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COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	4 October 2017
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2017) 335 final
Subject:	COMMISSION STAFF WORKING DOCUMENT For the Council Shipping Working party IMO – Union submission to be submitted to the 5th session of the Sub-Committee on Pollution Prevention and Response (PPR 5) of the IMO in London from 5 - 9 February 2018 concerning review of the 2015 Guidelines for Exhaust Gas Cleaning Systems (Resolution MEPC.259(68)) – Proposal for amendments to the 2015 Guidelines for Exhaust Gas Cleaning Systems

Delegations will find attached document SWD(2017) 335 final.

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COMMISSION STAFF WORKING DOCUMENT

For the Council Shipping Working party

IMO – Union submission to be submitted to the 5th session of the Sub-Committee on Pollution Prevention and Response (PPR 5) of the IMO in London from 5 - 9 February 2018 concerning review of the 2015 Guidelines for Exhaust Gas Cleaning Systems (Resolution MEPC.259(68))

COMMISSION STAFF WORKING DOCUMENT
For the Council Shipping Working party

IMO – Union submission to be submitted to the 5th session of the Sub-Committee on Pollution Prevention and Response (PPR 5) of the IMO in London from 5 – 9 February 2018 concerning review of the 2015 Guidelines for Exhaust Gas Cleaning Systems (Resolution MEPC.259(68))

PURPOSE

The document in Annex contains a draft Union submission to the 5th session of the Sub-Committee on Pollution Prevention and Response (PPR 5) of the IMO concerning amendments to the (2015) IMO Exhaust Gas Cleaning Guidelines in relation to improvement of the sampling guidance of these Guidelines, especially as regards washwater data collection. It is hereby submitted to the appropriate technical body of the Council with a view to achieving agreement on transmission of the document to the IMO prior to the required deadline of 3 November 2017[1].

MARPOL Annex VI requirements, with regard to limitation of SOx emissions, are implemented in EU law in Directive (EU) 2016/802 of the European Parliament and of the Council of 11 May 2016 relating to a reduction in the sulphur content of certain liquid fuels[2]. The 2009 Guidelines on Exhaust Gas Cleaning Systems (adopted as Resolution MEPC.184(59)) are referred to in Annex II of Directive 2016/802/EU in relation to conditions for the use of Exhaust Gas Cleaning Systems under that Directive. Furthermore, an amendment of the Guidelines may influence the flexibility Member States have in their choices to achieve the mandatory quality objectives laid down in existing EU rules regulating surface water quality (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the 'Water Framework Directive') and Directive 2008/56/EC of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy (the 'Marine Strategy Framework Directive')) as well as the emissions of priority substances and other pollutants

[1] The submission of proposals or information papers to the IMO, on issues falling under external exclusive EU competence, are acts of external representation. Such submissions are to be made by an EU actor who can represent the Union externally under the Treaty, which for non-CFSP (Common Foreign and Security Policy) issues is the Commission or the EU Delegation in accordance with Article 17(1) TEU and Article 221 TFEU. IMO internal rules make such an arrangement absolutely possible as regards existing agenda and work programme items. This way of proceeding is in line with the General Arrangements for EU statements in multilateral organisations endorsed by COREPER on 24 October 2011.

[2] OJ L 132, 21.5.2016, p. 58.

including excess nutrients to water (Water Framework Directive and Directive 2008/105/EC[3] of the European Parliament and of the Council on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council). In addition, on-board exhaust gas cleaning systems are listed in Commission Implementing Regulation (EU) 2017/306 indicating design, construction and performance requirements and testing standards for marine equipment[4], which refers to IMO Resolution MEPC.259(68), and therefore have to comply with the requirements of Directive 2014/90/EU on marine equipment and repealing Council Directive 96/98/EC[5]. The said draft Union submission therefore falls under EU exclusive competence.

[3] As amended by Directive 2013/39/EU

[4] OJ L 48, 24.2.2017, p. 1.

[5] OJ L 257, 28.8.2014, p. 146.

SUB-COMMITTEE ON
POLLUTION PREVENTION AND
RESPONSE

PPR 5/
XX September 2017
Original: ENGLISH

5th session
Agenda item 10

REVIEW OF THE 2015 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS (RESOLUTION MEPC. 259(68))

Proposal for amendments to the 2015 Guidelines for Exhaust Gas Cleaning Systems

Submitted by the European Commission on behalf of the European Union

SUMMARY

Executive summary:	The *2015 Guidelines for Exhaust Gas Cleaning Systems* stipulate discharge criteria for washwater from EGCS. Due to an improved level of information on washwater sampling and analysis, there is a need to improve the sampling guidance of these Guidelines especially as regards washwater data collection. In order to ensure comparability of the data collected, sampling should be carried out on the basis of a harmonized approach. This document proposes a revision of the *2015 Guidelines for Exhaust Gas Cleaning Systems* as set out in Resolution MEPC.259(68), in particular of Appendix 3 of the Guidelines.
Strategic direction:	2, 7.1, 7.2, 7.3, 8, 10
High-level action:	2.0.1, 7.2.2, 7.3.1
Output:	Revision of the *2015 Guidelines for Exhaust Gas Cleaning Systems* (Resolution MEPC.259(68))
Action to be taken:	Paragraph
Related documents:	Resolution MEPC.259(68), *2015 Guidelines for Exhaust Gas Cleaning Systems*, MEPC 59/4/19, MEPC 69/19, MEPC 69/21, MEPC 71/9/1, MEPC 71/INF 19

Introduction and background

1 Following a proposal at MEPC 69 (MEPC 69/19) for a new output on the review of the *2015 Guidelines for Exhaust Gas Cleaning Systems* (Resolution MEPC.259(68)) the Committee agreed to include a new output on the "Review of the *2015 Guidelines for Exhaust Gas Cleaning Systems* (Resolution MEPC.259(68), hereafter referred to as the “2015 EGCS

Guidelines)" in its post-biennial agenda, aiming at completing the work within three sessions. This document aims to facilitate and improve washwater data collection (Appendix 3 of resolution MEPC.259(68)) by contributing to the revision of the Guidelines during this process.

2 The 2015 EGCS Guidelines include provisions to give guidance on different aspects of the certification of Exhaust Gas Cleaning Systems (EGCS). The focus of this document is to improve the section on “Washwater Data Collection” of the 2015 EGCS Guidelines reflecting the initial experience gained with washwater sampling and analysis. A growing number of organizations and ships have gradually become more involved in washwater sampling and analysis exercises, following protocols that are only partially comparable. As a consequence, with a view to quality as well as comparability of the results, a need for a clearer and more detailed guidance on the matter has been reported.

3 The preamble of the 2015 EGCS Guidelines invites Administrations to collect and provide data as described in Appendix 3. Furthermore, this Appendix elaborates on why washwater collection data is necessary for substantiated revisions of washwater discharge criteria. Only improved and reliable information on types and quantities of pollutants in the washwater will allow for the development of adequate discharge criteria and associated control measures. Recognizing that the washwater discharge criteria in section 10 of the 2015 EGCS Guidelines are intended to act as initial guidance for implementing EGCS designs, Appendix 3 not only allows but rather promotes future initiatives to collect more data on washwater discharge contents and its effects on the marine environment. The relevance of Appendix 3 as one of the main mechanisms allowing future developments of the 2015 EGCS Guidelines should be reiterated and underlined, recognising the need for their improvement. Experimental and scientific-based evidence is fundamental for developing, improving and consolidating of the relevant criteria and meaningful control mechanisms in the Guidelines.

4 This document has been prepared by the European Sustainable Shipping Forum (ESSF), an expert group of the European Commission, bringing together 28 EU Member States and 32 maritime organisations. The forum aims at enabling, inter alia, a structured dialogue on the monitoring of compliance with the sulphur regulations, creating the framework conditions for the use of liquefied natural gas (LNG) as a ship fuel, the increasing use of EGCS technology in shipping, in particular its technical, economic, environmental and operational aspects, coordinating research and development activities and encouraging innovation, exploring all available financing opportunities, ensuring compatibility with the EU’s broader environmental protection objectives (e.g. the effects of the use of EGCS on the aquatic environment and the need to also achieve the environmental objectives under EU Water Legislation[6]), and on identifying potential improvements in sustainability and competitiveness.

The ESSF, resulting from its engagement in a set of activities aimed at supporting sustainable shipping in the context of cost-efficient and coherent implementation of the more stringent regulations related to the sulphur content of marine fuel oil in European ECAs with respect to SOx air emissions, has identified a clear need for amendments to the 2015 EGCS Guidelines and in particular to bring washwater sampling and analysis to the attention of the Sub-Committee.

6 - Subject for further consideration in view of the results of ongoing research.

5 Whilst Appendix 3 of the 2015 EGCS Guidelines is clear about the relevance and objectives of washwater data collection, indicating important elements for consideration on the planning and preparation of sampling and analysis exercises, it is not considered to be entirely sufficient to ensure harmonization throughout different possible initiatives and sources of data. Comparability of results, regression statistics and correlation of a wider amount of differently sourced data will only be possible on the basis of similar sample preparation, standards, procedures, laboratory accreditation, amongst other aspects. The relevance of such considerations is particularly high in the context of a growing number of EGCS installations on ships

6 In paragraph 2 of the Annex to document MEPC 59/4/19, GESAMP recommended more explicit guidelines on sampling and analyses. Based on experience from ongoing research by industry and Administrations, it is believed that detailed guidelines for sampling and analysis of EGCS discharge water are urgently needed. Equipment manufacturers are interested in allowing the demonstration of the full environmental potential of EGCS, ship owners in the demonstration of the environmental performance of their installed systems, and authorities in being able to quantify the risk of negative environmental impacts from the use of EGCS. The principle of transparency needs, therefore, to be promoted and applied in order to satisfy all parties in a balanced manner. Furthermore, it should be ensured that the 2015 EGCS Guidelines and relevant discharge criteria can be revised on the basis of improved evidence-based analysis. In the text that follows, the term "discharge water" is used instead of "washwater ", consistent with the proposal made in MEPC 71/9/1 to revise the main text of the 2015 EGCS Guidelines.

Analysis of the issue

7 During recent sampling exercises, it became obvious that the method of carrying out the sampling is essential for receiving valuable data on discharge water. Not only is it important to ensure the main principles of repeatability, reproducibility and reliability, but also to ensure that the necessary level of transparency is achieved in each of the different sampling and analysis initiatives. Therefore, ship operators, manufacturers and authorities should be provided with a thorough, harmonized description of the sampling and analysis procedures for discharge water data collection. Hence, a revision of Appendix 3 of the 2015 EGCS Guidelines is proposed in Annex 1 to this document

The proposed Appendix 3 is structured as suggested in document MEPC 71/INF.19, Table 1, and represents the six steps of the sample life-cycle approach: preparation, collection, handling and holding, transport, sample preparation and analysis as well as disposal:

8 Annex 1 Para 2.1 Preparation

The preparation for sampling needs to start with sufficient time prior to its execution. As sampling and the required preparation are normally not part of the daily business of ship operators, para 2.1 was introduced in order to ensure completeness of the preparation.

8.1 Annex 1 Para 2.1.1 Sampling Points

A new proposal for consideration of sampling points is made in 2.1.1, as a development from the provision already in Appendix 3 of the 2015 EGCS Guidelines. Where sampling locations are today indicated in Appendix 3, it is now proposed to include the requirement for sampling

points into the guideline under 10.6. This is understood to be a requirement in the best interest of safety of equipment and personnel, whilst ensuring the principles of sampling & analysis to be guaranteed. It would not only allow for a safe practice in sampling but, also important, it would lead to an easily repeatable sampling execution. Notwithstanding the prescriptive nature of this proposal, it submitted for due consideration in the interests of the objectives set out in the present proposal. Not having sampling points in the designated sampling locations would lead to significant difficulties in executing the sampling. Suggested amendments for the guideline under 10.6 are described in Para 13 and Annex 2 of this submission.

8.2 Annex 1 Para 2.1.2 Preparation for sampling, handling and transport

Sampling equipment should be ordered by the analysing laboratory with sufficient time prior to sampling in order to ensure that clean and well prepared sampling bottles in sufficient numbers are available for sampling. For certain parameters it is important that all samples are stored and shipped at specific temperatures in order to stabilize the samples. In order to minimize loss of time during transportation, the shipping of the samples must be organized prior to sampling in the destination port.

8.3 Annex 1 2.1.2.1 Sampling equipment

Sufficient sampling equipment needs to be on board and be well prepared prior to sampling. The requirements for handling and holding of samples are defined by the methods used for analysis.

8.4 Annex 1 2.1.2.2 Preparation for storage and holding of samples

In order to ensure that storage requirements for the samples are fulfilled, ice pads and storage locations need to be prepared in advance.

8.5 Annex 1 2.1.2.3 Preparation for transport

In order to avoid any delay in transportation to the laboratory, shipment needs to be arranged in advance with the port agent of the destination port.

8.6 Annex 1 Para 2.1.2.4 Preparation of personnel conducting the sampling

The personnel should be aware that handling EGCS water can be hazardous and that personal protection equipment must be used. The personnel must be properly trained in order to ensure that the right water stream is sampled.

9 Annex 1 Para 2.2 Collection

A thorough approach to collecting the samples is essential. The sampling needs to be highly accurate and appropriately timed.

9.1 Annex 1 Para *2.2.1* Sample Time Schedule

A Sampling Time Plan needs to be produced in advance and agreed with the ship's master/captain how Engine and EGCS are operated during sampling.

In order to ensure that the sample represents the defined conditions of the engine, the timing of the sample collection is important. Para 2.2 describes how to consider the right time-slot for sampling under open loop and closed loop conditions.

9.2 Annex 1 Para 2.2.2 Sampling schedule in relation to stage of journey

Samples should not be taken more than 24 hours prior to berthing in order to ensure that preservation times are fulfilled.

9.3 Annex 1 Para 2.2.3 Filling of the sampling bottle

Prior to filling the sampling bottles it needs to be ensured that water flows through the sampling point, that is representative of the flow being sampled. Therefore, the sampling point needs to be flushed sufficiently. The sample can easily be contaminated if certain cleaning agents have been used and/or the sample comes into contact with contaminated hoses, funnels or secondary containers, therefore the use of the latter should be avoided.

10 Annex 1 Para 2.3. Transportation

During transportation the requested shipping requirements (e.g. temperature and time) must be fulfilled. Chain of custody needs to be considered in order to ensure timely shipping.

11 Annex 1 Para 2.4 Sample preparation and analysis

Recalling GESAMP's advice in Article 3 of the Annex to the document MEPC 59/4/19, to give recommendations for the replacement of national standards with international standards for the analysis of the parameters in section 10, Appendix 3 should contain a list of international standards to be used for sampling and analysis of the different parameters. Results of laboratory analyses are influenced by the sample preparation methods as well as by the analytical method. Therefore, both methods need to be described in detail. In order to ensure that the results are comparable, a method for each parameter should be listed in the Appendix 3 to the Guidelines. For quality-assurance reasons, laboratories need to be accredited according to ISO/IEC-17025 standard, and the methods used for analysis must all be in the scope of the ISO/IEC-17025 accreditation of the laboratory.

11.1 Annex 1 Para 2.4 PAH

Currently most studies analysing the 16 EPA PAHs have used the EPA 8270 method. However, as recommended by GESAMP (MEPC 59/4/19 Annex Para 3) national standards should be replaced by international standards.

For analysing PAHs in water, two steps are required. The first step involves transferring the PAHs into a liquid which can be analysed in the second step.

11.1.1 *PAH Preparation method*

For the transfer into liquid for analysis, two alternative methods are commonly used: Liquid-liquid extraction (LLE) and solid-phase extraction (SPE).

In LLE the water sample needs to be shaken with a solvent in order to extract the PAHs into the solvent. The solvent is then analysed. LLE is one preparation method which can be used before the EPA 8270 analytical method.

In SPE the water sample is filtrated over the solid phase. During this filtration the PAHs are absorbed from the solid phase. After the filtration the PAHs are removed with a solvent from the solid phase. The solvent is then analysed.

Scientific studies show that the use of either LLE or SPE as preparation method will lead to results that will be difficult to compare. In order to ensure comparable results, Appendix 3 should recommend the use of an international standard indicating either LLE or SPE as preparation method. Administrations are invited to submit further information about PAH sample preparation methods.

11.1.2 *Method for the determination of PAH*

The analytical method does not affect the results as much as the preparation method does. The most common analytical method is GC-MS and is described in EPA 8270 as well as in EN 16691.

11.2 Annex 1 Para 2.4 Nitrate and nitrite (NO3-/NO2-)

These parameters can be analysed without sample preparation. ISO 10304-1 is proposed as the analytical method.

11.3 Annex 1 Para 2.4 Metals

For metals, different preparation methods need to be applied depending on whether dissolved or total metal concentrations are analysed. For analysis, the same ISO 17294-2 method applies. Results should be published as total and dissolved concentrations.

12 Annex 1 Para 3: Template for required sampling data

For a thorough evaluation of the sampling data, it is important to collect additional general information about the ship and the EGCS before and while the sample is taken.

13 Annex 2: Recommendations for sampling points

EGCS sampled water and in particular discharge water is a mixture of secondary immiscible phases (i.e. ash, black carbon, soot or oil) with substantially varying densities. Some of the required monitoring and sampling parameters are related to the secondary immiscible phase.

Isokinetic sampling as recommended by Article 3 of part 1 of the Annex of the “Guidelines for Ballast Water Sampling (G2)” (MEPC.173(58)) is therefore considered to be essential for achieving representative results. Isokinetic sampling can ensure that a sample contains the same proportions of the various flowing constituents as the flow stream being sampled.

Therefore, it is proposed to include design specifications for sampling points in the 2015 EGCS Guidelines. The online monitoring on board in accordance with Article 10 of the Guidelines is designed to prove the compliance of the EGCS water streams; therefore it is important that compliance is proved under isokinetic conditions. It is proposed to add the requirements as

described in Annex 2 of this submission as new general requirements in section 10 of the 2015 EGCS Guidelines.

14.1 Annex 2 Para 10.6: Design requirements for sampling points

The sampling points need to be designed to support isokinetic conditions. If the sampling water stream is divided into different streams after the main sampling point (e.g. for parallel measuring of on board parameters), isokinetic conditions also should be ensured for both water streams.

14.2 Annex 2 Para 10.6.1.1 Location of sampling points

Sampling points need to be located appropriately. Bends and pumps create turbulence and could affect the representativity of the samples. Therefore the sampling points should not be located close to such features.

14.3 Annex 2 Para 10.6.1.3 Design requirements for sampling valves

In order to ensure that the samples can be easily collected and no contamination occurs from the sampling valve, design requirements for the sampling valve are specified.

Action requested to the Sub-Committee

15 The Sub-Committee is invited to consider the proposal to amend the *2015 Guidelines for Exhaust Gas Cleaning Systems* (resolution MEPC.259(68)) as outlined in paragraph 7 and 8 and Annexes 1 and 2 of this document and to take action as appropriate.

16 The Sub-Committee is also invited to recall that much of the substance contained in the present proposal follows very closely the recommendations from GESAMP in document MEPC 59/4/19. It is therefore suggested that GESAMP be consulted on the proposal.

Annex 1

APPENDIX 3

DISCHARGE WATER DATA COLLECTION

1 Introduction

1.1 The discharge water quality criteria are intended to act as initial guidance for implementing EGCS designs. The criteria should be revised in the future as more data become available on the contents of the discharge and its effects, taking into account any advice given by GESAMP.

1.2 Administrations should therefore invite the collection of relevant data. To this end, shipowners in conjunction with the EGCS manufacturer are invited to sample and analyse samples of EGC Systems.

1.3 The sampling may be conducted during approval testing or shortly after commissioning and at about twelve-monthly intervals.

1.4 In the future the extent of sampling may be adapted or enhanced in the light of developing knowledge.

1.5 It is recommended that a ship that has provided information according to this appendix and to the satisfaction of the Administration should be granted a waiver as regards compliance of the existing installation(s) with possible future stricter discharge water standards whilst acknowledging the relevance of UNCLOS Article 195 and the fact that restrictions may be in place in certain areas in order to ensure that environmental quality standards under regional or national water quality legislation are met. The Administration should forward information submitted on this issue to the Organization for dissemination by the appropriate mechanisms.

2. Sampling

In order to evaluate the contents of the discharge water and its effects, samples should be analyzed for the parameters listed under para 2.5 of this Appendix. Sampling water should be taken from the following sampling points:
Open Loop: Inlet, Outlet and after the treatment but before dilution.
Closed Loop: Inlet, before treatment, after treatment and dilution. Temporarily stored discharge water, from any tank designed for that effect, from the bottom of the storage tank.

2.1 Preparation

This section describes preparations required prior to any sampling.

2.1.1 The EGCS needs to be equipped with sampling points for sampling of the following water streams:

- inlet water (for background);
- water after the EGC unit (before or after treatment but before any kind of dilution); and
- discharge water after treatment and dilution.

The sampling points should meet the requirements listed under 10.6 of the Guideline.

2.1.2 Preparation for sampling, handling and transport

2.1.2.1 Sampling equipment
The sampling equipment in accordance with paragraph 2.5 needs to be on board prior to sampling. The equipment can be ordered from the laboratory performing the analysis. The equipment should be ordered well before the sampling takes place, taking into consideration the itinerary of the ship.

Labelling of the sampling bottles should be completed before sampling, as the bottles might get wet during filling. The labelling should contain information that can identify which bottle contain which water (OL/CL, inlet/outlet etc.) and at which hour the sample was drawn. In this manner, continuous recorded EGCS control parameters can be retrieved at a later stage. A list with the required information is sown under Para 3.2.7.

Below table lists the recommended physical properties of the sampling bottles needed. It takes ISO 5667-3 and the appropriate analytical standard into account. The table furthermore informs how the samples should be stored when drawn and when they latest need to reach the laboratory for analysis (be aware that laboratories do not perform work during weekends).

Parameter	**Bottle material**	**Volume**	**Method specifying sampling bottle requirements**	**Storage temperature**	**Maximum time until analysis**
NO_2^-/NO_3^-	PE	250 mL	ISO 10304-1	Frozen (≤ -18°C)	8 days
Metals	PE	0,5 L	ISO 17294-2	Cooled (4°C) / dark	1 month
PAHs	Amber-glass with PTFEseal	2 L (OL), 1 L (CL)	DIN EN 16691 or EPA 8270	Cooled (4°C) / dark	7 days
Oil detailed GC-MS	tba	tba	ISO 9377-2	tba	tba

analysis					

2.1.2.2 Preparation for storage and holding of samples
In order to ensure proper storage and holding, the on-board space for samples and ice packs as required needs to be prepared. E.g. the cold garbage room or a provision room may serve as on-board storage space for samples. If the samples have to be stored in a food-handling area, they must be leakage proof, away from food items, and secured against the ship's movement, preferably in an enclosed container.

2.1.2.3 Preparation for transport
In order to ensure proper transport of samples, ice packs as required under 2.4.1 of this Appendix, should be deep-frozen at least 48 h prior to sampling.

Shipping of the samples should be arranged in advance with the port agent of the destination port.

2.1.2.4 Preparation of personnel conducting the sampling
In order to ensure the safety of the ship and the health and safety of the personnel taking the samples, the following should be ensured:

2.1.2.4.1 Personnel conducting the sampling are aware of the hazardous nature of the sampled water and the risk from consuming it or from contact with soft tissues like the eyes.

2.1.2.4.2 Personal protection equipment should be used in accordance with ship / company requirements. Protective eyeglasses/goggles, ear protection, gloves, protective clothing and safety shoes are recommended.

2.1.2.5 Personnel qualifications and responsibilities.
It is important that the personnel taking the samples are well trained. They need to be aware of:

- how the system is working and where the sampling points are located; and
- how to dispose of the flushing water collected during flushing.

2.1.2.6 Information prior to sampling
Prior to sampling the template under 3.1 should be completed.

2.2 Collection
Sampling should be conducted at the sampling points described in paragraph 2.2.1, below.

2.2.1 Sample Time Schedule
A Sampling Time Plan to be produced in advance and agreement reached with the ship's

master/captain as to Engine/EGCS to operate for sampling. Sampling should be executed at least at two different Engine loads (50% and 85% MCR), having consideration for the relevant operational constraints as decided by the ship's master/captain.

Should auxiliary engines be fitted with EGCSs, samples may be taken while the vessel is at sea or at berth, and auxiliary engines should be operated at the highest practicable load. The sampling should be carried out after the system has been running under stable conditions (stable engine load, same fuel oil and stable washwater flow) for a sufficient time:

2.2.1.1 Open Loop operation: The system should have been running under stable conditions for 15 minutes before sampling.

2.2.1.2 Closed Loop operation: The objective for sampling and analysis of EGCS in Closed Loop operation should be the evaluation of the Water Treatment efficiency and to obtain information on the typical pollutant contents in a holding/storage tank. Sampling should be executed during bleed-off.

2.2.2 Sampling schedule in relation to stage of journey
Samples should be taken no more than 24 hours before berthing. (see 2.3 of this Appendix, regarding the maximum allowable sample preservation time).

2.2.3. Filling of the sampling bottle
In order to prevent any contamination of the sampling bottles, the correct filling of the sampling bottle is critical. Therefore it should be ensured that:

- Only sampling bottles prepared by the laboratory are used. For each parameter listed under Para 2.5.1 at least one bottle in accordance with 2.1.2.1. needs to be filled.
- Safety requirements as described under 2.1.2.4 are applied.
- The water flow is steady before and during sampling.
- The valve should be flushed with a minimum of 10 liters of sampling water before taking out samples and is not closed or touched after flushing and before the sampling is done.
- If more than one bottle is filled, the valve should not be closed in between.
- The use of any hydrocarbon-based cleaning agents at the sampling point must be avoided.
- Because of the risk of sample contamination, in-situ hoses must not be used for filling sample bottles. In general the use of hoses, funnels and secondary containers should be avoided.

2.2.4 Information while sampling
While sampling the template 3.2 should be completed.

2.3. Transportation
During transportation it is important to meet the requirements listed under 2.1.2.1 above.

2.3.1 Transportation container

For transportation an insulated and leak proof container should be used. The transportation container should be provided by the laboratory. It should be able to receive a sufficient quantity of ice packs.

2.3.2 Shipping to the laboratory

Shipping of the samples to the laboratory should take place as fast as possible. Labelling of the transportation container should be in accordance with local requirements for shipping and handling of water samples.

Immediately before handing over the samples to the port agent, the ice packs should be put into the box.

2.3.3 Chain of custody

Usually it is not necessary to include a customs declaration as these are water samples of zero commercial value.

2.3.4 Information from the laboratory

Take into consideration information, if any, provided by laboratory.

2.4 Sample preparation and analysis

Analysis should be undertaken by ISO 17025 accredited laboratories using EPA, ISO or equivalent test procedures. Methods used in the laboratories need to be within the scope of ISO 17025 accreditation of the laboratory.

2.4.1 To ensure comparability of laboratory results, the following methods are recommended:

Parameter	**Recommended method for sample analysis**	**Recommended method for sample preparation**
Polycyclic Aromatic Hydrocarbons (PAH): 16 EPA PAHs: Acenaphthene Acenaphthylene Anthracene Benzo-a-anthracene Benzo-a-pyrene Benzo-b-fluoranthene Benzo-g,h,i-perylene Benzo-k-fluoranthene Chrysene Dibenzo-a,h-anthracene Fluoranthene	To be determined DIN EN 16691 (recognising DIN EN 16691 as ISO is currently under consideration) (alternatively: EPA 8270)	To be determined DIN EN 16691 (alternatively: EPA XXXX)

Fluorene Indeno-1,2,3-pyrene Naphthalene Phenanthrene Pyrene		
Oil detailed GC-MS analysis	ISO 9377-2	ISO 9377-2
Nitrate and nitrite (NO_3^- /NO_2^-)	ISO 10304-1	No preparation required
Metals: ▪ Cd ▪ Cu ▪ Ni ▪ Pb ▪ Zn ▪ As ▪ Cr ▪ V	Dissolved and total metal concentrations: ISO 17294-2	Total metal concentrations: ISO 17294-2 Unsolved metals: ISO 15587-2
Discharge water pH should be determined by instant on-board measurements	tba	tba

2.5. Disposal

Disposal should be in compliance with the local and laboratory requirements. If any special additives or reactants are present in or added to the samples, these should be indicated on the sampling bottles.

3. Template for required sampling data

When submitting sampling data to the Administration, the data should include information according to paragraphs 1 and 2 as well as the results from the analyses as described under paragraph 5.

3.1 Data Template Part 1 **Information prior to sampling**		
Parameter	Value	Unit
3.1.1 Ship information		
Ship's name		
IMO number		

Ship build date		dd.mm.yyyy
3.1.2 Combustion unit(s) details Engine questions should be answered for every fuel-burning facility connected to the EGCS		
Number of combustion units connected to EGCS		
Combustion units manufacturers		
Type of combustion unit(s) (ME, AE, 2/4-stroke, boiler)		
EGCS capacity in MW		
3.1.3 EGCS general		
Name of manufacturer		
Name of system		
Number of streams	single / multiple	
System operation mode	open / closed / hybrid	
Type of washwater treatment		
EGCS retrofit or new building		
Installation date		
ETM scheme A or B approval		
Additional notes:		

3.2 Data Template Part 2 **Information for each sampling point while sampling**		
Parameter	Value	Unit

3.2.1 Ship information during sampling		
Min. cruise speed		knots
Max. cruise speed		knots
Start of sampling date and time		UTC
Stop of sampling date and time		UTC
Ship's position start of sampling		GPS
Ship's position end of sampling		GPS
Weather conditions (during sampling)		calm / rough
3.2.2 EGCS operation during sampling		
Number of exhaust gas streams	single / multiple	
System operation mode	open / closed / hybrid	
Type of wash water treatment		
Added chemicals for treatment		Name
Dosage rate of added chemicals for treatment during sampling		[l/m³]
Average washwater flow rate to EGCS during sampling period		[m³/h]
Average dilution water flow rate during sampling period		[m³/h]
3.2.3 Combustion unit(s) operation during sampling		
Average combustion unit(s) load to EGCS		MW
Fuel consumption		t/h
Fuel sulphur content (according to fuel analysis)		

Fuel sulphur content (according BDN)		
Fuel viscosity if available		
Additional notes:		

3.2.4 Online monitoring readings during sampling, for each sampling point			
Monitoring unit	pH	PAH [µg/L / ppb]	Turbidity [FNU / NTU]
Inlet (if available), average during sampling period			
Discharge point, average during sampling period (Outlet)		NA	NA
Before dilution, average during sampling period	NA		

3.2.6 Results to be reported by the laboratory				
Question	Answer		Comments	
Temperature requirements fulfilled during transportation	Yes / No			
Sampling bottles and transportation container prepared by laboratory	Yes / No			
Methods within the scope of ISO 17025 accreditation of the laboratory	Yes / No			
Date and time samples arrived at laboratory				
Date and time of analyses				
Parameter	Bottle ID	Preparartion method	Analytical method	Result + [unit]

Polycyclic Aromatic Hydrocarbons (PAH): 16 EPA PAHs: Acenaphthene Acenaphthylene Anthracene Benzo-a-anthracene Benzo-a-pyrene Benzo-b-fluoranthene Benzo-g,h,i-perylene Benzo-k-fluoranthene Chrysene Dibenzo-a,h-anthracene Fluoranthene Fluorene Indeno-1,2,3-pyrene Naphthalene Phenanthrene Pyrene				
Oil detailed GC-MS analysis				
Nitrate and nitrite (NO_3^-/NO_2^-)				
Metals: ▪ Cd ▪ Cu ▪ Ni ▪ Pb ▪ Zn ▪ As ▪ Cr ▪ V				

3.2.7 List of Bottle IDs

Sampling point	Parameter PAH	Parameter Metals	Parameter X
Inlet/discharge point etc.	Bottle # 1 + time stamp	Bottle #2 + time stamp	Etc.
discharge point	Bottle # + time stamp	Bottle # + time stamp	Etc.
Etc.	Etc.	Etc.	Etc.

Annex 2

Proposed amendments to the *2015 Guidelines for Exhaust Gas Cleaning Systems*, MEPC.259(68)

In order to ensure representative sampling, it is proposed to add a new general requirement in section 10:

10.6 Design requirements for sampling points valid for water monitoring systems according to 10.2 and for sampling in accordance with Appendix 3 of these Guidelines.

10.6.1 Isokinetic conditions

Each sampling point for water monitoring according to 10.2 and for sampling in accordance with Appendix 3 should support isokinetic conditions. The sampling point should be installed at a location representative of the main water stream with the same flow speed as the main water stream. If the water stream in the monitoring unit according to 10.2. is split into parts, the requirements under 10.6 need to be ensured inside each monitoring unit.

10.6.1.1 Location of sampling point

The sample should be taken inside the pipe of the main water stream at a point with as little turbulence as possible.

Turbulence before and directly after the sampling point could affect the representatives of the water sample and should be avoided. Sampling points therefore need to be located away from features such as curves and pumps. The minimum distance to such features should be five times the diameter of the main pipe before the sampling point and three times the diameter of main pipe after the sampling point.

10.6.1.2 Flow speed at sampling point

In order to ensure isokinetic conditions the flow speed of the sampling stream needs to be equivalent to the flow speed of the main water stream. This can be ensured by a pump operating at a speed which represents the flow speed of main water stream.

10.6.1.3 Design requirements for sampling valves

In order to ensure sampling in accordance with Appendix 3 of this Guideline and avoid contamination, the respective sampling valves should be designated for taking the samples only and not be used for any other purpose (e.g. pressure sensor).
In addition, the sampling valve should be:

- kept clean in order to avoid contamination;
- labeled for clear identification;
- easily accessible with sufficient space (at least 35 cm) in order to place a sampling bottle underneath; and

- equipped with a drainage device in order to drain the flushing water either back into the system or into the bilge
- preceded by a stop valve to allow the sampling valve to be removed for maintenance such as de-scaling, or to be replaced if malfunction (e.g. leaking) occurs.