European Sustainable Shipping Forum
3rd Plenary Meeting
Brussels, 04 December 2014

Final Report Submission from the ESSF Sub-Groups

Submission from:
ESSF sub-group on EGCS

This document reflects the outcomes of deliberations of the Exhaust Gas Cleaning Systems sub-group of the European Sustainable Shipping Forum of which the European Commission is part. It is not an official document adopted by the European Commission.

1. INTRODUCTION

The European Sustainable Shipping Forum (ESSF) sub-group for Exhaust Gas Cleaning Systems (EGCS) was formed as an official European Commission expert group to facilitate the adoption of EGCS as an alternative means of compliance with the new low sulphur standards introduced by Directive 2012/33/EU amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels (the Sulphur Directive). This mandates fuel with a maximum sulphur content of 0.1% in EU Sulphur Emissions Control Areas (SECAs) as of 2015 and 0.5% outside SECAs as of 2020 and is aligned with the provisions of the International Maritime Organization (IMO) in Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL).

EGCS is one of the alternative means of compliance recognised under Regulation 4 of MARPOL Annex VI and within Article 4c of the Sulphur Directive. The IMO has developed guidelines for EGCS, contained in IMO Resolution MEPC.184(59) and which forms the basis for the acceptance criteria contained within Directive 2008/67/EC of 30 June 2008 amending Council Directive 96/98/EC on marine equipment (the Marine Equipment Directive, MED).

Despite the clear and unambiguous regulatory acceptance of EGCS by the IMO and within the Sulphur Directive and MED it has been noted that industry has faced a number of regulatory, operational and economic challenges when trying to adopt EGCS as a compliance option. These challenges have hampered EGCS technology take-up; the EGCS sub-group was established to examine these challenges in an integrated manner. In particular, the work of the sub-group has been concentrated on wet phase flue gas de-sulphurisation exhaust gas cleaning technologies, also known as wet scrubbing. This is because this is currently the most widely available EGCS technology and also because most of the regulatory challenges identified relate to discharges to water from wet scrubbers.
The EGCS sub-group includes Members drawn from:

- The European Commission (DG-MOVE and DG-ENV)
- The European Maritime Safety Agency (EMSA)
- Member States (MS)
- Classification Societies
- Equipment Manufacturers
- Ship Owners/Operators
- Shipyards/Designers
- Ports
- Waste handling/processing specialists
- European Oil Refiners
- Environmental Non-Governmental Organisation

The sub-group generated a series of work packages, each of which related to a particular objective or task included within the EGCS SG ToR (see updated progress table in Annex 1). From the outset it was agreed and understood that the work of the sub-group would support and complement the work of the IMO and that where shortcomings were identified within the IMO guidelines the sub-group would propose solutions intended to improve these guidelines by working within both the established EU and the IMO formal coordination processes so as to avoid any divergence.

2. ANALYSIS OF FINDINGS

2.1 Guidelines for the Approval, Certification and Use of EGCS

Deliverable D.1.1 of the ToR requires proposals for comprehensive guidelines and/or standards, rules regarding approval, certification, and safe, efficient, and reliable installation and use of scrubbing technology on board seagoing vessels. The sub-group generated the following work packages intended to achieve this deliverable.

2.1.1 Work package 1 - Dry-scrubbing technology

The Sub-group considered dry phase flue gas de-sulphurisation, or more simply, dry scrubbing technology as an alternative to wet scrubbing. This was noted to be an effective solution however the large size and weight of such systems severely limits the potential application of dry EGCS. Further, the only vendor of such systems in the marine sector was in liquidation when the sub-group considered dry scrubbing. Since the challenges industry faces in adopting EGCS primarily relates to wet scrubbing it was agreed that the sub-group should concentrate its work on wet systems.

2.1.2 Work Packages 4, 5 & 6 - Approval Aspects, Trials and Commissioning of Wet-scrubbing EGCS and possibility of using non-compliant fuel during commissioning

Completion of the approval processes for EGCS face significant barriers if the approval is to be done within a SECA. Completion of commissioning and some aspects of the approval process may require
the ship to combust high sulphur residual fuel oil (RFO); unless the ship has an alternative approved means of compliance (i.e. an approved scrubber) it is illegal for the ship to combust RFO while in a SECA and there may be difficulties bunkering RFO unless the scrubber has been approved.

Commissioning activities for early installations has been facilitated by application of trials permits as allowed by Regulation 3 of MARPOL Annex VI and Article 4e of the Sulphur Directive. However, trial requirements are onerous and not applicable to or practical for the commissioning of standardized scrubbers where testing is expected to be limited to normal start up and adjustment checks followed by verification that the systems meets the requirements of the MEPC.184(59) Guidelines. The ESSF plenary meeting held on June 26th 2014 supported the sub-group recommendation that commissioning of existing technology and trials/testing of new technology should be considered as two separate and distinct activities and agreed with the sub-group proposals to facilitate commissioning (in Annex 2). The differences between commissioning and trials/testing form the basis of a General Guidance (Q & A) to be published by the Commission and the sub-group continues to work on this issue.

2.1.3 Work Package 8 - Washwater discharge pH criteria verification and possible amendments to the IMO guidelines

The sub-group believes that IMO guidelines for verifying the pH of washwater discharge are hampering the adoption of wet scrubbing EGCS. This is a specific technical matter concerning applying external dilution of the washwater pH. The IMO guidelines limit the pH of washwater to 6.5 but it is allowed to meet this limit at a distance of 4 metres from the discharge point (ships side). External dilution significantly reduces the energy demand of a wet scrubbing system, consequently reducing fuel demand and associated emissions.

The existing IMO guidelines require the pH to be physically measured with the ship ‘at rest in harbour’, effectively limiting the dilution rate to that corresponding to the maximum ‘at rest’ load of the system. After a vigorous debate the sub-group agreed the text for a possible amendment to the IMO guidelines to allow the use of a calculated methodology and/or modelling to verify the pH discharge at 4 metres from the overboard discharge point.

The ESSF plenary meeting held on June 26th 2014 supported the sub-group recommendation that a submission be made to the IMO Marine Environment Protection Committee (MEPC 67) calling for the IMO to explicitly recognise calculation and/or modelling as a means of verifying the pH of washwater discharge (in Annex 3). A paper inviting the Committee to consider a calculation-based methodology was submitted to MEPC 67 by the EU MS and the European Commission (MEPC 67/4/22, in Annex 4), this was noted by MEPC Plenary and referred to the PPR sub-committee for detailed consideration. There were no negative responses to this paper from any of the delegations at MEPC 67 and referred to the IMO Sub-Committee on Pollution Prevention and Response (PPR 2) - formerly BLG - for detailed consideration. The sub-group continues to work on this issue and has already prepared a submission to PPR 2 proposing amendments to the IMO guidelines.

2.1.4 Work Package 7 - Washwater discharge criteria and acceptability of washwater discharge within coastal waters and ports

The sub-group identified a potential conflict between washwater discharge standards contained within the IMO guidelines, the Sulphur Directive and MED and local environmental controls prohibiting washwater discharge.

The ESSF plenary meeting held on June 26th 2014 supported the sub-group recommendation that MS, local authorities and ports to have a sensible and pragmatic approach to the use of open loop
wet scrubbers in ports, estuaries and coastal waters and for MS to communicate any potential limitations of discharges from wet scrubbers (in Annex 5). Continued efforts since the plenary meeting have established that the principal issue is the interaction between the Sulphur Directive and the EU Water Framework Directive (WFD) 2000/60/EC establishing a framework for Community action in the field of water policy which governs water quality in ports, estuaries and coastal waters.

A sub-group delegation attended a meeting of the Working Group on Chemicals under the Common Implementation Strategy of WFD on Friday October 17th 2014 to request that DG-Environment provide direction on this issue (summary report to DG-ENV in Annex 6). This delegation stressed the primacy of international law and that wet scrubbing is an accepted means of equivalence recognised by both the IMO and the EU Sulphur and Marine Equipment Directives. The delegation explained the costs facing shipping and magnitude of the financial implications of a transition to low sulphur fuels and that this will not affect shipping alone. The technical merits of wet scrubbing and the emission limits to water in the IMO guidelines were also explained. The uncertainty created by this issue is affecting investment and the sub-group believes that early adopters who are investing in sustainability and environmentally friendly technologies should not be penalised. The working group on chemicals has asked the sub-group to supply more data to allow them to better understand the environmental impact of washwater discharge; their primary concern is PAH levels within the washwater. The sub-group will provide additional information to the extent possible.

The sub-group has been researching the position of the EU SECA MS and has developed a matrix containing the position of each MS on this issue (in Annex 7). Something which has emerged from this work package is the lack understanding of the terms ‘open-loop’ and ‘closed-loop’ wet scrubber on which there is no real technical definition and for which the IMO guidelines do not make reference. Some parts of the industry are using the term ‘closed-loop’ to mean ‘zero discharge’ which is not correct as closed-loop scrubbers continuously bleed-off an amount of washwater. This could become part of the general guidance (Q & A) or part of suggested changes to the IMO guidelines. The sub-group continues to work on this issue.

To facilitate evidence based decision making, the sub-group has agreed to engage in a joint exercise (ship owners/operators, EGCS manufacturers and waste management companies) to collect washwater samples from ten to fifteen ships and later sent to a laboratory in Germany for analysis. To facilitate the willingness of operators and manufacturers to participate in this program, both ships and equipment details from which the samples are taken will remain anonymous. However the program will be managed using transparent processes and the analysis obtained will be made available to the sub-group.

The sub-group believes that it would be beneficial to engage with stakeholders outside the EU such as Russia to inquire about the acceptability of discharging EGCS washwater and the existence of port reception facilities for EGCS waste.

2.2 Recommendations for Remedial Actions to Address Market Barriers Hampering EGCS Take-up

Deliverable D.1.2 requires proposed recommendations for remedial actions to address some of the market barriers hampering scrubbing technology take-up. The following work packages have been progressed pursuant to this deliverable.

2.2.1 Work Package 2 - EGCS Waste Handling

The safe and environmentally responsible processing and disposal of EGCS waste and sludge is creating some barriers to the adoption of EGCS. There is some confusion over what is meant by the term scrubber ‘sludge’; manufacturers and operators understand sludge to be the effluent
generated by washwater filtration and conditioning equipment which is retained on-board and transferred ashore as waste whilst some are using the word sludge to describe washwater discharge. There must be a clear distinction between sludge, which is a dirty effluent with similarities to fuel treatment sludge, and washwater discharge which is sea water meeting the discharge emission limits contained within the IMO guidelines. The sub-group has again called for a joint exercise on sludge sampling and analysis to generate sufficient hard data to facilitate objective, evidence based decisions on this issue. The waste handling/processing representative (EUROSHORE) has offered to analyse sludge samples free of charge and the sub-group are encouraging operators to avail themselves of this generous offer. This analysis will consider a wide range of potential pollutants which may be found within the sludge.

The sub-group questioned whether there are any safety risks associated with EGCS sludge, particularly where such sludge may be retained on-board for extended periods. After reviewing this question the IACS agreed that storing EGCS sludge on-board for long periods may present safety risks and that this merits further analysis. Work package tasks are on-going to analyse samples and collect sludge data and also to evaluate related safety risks.

2.2.2 Work Package 9 - Operational Non-Compliance Scenarios

Operators have expressed concern at how Flag and Coastal Administrations will respond to potential non-compliance with the requirements of the Sulphur Directive and MARPOL Annex VI in the event of an EGCS failure. There are numerous potential scenarios, the three identified as being most likely are:

- Transitory non-compliance (for example due to engine load fluctuation)
- Non-compliance with the SOx emission limits during the running up and shut down of the EGCS
- Accidental break down of the EGCS

The first two scenarios can be addressed in the Emissions Technical Manual (ETM) which is required for the approval of EGCS. For the third scenario, a scrubber may break down just as any other machinery system. Applying the letter of the regulations the ship should either change over to low sulphur fuel or proceed to a port to make repairs to the defective scrubber; both of these alternative options have major cost implications. The sub-group recommends that a pragmatic, reasonable approach should be taken by Authorities. Where a ship has reasonable redundancy of the machineries and equipment needed to operate the EGCS then the sub-group believes that ships should be allowed to continue operating on RFO without interrupting their itinerary until repairs can be made to the defective scrubber providing that repairs are made in a timely manner. The sub-group notes that Articles 4a, paragraphs 5a & 5b of the Sulphur Directive support this philosophy. This approach is also consistent with the provisions under Regulations 3.1 and 5.5 of MARPOL Annex VI regarding exemptions and the guidance under 1.3.10 of the NOx Technical Code for temporary non-compliance when unable to operate dual-fuel engines in gas mode.

An additional subject was included within this work package when it was noted by the sub-group that the current wording of the Bunker Delivery Note (BDN) may prevent ships which have an approved EGCS to bunker RFO (i.e. non-compliant fuel) for use with machinery connected to the approved EGCS. The ESSF plenary meeting held on June 26th 2014 supported the sub-group recommendation that a submission be made to the IMO calling for an amendment to the BDN declaration. The EU MS and the European Commission submitted a joint paper (MEPC 67/12/7, in Annex 8), proposing such an amendment. This received a favourable response and has been referred
to the PPR 2 for action (consider and prepare draft amendments to Appendix V of MARPOL Annex VI). The work continues on this work package, linked with the work in WP 4, 5 & 6.

2.2.3 Work Package 10 - Sodium Hydroxide Bunkering

The sub-group decided to identify a new Work Package to work on this matter. Closed-loop wet scrubbing systems require a pH buffering additive which under certain circumstances may also be required for open-loop systems. Many systems use sodium hydroxide since its highly alkaline properties make it very effective. The sub-group is considering the restrictions imposed by some ports on loading sodium hydroxide and is collating experience and information which it is intended to disseminate to facilitate good practices and safe transfers. This is fully in accordance with Deliverable D.1.3.2 which calls for the sub-group to compile a compendium of best practices and lessons learned.

2.2.4 Port Reception Facilities Directive

The sub-group recommends that the advance submission required by Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues should be updated and that the Directive is reviewed to ensure that the particular requirements associated with EGCS waste are recognised within the Directive.

2.3 Coordination with the Initiatives and Activities of other relevant International Bodies

**Deliverable D.1.3.1** requires proposed recommendations to ensure coordination with other initiatives and activities carried out by relevant international bodies such as the IMO. The sub-group has proceeded on the basis of co-operation and coordination with other international stakeholders and avoiding divergences from accepted international standards and regulations such as the IMO guidelines.

Section 2.1.3 of this report confirms that the sub-group has proposed changes to how the pH of washwater discharge is verified using the existing IMO recognised pH limit and that a submission to IMO MEPC 67 has been made to make this verification workable.

Section 2.1.4 of this report highlights the sub-groups efforts to promote the IMO MEPC.184(59) guidelines as the universal standard for washwater discharge criteria and to avoid regional and local standards which differ from these guidelines as well as recommending outreach to non-EU countries so as to establish an understanding on EGCS issues. Finally, section 2.2.2 of this report confirms that the work of the sub-group has resulted in a second submission to IMO MEPC 67 to amend the BDN.

From this it is evident that the sub-group is coordinating its efforts with the IMO processes. Where any shortcoming with IMO requirements is identified the sub-group is proposing improvements to such requirements so as to avoid any divergence between EU and the IMO standards.

2.4 Best Practice and Lessons Learned Compendium

**Deliverable D.1.3.2** calls for the sub-group to produce a compendium of best practices and lessons learned from tests and trials. The sub-group has identified key priority tasks (see 2.1.2, 2.1.3, 2.1.4 and 2.2.2 of this report) and given the urgency of these priority tasks and the limited resources of the sub-group D.1.3.2 is currently in abeyance. However, it should be noted that each of these work packages originated in members of the sub-group sharing practical experiences and lessons learned therefore the sub-group has been actively engaged in capturing experiential learning.
2.5 Assessing the Business Case for EGCS

Deliverable D.1.4 calls for the sub-group to produce guidance material on developing and assessing business cases for the installation and use of scrubbers. There have been some presentations on this issue to the sub-group but as with deliverable D.1.3.2 this item has been in abeyance whilst the sub-group devotes resources and effort into developing solutions for the most urgent technical and regulatory challenges.

2.5.1 Work package 3 - Fuel-oil quality and availability

Whilst this is not directly an assessment of the business case for scrubbing, the availability and quality of fuel oils is of critical importance for operators when considering compliance strategies. This considered the technical aspects of EU fuels and desulphurisation/refining challenges, finding that current desulphurisation/refining technologies are more suitable for desulphurising distillates rather than RFO. Given this, and the simplicity and lower energy levels involved, the use of EGCS on-board can be recommended as a better option than de-sulphurising RFO at the refining stage. Considerable CO₂ emission savings can also be achieved by scrubbing on-board, estimated at nine million tonnes per annum as compared to de-sulphurising RFO in refineries.

This work package also examined fuel quality and sulphur distribution. Fuel sulphur content has been dropping since 2006; the latest IMO monitoring indicates an average of 2.43% for RFO, 10.8% of RFO has sulphur content below 1% whilst only 1% is above 3.5%. 80% of marine diesel oil has sulphur content below 0.1% but this may not be representative as only a small fraction of total distillate volume is sampled. If looking at Europe in particular 20% of European RFO has sulphur content below 1% with the median being 2.4% and 80% is below 3% sulphur. The supply of 0.1% sulphur fuel in 2015 is expected to be sufficient to meet demand however in 2020 the supply of 0.5% sulphur fuel requires new refinery investment.
3. SUMMARY

The sub-group has prioritised three tasks with the intention of developing pragmatic solutions to facilitate the adoption of EGCS whilst maintaining robust environmental protection:

1) *The acceptability of washwater discharge from wet scrubbing*, although usually presented an open loop issue this is also applicable to closed loop scrubber bleed off. The sub-group is developing a matrix of the position of each member state on acceptance of washwater discharge as well as engaging with DG-Environment to develop a mutually satisfactory reconciliation between the demands of Article 4c of the Sulphur Directive and the Water Framework Directive.

2) Verification of the *pH discharge criteria at 4 metres from the discharge point* using calculation and/or modelling. The sub-group originated a submission to MEPC67 by the member states and the European Commission which has been referred to the PPR sub-committee for action.

3) Developing *practical guidance (Q&A) to facilitate commissioning of EGCS* within the North Sea and Baltic SECA.

In addition to these three priority tasks the sub-group has been active in addressing a wide range of potential barriers to the adoption of EGCS and proposing regulatory improvements, principally:

4) During the EGSC sub-group’s discussions, particularly on the preparation of the document to the PPR 2 Meeting and in the discussions with the chemicals strategy group for the WFD afterwards, it has been recognized that there are other issues in the 2009 Guidelines for EGCS, apart from those related to the verification of the pH criteria of scrubber washwater, which may need further clarification. There is a need for washwater discharge data and analysis to facilitate evidence based assessment of washwater discharge and to facilitate consideration of whether further submissions on these issues to IMO should be developed.

5) Amending the BDN, the sub-group originated a submission to MEPC67 by the member states and the European Commission which has been referred to the PPR sub-committee for action.

6) Operational non-compliance of EGCS.

7) EGCS waste handling and the environmentally responsible disposal of sludge produced by EGCS, including consideration of those clauses of the Port Reception Facilities Directive which affect EGCS.

8) Bunkering of sodium hydroxide.

In pursuing these tasks the sub-group has been guided by a philosophy of:

A. Working with the processes of IMO and avoiding a divergence between European Union and IMO requirements;

B. Making existing regulatory requirements workable and addressing implementation of the already agreed international standards for parameters such as washwater discharge;

C. Developing pragmatic, workable solutions without relaxing environmental controls.
4. REQUESTS TO THE PLENARY

The sub-group requests that the ESSF plenary note and endorse this progress report. Further, the sub-group requests that the ESSF plenary approves:

1. That the Exhaust Gas Cleaning sub-group remains active and continues its work into 2015.

2. That the sub-group, while acknowledging that ‘it should continue to work towards technical solutions and avoid re-opening the discussions on existing requirements at the IMO’, considers whether further submissions to this Organization on issues, which require further clarification in the 2009 Guidelines on EGCS, would be necessary.

3. That the sub-group continues to collect washwater data so as to facilitate analysis of such data with the possibility of using this analysis to consider whether a further submission on this issue to IMO should be developed.

4. Further work by the sub-group to provide clear guidance as to the acceptability of EGCS washwater discharge in coastal and in-shore waters and to continue engagement with the Commission to reconcile the requirements of Article 4c of the Sulphur Directive and the Water Framework Directive.

5. A request of the sub-group that member states respond to requests for clarification of their position on washwater discharge to facilitate completion of a definitive table of national positions.

6. The Q&A document produced by DG-Environment to facilitate commissioning of EGCS within the SECA.

7. Continued work of the sub-group to finalise amendments to the BDN which is scheduled for consideration by PPR 2.

8. That the sub-group considers possible amendments to the Port Reception Facilities Directive to ensure that this directive is not seen as a barrier to the adoption of EGCS.

9. Outreach to non-EU countries to establish the position of countries such as Russia on issues raised by the sub-group.

10. That the sub-group continues its efforts to capture experience and good practices for safely bunkering sodium hydroxide and that the results of this work are disseminated to industry.

11. Subject to completion of those tasks which have been identified as the most urgent, to compile a compendium of best practices and lessons learned and to produce guidance materials to assist the industry when assessing the business case for EGCS in accordance with the ToR of the sub-group.
ANNEXES

1. Work Packages progress table - updated 15 November 2014

2. July 2014 Submission to ESSF Plenary, Trials vs. Commissioning and the Possibility of Using HFO during Commissioning - Work Packages 5 & 6

3. July 2014 Submission to ESSF Plenary, Washwater Discharge Plume pH Verification - Work Package 8

4. IMO Submission MEPC 67/4/22 - on the verification of washwater discharge criteria for pH

5. July 2014 Submission to ESSF Plenary, Washwater discharge criteria (pH value) - Work Package 7


7. Sulphur Emission Control Area (SECA) EU Member States - Position on EGCS washwater discharge - updated 18 November 2014

8. IMO Submission MEPC 67/12/7 - on the BDN
<table>
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<th>Identified barriers hampering scrubbing technology take-up</th>
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<th>Dry scrubbing technology</th>
<th>Don Gregory (EGCSA)</th>
<th>ESPO LR/IAICS EUROSHORE</th>
<th>Additional information to be gathered/compiled on sludge composition and H₂S</th>
<th>On-going work - joint stakeholders exercise sampling &amp; analysis (washwater + sludge + bleed-off water + H₂S long-term storage)</th>
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<td>2 EGCS waste handling (see WP7)</td>
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<td>- IMO+CONCAWE Sulphur Monitoring &amp; Survey Reports - CO₂ saving potential reflected in the report for Plenary (4 Dec)</td>
<td>No further actions required</td>
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<td>Financing Opportunities (Business Case)</td>
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<td>Fuel oil quality and availability</td>
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<td>-Consolidate Q&amp;A as possible -Proposed amendment to the BDN in MEPC 67/12/7, PPR 2 follow-up?</td>
<td>- On-going work - general guidance document with technical input from the EGCS SG members as required - 4/12 Positions and Recommendations in Progress Report for Plenary consideration</td>
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<td>Additional information being compiled on water quality standards. Member States (MS), Port Authorities (PA) and DG-ENV WFD WGC involved</td>
<td>On-going work - joint exercise Summary table of SECA EU Member States Position on EGCS washwater discharge (circulated to the SG Members and DG-ENV WFD Working Group Chemicals)</td>
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<td>8 Verification and approval of pH criteria according to 10.1.2.lii externally from the ship</td>
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<td>Jorma Kämäräinen (FI)</td>
<td>EC/EMSA EGCSA + Members LR, DNV</td>
<td>Following proposed amendments to the IMO EGCS Guidelines in MEPC 67/4/22, PPR 2 submission being finalised through EU coordination procedure (SWP)</td>
<td>3/11: PPR 2 submission to be introduced and discussed in the SWP</td>
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<td>9 On operational non-compliance scenarios (see WP4,5&amp;6)</td>
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<td>Rapporteur EC</td>
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European Sustainable Shipping Forum
2nd Plenary Meeting
Brussels, 26 June 2014

Submission from ESSF sub-groups

Submissions can be max. 3 pages of length

Work Packages 5 & 6 – Trials vs. Commissioning and the Possibility of Using HFO during Commissioning

1. Submission from:

ESSF sub-group on scrubbers

2. Sub-group recommendation(s) to the Plenary

The Sub-group recommends that Plenary support the principal of commissioning of existing technology and trials/testing of new technology being considered as two separate and distinct activities and to agree to the proposals of the sub-group for facilitating commissioning contained in Section 3.

3. Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

Plenary is requested to agree to using the conclusions produced by the Sub-group defining differences between commissioning and trials/testing as the basis of a recommendation for General Guidance (Q & A) that could be published by the Commission and to support the continued work of the Sub-group on this issue.

4. Timing of required action(s) in view of upcoming deadlines and critical requirements:

Sulphur reductions become effective January 1st 2015, industry requires guidance to facilitate commissioning of scrubbers within an (S)ECA before this date.

5. Summary of the issue and possible alternative solution(s)

Exhaust gas cleaning using scrubbing is an alternative means of compliance under Regulation 4 of MARPOL Annex VI. Ships are not permitted to combust fuel which does not meet applicable sulphur content limits unless fitted with an approved means of reducing sulphur oxide emissions to a level which is equivalent to that which would be achieved by using compliant fuel. For a scrubber to be approved it
must be tested and some of this testing may necessitate a period of operation on high sulphur fuel. This creates a conflict in that for the ship to use non-compliant fuel it must have an approved scrubber but for the scrubber to be approved the ship may need to use a quantity of high sulphur fuel. This is not a problem if the scrubber is to be installed and commissioned outside an emissions control area (ECA) but it could prevent such work within an ECA. Regulation 3 of MARPOL Annex VI makes provision for the issue of Trials Permits with duration of 18 months to facilitate testing and trials of emissions control technologies. The Trials Permit gives permission for the ship to operate on non-compliant fuel to enable the development and testing of emissions abatement technology.

This principle is endorsed by the Sulphur Directive but only for new emission abatement methods which do not fall within the scope of the Marine Equipment Directive. This would include scrubbers with innovative technology including certain R&D elements. Under the terms of the Sulphur Directive, issue of such a Trials Permit requires an advance notification of six months to the Commission and any port State which will be affected by the trial and such permit can be issued only once and for duration up to 18 months. In addition to some other conditions, the results of the trial will have to be provided to the Commission, and made publicly available. Since these are onerous requirements and not applicable to or practical for the commissioning of standardised scrubbers where testing is expected to be limited to normal start up and adjustment checks followed by verification that the systems meets the requirements of the MEPC184(59) Guidelines.

There is no explicit provision to allow the use of non-compliant fuel without having an approved scrubber for commissioning, as opposed to trials, in either MARPOL Annex VI or the Sulphur Directive. The sub-group believe that commissioning should be recognised as being distinct and separate from trials and testing of new technology. Subject to certain controls and commissioning being completed so far as is reasonably practicable using compliant fuel then derogation in the form of either a letter of authorisation from the Administration (preferred option) or possibly a short duration IAPPC should be issued to the ship. This derogation would allow the ship to load and use high sulphur fuel for the purposes of commissioning an exhaust gas cleaning (scrubber) system where it is demonstrated that commissioning cannot be completed using only compliant fuel. This derogation is to be limited to duration of up to 2 months and is to include references to the commissioning protocol and parameters which are to be monitored and recorded so as to prevent possible abuse of the derogation. Where commissioning is interrupted for any reason then the ship is to revert to compliant fuel until commissioning can recommence.

6. Background information

The absence of any explicit provision for commissioning in the Sulphur Directive has resulted in normal commissioning activities being carried out under the aegis of a Trials Permit/provision in the Sulphur Directive. Since there has been limited provision for commissioning in the Sulphur Directive, the sub-group have proposed that commissioning should be recognised as being distinct and separate from trials and testing of new technology. Subject to certain controls and commissioning being completed so far as is reasonably practicable using compliant fuel then derogation in the form of either a letter of authorisation from the Administration (preferred option) or possibly a short duration IAPPC should be issued to the ship. This derogation would allow the ship to load and use high sulphur fuel for the purposes of commissioning an exhaust gas cleaning (scrubber) system where it is demonstrated that commissioning cannot be completed using only compliant fuel. This derogation is to be limited to duration of up to 2 months and is to include references to the commissioning protocol and parameters which are to be monitored and recorded so as to prevent possible abuse of the derogation. Where commissioning is interrupted for any reason then the ship is to revert to compliant fuel until commissioning can recommence.

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1. A more permanent solution for ships using non-compliant fuel in combination with approved scrubbers should also be envisaged through an amendment of MARPOL Annex VI, Appendix V on BDN (bunker delivery note). Reference is made to the report of the Working Group at IMO PPR Sub-Committee PPR1/WP.5. The sub-group will finalise a proposal for an amendment at the next meeting.
application of scrubbers to date this has worked reasonably well. As scrubbing becomes more popular it is felt that this trials process will be too onerous and will impose unreasonable demands on what will increasingly be seen as routine commissioning carried for normal acceptance and approval purposes. If these tests are to be carried out inside an ECA and it is not practicable for such testing to be completed without some use of non-compliant fuel then a mechanism is needed to allow for the supply and use of such fuel. Currently the alternatives are to apply for a trials permit, risk enforcement action for operating on non-compliant fuel without an approved scrubber or to move scrubber installation and commissioning work to those areas not within an ECA.

Issuance of a letter of authorisation or of a short duration IAPPC would allow for the supply and use of high sulphur fuel within an ECA under controlled conditions and with a strict limitation on the duration of such derogation. If a means of facilitating such commissioning is not agreed then there is a risk that installation of scrubbers within ECA’s will be perceived as being impractical with a consequent transfer of this market to ship building and repair facilities outside of ECA’s. Alternatively ships may make an additional voyage to a location outside of an ECA solely for the purpose of loading fuel and commissioning before re-entering the ECA after having gained the requisite approvals for the scrubber and such an alternative is not cost-effective.

The Sub-group underlines that there are significant socio-economic benefits to economies whose coastlines are within an ECA if local ship building and ship repair activities can compete in the scrubber market and there is no environmental benefit to be gained from ships making additional voyages of potentially significant distances solely for the purpose of commissioning a scrubber. Unless provision is made for commissioning of scrubbers then the market for installing such systems may be severely constricted for suppliers operating inside an ECA with business being lost to competitors outside the ECA.

Provided that there are suitable controls, possibly harmonised at EU level, in place to prevent the abuse of such derogation and that the duration is limited then negative environmental impact will be insignificant and will be outweighed by the longer term positive environmental impacts of facilitating the adoption of scrubbers as a compliance option. There is a degree of risk in this approach, by allowing ships to deviate from the requirements of the directive and of MARPOL a port state control (PSC) officer could challenge the validity of an IAPPC issued to the ship for commissioning. If the commissioning was completed without the ship sailing into the jurisdiction of another administration then this should not be a risk, however complications could arise if the ship does have to carry out commissioning trials on voyage resulting in such commissioning taking place within in the waters of another administration.

This is a further reason for limiting the duration of the derogation and imposing strict limitations on its use so as to provide assurance to interested parties that the derogation is not simply a means of by-passing the Trial Permit process or of the provisions of the directive and MARPOL.
European Sustainable Shipping Forum
2nd Plenary Meeting

Brussels, 26 June 2014

Submission from ESSF sub-groups

Submissions can be max. 3 pages of length

Work Package 8 – Wash Water Discharge Plume pH Verification

1. Submission from:

   ESSF sub-group on scrubbers

2. Sub-group recommendation(s) to the Plenary

   The Sub-group recommends that plenary review and approve the proposal contained within Section 3 in view of a possible submission to MEPC67.

3. Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

   Following the proposed draft amendments by IMO Sub-Committee on Prevention of Air Pollution from Ships PPR 1 of February 2014, the sub-group discussed additional improvements for the text of paragraph 10.1.2.1(ii) and for the additional paragraph 10.1.2.1(iii) regarding the Wash Water Discharge Plume pH Verification of IMO Resolution MEPC.184(59) 2009 Guidelines for Exhaust Gas Cleaning Systems.

   Building upon the progress made by this Sub-Group on further amending the text proposed in the Report of the Working Group PPR 1/WP.5 paragraph 30-32, Plenary is requested to support a submission to MEPC67 having in mind the general consensus reached in the sub-group.

   The current draft version of the proposed text by the sub-group (below) amending clause 10.1.2.1(ii) is to be finalized at the next Sub-Group meeting (2nd July).

   [(ii) Alternatively, the pH limit at the overboard monitoring position may be set at that necessary to achieve a pH of not less than 6.5 at a position 4 metres from the discharge point with the ship at rest in still water when the EGCS is operating at its full load and with a fuel oil of the maximum sulphur content for which the unit is certified. Where it is not possible to achieve the full design load of the machinery system then the highest practicable load of the machinery system is to be used.]
Where the wash water flow rate is varied in accordance with the EGCS gas flow rate the implications of this on part load performance should also be evaluated to ensure that the minimum pH limit is not exceeded at any load. This discharge pH limit determination may be undertaken, with the approval of the Administration, by means of direct measurement, by reference to other installations or by flow modelling or calculation. This modelling or calculation is to be based on wash water discharge point parameters such as diameter of the wash water discharge outlet(s) and flow velocity of the outflow. Where the pH discharge approval is to be based upon modelling or calculation then the ETM-A or ETM-B is to record details of the plume model or calculation methodology used. A reference ambient alkalinity of 2200 micromol/liter and pH of 8.2 is to be used. The discharged pH value, or values, to achieve this minimum pH of 6.5 units will become the overboard pH discharge limit, or limits, recorded in the ETM-A or ETM-B.

In the case where the discharged pH is to be established by physical testing but fuel oil of the maximum sulphur content for which the EGCS is certified is not available the following procedure, with the agreement of the Administration, may be instead followed. Where it is not practical to load test fuel at the highest sulphur content for which the unit is to be approved then measurement may be undertaken using two test fuels with lower sulphur content provided that the requirements of this section are satisfied. The two fuels should have a difference in sulphur content sufficient to demonstrate the behaviour of the wash water plume and that the pH limit can be met if the EGCS unit were to be operated with the highest fuel sulphur content for which the EGCS is certified. These two tests may be undertaken on two different, but identical, EGCS units.

4. Timing of required action(s) in view of upcoming deadlines and critical requirements:

Friday 11th July 2014 is the deadline for submitting a paper to MEPC67 on new and bulky items.

5. Summary of the issue and possible alternative solution(s)

The IMO guidelines for exhaust gas cleaning systems include emissions discharge limits to sea for wash water pH. This can either be 6.5 at the ships side or alternatively 6.5 at a distance 4 meters from the ships side. Clause 10.1.2.1(ii) requires that if the discharge limit is to be achieved 4 meters from the ships side then the wash water discharge plume is to be measured with the ship at rest. The pH at the overboard discharge point corresponding to a pH of 6.5 at 4 meters from the ships side is to become the pH discharge limit. The pH limit will be based on the maximum at rest load of the scrubber, once the propulsion engines are started then pH will decrease below this at rest level and the wash water discharge will become non-compliant. The intent of this clause is not to restrict scrubbers to a maximum at berth or at rest load, nor was it intended to infer that there is no emission discharge limit at sea. Meeting the pH limit at the overboard discharge point imposes a large additional power demand to achieve internal dilution with a consequent increase in the carbon intensity of the system. This can be resolved by allowing modelling or calculation methods to verify the discharge plume pH.
Additionally, there will be instances where approval is sought for operation with fuels of higher sulphur content than those fuels which are available for the purposes of testing and approval. Two different fuels which allow the discharge plume characteristics to be evaluated should be permitted as the basis for approval at the maximum sulphur content for which approval is sought.

6. **Background information**

IMO has published Guidelines for the approval of scrubbers, these are contained within MEPC.184(59) and are also the acceptance criteria referenced in the Marine Equipment Directive. These Guidelines contain emissions limit values for wash water discharge to sea and also the means of verifying this wash water discharge to sea. The Guidelines allow external dilution however stipulate that the pH of the wash water plume is to be measured with the ship at rest. This effectively limits the maximum load of the scrubber by basing the pH discharge limit on the maximum at rest load. Operating the scrubber with propulsion engine exhaust streams will result in the pH emission discharge limit being exceeded. This has been recognised by IMO and the matter was discussed at the first meeting of the pollution prevention sub-committee, PPR1. The proposed wording is based on possible amendment debated at PPR1 but takes into consideration the more in depth evaluation which is possible from exchanging ideas over an extended period. The proposed amendment thus uses the text of PPR1 WP.5 paragraph 30 as a base but makes the following amendments:

- Changes wording from model to model or calculation, at the moment there is no agreed modelling tool and there is potential for a quicker and simpler means of calculation than using tools such as CFD

- Where such modelling or calculation is used it is to be recorded in the ETM, this uses the approach from alternative 10.1.2.1(iii) discussed at PPR1 and included as paragraph 31 of PPR1/WP.5

- The proposed new second paragraph of 10.1.2.1(ii) is derived from concerns that it is often extremely difficult to source fuel of the sulphur content for which the EGCS is to be approved. The two test plus extrapolation method is already included in MEPC.184(59) 4.1.2.2 for exhaust gas certification when using Scheme A.

- The wording includes provision for those cases that where the wash water flow rate varies with load and where the critical point may not be at the maximum scrubber load.

The proposed wording is intended to achieve an acceptable compromise between retaining the technical intent of the existing requirements and the spirit of the proposal contained in PPR1 WP.5, making amendments based on practical concerns of implementation and usability. By leaving the modelling and calculation as goal based to be agreed by the Administration it avoids the necessary debate of the various methods required to agree a standard modelling tool at IMO which could be a time consuming task. More prescriptive requirements can be developed in time if it is felt necessary.
AIR POLLUTION AND ENERGY EFFICIENCY

Request for application of calculation-based methodology for verification of the wash water discharge criteria for pH in section 10.1.2.1 (ii) of the 2009 Guidelines for exhaust gas cleaning systems

Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom and the European Commission

SUMMARY

Executive summary: This document addresses urgent outstanding issues with regard to verification of wash water discharge criteria for pH for exhaust gas cleaning systems as set out in section 10.1.2.1 (ii) of the 2009 Guidelines for exhaust gas cleaning systems, adopted by resolution MEPC.184(59). The Committee is asked to further consider the use of calculation-based methodology for verification of the wash water discharge criteria for pH set out in section 10.1.2.1 (ii) of the 2009 Guidelines and instruct the PPR Sub-Committee accordingly.

Strategic direction: 7.3
High-level action: 7.3.1
Planned output: 7.3.1.1
Action to be taken: Paragraph 17
Related documents: BLG 17/11/2, BLG 17/11/5, BLG 17/18, BLG 17/INF.3; MEPC 59/4/19, MEPC 59/24; MEPC 60/4/19, MEPC 60/4/25, MEPC 60/22; MEPC 61/4/3, MEPC 61/4/6; PPR 1/9/3, PPR 1/WP.5; MEPC 66/INF.31 and MEPC.184(59)
**Introduction**

1. MEPC 59 adopted resolution MEPC.184(59) to amend the *Guidelines for exhaust gas cleaning systems*, set out in resolution MEPC.170(57). These amendments mainly concerned the wash water discharge conditions. At MEPC 60, these amendments were questioned, and it was decided to refer the matter to MEPC 61 and subsequently MEPC decided to defer the matter to BLG Sub-Committee. At BLG 15, it was decided to allow further time for examination by inviting Member Governments and international organizations to submit the outcome and experiences in applying the 2009 *Guidelines for exhaust gas cleaning systems* (BLG 15/19, paragraph 11.44).

2. At BLG 17, Denmark raised their concern on approval of sea water scrubbers with regard to discharge criteria of pH of scrubber wash water given in chapter 10 of the 2009 *Guidelines for exhaust gas cleaning systems*, set out in resolution MEPC.184(59) (BLG 17/11/2).

3. While resolution MEPC.170(57) distinguishes between discharge in harbours, ports and estuaries and discharge at open sea, the 2009 Guidelines only outline two options for compliance without distinguishing between open sea and harbours, ports and estuaries. The discharge requirements under paragraph 10.1.2.1 are:

   .1 a pH value of no less than 6.5 at the ship's overboard discharge; or
   .2 a pH value of no less than 6.5 measured 4 metres from the discharge point.

4. Measuring the pH value using option .2 is only practically feasible when the ship is at rest in harbour, however the main engines of the ship cannot be run at full power when the ship is at rest. The guidelines do not allow measurement of the pH value 4 metres from the overboard discharge when the ship is in motion. Accordingly, option .1 will be the only requirement to apply at open sea, implying that a pH of 6.5 at the overboard discharge should be met. Being unable to use option .2 makes the pH requirement more difficult to meet at open sea than in port, which is not helpful in addressing the environmental concerns on the basis of which the requirements are developed. Further measuring tests in accordance with section 10.1.2.1 (ii) are in practice impossible or not safe to arrange, if testing is required for the main propulsion engines “at rest in harbor”.

5. In order to solve these problems, INTERFERRY proposed amendments to the pH discharge criteria in their document BLG 17/11/5.

6. However, BLG 17 did not agree to the amendments to the 2009 Guidelines as proposed by INTERFERRY, but invited further information to be submitted on the following (BLG 17/18, paragraph 11.36):

   .1 impact on the marine environment of discharging wash water with a low pH value; and
   .2 current availability of Exhaust Gas Cleaning Systems to meet the requirements as set out in the 2009 Guidelines and those that cannot.

7. The pH criteria for wash water was further discussed at PPR 1, based on document PPR 1/9/3 submitted by Norway. The Working Group on Prevention of Air Pollution from Ships considered the proposals set out in paragraphs 5, 6, 7 and 8 of document PPR 1/9/3, prepared draft text to replace paragraph 10.1.2.1 (ii), and agreed to include it in the group's report for future reference as follows (PPR 1/WP.5, paragraph 30):
"(ii) Alternatively, the pH limit at the overboard monitoring position may be set at that necessary to achieve a pH of not less than 6.5 at a position 4 metres from the discharge point with the ship in still water when the EGCS is operating at full load and with a fuel oil of the maximum sulphur content for which the unit is certified. This discharge pH limit determination may be undertaken, with the approval of the Administration, by means of direct measurement, by reference to other installations or by flow model calculation."

8 During the consideration by the working group of the inclusion of alternative text, additional draft text was proposed as a new paragraph 10.1.2.1(iii), and as the proposed draft text received some support, the group agreed (PPR 1/WP.5, paragraph 31) to include it in its report for future reference as follows:

"(iii) The wash water discharge plume should not be less than pH 6.5 at 4 meters from the discharge point. This should be calculated by the use of a verified plume modelling programme taking into account the minimum and maximum (manufacturers designed) water flow rate at discharge. The discharge pH to achieve a minimum pH of 6.5 at 4 meters from the discharge point will become the overboard pH discharge limit recorded in the ETM-A or ETM-B along with details of the plume model used and methodology."

9 IMarEST in their document MEPC 66/INF.31 provided information on a study undertaken by the University College London (UCL) regarding linking laboratory measured pH recovery with a theoretical pH recovery mathematical model, in relation to wash water discharge pH as described in the 2009 Guidelines for exhaust gas cleaning systems (resolution MEPC.184(59)). The Committee noted the document and agreed to forward it to PPR 2 for further consideration under the agenda item on Review of relevant non-mandatory instruments as a consequence of the amended MARPOL Annex VI and the NOX Technical Code.

10 The European Commission has launched a set of activities aiming to take forward all aspects of sustainable shipping relevant to a cost-efficient and coherent implementation of the forthcoming more stringent regulations for sulphur content of fuel oil in European Emission Control Areas for SO₂ emissions. To serve this purpose, the European Sustainable Shipping Forum (ESSF) has been created bringing together 28 EU Member States and 32 maritime organizations to enable a structured dialogue, inter alia, on the monitoring of compliance of the sulphur regulations, on creating the framework conditions for the use of marine liquefied natural gas (LNG) as ship fuel, on promotion of the use of scrubbing technology in shipping by addressing its technical, economic and operational aspects, on coordinating research and development activities and encourage innovation, on exploring all available financing opportunities, and on identifying potential improvements in sustainability and competitiveness. The current submission follows specific deliberations held within the context of the ESSF.

Discussion

11 Due to the forthcoming (1 January 2015) more stringent regulations for the sulphur content of fuel oil in Emission Control Areas for SO₂ emissions, i.e. the 0.10% sulphur limit, the shipping industry is now preparing for technical installations of machinery systems of ships sailing in SECA areas to meet the new regulations.

12 In addition to plans to use low sulphur distillate fuel in ships, several types of scrubbers, like closed loop scrubbers, sea water scrubbers and hybrid scrubbers, which can be used either in closed loop mode or as sea water scrubbers, have already been installed on ships or ordered.
13 The main outstanding problem with regard to approval of sea water scrubbers as described in paragraph 4 above is the verification of the wash water discharge criteria for the pH given in section 10.1.2.1(ii) in the 2009 Guidelines for exhaust gas cleaning systems (resolution MEPC.184(59)), mainly because scrubbers connected to ship propulsion machineries cannot be tested “at rest in harbour”. The industry has been trying to find a solution to this problem and come to the conclusion that calculation-based methodologies (for example computational fluid dynamics and/or by the use of established empiric formulae) are feasible solutions to this problem. However, the current guidelines do not allow a calculation-based methodology to be used for verification of the wash water discharge criteria for pH.

14 The cosponsors are aware that MEPC has referred the matter to the PPR Sub-Committee but, due to the urgency of the matter, we have brought the issue directly to MEPC. We are also aware that it may take some time before IMO will finalize a new version of the 2009 Guidelines and, in order to enhance the work in this matter at the PPR Sub-Committee, we propose that the use of a calculation-based methodology would be acceptable as an equivalent alternative to pH measurements 4 metres away from discharge point when verifying the wash water discharge criteria for pH, as has already been suggested by the Working Group on Prevention of Air Pollution from Ships at PPR 1, as addressed in paragraph 7 above.

Proposal for MEPC 67 to further consider the use of calculation-based methodology when verifying the wash water discharge criteria for pH

15 The cosponsors are of the view that the 2009 Guidelines for exhaust gas cleaning systems should provide clarity about testing of scrubbers connected to ship machinery items that cannot be tested at higher loads, or tested at all "at rest in harbor". We find the use of calculation-based methodology (such as computational fluid dynamics and/or the use of established empiric formulae) a feasible alternative to the measurements. Our tentative proposal for amendments to section 10.1.2.1(ii) of the 2009 Guidelines can be found in the annex to this document. We are planning to submit a more detailed proposal on this matter to PPR 2.

16 Our view is also that the use of a calculation-based methodology would be a practical approach for demonstration of compliance for ship machinery items that cannot be tested at higher loads, or tested at all "at rest in harbour", since measuring tests in accordance with section 10.1.2.1(ii) are in practice impossible or not safe to arrange in such cases.

Action requested of the Committee

17 The Committee is invited to consider the proposal made in paragraphs 15 and 16 and to:

.1 further consider the use of calculation-based methodology for verification of the wash water criteria for pH as an acceptable alternative method to verify compliance with section 10.1.2.1(ii) of resolution MEPC.184(59) and instruct the PPR Sub-Committee accordingly; and

.2 ask interested Member States and industry organizations to submit information and proposals to the PPR Sub-Committee for further development of the 2009 Guidelines in this regard.

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ANNEX

TENTATIVE PROPOSAL FOR AMENDMENTS TO SECTION 10.1.2.1 (II) IN THE 2009 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS SET OUT IN ANNEX TO RESOLUTION MEPC.184(59)

Existing 10.1.2.1 (ii) is replaced with:

(ii) The pH discharge limit, at the overboard monitoring position, is the value that will achieve as a minimum pH 6.5 at 4 metres from the overboard discharge point with the ship stationary and which is to be recorded as the overboard pH discharge limit in the ETM-A or ETM-B. The pH discharge limit can be determined either by means of direct measurement or by a calculation-based methodology (such as Computational Fluid Dynamics and/or the use of established empiric formulae) to be accepted by the Administration, and in accordance with the following conditions to be recorded in the ETM-A or ETM-B:

.1 the EGCS is operating at its full load (or highest practicable load) and with a fuel oil of the maximum sulphur content for which the unit is to be certified;

.2 if a test fuel with lower sulphur content sufficient to demonstrate the behaviour of the wash water plume is used, a mixing ratio of the plume would have to be established based on the titration curve of seawater. The mixing ratio is used to demonstrate the behaviour of the wash water plume and that the pH limit is met if the EGCS were to be operated with the highest fuel sulphur content for which the EGCS is certified;

.3 where the wash water flow rate is varied in accordance with the EGCS gas flow rate, the implications of this on part load performance should also be evaluated to ensure that the minimum pH limit is not exceeded at any load;

.4 reference to sea water alkalinity of 2,200 micromole/litre and pH 8.2 should be used; where testing conditions differ from the reference sea water, correction factors may be used; and

.5 details of the discharge point specification, wash water discharge flow rates, the calculation-based methodology used and the titration data should be submitted.
European Sustainable Shipping Forum
2nd Plenary Meeting

Brussels, 26 June 2014

Submission from ESSF sub-groups

Submissions can be max. 3 pages of length

Washwater discharge criteria (pH value) - Work Package 7

1. Submission from:

ESSF sub-group on scrubbers

2. Sub-group recommendation(s) to the Plenary

The sub-group recommends Member States, local authorities and ports to have a sensible and pragmatic approach to the use of open loop scrubbers in ports, estuaries and coastal waters by keeping in mind their currently limited total number, to ensure early movers that have invested in ‘green shipping technology’ are not disproportionately penalised and by enacting the revised Sulphur Directive, as well as the Marine Equipment Directive, which allows their use as alternative emission abatement methods when they are approved and functioning according the IMO Resolution MEPC.184 (59) 2009 Guidelines for Exhaust Gas Cleaning System (EGCS Guidelines).

The sub-group also recommends Member States to communicate on any potential limitations of discharges from (open loop) scrubbers in their waters and/or ports as soon as possible in order to enhance legal certainty.

The sub-group further recommends the Plenary to assess the need of revising the IMO EGCS Guidelines and to coordinate the EU input to IMO in light of the most updated and peer-reviewed scientific and technical evidence regarding recent trials and/or data collected on the contents of the discharge and its effects (i.e. environmental impact studies) which have been, or will still have to be, submitted to the IMO. Such revision should primarily consider additional guidance with a view to make the existing requirements workable.

3. Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

Recognize that because of local/regional surface water quality requirements which implement EU legislation such as the Water Framework Directive, the discharge from scrubber washwater in ports, estuaries and coastal waters to one nautical mile out to sea may be limited or even...
entirely prohibited even though that the washwater complies with the requirements in the IMO EGCS Guidelines.

Recall that the Water Framework Directive aims at achieving ‘good status’ for all EU waters by a set deadline. The requirements at river basin level to achieve good status are to be defined at local level depending on the current status of the water which implies that local requirements may be different.

Consider that the revised Sulphur Directive only refers to the IMO EGCS as applicable standard for the approval of scrubbers, and that this reference can only be adapted through a delegated act where this is justified in the light of scientific and technical progress and in strict consistency with the relevant instruments and standards adopted by IMO.

Underline the freedom for Member States to go beyond the environmental requirements laid down in EU legislation.

Agree that only after a full assessment by IMO the current EGCS Guidelines could be changed.

Invite Member States to share the outcomes of any trials, especially in relation to the findings on pH with IMO and GESAMP (as per Annex III of the IMO EGCS Guidelines) in order to base any assessment on extensive recent figures and findings.

Invite the ESSF scrubber and Implementation sub-group to further work on defining a common approach which should preferably be extended to IMO.

4. Timing of required action(s) in view of upcoming deadlines and critical requirements:

Further discuss in line with the views of the Plenary in the next ESSF Scrubber (2 July) and Implementation (3 July) sub-groups.

Deadline for introducing submissions to MEPC 67 is Friday 8 August 2014 (non-bulky documents – 6 pages or fewer).

5. Summary of the issue and possible alternative solution(s)

Following a number of indications that the discharge of scrubber washwater may be prohibited in coastal waters of some EU Member States and specifically in ports areas, both the ESSF Scrubber and Implementation sub-groups held detailed discussions about the reasoning behind such limitations especially when scrubbers have been approved in line with the requirements of the revised Sulphur Directive which sets the IMO EGCS Guidelines as the appropriate standard defining scrubber discharge water.

After presentations by the European Seaports Organisation (ESPO), the Exhaust Gas Cleaning Systems Association (EGCSA) and ship owners, it turned out that it is more the surface water protection legislation (national, local rules implementing the Water Framework Directive) that sets the limitations of any discharge to the water.

Discussions in the sub-group took place regarding the possibility of amending the IMO Guidelines. It is unclear though, particularly with regards to the washwater discharge criteria, to what extent this would solve the above described problems deriving from surface water quality legislation (i.e. use of open loop scrubbers in ports, estuaries and coastal waters).

6. Background information

Relevant outcomes from the latest discussions held at the IMO concerning EGCS washwater:
SUB-COMMITTEE ON BULK LIQUIDS AND GASES (BLG)

BLG 17/18 - Final Report to MEPC - *Washwater discharge criteria for exhaust gas cleaning systems* - Pages 35 to 37 - paragraphs 11.30 to 11.37

“Following the discussion, the Sub-Committee did not agree to the amendments to the 2009 Guidelines as proposed, and agreed to invite further information to be submitted on the following:

1. Impact on the marine environment of discharging washwater with a low pH value;
2. Current availability of Exhaust Gas Cleaning Systems that can meet the requirements as set out in the 2009 Guidelines and those that cannot.”

SUB-COMMITTEE ON POLLUTION PREVENTION AND RESPONSE (PPR)

PPR 1/16 - Final Report to MEPC - *2009 Guidelines for exhaust gas cleaning systems* - Pages 22 to 24 - paragraphs 9.9 to 9.12 and 9.20

“The Sub-Committee noted the discussion of the group in respect of future amendments to the 2009 Guidelines for exhaust gas cleaning system...”

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)


“The Committee, having noted document MEPC 66/INF.31 (IMarEST), providing information on a study undertaken by the University College London (UCL) regarding linking laboratory measured pH recovery with a theoretical pH recovery mathematical model, in relation to wash water discharge pH as described in the 2009 Guidelines for exhaust gas cleaning systems (resolution MEPC.184(59)), agreed to forward the document to PPR 2 for further consideration under the agenda item on Review of relevant non-mandatory instruments as a consequence of the amended MARPOL Annex VI and the NOx Technical Code.”
Summary of Report to DG - Environment

This report is a summary of the more detailed report prepared by the ESSF sub-group on exhaust gas cleaning, ref: ESSF EGCS Water Framework Directive (WFD) report. More detailed argument, references and background are contained within the full length report along with a copy of the IMO Resolution MEPC.184(59) – 2009 Guidelines for Exhaust Gas Cleaning Systems.

The maritime industry is facing profound changes as a result of changes to maritime environmental regulation contained within Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012 – regarding the sulphur content of marine fuels and within IMO emissions control areas regarding the allowable sulphur content of marine fuels which take effect on January 1st 2015. As a result of the potentially enterprise changing effects of a change to low sulphur oil fuels and the problems associated with the price, regulatory and safety risks and availability of other alternative fuels it is expected that exhaust gas cleaning technologies will be adopted by the shipping sector. Given the high cost of low sulphur distillate oils and the challenges associated with alternative fuels an attractive option is to fit emissions abatement in the form of flue exhaust gas cleaning to remove sulphur oxides (SOx) from the exhaust gas emissions. Exhaust gas cleaning comprises of a group of technologies, most of which are mature and established and which can provide equivalence with using 0.1% fuel whilst continuing to combust high sulphur residual fuels. The principle of emissions abatement is recognised in Directive and Article 4c requires member states to allow the use of emissions abatement systems.

A further consideration is carbon intensity. Whilst it may appear to be counter intuitive to suggest that exhaust gas cleaning is a low carbon solution to lowering SOx it has been demonstrated to be the case. Whilst the long term future may be conversion of shipping to cleaner fuels or perhaps more radical technologies such as hydrogen fuel cells or nuclear, in the short – midterm the issues of regulatory acceptance, supply infrastructure, capital cost and ease of retro-fitting to existing ships make combusting residual fuel oils with exhaust gas cleaning an attractive option.

Currently wet scrubbing is the most attractive exhaust gas cleaning technology for most potential operators. Wet scrubbing is effective, robust and reliable however it produces wash water which has to be conditioned and discharged. In an open loop system this wash water goes to the sea whilst systems described as closed loop require bleed off and unless the ship is provided with very large collecting tanks or the ship is in a position to discharge bleed off holding tanks frequently then this bleed off will go to sea. The IMO MEPC184.(59) guidelines regulate the pH, PAH and turbidity of discharge to water. The IMO guidelines reference wash water discharges and do not include references to open or closed loop operation.

The IMO MEPC184.(59) guidelines do not provide any geographical restrictions and providing the emission limit values are satisfied they allow for exhaust gas cleaning systems to operate whilst discharging wash water to sea with no further restrictions. These guidelines are in general the acceptance criteria applied by National Administrations, are referenced in the European Sulphur Directive are the acceptance criteria in Directive 96/98/EC as amended (MED). At IMO level, European level and at national level in most Administrations the wash water discharge criteria contained within MEPC184.(59) are the accepted standard. There is some confusion regarding the terms open loop and closed loop, no IMO standards or guidelines reference open or closed loop/modes and it appears that certain parties have taken closed loop to mean zero discharge of wash water which is not the case.

During the meetings of the ESSF sub-group it has become apparent that despite the acceptance of wash water discharge from exhaust gas cleaning systems at international level there is an interaction with the Water Framework Directive and local water quality controls. This has created uncertainty and a perceived risk that wet scrubbing will not be a viable solution for many operators if they are not allowed to use these systems in littoral and inshore waters. This problem is not limited to open loop systems and will also affect closed loop systems. The maritime
industry requires clear guidance and clarification of the interaction between the Water Framework Directive and maritime regulations so as to be able to make informed decisions regarding the acceptability of wet scrubber exhaust gas cleaning systems within the waters subject to the Water Framework Directive.

To date most concerns appear to relate to the acidity of wash water discharges although this is not the only emission limit for the wash water. There have also been concerns about contaminants which are not monitored, such as heavy metals and the potential for accumulation in sediment on the bed of closed docks and other areas with limited water exchange.

The environmental impact of wash water discharge has been studied in a number of technical papers, primarily focusing on the effects of wash water acidity and ocean acidification since this has been the principal concern expressed about such discharges. While some studies consider this a potential risk, more recent papers prepared for the Danish Environmental Protection Agency found that the effects upon ocean acidification from wash water discharges to be negligible. A study by University College London also supports the position that acidic jets discharged into an alkaline environment as per wash water discharges from exhaust gas cleaning systems can be safely absorbed by the sea with a negligible effect on acidification.

The ESSF sub-group requests that DG-Environment considers that:

1. Exhaust gas cleaning is an economically attractive alternative means of compliance to meeting the fuel sulphur content limits of the Sulphur Directive and of MARPOL Annex VI Regulation 14. In addition to being economically attractive the use of exhaust gas cleaning combined with high sulphur fuels will ease potential tightening of low sulphur distillate grades.

2. There is an environmental benefit to society resulting from the lower carbon foot print of de-sulphurising exhaust gas relative to de-sulphurising oil fuels at the fuel refining stage.

3. Whilst alternatives to wet scrubbing are available, currently the compact size and weight of wet scrubbing combined with it being a fundamentally simple, robust and established technology makes it the most attractive option for exhaust gas cleaning for most ships.

4. Whilst wet scrubbing is associated with wash water discharge (in both open and closed loop modes of operation) that this wash water is subject to internationally agreed controls for pH, PAH and turbidity which are to be continuously monitored and recorded. There are further controls for nitrates and chemicals which whilst not continuously monitored are included within the guidelines. Further, these guidelines are the basis of equivalent controls within the Sulphur Directive and are referenced as the acceptance criteria for exhaust gas cleaning systems within the Marine Equipment Directive.

5. There are alternative low sulphur fuels such as liquefied natural gas (LNG), methanol and liquefied petroleum gas (LPG) which whilst potentially attractive to new build projects are expected to be significantly more expensive and technically challenging as retrofit options.
Given that the deadline for compliance with the reduced fuel sulphur content limits of the Sulphur Directive and of MARPOL Annex VI Regulation 14 is January 1st 2015 and after considering 1-5 the ESSF sub-group requests that DG Environment;

A. Considers the acceptability of exhaust gas cleaning wash water which is subject to the internationally agreed controls of the IMO guidelines within inshore coastal and littoral waters which are subject to the provisions of the Water Framework Directive.

B. Applies a pragmatic approach to considering the acceptability of exhaust gas cleaning wash water discharges which whilst applying all applicable legislation also recognises the socio-economic benefits offered by exhaust gas cleaning.

C. Delivers a clear direction to the maritime industry and to National Maritime Administrations on the acceptability of exhaust gas cleaning wash water discharges within those areas subject to the Water Framework Directive so as to end uncertainty and to facilitate the uptake of emissions abatement technology which can deliver clear socio-economic benefits.
### European Sustainable Shipping Forum (ESSF)  
14 November 2014

<table>
<thead>
<tr>
<th>Countries</th>
<th>National/Local Regulations?</th>
<th>EGCS washwater discharge allowed?</th>
<th>If allowed, are there any exemptions?</th>
<th>Additional information/comments provided</th>
<th>Contact Person (Competent Authority)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves but haven’t done yet.</td>
<td>Anita Mäkinen: <a href="mailto:anita.makinen@trafi.fi">anita.makinen@trafi.fi</a></td>
</tr>
<tr>
<td>Sweden</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves, but haven’t done yet.</td>
<td>Caroline Petrini: <a href="mailto:caroline.petlini@transportstyrelsen.se">caroline.petlini@transportstyrelsen.se</a></td>
</tr>
<tr>
<td>Norway</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves, but haven’t done yet.</td>
<td>Svein Erik Eng: <a href="mailto:SveinErik.Enge@sjofartsdir.no">SveinErik.Enge@sjofartsdir.no</a></td>
</tr>
<tr>
<td>Estonia</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves, but haven’t done yet. This topic is under discussion.</td>
<td>Heiko Heitur: <a href="mailto:Heiko.Heitur@envir.ee">Heiko.Heitur@envir.ee</a></td>
</tr>
</tbody>
</table>

National/Local Regulations:  
- **No**: National regulations don’t allow EGCS washwater discharge.  
- **Yes**: National regulations allow EGCS washwater discharge.

EGCS: European Greenhouse Gas Inventory System for Ships

SULFUR EMISSION CONTROL AREA (SECA) EU Member States - Position on EGCS washwater discharge.
**Directive 1999/32/EC (as amended) - as regards to sulphur content of marine fuels**

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Latvia</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Discussion is ongoing about status of scrubber washwater, if this is seen as wastewater or not. If not discharge is not forbidden.</td>
<td>Laura Mazmaca: <a href="mailto:laura.mazmaca@vvd.gov.lv">laura.mazmaca@vvd.gov.lv</a></td>
</tr>
<tr>
<td>Lithuania</td>
<td>Yes, Sulphur Directive</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Discharge is allowed only if the emission abatement methods referring in the Article 4c shall comply at least with the criteria specified in Annex I and II of Directive 1999/32 referring to IMO Guidelines MEPC.184(59).</td>
<td>Renata Gagiene: <a href="mailto:r.gagiene@am.lt">r.gagiene@am.lt</a></td>
</tr>
<tr>
<td>Poland</td>
<td>No</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports and Maritime Offices can set rules for themselves.</td>
<td>Pawel Banas: <a href="mailto:pawel.banas@mir.gov.pl">pawel.banas@mir.gov.pl</a></td>
</tr>
<tr>
<td>Denmark</td>
<td>Yes, Sulphur Directive</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>In general discharge allowed if the emission abatement methods referred to in Article 4c shall comply at least with the criteria specified in Annex I and II of Directive 1999/32 referring to IMO-Guidelines MEPC.184 (59). Under certain circumstances the ports may set rules for themselves, but haven't done yet.</td>
<td>Dorte Kubel: <a href="mailto:dokub@mst.dk">dokub@mst.dk</a></td>
</tr>
</tbody>
</table>
## Directive 1999/32/EC (as amended) - as regards to sulphur content of marine fuels

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<tr>
<th>Countries</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Yes</td>
<td>No/Yes</td>
<td>See further information</td>
<td>EEZ and Coastal Waters: Discharge prohibited unless it can be proved, that washwater fulfils the criteria of the IMO Washwater Guidelines MEPC.184(59). On rivers and in ports: Discharge prohibited.</td>
<td>Carolin Abromeit: <a href="mailto:carolin.abromeit@bsh.de">carolin.abromeit@bsh.de</a></td>
</tr>
<tr>
<td>Netherlands</td>
<td>Yes, Sulphur Directive</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Discharge is allowed only if the emission abatement methods referred to in Article 4c shall comply at least with the criteria specified in Annex I and II of Directive 1999/32 referring to IMO-guidelines MEPC.184 (59).</td>
<td>Stephan Hagens: <a href="mailto:stephan.hagens@iient.nl">stephan.hagens@iient.nl</a></td>
</tr>
<tr>
<td>Belgium</td>
<td>Yes</td>
<td>No</td>
<td>No exemptions so far</td>
<td>Discharge isn't allowed from 3 miles zone off Belgium coast (Federal Law). In Ports discharge isn't allowed (Flemish Government). However, the no-discharge rule is under discussion with the ports and the Flemish government.</td>
<td>Christophe Swolfs: <a href="mailto:christophe.swolfs@mobilit.fgov.be">christophe.swolfs@mobilit.fgov.be</a></td>
</tr>
</tbody>
</table>
### Directive 1999/32/EC (as amended) - as regards to sulphur content of marine fuels

**Sulphur Emission Control Area (SECA) EU Member States - Position on EGCS washwater discharge**

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</thead>
<tbody>
<tr>
<td>UK</td>
<td>Yes</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves, but we are not aware of any UK ports that are planning to do so yet. Discharge is allowed only if the emission abatement methods referred to in Article 4c shall comply at least with the criteria specified in Annex I and II of Directive 1999/32 referring to IMO-Guidelines MEPC.184 (59).</td>
<td>Ian Timpson: <a href="mailto:ian.timpson@dft.gsi.gov.uk">ian.timpson@dft.gsi.gov.uk</a></td>
</tr>
<tr>
<td>France</td>
<td>Yes</td>
<td>Yes</td>
<td>No exemptions so far</td>
<td>Ports can set rules for themselves, but haven't done yet.</td>
<td>Perrine Prigent: <a href="mailto:Perrine.Prigent@developpement-durable.gouv.fr">Perrine.Prigent@developpement-durable.gouv.fr</a></td>
</tr>
</tbody>
</table>

**Note:** Inputs to the above summary table were given by the Member States, in result of the discussions (and follow-up actions) held in both the ESSF Exhaust Gas Cleaning Systems and the Implementation of the Sulphur Directive Sub-Groups, more particularly within the EGCS SG Work-package 7 on washwater discharge criteria (pH value) - water quality standards.
REPORTS OF SUB-COMMITTEES

Outcome of PPR 1

Additional sentence to appendix V of the MARPOL Annex VI – Information to be included in the bunker delivery note (regulation 18.5)

Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom and the European Commission

SUMMARY

Executive summary: This submission calls for the need to insert an additional sentence in the last paragraph of appendix V of MARPOL Annex VI – Information to be included in the bunker delivery note (BDN) (regulation 18.5)

Strategic direction: 7.3

High-level action: 7.3.1

Planned output: 7.3.1.1

Action to be taken: Paragraph 11

Related documents: PPR 1/16, paragraph 9, 18, and PPR1/WP.5, paragraph 42

Introduction

1 This submission proposes to insert an additional sentence in the last paragraph of appendix V of MARPOL Annex VI – Information to be included in the bunker delivery note.

2 Regulations 14.1 and 14.4 set the limits of the sulphur content of any fuel used on board ships when operating inside and outside the emission control areas. This proposed additional sentence would allow ships that meet the requirements within regulation 4 of MARPOL Annex VI, which deals with "Equivalents", not to have the Bunker Delivery Note (BDN) declaring that the fuel oil supplied on board has met the regulations 14.1 and 14.4 of MARPOL Annex VI.
It should be emphasized that this proposal is neither a new regulation nor a requirement change. It merely facilitates the application of regulation 4 of MARPOL Annex VI.

**Background**

In accordance with regulation 18.6 of MARPOL Annex VI, ships are required to retain the BDN on board for a period of three years after the fuel oil has been delivered on board.

Presently, the BDN contains a declaration which takes account of the last sentence of appendix V of MARPOL Annex VI.

The last paragraph of appendix V of MARPOL Annex VI contains the following declaration:

"A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with the applicable paragraph of regulation 14.1 or 14.4 and regulation 18.3 of this Annex."

The European Commission has launched a set of activities aiming to take forward all aspects of sustainable shipping relevant to a cost-efficient and coherent implementation of the forthcoming more stringent regulations for sulphur content of fuel oil in European Emission Control Areas for SOx emissions. To serve this purpose, the European Sustainable Shipping Forum (ESSF) has been created bringing together 28 EU Member States and 32 maritime organizations to enable a structural dialogue, inter alia, on the monitoring of compliance of the sulphur regulations, on creating the framework conditions for the use of marine liquefied natural gas (LNG) as ship fuel, on promotion of the use of scrubber technology in shipping by addressing its technical, economic and operational aspects, on coordinating research and development activities and encourage innovation, on exploring all available financing opportunities, and on identifying potential improvements in sustainability and competitiveness. The current submission follows specific deliberations held within the context of the ESSF.

**Discussion**

Regulation 4 of MARPOL VI allows "Equivalents", but the present declaration signed and certified by the fuel oil supplier prevents this from taking place. In the present declaration, the oil supplier can only supply fuel oil with the sulphur content that meets MARPOL Annex VI regulation 14.1 or 14.4 limits. However, ships that have installed alternative technologies in compliance with regulation 4 should be allowed to purchase and the oil supplier to supply fuel oil that will not meet regulation 14.1 or 14.4.

This issue had been discussed in the Working group on Prevention of Air Pollution from Ships during PPR 1. The working group agreed that there might be a need to amend the BDN declaration. The Sub-Committee approved the working group report.

In order to allow the application of regulation 4 of MARPOL Annex VI, the following is the proposed text for the last paragraph of appendix V of the MARPOL Annex VI, with the additional sentence shown in underlined text:

"A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with the applicable paragraph of regulation 14.1 or 14.4 and regulation 18.3 of this Annex. If the receiver of the fuel oil identifies that the
fuel oil is intended to be used in combination with an approved equivalent means of compliance in accordance with regulation 4 of MARPOL Annex VI, the declaration shall certify that the fuel oil supplied is in conformity with regulation 18.3 of this Annex."

Action requested of the Committee

11 The Committee is invited to consider the proposal in paragraph 10 and take action as appropriate.