $p_x=P_x$ =site ambient total pressure)	kPa
$T_a$	temperature at air inlet (in ISO 3046-1, 1995: $T_x=TT_x$ =site ambient thermodynamic air temperature)	K

#### 6.4.5 *Engine performance and ambient condition monitoring equipment*

6.4.5.1 The engine performance and ambient condition monitoring equipment shall be installed and maintained in accordance with manufacturers' recommendations such that requirements of section 1.3 and tables 3 and 4 of appendix 4 of this Code are met in respect of the permissible deviations.

#### 6.4.6 *Test cycles*

6.4.6.1 Engine operation on board under a specified test cycle may not always be possible, but the test procedure, as approved by the Administration, shall be as close as possible to the procedure defined in 3.2. Therefore, values measured in this case may not be directly comparable with test-bed results because measured values are very much dependant on the test cycle.

6.4.6.2 In the case of the E3 test cycle, if the actual propeller curve differs from the E3 curve, the load point used shall be set using the engine speed, or the corresponding mean effective pressure (MEP) or mean indicated pressure (MIP), given for the relevant mode of that cycle.

6.4.6.3 Where the number of measuring points on board is different from those on the test bed, the number of measurement points and the associated revised weighting factors shall be approved by the Administration.

6.4.6.4 Further to 6.4.6.3 where the E2, E3 or D2 test cycles are applied, a minimum of load points shall be used of which the combined nominal weighting factor, as given in 3.2, is greater than 0.50.

6.4.6.5 Further to 6.4.6.3 where the C1 test cycle is applied, a minimum of one load point shall be used from each of the rated, intermediate and idle speed sections. If the number of measuring points on board is different from those on the test bed, the nominal weighting factors at each load point shall be increased proportionally in order to sum to unity (1.0).

6.4.6.6 With regard to the application of 6.4.6.3 guidance in respect of the selection of load points and revised weighting factors is given in section 6 of appendix 8 of this Code.

6.4.6.7 The actual load points used to demonstrate compliance shall be within  $\pm 5\%$  of the rated power at the modal point except in the case of 100% load where the range shall be +0 to  $-10\%$ . For example, at the 75% load point the acceptable range shall be 70% – 80% of rated power.

6.4.6.8 At each selected load point, except idle, and after the initial transition period (if applicable), the engine power shall be maintained at the load set point within a 5% coefficient of variance (%C.O.V.) over a 10-minute interval. A worked example of the coefficient of variance calculation is given in section 7 of appendix 8 of this Code.

6.4.6.9 Regarding the C1 test cycle, the idle speed tolerance shall be declared, subject to the approval of the Administration.

#### 6.4.7 *Test condition parameter*

6.4.7.1 The test condition parameter specified in 5.2.1, shall not apply to onboard NO<sub>x</sub> monitoring. Data under any prevailing ambient condition shall be acceptable.

#### 6.4.8 *Analyser in-service performance*

6.4.8.1 Analysing equipment shall be operated in accordance with manufacturer's recommendations.

6.4.8.2 Prior to measurement, zero and span values shall be checked and the analysers shall be adjusted as necessary.

6.4.8.3 After measurement, analyser zero and span values shall be verified as being within that permitted by 5.9.9.

#### 6.4.9 *Data for emission calculation*

6.4.9.1 The output of the analysers shall be recorded both during the test and during all response checks (zero and span). This data shall be recorded on a strip chart recorder or other types of data recording devices. Data recording precision shall be in accordance with 5.9.7.1.

6.4.9.2 For the evaluation of the gaseous emissions, a 1-Hertz minimum chart reading of a stable 10-minute sampling interval of each load point shall be averaged. The average concentrations of NO<sub>x</sub>, and if required CO<sub>2</sub>, and optionally CO, HC and O<sub>2</sub>, shall be determined from the averaged chart readings and the corresponding calibration data.

6.4.9.3 As a minimum, emission concentrations, engine performance and ambient condition data shall be recorded over the aforementioned 10-minute period.

#### 6.4.10 *Exhaust gas flow rate*

6.4.10.1 Exhaust gas flow rate shall be determined:

- .1 in accordance with 5.5.2 or 5.5.3; or
- .2 in accordance with 5.5.4 and appendix 6 of this Code, with not measured species set to zero and  $c_{CO_2d}$  set to 0.03%.

#### 6.4.11 Fuel oil composition

6.4.11.1 Fuel oil composition, to calculate gas mass flow wet,  $q_{mf}$ , shall be provided by one of the following:

- .1 fuel oil composition, carbon, hydrogen, nitrogen and oxygen, by analysis (default oxygen value may be adopted); or
- .2 default values as given in table 9.

*Table 9*  
Default fuel oil parameters

	Carbon	Hydrogen	Nitrogen	Oxygen
	$w_{BET}$	$w_{ALF}$	$w_{DEL}$	$w_{EPS}$
Distillate fuel oil (ISO 8217 DM grade)	86.2%	13.6%	0.0%	0.0%
Residual fuel oil (ISO 8217 RM grade)	86.1%	10.9%	0.4%	0.0%

#### 6.4.12 Dry/wet correction

6.4.12.1 If not already measured on a wet basis, the gaseous emissions concentrations shall be converted to a wet basis according to:

- .1 direct measurement of the water component; or
- .2 dry/wet correction calculated in accordance with 5.12.3.

#### 6.4.13 $NO_x$ correction for humidity and temperature

6.4.13.1  $NO_x$  correction for humidity and temperature shall be in accordance with 5.12.4. The reference charge air temperature ( $T_{SCRef}$ ) shall be stated and approved by the Administration. The  $T_{SCRef}$  values are to be referenced to 25°C seawater temperature and in the application of the  $T_{SCRef}$  value due allowance shall be made for the actual seawater temperature.

#### 6.4.14 Calculation of emission flow rates and specific emissions

6.4.14.1 The calculation of emission flow rates and specific emissions shall be in accordance with 5.12.5 and 5.12.6.

#### 6.4.15 Limit value and allowances

6.4.15.1 In the case of the application of 6.4.6.3 the emission value obtained shall, subject to the approval of the Administration, be corrected as follows:

$$\text{Corrected gas}_x = \text{gas}_x \cdot 0.9 \quad (21)$$

6.4.15.2 The emission value,  $gas_x$  or corrected  $gas_x$  as appropriate, shall be compared to the applicable  $NO_x$  emission limit value as given in regulation 13 together with the allowance values as given in 6.3.11.1, 6.3.11.2 and 6.3.11.3 in order to verify that an engine continues to comply with the requirements of regulation 13.

#### 6.4.16 *Data for demonstrating compliance*

6.4.16.1 Compliance is required to be demonstrated at renewal, annual and intermediate surveys or following a substantial modification as per 1.3.2. In accordance with 2.4.5, data is required to be current; that is within 30 days. Data is required to be retained on board for at least three months. These time periods shall be taken to be when the ship is in operation. Data within that 30-day period either may be collected as a single test sequence across the required load points or may be obtained on two or more separate occasions when the engine load corresponds to that required by 6.4.6.

#### 6.4.17 *Form of approval*

6.4.17.1 The Direct Measurement and Monitoring method shall be documented in an Onboard Monitoring Manual. The Onboard Monitoring Manual shall be submitted to the Administration for approval. The approval reference of that Onboard Monitoring Manual shall be entered under section 3 of the Supplement to the EIAPP Certificate. The Administration may issue a new EIAPP Certificate, with the details in section 3 of the Supplement duly amended, if the method is approved after the issue of the first EIAPP Certificate, i.e. following the pre-certification survey.

#### 6.4.18 *Survey of equipment and method*

6.4.18.1 The survey of the Direct Measurement and Monitoring method shall take into account, but is not limited to:

- .1 the data obtained and developed from the required measurements; and
- .2 the means by which that data has been obtained, taking into account the information given in the Onboard Monitoring Manual as required by 6.4.14.

## Chapter 7

### *Certification of an Existing Engine*

7.1 Where an Existing Engine is to comply with regulation 13.7, then the entity responsible for obtaining emissions certification shall apply to the approving Administration for certification.

7.2 Where an application for Approved Method approval includes gaseous emission measurements and calculations, those are to be in accordance with chapter 5.

7.3 Emission and performance data obtained from one engine may be shown to apply to a range of engines.

7.4 The Approved Method for achieving compliance with regulation 13.7 shall include a copy of the Approved Method File which is required to accompany the engine throughout its life on board ship.

7.5 A description of the engine's onboard verification procedure shall be included in the Approved Method File.

7.6 After installation of the Approved Method, a survey shall be conducted in accordance with the Approved Method File. If this survey confirms compliance, the Administration shall amend the ship's IAPP Certificate accordingly.

*Appendix 1*

**Form of EIAPP Certificate**  
*(Refer to 2.2.10 of the NO<sub>x</sub> Technical Code)*

**ENGINE INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE**

Issued under the provisions of the Protocol of 1997, as amended by resolution MEPC.xx(58) in 2008, to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as “the Convention”) under the authority of the Government of:

.....  
*(full designation of the country)*

by.....  
*(full designation of the competent person or organization  
authorized under the provisions of the Convention)*

<b>Engine manufacturer</b>	<b>Model number</b>	<b>Serial number</b>	<b>Test cycle(s)</b>	<b>Rated power (kW) and speed (rpm)</b>	<b>Engine approval number</b>

THIS IS TO CERTIFY:

1 That the above-mentioned marine diesel engine has been surveyed for pre-certification in accordance with the requirements of the Revised Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (2008) made mandatory by Annex VI of the Convention; and

2 That the pre-certification survey shows that the engine, its components, adjustable features, and Technical File, prior to the engine’s installation and/or service on board a ship, fully comply with the applicable regulation 13 of Annex VI of the Convention.

This certificate is valid for the life of the engine subject to surveys in accordance with regulation 5 of Annex VI of the Convention, installed in ships under the authority of this Government.

Issued at:

.....  
*(Place of issue of certificate)*

(dd/mm/yyyy) .....  
*(Date of issue)*

.....  
*(Signature of duly authorized official issuing the certificate)*

*(Seal or stamp of the authority, as appropriate)*

**SUPPLEMENT TO ENGINE INTERNATIONAL AIR POLLUTION  
PREVENTION CERTIFICATE (EIAPP CERTIFICATE)**

**RECORD OF CONSTRUCTION, TECHNICAL FILE AND MEANS OF VERIFICATION**

*Notes:*

- 1 This Record and its attachments shall be permanently attached to the EIAPP Certificate. The EIAPP Certificate shall accompany the engine throughout its life and shall be available on board the ship at all times.
- 2 The Record shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.
- 3 Unless otherwise stated, regulations mentioned in this Record refer to regulations of Annex VI of the Convention and the requirements for an engine's Technical File and means of verifications refer to mandatory requirements from the Revised NO<sub>x</sub> Technical Code (2008).

**1 Particulars of the engine**

- 1.1 Name and address of manufacturer .....
- 1.2 Place of engine build .....
- 1.3 Date of engine build .....
- 1.4 Place of pre-certification survey .....
- 1.5 Date of pre-certification survey .....
- 1.6 Engine type and model number .....
- 1.7 Engine serial number .....
- 1.8 If applicable, the engine is a Parent Engine  or a Member Engine  of the following Engine Family  or Engine Group  .....
- 1.9 Individual Engine or Engine Family / Engine Group details:
  - 1.9.1 Approval reference .....
  - 1.9.2 Rated power (kW) and rated speed (rpm) values or ranges .....
  - 1.9.3 Test cycle(s) .....
  - 1.9.4 Parent Engine(s) test fuel oil specification .....
  - 1.9.5 Applicable NO<sub>x</sub> emission limit (g/kWh), regulation 13.3, 13.4, or 13.5.1 (delete as appropriate) .....
  - 1.9.6 Parent Engine(s) emission value (g/kWh) .....

**2 Particulars of the Technical File**

The Technical File, as required by chapter 2 of the NO<sub>x</sub> Technical Code, is an essential part of the EIAPP Certificate and must always accompany an engine throughout its life and always be available on board a ship.

- 2.1 Technical File identification/approval number .....
- 2.2 Technical File approval date .....

### 3 Specifications for the onboard NO<sub>x</sub> verification procedures

The specifications for the onboard NO<sub>x</sub> verification procedures, as required by chapter 6 of the NO<sub>x</sub> Technical Code, are an essential part of the EIAPP Certificate and must always accompany an engine through its life and always be available on board a ship.

3.1 Engine Parameter Check method:

3.1.1 Identification/approval number .....

3.1.2 Approval date .....

3.2 Direct Measurement and Monitoring method:

3.2.1 Identification/approval number .....

3.2.2 Approval date .....

Alternatively the Simplified Measurement method in accordance with 6.3 of the NO<sub>x</sub> Technical Code may be utilized.

Issued at:

.....

*(Place of issue of certificate)*

(dd/mm/yyyy) .....

*(Date of issue)*

.....

*(Signature of duly authorized official issuing the certificate)*

*(Seal or stamp of the authority, as appropriate)*

## *Appendix 2*

### **Flowcharts for survey and certification of marine diesel engines** *(Refer to 2.2.9 and 2.3.11 of the NO<sub>x</sub> Technical Code)*

Guidance for compliance with survey and certification of marine diesel engines, as described in chapter 2 of this Code, is given in figures 1, 2 and 3 of this appendix:

Figure 1: Pre-certification survey at the manufacturer's facility

Figure 2: Initial survey on board a ship

Figure 3: Renewal, annual or intermediate survey on board a ship

*Note:* These flowcharts do not show the criteria for the certification of an Existing Engine as required by regulation 13.7.

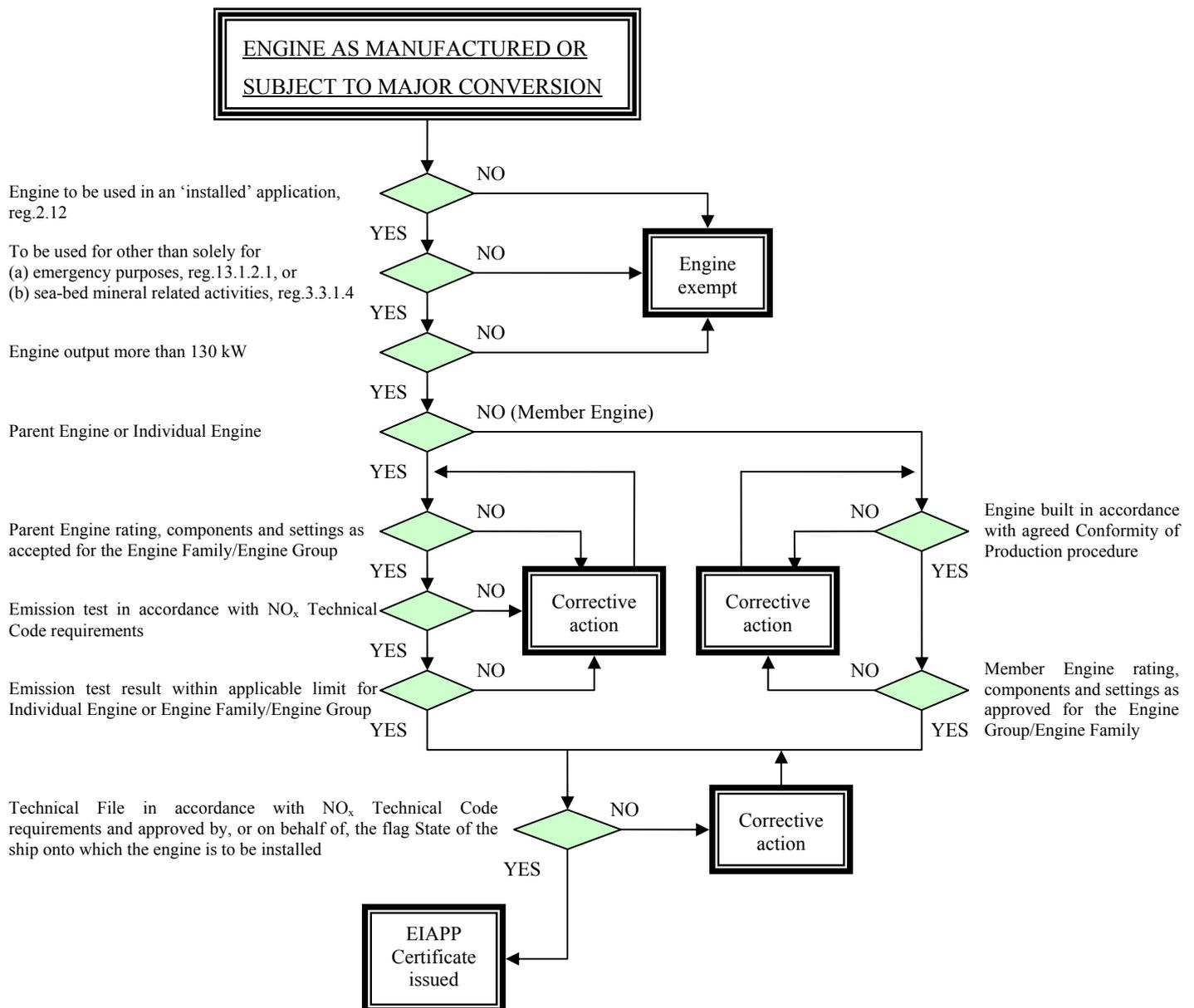


Figure 1 – Pre-certification survey at the manufacturer's facility

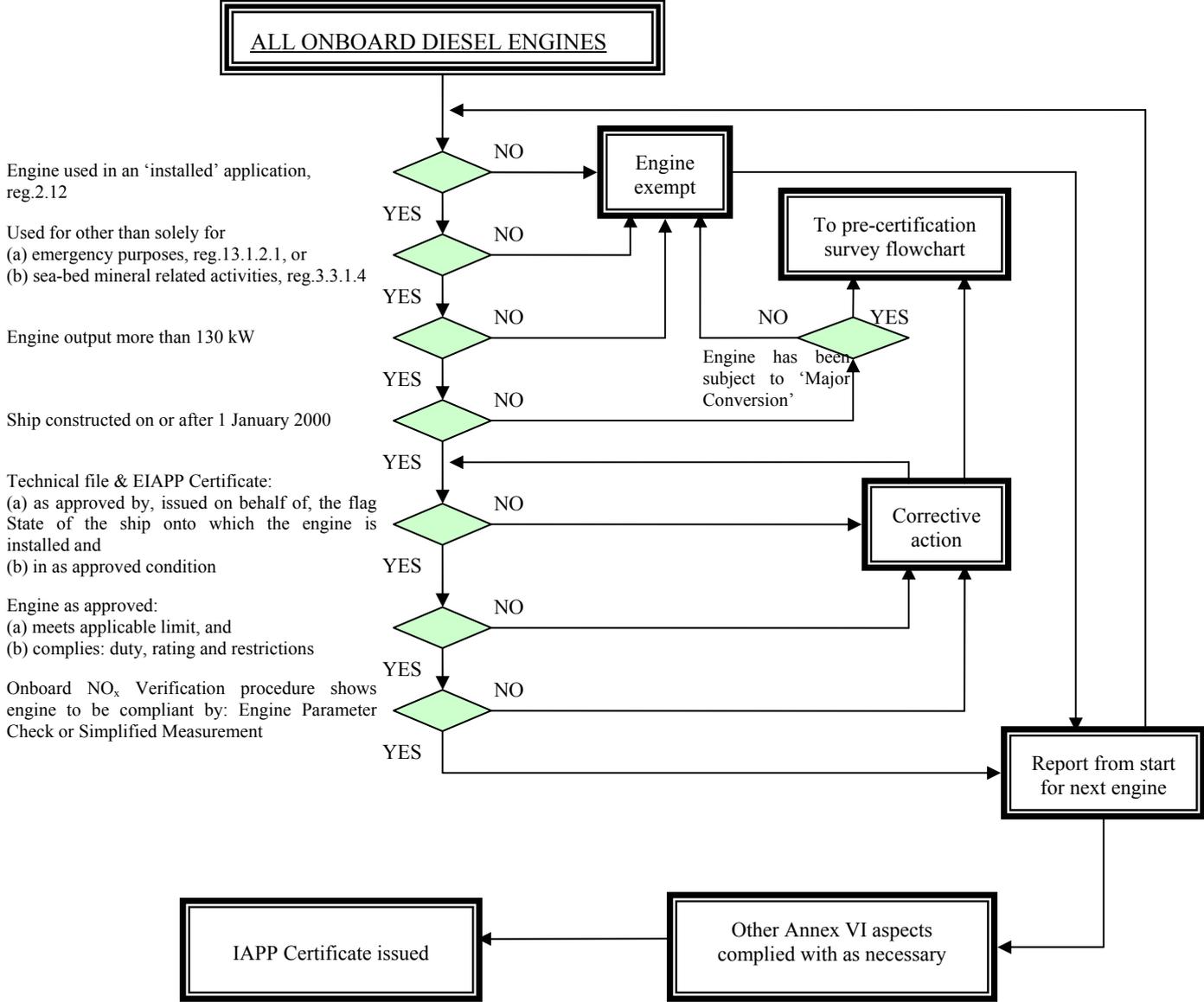


Figure 2 – Initial survey on board a ship

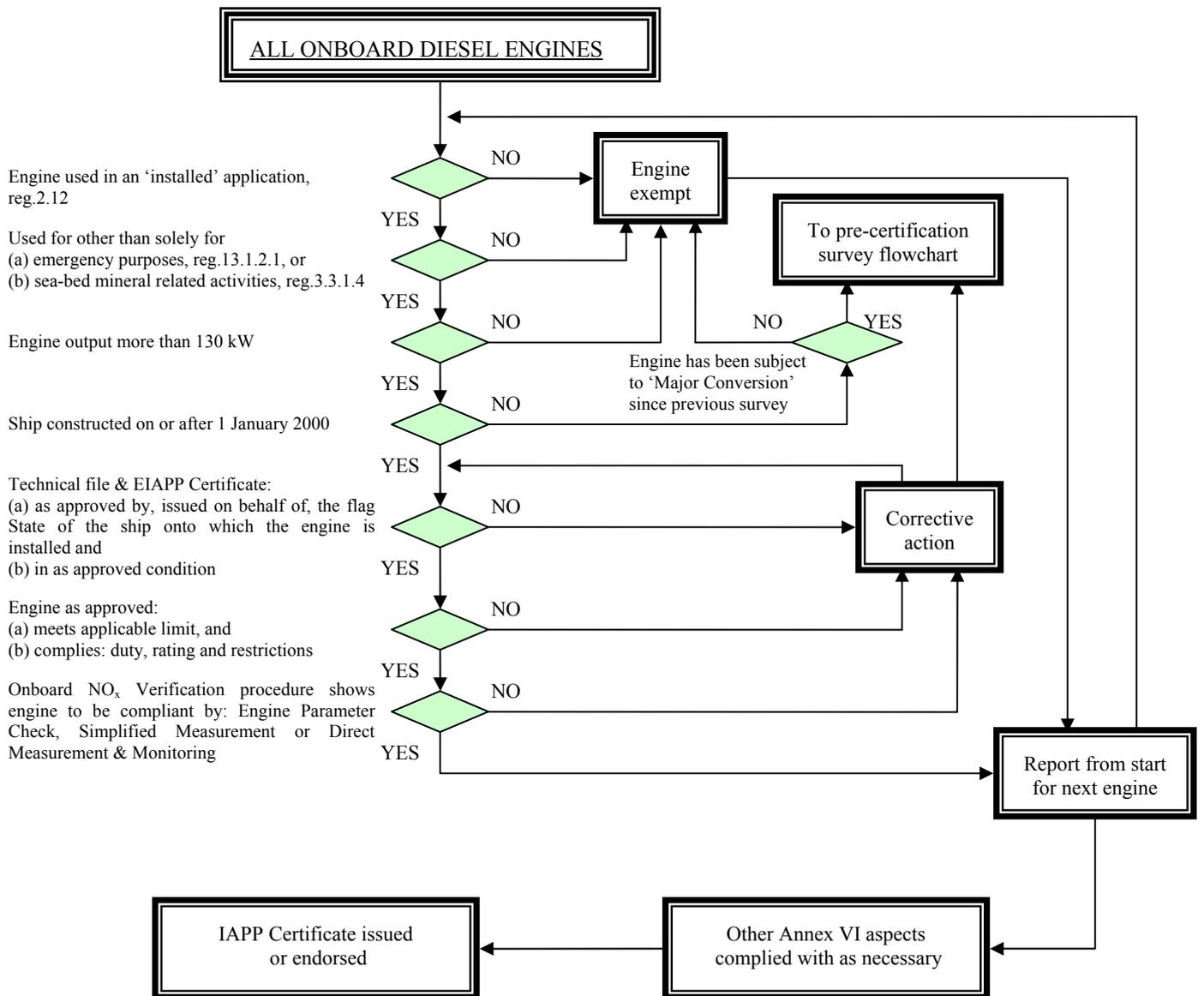


Figure 3 – Renewal, annual or intermediate survey on board a ship

### Appendix 3

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

(Refer to chapter 5 of the *NO<sub>x</sub> Technical Code*)

### 1 General

1.1 The components included in an exhaust gas analysis system for the determination of the concentrations of CO, CO<sub>2</sub>, NO<sub>x</sub>, HC and O<sub>2</sub> are shown in figure 1. All components in the sampling gas path must be maintained at the temperatures specified for the respective systems.

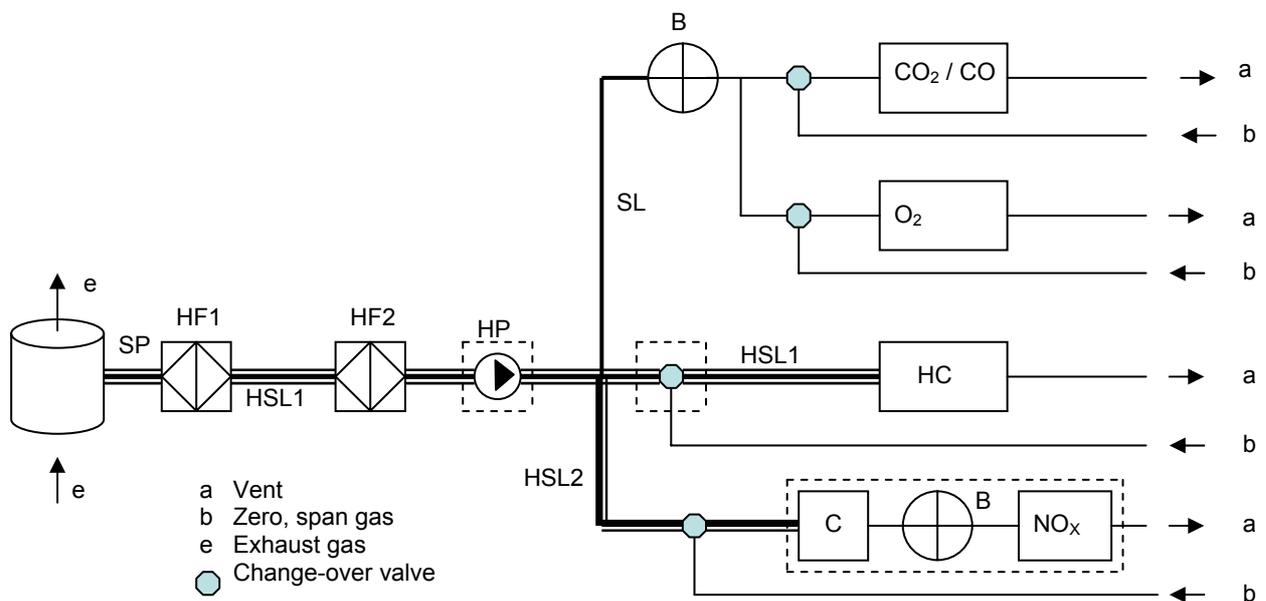


Figure 1 – Arrangement of exhaust gas analysis system

1.2 An exhaust gas analysis system shall include the following components. In accordance with chapter 5 of the Code equivalent arrangements and components may, subject to approval by the Administration, be accepted.

#### .1 SP – Raw exhaust gas sampling probe

A stainless steel, straight, closed-end, multi-hole probe. The inside diameter shall not be greater than the inside diameter of the sampling line. The wall thickness of the probe should not be greater than 1 mm. There should be a minimum of three holes in three different radial planes sized to sample approximately the same flow.

For the raw exhaust gas, the sample for all components may be taken with one sampling probe or with two sampling probes located in close proximity and internally split to the different analysers.

*Note:* If exhaust pulsations or engine vibrations are likely to affect the sampling probe, the wall thickness of the probe may be enlarged subject to the approval of the Administration.

.2 HSL1 – Heated sampling line

The sampling line provides a gas sample from a single probe to the split point(s) and the HC analyser. The sampling line shall be made of stainless steel or PTFE and have a 4 mm minimum and a 13.5 mm maximum inside diameter.

The exhaust gas temperature at the sampling probe shall not be less than 190°C. The temperature of the exhaust gas from the sampling point to the analyser shall be maintained by using a heated filter and a heated transfer line with a wall temperature of 190°C ± 10°C.

If the temperature of the exhaust gas at the sampling probe is above 190°C, a wall temperature greater than 180°C shall be maintained.

Immediately before the heated filter and the HC analyser a gas temperature of 190°C ± 10°C shall be maintained.

.3 HSL2 – Heated NO<sub>x</sub> sample line

The sampling line shall be made of stainless steel or PTFE and maintain a wall temperature of 55°C to 200°C, up to the converter C when using a cooling unit B, and up to the analyser when a cooling unit B is not used.

.4 HF1 – Heated pre-filter (optional)

The required temperature shall be the same as for HSL1.

.5 HF2 – Heated filter

The filter shall extract any solid particles from the gas sample before the analyser. The temperature shall be the same as for HSL1. The filter shall be changed as necessary.

.6 HP – Heated sampling pump (optional)

The pump shall be heated to the temperature of HSL1.

.7 SL – Sampling line for CO, CO<sub>2</sub> and O<sub>2</sub>

The line shall be made of PTFE or stainless steel. It may be heated or unheated.

.8 CO<sub>2</sub>/CO – Carbon dioxide and carbon monoxide analysers

Non-dispersive infrared (NDIR) absorption. Either separate analysers or two functions incorporated into a single analyser unit.

.9 HC – Hydrocarbon analyser

Heated flame ionization detector (HFID). The temperature shall be kept at 180°C to 200°C.

.10 NO<sub>x</sub> – Nitrogen oxides analyser

Chemiluminescent detector (CLD) or heated chemiluminescent detector (HCLD). If a HCLD is used, it shall be kept at a temperature of 55°C to 200°C.

*Note:* In the arrangement shown NO<sub>x</sub> is measured on a dry basis. NO<sub>x</sub> may also be measured on a wet basis in which case the analyser shall be of the HCLD type.

.11 C – converter

A converter shall be used for the catalytic reduction of NO<sub>2</sub> to NO prior to analysis in the CLD or HCLD.

.12 O<sub>2</sub> – Oxygen analyser

Paramagnetic detector (PMD), zirconium dioxide (ZRDO) or electrochemical sensor (ECS).

*Note:* In the arrangement shown O<sub>2</sub> is measured on a dry basis. O<sub>2</sub> may also be measured on a wet basis in which case the analyser shall be of the ZRDO type.

.13 B – cooling unit

To cool and condense water from the exhaust sample. The cooler shall be maintained at a temperature of 0°C to 4°C by ice or refrigerator. If water is removed by condensation, the sample gas temperature or dew point shall be monitored either within the water trap or downstream. The sample gas temperature or dew point shall not exceed 7°C.

1.3 The analysers shall have a measuring range appropriate for the accuracy required to measure the concentrations of the exhaust gas components (see 1.6) and 5.9.7.1 of the Code. It is recommended that the analysers be operated such that the measured concentration falls between 15% and 100% of full scale. Where full scale refers to the measurement range used.

1.4 If the full scale value is 155 ppm (or ppmC) or less, or if read-out systems (computers, data loggers) that provide sufficient accuracy and resolution below 15% of full scale are used, concentrations below 15% of full scale are also acceptable. In this case, additional calibrations are to be made to ensure the accuracy of the calibration curves.

1.5 The electromagnetic compatibility (EMC) of the equipment shall be such as to minimize additional errors.

## 1.6 Accuracy

### 1.6.1 Definitions

ISO 5725-1: Technical Corrigendum 1: 1998, Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions, Technical Corrigendum 1.

ISO 5725-2: 1994, Accuracy (trueness and precision) of measurement methods and results – Part 2: A basic method for the determination of repeatability and reproducibility of a standard measurement method.

1.6.2 An analyser shall not deviate from the nominal calibration point by more than  $\pm 2\%$  of the reading over the whole measurement range except zero, or  $\pm 0.3\%$  of full scale whichever is larger. The accuracy shall be determined according to the calibration requirements laid down in section 5 of appendix 4 of this Code.

### 1.7 Precision

The precision, defined as 2.5 times the standard deviation of 10 repetitive responses to a given calibration or span gas, shall be not greater than  $\pm 1\%$  of full scale concentration for each range used above 100 ppm (or ppmC) or  $\pm 2\%$  of each range used below 100 ppm (or ppmC).

### 1.8 Noise

The analyser peak-to-peak response to zero and calibration or span gases over any 10 seconds period shall not exceed 2% of full scale on all ranges used.

### 1.9 Zero drift

Zero response is defined as the mean response, including noise, to a zero gas during a 30 seconds time interval. The drift of the zero response during a one-hour period shall be less than 2% of full scale on the lowest range used.

### 1.10 Span drift

Span response is defined as the mean response, including noise, to a span gas during a 30-second time interval. The drift of the span response during a one-hour period shall be less than 2% of full scale on the lowest range used.

## 2 Gas drying

Exhaust gases may be measured wet or dry. A gas drying device, if used, shall have a minimal effect on the composition of the measured gases. Chemical dryers are not an acceptable method of removing water from the sample.

## 3 Analysers

Sections 3.1 to 3.5 describe the measurement principles to be used. The gases to be measured shall be analysed with the following instruments. For non-linear analysers, the use of linearizing circuits is permitted.

### 3.1 **Carbon monoxide (CO) analysis**

The carbon monoxide analyser shall be of the non-dispersive infrared (NDIR) absorption type.

### 3.2 **Carbon dioxide (CO<sub>2</sub>) analysis**

The carbon dioxide analyser shall be of the non-dispersive infrared (NDIR) absorption type.

### 3.3 **Hydrocarbon (HC) analysis**

The hydrocarbon analyser shall be of the heated flame ionization detector (HFID) type with detector, valves, pipe-work and associated components heated so as to maintain a gas temperature of  $190^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

### 3.4 **Nitrogen oxides (NO<sub>x</sub>) analysis**

The nitrogen oxides analyser shall be of the chemiluminescent detector (CLD) or heated chemiluminescent detector (HCLD) type with a NO<sub>2</sub>/NO converter, if measured on a dry basis. If measured on a wet basis, a HCLD with converter maintained above  $55^{\circ}\text{C}$  shall be used, provided the water quench check (see section 9.2.2 of appendix 4 of this Code) is satisfied. For both CLD and HCLD, the sampling path shall be maintained at a wall temperature of  $55^{\circ}\text{C}$  to  $200^{\circ}\text{C}$  up to the converter for dry measurement, and up to the analyser for wet measurement.

### 3.5 **Oxygen (O<sub>2</sub>) analysis**

The oxygen analyser shall be of the paramagnetic detector (PMD), zirconium dioxide (ZRDO) or electrochemical sensor (ECS) type.

## *Appendix 4*

### **Calibration of the analytical and measurement instruments** *(Refer to chapters 4, 5 and 6 of the NO<sub>x</sub> Technical Code)*

#### **1 Introduction**

1.1 Each analyser used for the measurement of an engine's parameters shall be calibrated as often as necessary in accordance with the requirements of this appendix.

1.2 Except as otherwise specified, all results of measurements, test data or calculations required by this appendix shall be recorded in the engine's test report in accordance with section 5.10 of this Code.

#### 1.3 *Accuracy of measuring instruments*

1.3.1 The calibration of all measuring instruments shall comply with the requirements as set out in tables 1, 2, 3 and 4 and shall be traceable to standards recognized by the Administration. Additional engine measurements may be required by the Administration and such additional measuring instruments used shall comply with the appropriate deviation standard and calibration validity period.

1.3.2 The instruments shall be calibrated:

- .1 in time intervals not greater than as given in tables 1, 2, 3 and 4; or
- .2 in accordance with alternative calibration procedures and validity periods subject to such proposals being submitted in advance of the tests and approved by the Administration.

*Note:* The deviations given in tables 1, 2, 3, and 4 refer to the final recorded value, which is inclusive of the data acquisition system.

*Table 1*  
Permissible deviations and calibration validity periods of instruments  
for engine related parameters for measurements on a test bed

No.	Measurement instrument	Permissible deviation	Calibration validity period (months)
1	Engine speed	$\pm 2\%$ of reading or $\pm 1\%$ of engine's maximum value, whichever is larger	3
2	Torque	$\pm 2\%$ of reading or $\pm 1\%$ of engine's maximum value, whichever is larger	3

No.	Measurement instrument	Permissible deviation	Calibration validity period (months)
3	Power (where measured directly)	$\pm 2\%$ of reading or $\pm 1\%$ of engine's maximum value, whichever is larger	3
4	Fuel consumption	$\pm 2\%$ of engine's maximum value	6
5	Air consumption	$\pm 2\%$ of reading or $\pm 1\%$ of engine's maximum value, whichever is larger	6
6	Exhaust gas flow	$\pm 2.5\%$ of reading or $\pm 1.5\%$ of engine's maximum value, whichever is larger	6

*Table 2*

Permissible deviations and calibration interval periods of instruments for other essential parameters for measurements on a test bed

No.	Measurement instrument	Permissible deviation	Calibration validity period (months)
1	Temperatures $\leq 327^{\circ}\text{C}$	$\pm 2^{\circ}\text{C}$ absolute	3
2	Temperatures $> 327^{\circ}\text{C}$	$\pm 1\%$ of reading	3
3	Exhaust gas pressure	$\pm 0.2$ kPa absolute	3
4	Charge air pressure	$\pm 0.3$ kPa absolute	3
5	Atmospheric pressure	$\pm 0.1$ kPa absolute	3
6	Other pressures $\leq 1000$ kPa	$\pm 20$ kPa absolute	3
7	Other pressures $> 1000$ kPa	$\pm 2\%$ of reading	3
8	Relative humidity	$\pm 3\%$ absolute	1

*Table 3*

Permissible deviations and calibration validity periods of instruments for engine related parameters for measurements on board a ship when the engine is already pre-certified

No.	Measurement instrument	Permissible deviation	Calibration validity period (months)
1	Engine speed	± 2% of engine's maximum value	12
2	Torque	± 5% of engine's maximum value	12
3	Power (where measured directly)	± 5% of engine's maximum value	12
4	Fuel consumption	± 4% of engine's maximum value	12
5	Air consumption	± 5% of engine's maximum value	12
6	Exhaust gas flow	± 5% of engine's maximum value	12

*Table 4*

Permissible deviations calibration validity period of instruments for other essential parameters for measurements on board a ship when the engine is already pre-certified

No.	Measurement instrument	Permissible deviation	Calibration validity period (months)
1	Temperatures ≤ 327°C	± 2°C absolute	12
2	Temperatures > 327°C	± 15°C absolute	12
3	Exhaust gas pressure	± 5% of engine's maximum value	12
4	Charge air pressure	± 5% of engine's maximum value	12
5	Atmospheric pressure	± 0.5% of reading	12
6	Other pressures	± 5 % of reading	12
7	Relative humidity	± 3% absolute	6

## 2 Calibration gases and zero and span check gases

The shelf life of all calibration gases and span and zero check gases shall be respected. The expiry date of the calibration gases and the zero and span check gases, stated by the manufacturer, shall be recorded.

## 2.1 *Pure gases (including zero check gases)*

2.1.1 The required purity of the gases is defined by the contamination limits given below. The following gases shall be available:

- .1 purified nitrogen (contamination  $\leq 1$  ppmC,  $\leq 1$  ppm CO,  $\leq 400$  ppm CO<sub>2</sub>,  $\leq 0,1$  ppm NO);
- .2 purified oxygen (purity  $> 99.5\%$  volume O<sub>2</sub>);
- .3 hydrogen-helium mixture ( $40 \pm 2\%$  hydrogen, balance helium), (contamination  $\leq 1$  ppmC,  $\leq 400$  ppm CO<sub>2</sub>); and
- .4 purified synthetic air (contamination  $\leq 1$  ppmC,  $\leq 1$  ppm CO,  $\leq 400$  ppm CO<sub>2</sub>,  $\leq 0.1$  ppm NO (oxygen content 18% – 21% volume)).

## 2.2 *Calibration and span gases*

2.2.1 Mixtures of gases having the following chemical compositions shall be available:

- .1 CO and purified nitrogen;
- .2 NO<sub>x</sub> and purified nitrogen the amount of NO<sub>2</sub> contained in this calibration gas shall not exceed 5% of the NO content);
- .3 O<sub>2</sub> and purified nitrogen;
- .4 CO<sub>2</sub> and purified nitrogen; and
- .5 CH<sub>4</sub> and purified synthetic air or C<sub>3</sub>H<sub>8</sub> and purified synthetic air.

*Note:* Other gas combinations are allowed provided the gases do not react with one another.

2.2.2 The true concentration of a calibration and span gas must be within  $\pm 2\%$  of the nominal value. All concentrations of calibration and span gases shall be given on a volume basis (volume per cent or volume ppm).

2.2.3 The gases used for calibration and span may also be obtained by means of precision blending devices (gas dividers), diluting with purified N<sub>2</sub> or with purified synthetic air. The accuracy of the mixing device must be such that the concentration of the blended calibration gases is accurate to within  $\pm 2\%$ . This accuracy implies that primary gases used for blending must be known to an accuracy of at least  $\pm 1\%$ , traceable to national or international gas standards. The verification shall be performed at between 15 and 50% of full scale for each calibration incorporating a blending device. Optionally, the blending device may be checked with an instrument which by nature is linear, e.g., using NO gas with a CLD. The span value of the instrument shall be adjusted with the span gas directly connected to the instrument. The blending device shall be checked at the used settings and the nominal value shall be compared to the measured concentration of the instrument. This difference shall in each point be within  $\pm 1\%$  of

the nominal value. This linearity check of the gas divider shall not be performed with a gas analyser which was previously linearized with the same gas divider.

2.2.4 Oxygen interference check gases shall contain propane or methane with  $350 \text{ ppmC} \pm 75 \text{ ppmC}$  hydrocarbon. The concentration shall be determined to calibration gas tolerances by chromatographic analysis of total hydrocarbons plus impurities or by dynamic bleeding. Nitrogen shall be the predominant diluent with the balance oxygen. Blends required are listed in table 5.

*Table 5*  
Oxygen interference check gases

O <sub>2</sub> concentration	Balance
21 (20 to 22)	Nitrogen
10 (9 to 11)	Nitrogen
5 (4 to 6)	Nitrogen

### **3 Operating procedure for analysers and sampling system**

The operating procedure for analysers shall follow the start-up and operating instructions of the instrument manufacturer. The minimum requirements given in sections 4 to 9 shall be included.

#### **4 Leakage test**

4.1 A system leakage test shall be performed. The probe shall be disconnected from the exhaust system and the end plugged. The analyser pump shall be switched on. After an initial stabilization period all flow meters shall read zero. If not, the sampling lines shall be checked and the fault corrected.

4.2 The maximum allowable leakage rate on the vacuum side shall be 0.5% of the in-use flow rate for the portion of the system being checked. The analyser flows and bypass flows may be used to estimate the in-use flow rates.

4.3 Another method is the introduction of a concentration step change at the beginning of the sampling line by switching from zero to span gas. If after an adequate period of time the reading shows a lower concentration compared to the introduced concentration, this points to calibration or leakage problems.

4.4 Other arrangements may be acceptable subject to approval of the Administration.

#### **5 Calibration procedure**

##### *5.1 Instrument assembly*

The instrument assembly shall be calibrated and the calibration curves checked against standard gases. The same gas flow rates shall be used as when sampling exhaust.

##### *5.2 Warming-up time*

The warming-up time shall be according to the recommendations of the analyser's manufacturer. If not specified, a minimum of two hours is recommended for warming up the analysers.

### 5.3 *NDIR and HFID analysers*

The NDIR analyser shall be tuned, as necessary. The HFID flame shall be optimized as necessary.

### 5.4 *Calibration*

5.4.1 Each normally used operating range shall be calibrated. Analysers shall be calibrated not more than 3 months before being used for testing or whenever a system repair or change is made that can influence calibration, or as per provided for by 1.3.2.2.

5.4.2 Using purified synthetic air (or nitrogen) the CO, CO<sub>2</sub>, NO<sub>x</sub> and O<sub>2</sub> analysers shall be set at zero. The HFID analyser shall be set to zero using purified synthetic air.

5.4.3 The appropriate calibration gases shall be introduced to the analysers, the values recorded, and the calibration curve established according.

### 5.5 *Establishment of the calibration curve*

#### 5.5.1 General Guidance

5.5.1.1 The calibration curve shall be established by at least 6 calibration points (excluding zero) approximately equally spaced over the operating range from zero to the highest value expected during emissions testing.

5.5.1.2 The calibration curve shall be calculated by the method of least-squares. A best-fit linear or non-linear equation may be used.

5.5.1.3 The calibration points shall not differ from the least-squares best-fit line by more than  $\pm 2\%$  of reading or  $\pm 0.3\%$  of full scale, whichever is larger.

5.5.1.4 The zero setting shall be rechecked and the calibration procedure repeated, if necessary.

5.5.1.5 If it can be shown that alternative calibration methods (e.g., computer, electronically controlled range switch, etc.) can give equivalent accuracy, then these alternatives may be used subject to the approval by the Administration.

## 6 **Verification of the calibration**

6.1 Each normally used operating range shall be checked prior to each analysis in accordance with the following procedure:

- .1 the calibration shall be checked by using a zero gas and a span gas whose nominal value shall be more than 80% of full scale of the measuring range; and
- .2 if, for the two points considered, the value found does not differ by more than  $\pm 4\%$  of full scale from the declared reference value, the adjustment parameters may be modified. If this is not the case, a new calibration curve shall be established in accordance with 5.5 above.

## 7 Efficiency test of the NO<sub>x</sub> converter

The efficiency of the converter used for the conversion of NO<sub>2</sub> into NO shall be tested as given in 7.1 to 7.8 below.

### 7.1 Test set-up

Using the test set-up as schematically shown in figure 1 and the procedure below, the efficiency of converter shall be tested by means of an ozonator.

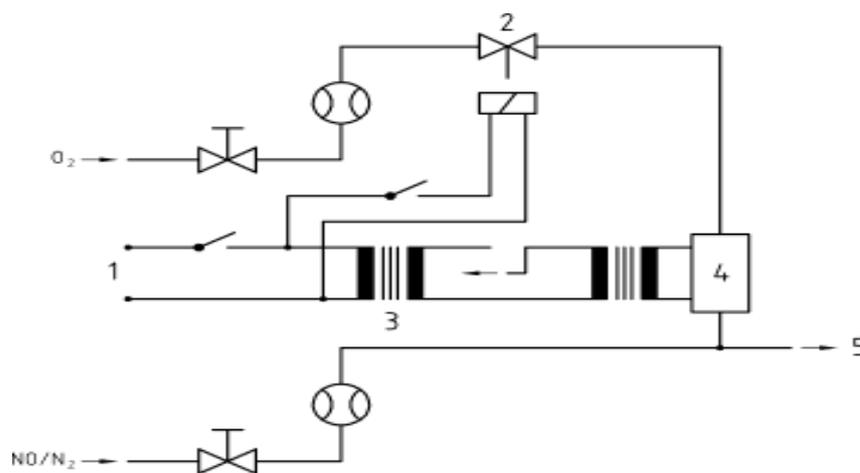


Figure 1 – Schematic representation of NO<sub>2</sub> converter efficiency device

- |   |                |   |             |
|---|----------------|---|-------------|
| 1 | AC             | 4 | Ozonator    |
| 2 | Solenoid valve | 5 | To analyser |
| 3 | Variac         |   |             |

### 7.2 Calibration

The CLD and the HCLD shall be calibrated in the most common operating range following the manufacturer's specifications using zero and span gas (the NO content of which must amount to about 80% of the operating range and the NO<sub>2</sub> concentration of the gas mixture to less than 5% of the NO concentration). The NO<sub>x</sub> analyser must be in the NO mode so that the span gas does not pass through the converter. The indicated concentration shall be recorded.

### 7.3 Calculation

The efficiency of the NO<sub>x</sub> converter shall be calculated as follows:

$$3. \quad E_{\text{NO}_x} = \left( 1 + \frac{a-b}{c-d} \right) \cdot 100 \quad (1)$$

where:

- a* = NO<sub>x</sub> concentration according to 7.6 below
- b* = NO<sub>x</sub> concentration according to 7.7 below
- c* = NO concentration according to 7.4 below
- d* = NO concentration according to 7.5 below

#### 7.4 *Adding of oxygen*

7.4.1 Via a T-fitting, oxygen or zero air is added continuously to the gas flow until the concentration indicated is about 20% less than the indicated calibration concentration given in 7.2 above. The analyser must be in the NO mode.

7.4.2 The indicated concentration (*c*) shall be recorded. The ozonator must be kept deactivated throughout the process.

#### 7.5 *Activation of the ozonator*

The ozonator shall then be activated to generate enough ozone to bring the NO concentration down to about 20% (minimum 10%) of the calibration concentration given in 7.2 above. The indicated concentration (*d*) shall be recorded. The analyser must be in the NO mode.

#### 7.6 *NO<sub>x</sub> mode*

The NO analyser shall then be switched to the NO<sub>x</sub> mode so that the gas mixture (consisting of NO, NO<sub>2</sub>, O<sub>2</sub> and N<sub>2</sub>) now passes through the converter. The indicated concentration (*a*) shall be recorded. The analyser must be in the NO<sub>x</sub> mode.

#### 7.7 *Deactivation of the ozonator*

The ozonator is then deactivated. The mixture of gases described in 7.6 above passes through the converter into the detector. The indicated concentration (*b*) shall be recorded. The analyser is in the NO<sub>x</sub> mode.

#### 7.8 *NO mode*

Switched to NO mode with the ozonator deactivated, the flow of oxygen or synthetic air shall also be shut off. The NO<sub>x</sub> reading of the analyser shall not deviate by more than 5% from the value measured according to 7.2 above. The analyser must be in the NO mode.

#### 7.9 *Test interval*

The efficiency of the converter shall be tested prior to each calibration of the NO<sub>x</sub> analyser.

#### 7.10 *Efficiency requirement*

The efficiency of the converter shall not be less than 90%.

## 8 Adjustment of the HFID

### 8.1 Optimization of the detector response

8.1.1 The HFID shall be adjusted as specified by the instrument manufacturer. A propane in air span gas shall be used to optimize the response on the most common operating range.

8.1.2 With the fuel and air flow rates set at the manufacturer's recommendations, a  $350 \pm 75$  ppmC span gas shall be introduced to the analyser. The response at a given fuel flow shall be determined from the difference between the span gas response and the zero gas response. The fuel flow shall be incrementally adjusted above and below the manufacturer's specification. The span and zero response at these fuel flows shall be recorded. The difference between the span and zero response shall be plotted and the fuel flow adjusted to the rich side of the curve. This is the initial flow rate setting which may need further optimization depending on the results of the hydrocarbon response factors and the oxygen interference check according to 8.2 and 8.3.

8.1.3 If the oxygen interference or the hydrocarbon response factors do not meet the following specifications, the air flow shall be incrementally adjusted above and below the manufacturer's specifications, 8.2 and 8.3 for each flow.

8.1.4 The optimization may optionally be conducted using alternative procedures subject to the approval of the Administration.

### 8.2 Hydrocarbon response factors

8.2.1 The analyser shall be calibrated using propane in air and purified synthetic air, according to 5.

8.2.2 Response factors shall be determined when introducing an analyser into service and after major service intervals. The response factor ( $r_h$ ) for a particular hydrocarbon species is the ratio of the HFID ppmC reading to the gas concentration in the cylinder expressed in terms of ppmC.

8.2.3 The concentration of the test gas must be at a level to give a response of approximately 80% of full scale. The concentration must be known to an accuracy of  $\pm 2\%$  in reference to a gravimetric standard expressed in volume. In addition, the gas cylinder must be preconditioned for 24 hours at a temperature of  $25^\circ\text{C} \pm 5^\circ\text{C}$ .

8.2.4 The test gases to be used and the recommended relative response factor ranges are as follows:

- Methane and purified synthetic air  $1.00 \leq r_h \leq 1.15$
- Propylene and purified synthetic air  $0.90 \leq r_h \leq 1.1$
- Toluene and purified synthetic air  $0.90 \leq r_h \leq 1.1$

These values are relative to a  $r_h$  of 1 for propane and purified synthetic air.

### 8.3 Oxygen interference check

8.3.1 The oxygen interference check shall be determined when introducing an analyser into service and after major service intervals.

8.3.2 A range shall be chosen where the oxygen interference check gases will fall in the upper 50%. The test shall be conducted with the oven temperature set as required. The oxygen interference gases are specified in 2.2.4.

- .1 The analyser shall be zeroed.
- .2 The analyser shall be spanned with the 21% oxygen blend.
- .3 The zero response shall be rechecked. If it has changed more than 0.5% of full scale (FS) steps 8.3.2.1 and 8.3.2.2 shall be repeated.
- .4 The 5% and 10% oxygen interference check gases shall be introduced.
- .5 The zero response shall be rechecked. If it has changed more than  $\pm 1\%$  of full scale, the test shall be repeated.
- .6 The oxygen interference ( $\%O_2I$ ) shall be calculated for each mixture in step .4 as follows:

$$\%O_2I = \frac{(B - \text{analyser response})}{B} \cdot 100 \quad (2)$$

where:

analyser response is  $(A/\% \text{ FS at } A) \cdot (\% \text{ FS at } B)$

where:

$A$  = hydrocarbon concentration in ppmC (microlitres per litre) of the span gas used in 8.3.2.2

$B$  = hydrocarbon concentration (ppmC) of the oxygen interference check gases used in 8.3.2.4

$$(\text{ppmC}) = \frac{A}{D} \quad (3)$$

$D$  = percentage of full scale analyser response due to  $A$

- .7 The % of oxygen interference ( $\%O_2I$ ) shall be less than  $\pm 3.0\%$  for all required oxygen interference check gases prior to testing.
- .8 If the oxygen interference is greater than  $\pm 3.0\%$ , the air flow above and below the manufacturer's specifications shall be incrementally adjusted, repeating 8.1 for each flow.
- .9 If the oxygen interference is greater than  $\pm 3.0\%$  after adjusting the air flow, the fuel flow and thereafter the sample flow shall be varied, repeating 8.1 for each new setting.
- .10 If the oxygen interference is still greater than  $\pm 3.0\%$ , the analyser, HFID fuel, or burner air shall be repaired or replaced prior to testing. This clause shall then be repeated with the repaired or replaced equipment or gases.

## 9 Interference effects with CO, CO<sub>2</sub>, NO<sub>x</sub> and O<sub>2</sub> analysers

Gases other than the one being analysed can interfere with the reading in several ways. Positive interference occurs in NDIR and PMD instruments where the interfering gas gives the same effect as the gas being measured, but to a lesser degree. Negative interference occurs in NDIR instruments by the interfering gas broadening the absorption band of the measured gas, and in CLD instruments by the interfering gas quenching the radiation. The interference checks in 9.1 and 9.2 shall be performed prior to an analyser's initial use and after major service intervals, but at least once per year.

### 9.1 CO analyser interference check

Water and CO<sub>2</sub> can interfere with the CO analyser performance. Therefore, a CO<sub>2</sub> span gas having a concentration of 80% to 100% of full scale of the maximum operating range used during testing shall be bubbled through water at room temperature and the analyser response recorded. The analyser response must not be more than 1% of full scale for ranges equal to or above 300 ppm or more than 3 ppm for ranges below 300 ppm.

### 9.2 NO<sub>x</sub> analyser quench checks

The two gases of concern for CLD (and HCLD) analysers are CO<sub>2</sub> and water vapour. Quench responses to these gases are proportional to their concentrations, and therefore require test techniques to determine the quench at the highest expected concentrations experienced during testing.

#### 9.2.1 CO<sub>2</sub> quench check

9.2.1.1 A CO<sub>2</sub> span gas having a concentration of 80% to 100% of full scale of the maximum operating range shall be passed through the NDIR analyser and the CO<sub>2</sub> value recorded as *A*. It shall then be diluted approximately 50% with NO span gas and passed through the NDIR and (H)CLD, with the CO<sub>2</sub> and NO values recorded as *B* and *C*, respectively. The CO<sub>2</sub> shall then be shut off and only the NO span gas be passed through the (H)CLD and the NO value recorded as *D*.

9.2.1.2 The quench shall be calculated as follows:

$$E_{\text{CO}_2} = \left[ 1 - \left( \frac{C \cdot A}{(D \cdot A) - (D \cdot B)} \right) \right] \cdot 100 \quad (4)$$

where:

- A* = is the undiluted CO<sub>2</sub> concentration measured with NDIR in percentage by volume;
- B* = is the diluted CO<sub>2</sub> concentration measured with NDIR in by volume;
- C* = is the diluted NO concentration measured with (H)CLD in ppm; and
- D* = is the undiluted NO concentration measured with (H)CLD in ppm.

9.2.1.3 Alternative methods of diluting and quantifying of CO<sub>2</sub> and NO span gas values such as dynamic mixing/blending, can be used.

## 9.2.2 Water quench check

9.2.2.1 This check applies to wet gas concentration measurements only. Calculation of water quench must consider dilution of the NO span gas with water vapour and scaling of water vapour concentration of the mixture to that expected during testing.

9.2.2.2 A NO span gas having a concentration of 80% to 100% of full scale of the normal operating range shall be passed through the HCLD and the NO value recorded as D. The NO span gas shall then be bubbled through water at a temperature of  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and pass through the HCLD and record the NO value as C. The water temperature shall be determined and recorded as F. The mixture's saturation vapour pressure that corresponds to the bubbler water temperature (F) shall be determined and recorded as G. The water vapour concentration ( $H$  in %) of the mixture shall be calculated as follows:

$$H = 100 \cdot \left( \frac{G}{p_b} \right) \quad (5)$$

The expected diluted NO span gas (in water vapour) concentration ( $D_e$ ) shall be calculated as follows:

$$D_e = D \cdot \left( 1 - \frac{H}{100} \right) \quad (6)$$

For diesel engine exhaust, the maximum exhaust water concentration (in %) expected during testing shall be estimated, under the assumption of a fuel atom H/C ratio of 1.8/1, from the maximum  $\text{CO}_2$  concentration A in the exhaust gas as follows:

$$H_m = 0.9 \cdot A \quad (7)$$

and  $H_m$  is recorded.

9.2.2.3 The water quench shall be calculated as follows:

$$E_{\text{H}_2\text{O}} = 100 \cdot \left( \frac{D_e - C}{D_e} \right) \cdot \left( \frac{H_m}{H} \right) \quad (8)$$

where:

- $D_e$  = is the expected diluted NO concentration in ppm;
- $C$  = is the diluted NO concentration in ppm;
- $H_m$  = is the maximum water vapour concentration in %; and
- $H$  = is the actual water vapour concentration in %.

*Note:* It is important that the NO span gas contains minimal  $\text{NO}_2$  concentration for this check, since absorption of  $\text{NO}_2$  in water has not been accounted for in the quench calculations.

### 9.2.3 Maximum allowable quench

The maximum allowable quench shall be:

- .1 CO<sub>2</sub> quench according to 9.2.1: 2% of full scale.
- .2 Water quench according to 9.2.2: 3% of full scale.

### 9.3 O<sub>2</sub> analyser interference

9.3.1 Instrument response of a PMD analyser caused by gases other than oxygen is comparatively slight. The oxygen equivalents of the common exhaust gas constituents are shown in table 6.

*Table 6*  
Oxygen equivalents

Gas	O <sub>2</sub> equivalent %
Carbon dioxide (CO <sub>2</sub> )	- 0,623
Carbon monoxide (CO)	- 0,354
Nitric oxide (NO)	+ 44,4
Nitrogen dioxide (NO <sub>2</sub> )	+ 28,7
Water (H <sub>2</sub> O)	- 0,381

9.3.2 The observed oxygen concentration shall be corrected by the following formula:

$$E_{O_2} = \frac{(\text{Equivalent } O_2 \cdot c_{\text{observed}})}{100} \quad (9)$$

9.3.3 For ZRDO and ECS analysers, instrument interference caused by gases other than oxygen shall be compensated in accordance with the manufacturer's recommendations and with good engineering practice. Electrochemical sensors shall be compensated for CO<sub>2</sub> and NO<sub>x</sub> interference.

*Appendix 5*

**Parent Engine test report and test data**  
(Refer to 2.4.1.5 and 5.10 of the NO<sub>x</sub> Technical Code)

**Section 1 – Parent Engine test report – see 5.10 of the Code**

**Emissions Test Report No. ....**

**Sheet 1/5**

<b>Engine</b>			
Manufacturer			
Engine type			
Engine Family or Engine Group identification			
Serial number			
Rated speed			rpm
Rated power			kW
Intermediate speed			rpm
Maximum torque at intermediate speed			Nm
Static injection timing			deg CA BTDC
Electronic injection control	no:	yes:	
Variable injection timing	no:	yes:	
Variable turbocharger geometry	no:	yes:	
Bore			mm
Stroke			mm
Nominal compression ratio			
Mean effective pressure, at rated power			kPa
Maximum cylinder pressure, at rated power			kPa
Cylinder number and configuration	Number:	V:	In-line:
Auxiliaries			
<b>Specified ambient conditions:</b>			
Maximum seawater temperature			°C
Maximum charge air temperature, if applicable			°C
Cooling system spec. intermediate cooler	no:	yes:	
Cooling system spec. charge air stages			
Low/high temperature cooling system set points	/		°C
Maximum inlet depression			kPa
Maximum exhaust back pressure			kPa
Fuel oil specification			
Fuel oil temperature			°C

<b>Emissions test results:</b>				
Cycle				
NO <sub>x</sub>				g/kWh
Test identification				
Date/time				
Test site/bench				
Test number				
Surveyor				
Date and place of report				
Signature				

Emissions Test Report No. ....

Sheet 2/5

<b>Engine Family/Engine Group Information (Common specifications)</b>	
Combustion cycle	2 stroke cycle/4 stroke cycle
Cooling medium	air/water
Cylinder configuration	required to be written, only if the exhaust cleaning devices are applied
Method of aspiration	natural aspired/pressure charged
Fuel type to be used on board	distillate/distillate or heavy fuel/dual
Combustion chamber	open chamber/divided chamber
Valve port configuration	cylinder head/cylinder wall
Valve port size and number	
Fuel system type	

<b>Miscellaneous features:</b>	
Exhaust gas recirculation	no / yes
Water injection/emulsion	no / yes
Air injection	no / yes
Charge cooling system	no / yes
Exhaust after-treatment	no / yes
Exhaust after-treatment type	
Dual fuel	no / yes

<b>Engine Family / Engine Group Information (Selection of Parent Engine for test-bed test)</b>					
Family/Group Identification					
Method of pressure charging					
Charge air cooling system					
Criteria of the selection of Parent Engine	Highest NO <sub>x</sub> emission value				
Number of cylinders					
Max. rated power per cylin					
Rated speed					
Injection timing (range)					
Selected Parent Engine					Parent
Test cycle(s)					

<b>Exhaust Pipe</b>	
Diameter	Mm
Length	M
Insulation	no:                      yes:
Probe location	

<b>Measurement equipment</b>					
	Manufacturer	Model	Measurement ranges	Calibration	
				Span gas conc.	Deviation of calibration
<b>Analyser</b>					
NO <sub>x</sub> Analyser			ppm		%
CO Analyser			ppm		%
CO <sub>2</sub> Analyser			%		%
O <sub>2</sub> Analyser			%		%
HC Analyser			ppmC		%
Speed			rpm		%
Torque			Nm		%
Power, if applicable			kW		%
Fuel flow					%
Air flow					%
Exhaust flow					%
<b>Temperatures</b>					
Charge air coolant inlet			°C		°C
Exhaust gas			°C		°C
Inlet air			°C		°C
Charge air			°C		°C
Fuel			°C		°C
<b>Pressures</b>					
Exhaust gas			kPa		kPa
Charge air			kPa		kPa
Atmospheric			kPa		kPa
<b>Vapour pressure</b>					
Intake air			kPa		%
<b>Humidity</b>					
Intake air			%		%

**Fuel Characteristics**

<b>Fuel type</b>				
<b>Fuel properties:</b>			<b>Fuel elemental analysis:</b>	
Density	ISO 3675	kg/m <sup>3</sup>	Carbon	% m/m
Viscosity	ISO 3104	mm <sup>2</sup> /s	Hydrogen	% m/m
Water	ISO 3733	% V/V	Nitrogen	% m/m
			Oxygen	% m/m
			Sulphur	% m/m
			LHV/Hu	MJ/kg

Emissions Test Report No. ....

Ambient and Gaseous Emissions Data

Sheet 4/5

Mode	1	2	3	4	5	6	7	8	9	10
Power/Torque %										
Speed %										
Time at beginning of mode										

Ambient Data										
Atmospheric pressure kPa										
Intake air temperature °C										
Intake air humidity g/kg										
Relative humidity (RH) of intake air* %										
Air temperature at RH sensor* °C										
Dry bulb temperature of intake air* °C										
Wet bulb temperature of intake air* °C										
Test condition parameter, <i>f</i> <sub>a</sub>										

<b>Gaseous Emissions Data:</b>											
NO <sub>x</sub>	concentration dry/wet	ppm									
CO	concentration	ppm									
CO <sub>2</sub>	concentration	%									
O <sub>2</sub>	concentration dry/wet	%									
HC	concentration	ppmC									
NO <sub>x</sub> humidity correction factor, $k_{hd}$											
Dry/wet correction factor, $k_{wr}$											
NO <sub>x</sub>	mass flow	kg/h									
CO	mass flow	kg/h									
CO <sub>2</sub>	mass flow	kg/h									
O <sub>2</sub>	mass flow	kg/h									
HC	mass flow	kg/h									
NO <sub>x</sub>	specific	g/kWh									

\* As applicable.

Emissions Test Report No. ....

Engine Test Data

Sheet 5/5

Mode		1	2	3	4	5	6	7	8	9	10
Power/Torque	%										
Speed	%										
Time at beginning of mode											

Engine Data											
Speed	rpm										
Auxiliary power	kW										
Dynamometer setting	kW										
Power	kW										
Mean effective pressure	kPa										
Fuel rack	mm										
Uncorrected specific fuel consumption	g/kWh										
Fuel flow	kg/h or m <sup>3</sup> /h*										
Air flow	kg/h										
Exhaust flow ( $q_{mew}$ )	kg/h										
Exhaust temperature	°C										
Exhaust back pressure	kPa										
Charge air coolant temperature in	°C										
Charge air coolant temperature out	°C										
Charge air temperature	°C										
Charge air reference temperature	°C										
Charge air pressure	kPa										
Fuel oil temperature	°C										

\* As applicable.

**Section 2 – Parent Engine test data to be included in the Technical File – see 2.4.1.5 of the Code**

<b>Engine Family / Engine Group Reference</b>		
<b>Parent Engine</b>		
Model/Type		
Nominated rated power	kW	
Nominated rated speed	rpm	

<b>Parent Engine test fuel oil</b>		
Reference fuel designation		
ISO 8217: 2005 grade		
Carbon	% m/m	
Hydrogen	% m/m	
Sulphur	% m/m	
Nitrogen	% m/m	
Oxygen	% m/m	
Water	% V/V	

<b>Measured data (Parent Engine)</b>									
Power/Torque	%								
Speed	%								
Mode point		1	2	3	4	5	6	7	8
<b>Engine Performance</b>									
Power	kW								
Speed	rpm								
Fuel flow	kg/h								
Intake air flow (wet/dry)	kg/h								
Exhaust gas flow	kg/h								
Intake air temperature	°C								
Charge air temperature	°C								
Charge air reference temperature	°C								
Charge air pressure	kPa								
Additional parameter(s) used for emission corrections (specify)									
<b>Ambient conditions</b>									
Atmospheric pressure	kPa								
Relative humidity (RH) of intake air	%								
Air temperature at RH sensor*	°C								
Dry bulb temperature of intake air*	°C								
Wet bulb temperature of intake air*	°C								
Absolute humidity of intake air*	g/kg								

<b>Emission concentrations</b>									
NO <sub>x</sub> wet/dry	ppm								
CO <sub>2</sub>	%								
O <sub>2</sub> wet/dry	%								
CO	ppm								
HC	ppmC								
<b>Calculated data (Parent Engine)</b>									
Intake air humidity	g/kg								
Charge air humidity	g/kg								
Test condition parameter, $f_a$									
Dry/wet correction factor, $k_{wr}$									
NO <sub>x</sub> humidity correction factor, $k_{hd}$									
Exhaust gas flow rate	kg/h								
NO <sub>x</sub> emission flow rate	kg/h								
Additional emission correction factor(s) (specify)	g/kWh								
	g/kWh								
NO <sub>x</sub> emission	g/kWh								

<b>Test cycle</b>					
<b>Emission value</b>	g/kWh				

\* As applicable.

## *Appendix 6*

### **Calculation of exhaust gas mass flow (carbon-balance method)** *(Refer to chapter 5 of the NO<sub>x</sub> Technical Code)*

#### **1 Introduction**

1.1 This appendix addresses the calculation of the exhaust gas mass flow based on exhaust gas concentration measurement, and on the knowledge of fuel consumption. Symbols and descriptions of terms and variables used in the formulae for the carbon-balance measurement method are summarized in the Introduction of this Code.

1.2 Except as otherwise specified, all results of calculations required by this appendix shall be reported in the engine's test report in accordance with 5.10 of the Code.

#### **2 Carbon balance method, 1-step calculation procedure**

2.1 This method involves exhaust mass calculation from fuel consumption, fuel composition and exhaust gas concentrations.

2.2 Exhaust gas mass flow rate on wet basis:

$$q_{mew} = q_{mf} \cdot \left( \left( \frac{14 \cdot (w_{BET} \cdot w_{BET})}{\left( \frac{14 \cdot w_{BET}}{f_c} + (w_{ALF} \cdot 0.008936) - 1 \right) \cdot \frac{1}{1.293} + f_{fd}} + (w_{ALF} \cdot 0.008936) - 1 \right) \cdot \left( 1 + \frac{H_a}{1000} \right) + 1 \right) \quad (1)$$

with:

$f_{fd}$  according to equation (2),  $f_c$  according to equation (3).

$H_a$  is the absolute humidity of intake air, in gram water per kg dry air, however if

$H_a \geq H_{SC}$ , then  $H_{SC}$  shall be used in place of  $H_a$  in formula (1).

*Note:*  $H_a$  may be derived from relative humidity measurement, dewpoint measurement, vapour pressure measurement or dry/wet bulb measurement using the generally accepted formulae.

2.3 The fuel specific constant  $f_{fd}$  for the dry exhaust shall be calculated by adding up the additional volumes of the combustion of the fuel elements:

$$f_{fd} = -0.055593 \cdot w_{ALF} + 0.008002 \cdot w_{DEL} + 0.0070046 \cdot w_{EPS} \quad (2)$$

2.4 Carbon factor  $f_c$  according to equation (3):

$$f_c = (c_{\text{CO}_2\text{d}} - c_{\text{CO}_2\text{ad}}) \cdot 0.5441 + \frac{c_{\text{COd}}}{18522} + \frac{c_{\text{HCw}}}{17355} \quad (3)$$

with

- $c_{\text{CO}_2\text{d}}$  = dry CO<sub>2</sub> concentration in the raw exhaust, %
- $c_{\text{CO}_2\text{ad}}$  = dry CO<sub>2</sub> concentration in the ambient air, % = 0.03%
- $c_{\text{COd}}$  = dry CO concentration in the raw exhaust, ppm
- $c_{\text{HCw}}$  = wet HC concentration in the raw exhaust, ppm

## *Appendix 7*

### **Checklist for an Engine Parameter Check method**

*(Refer to 6.2.2.5 of the NO<sub>x</sub> Technical Code)*

1 For some of the parameters listed below, more than one survey possibility exists. In such cases, as a guideline, any one of, or a combination of, the below listed methods may be sufficient to show compliance. As approved by the Administration, the shipowner, supported by the applicant for engine certification, may choose which method is applicable.

- .1 parameter “injection timing”:
  - .1 Fuel cam position (individual cam or camshaft if cams are not adjustable):
    - optional (dependent on design): position of a link between the cam and the pump drive,
    - optional for sleeve-metered pumps: VIT index and cam position or position of the barrel, or
    - other sleeve metering device;
  - .2 start of delivery for certain fuel rack positions (dynamic pressure measurement);
  - .3 opening of injection valve for certain load points, e.g., using a Hall sensor or acceleration pick-up;
  - .4 load-dependent operating values for charge air pressure, combustion peak pressure, charge air temperature, exhaust gas temperature versus graphs showing the correlation with NO<sub>x</sub>. Additionally, it shall be ensured that the compression ratio corresponds to the initial certification value (see 1.7).

*Note:* To assess the actual timing, it is necessary to know the allowable limits for meeting the emission limits or even graphs showing the influence of timing on NO<sub>x</sub>, based on the test-bed measurement results.
- .2 parameter “injection nozzle”:
  - .1 specification and component identification number;
- .3 parameter “injection pump”:
  - .1 component identification number (specifying plunger and barrel design);
- .4 parameter “fuel cam”:
  - .1 component identification number (specifying shape);
  - .2 start and end of delivery for a certain fuel rack position (dynamic pressure measurement);

- .5 parameter “injection pressure”:
  - .1 only for common-rail systems: load-dependent pressure in the rail, graph showing correlation with NO<sub>x</sub>;
- .6 parameter “combustion chamber”:
  - .1 component identification numbers for the cylinder head and piston head;
- .7 parameter “compression ratio”:
  - .1 check for actual clearance;
  - .2 check for shims in piston rod or connecting rod;
- .8 parameter “turbocharger type and build”:
  - .1 model and specification (identification numbers);
  - .2 load-dependent charge air pressure, graph showing the correlation with NO<sub>x</sub>;
- .9 parameter “charge air cooler, charge air heater”:
  - .1 model and specification;
  - .2 load-dependent charge air temperature corrected to reference conditions, graph showing the correlation with NO<sub>x</sub>;
- .10 parameter “valve timing” (only for 4-stroke engines with inlet valve closure before BDC):
  - .1 cam position;
  - .2 check actual timing;
- .11 parameter “water injection” (for assessment: graph showing influence on NO<sub>x</sub>):
  - .1 load-dependent water consumption (monitoring);
- .12 parameter “emulsified fuel” (for assessment: graph showing influence on NO<sub>x</sub>):
  - .1 load-dependent fuel rack position (monitoring);
  - .2 load-dependent water consumption (monitoring);

- .13 parameter “exhaust gas recirculation” (for assessment: graph showing influence on NO<sub>x</sub>):
  - .1 load-dependent mass flow of recirculated exhaust gas (monitoring);
  - .2 CO<sub>2</sub> concentration in the mixture of fresh air and recirculated exhaust gas, i.e. in the “scavenge air” (monitoring);
  - .3 O<sub>2</sub> concentration in the “scavenge air” (monitoring);
- .14 parameter “selective catalytic reduction” (SCR):
  - .1 load-dependent mass flow of reducing agent (monitoring) and additional periodical spot checks on NO<sub>x</sub> concentration after SCR (for assessment: graph showing influence on NO<sub>x</sub>).

2 For engines with selective catalytic reduction (SCR) without feedback control, optional NO<sub>x</sub> measurement (periodical spot checks or monitoring) is useful to show that the SCR efficiency still corresponds to the state at the time of certification regardless of whether the ambient conditions or the fuel quality led to different raw emissions.

## *Appendix 8*

### **Implementation of the Direct Measurement and Monitoring method**

*(Refer to 6.4 of the NO<sub>x</sub> Technical Code)*

#### **1 Electrical equipment: materials and design**

1.1 Electrical equipment shall be constructed of durable, flame-retardant, moisture resistant materials, which are not subject to deterioration in the installed environment and at the temperatures to which the equipment is likely to be exposed.

1.2 Electrical equipment shall be designed such that current carrying parts with potential to earth are protected against accidental contact.

#### **2 Analysing equipment**

##### *2.1 Analysers*

2.1.1 The exhaust gases shall be analysed with the following instruments. For non-linear analysers, the use of linearizing circuits is permitted. Other systems or analysers may be accepted, subject to the approval of the Administration, provided they yield equivalent results to that of the equipment referenced below:

##### .1 Nitrogen oxides (NO<sub>x</sub>) analysis

The nitrogen oxides analyser shall be of the chemiluminescent detector (CLD) or heated chemiluminescent detector (HCLD) type. The exhaust gas sampled for NO<sub>x</sub> measurement shall be maintained above its dewpoint temperature until it has passed through the NO<sub>2</sub> to NO converter.

*Note:* In the case of raw exhaust gas this temperature shall be greater than 60°C if the engine is fuelled with ISO 8217 DM-grade type fuel and greater than 140°C if fuelled with ISO 8217 RM-grade type fuel.

##### .2 Carbon dioxide (CO<sub>2</sub>) analysis

When required, the carbon dioxide analyser shall be of the non-dispersive infrared (NDIR) absorption type.

##### .3 Carbon monoxide (CO) analysis

When required, the carbon monoxide analyser shall be of the non-dispersive infrared (NDIR) absorption type.

##### .4 Hydrocarbon (HC) analysis

When required, the hydrocarbon analyser shall be of the heated flame ionization detector (HFID) type. The exhaust gas sampled for HC measurement shall be maintained at 190°C ±10°C from the sample point to the detector.

.5 Oxygen (O<sub>2</sub>) analysis

When required, the oxygen analyser shall be of the paramagnetic detector (PMD), zirconium dioxide (ZRDO) or electrochemical sensor (ECS) type.

2.2 *Analyser specifications*

2.2.1 The analyser specifications shall be consistent with 1.6, 1.7, 1.8, 1.9 and 1.10 of appendix 3 of this Code.

2.2.2 The analyser range shall be such that the measured emission value is within 15% – 100% of the range used.

2.2.3 The analysing equipment shall be installed and maintained in accordance with manufacturers' recommendations in order to meet the requirements of 1.7, 1.8, 1.9, and 1.10 of appendix 3 of this Code and sections 7 and 9 of appendix 4 of this Code.

**3 Pure and calibration gases**

3.1 Pure and calibration gases, as required, shall comply with 2.1 and 2.2 of appendix 4 of this Code. Declared concentrations shall be traceable to national and/or international standards. Calibration gases shall be in accordance with the analysing equipment manufacturers' recommendations.

3.2 Analyser span gases shall be between 80% – 100% of the analyser scale being spanned.

**4 Gas sampling and transfer system**

4.1 The exhaust gas sample shall be representative of the average exhaust emission from all the engine's cylinders. The gas sampling system shall comply with 5.9.3 of this Code.

4.2 The exhaust gas sample shall be drawn from a zone within 10% to 90% of the duct diameter.

4.3 In order to facilitate the installation of the sampling probe, an example of a sample point connection flange is given in section 5.

4.4 The exhaust gas sample for NO<sub>x</sub> measurement shall be maintained so as to prevent NO<sub>2</sub> loss via water or acid condensation in accordance with analysing equipment manufacturers' recommendations.

4.5 The gas sample shall not be dried by chemical driers.

4.6 The gas sampling system shall be capable of being verified to be free of ingress leakage in accordance with analysing equipment manufacturers' recommendations.

4.7 An additional sample point adjacent to that used shall be provided to facilitate quality control checks on the system.

## 5 Sample point connection flange

5.1 The following is an example of a general purpose sample point connection flange which shall be sited, as convenient, on the exhaust duct of each engine for which it may be required to demonstrate compliance by means of the Direct Measurement and Monitoring method.

Description	Dimension
Outer diameter	160 mm
Inner diameter	35 mm
Flange thickness	9 mm
Bolt circle diameter 1	130 mm
Bolt circle diameter 2	65 mm
Flange slots	4 holes, each 12 mm diameter, equidistantly placed on each of the above bolt circle diameters. Holes on the two bolt circle diameters to be aligned on same radii. Flange to be slotted, 12 mm wide, between inner and outer bolt circle diameter holes.
Bolts and nuts	4 sets, diameter and length as required.
Flange shall be of steel and be finished with a flat face.	

5.2 The flange shall be fitted to a stub pipe of suitable gauge material aligned with the exhaust duct diameter. The stub pipe shall be no longer than necessary to project beyond the exhaust duct cladding, sufficient to enable access to the far side of the flange. The stub pipe shall be insulated. The stub pipe shall terminate at an accessible position free from nearby obstructions which would interfere with the location or mounting of a sample probe and associated fittings.

5.3 When not in use, the stub pipe shall be closed with a steel blank flange and a gasket of suitable heat resisting material. The sampling flange, and closing blank flange, when not in use, shall be covered with a readily removable and suitable heat resistant material which protects against accidental contact.

## 6 Selection of load points and revised weighting factors

6.1 As provided for by 6.4.6.3 of this Code, in the case of the E2, E3 or D2 test cycles, the minimum number of load points shall be such that the combined nominal weighting factors, as given in 3.2 of this Code, are greater than 0.50.

6.2 In accordance with 6.1, for the E2 and E3 test cycles it would be necessary to use the 75% load point plus one or more other load points. In the case of the D2 test cycle, either the 25% or 50% load point shall be used plus either one or more load points such that the combined nominal weighting factor is greater than 0.50.

6.3 The examples below give some of the possible combinations of load points which may be used together with the respective revised weighting factors:

.1 E2 and E3 test cycles

Power	100%	75%	50%	25%
Nominal weighting factor	0.2	0.5	0.15	0.15
Option A	0.29	0.71		
Option B		0.77	0.23	
Option C	0.24	0.59		0.18
Plus other combinations which result in a combined nominal weighting factor greater than 0.50. Hence use of the 100% + 50% + 25% load points would be insufficient.				

.2 D2 test cycle

Power	100%	75%	50%	25%	10%
Nominal weighting factor	0.05	0.25	0.3	0.3	0.1
Option D			0.5	0.5	
Option E		0.45		0.55	
Option F		0.38	0.46		0.15
Option G	0.06	0.28	0.33	0.33	
Plus other combinations which result in a combined nominal weighting factor greater than 0.50. Hence use of the 100% + 50% + 10% load points would be insufficient.					

6.4 In the case of the C1 test cycle, as a minimum, one load point from each of the rated, intermediate and idle speed sections shall be used. The examples below give some of the possible combinations of load points which may be used together with the respective revised weighting factors:

.1 C1 test cycle

Speed	Rated				Intermediate			Idle
	100%	75%	50%	10%	100%	75%	50%	0%
Torque	100%	75%	50%	10%	100%	75%	50%	0%
Nominal weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15
Option H		0.38			0.25			0.38
Option I				0.29		0.29		0.43
Option J	0.27	0.27					0.18	0.27
Option K	0.19	0.19	0.19	0.13		0.13		0.19
Plus other combinations incorporating at least one load point at each of rated, intermediate and idle speeds.								

6.5 Examples of calculation of revised weighting factors:

.1 For a given load point, revised weighting factors shall be calculated as follows:

$$y\% \text{ load} = \text{nominal weighting factor at load } y \cdot (1/(\text{sum of the load factors for load points where data was acquired}))$$

.2 For Option A:

75% load: revised value is calculated as:  $0.5 \cdot (1/(0.5 + 0.2)) = 0.71$

100% load: revised value is calculated as:  $0.2 \cdot (1/(0.5 + 0.2)) = 0.29$

.3 For Option F:

75% load: revised value is calculated as:  $0.25 \cdot (1/(0.25 + 0.3 + 0.1)) = 0.38$

.4 The revised weighting factors are shown to two decimal places. However, the values to be applied to equation 18 shall be to the full precision. Hence in the Option F case above the revised weighting factor is shown as 0.38 although the actual calculated value is 0.384615. Consequently, in these examples of revised weighting factors the summation of the values shown (to two decimal places) may not sum to 1.00 due to rounding.

## 7 Determination of power set point stability

7.1 To determine set point stability, the power coefficient of variance shall be calculated over a 10-minute interval, and the sampling rate shall be at least 1-Hz. The result shall be less than or equal to five per cent (5%).

7.2 The formulae for calculating the coefficient of variance are as follows:

$$Ave = \frac{1}{N} \sum_{j=1}^N x_j \quad (1)$$

$$S.D. = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (x_i - Ave)^2} \quad (2)$$

$$\%C.O.V. = \frac{S.D.}{Ave} \cdot 100 \leq 5\% \quad (3)$$

where:

%C.O.V.	power coefficient of variance in %
S.D.	standard deviation
Ave	Average
N	total number of data points sampled
$x_i, x_j$	$i^{\text{th}}, j^{\text{th}}$ value of power data point in kW
i	index variable in standard deviation formula
j	index variable in average formula.