WORKSHOP REPORT

EMSA Workshop on Ballast Water Sampling and the development of a Joint European Ballast Water Sampling Strategy

23rd and 24th February 2010

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I. Introduction

In November 2008, EMSA hosted a workshop entitled: Implementing the Ballast Water Management Convention[1] (BWM) – the EU dimension. This workshop resulted in the development of an Action Programme, through which the European Maritime Safety Agency and the European Commission could add value to the Member States work in ratifying the BWM Convention and developing and contributing to the strategies being developed by the Regional Sea Organisations[2].

Issues surrounding ballast water sampling and analysis were included in this Action Programme. Therefore, in order to develop an EU-wide ballast water sampling strategy EMSA set up this workshop to discuss the many issues surrounding compliance testing. The workshop was attended by 17 Member States, Croatia and Norway (please see Annex 1 for an attendance list). It also bought together 36 experts in ballast water sampling, ballast water analysis, policy making, port State control, statistics and legal issues from both the industry, EMSA and the Member States. It should be noted that two further Member States, Denmark and Sweden, could not attend due to other commitments and Turkey could not attend due to visa logistics.

II. Objectives of the workshop

The overall objectives of the workshop were to:

- develop an understanding of the following within the Member States:
  1). the latest developments in sampling and analysis for compliance testing;
  2). the practicalities and problems encountered when sampling on board a vessel;
  3). the practicalities and problems encountered when analysing a sample; and
  4). the practicalities and problems encountered when developing a case against a ship for non-compliance;
- identify the elements that need to be included in a European Ballast Water Sampling Strategy; and,
- identify any actions or research that may be needed in order to develop a European Ballast Water Sampling Strategy.

III. Workshop Report

Day 1

The meeting was opened by Theresa Crossley, EMSA's Head of Department B – Implementation. After welcoming everyone to Lisbon and to EMSA, she outlined the history of EMSA's work in the field of Ballast Water, which has resulted in the

[1] The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004

[2] HELCOM (the Helsinki Commission), the OSPAR Commission, the Barcelona Convention, through REMPEC, and the Black Sea Commission.

development of a Ballast Water Action Programme. She then outlined the objectives of the workshop and wished everyone success in their endeavours. Brian Elliott, Senior Project Officer in EMSA's Environmental Protection Sector and Co-Chairman of the Workshop then also welcomed everyone and ran through the Agenda of the workshop.

Background to Sampling

Originally the IMO was asked to attend the meeting, set the scene and outline the development of guidance on ballast water sampling and analysis at the MEPC and BLG Committees. Unfortunately due to the proximity to the BLG 14 and MEPC 60 meetings and the workload that this entails, Dandu Pugiuc, Head of Biosecurity at IMO could not attend. In absentia, he supplied a paper on the issue entitled "Ballast Water Sampling – An overview of the work carried out by IMO", which was presented by Mirja Ikonen, Senior Project Officer in EMSA's Environmental Protection Sector. This paper outlined the principles that have been developed and the discussions on sampling that have been held under the auspices of the IMO and the Globallast Project, from the first Globallast Workshop on this matter in Brazil in 2003, to the adoption of the Guidelines (G2) at MEPC in 2008.

Key principles that have been developed and utilised in the development of the Guidelines (G2), include:

- sampling techniques and programmes should be tailored to the purpose of sampling, such as scientific research, risk assessment, capacity building, efficacy testing of ballast water management systems or compliance monitoring;
- sampling has to be practical, rapid and, most importantly, needs to enable comparison of results when samples are taken in different countries by different stakeholders;
- the samples should be representative of the whole discharge from any single tank or any combination of tanks;
- sampling methods should be safe to the ship, inspectors, crew and operators as well as simple, feasible, rapid and applicable at the point of the ballast discharge;
- compliance testing methods can be grouped into indicative analysis, which can be completed rapidly and conducted by the port State control officers, and detailed sampling, which is time-consuming, labour-intensive and requires expert personnel and laboratory facilities;
- indicative analysis can help the port State to identify immediate mitigation measures to avoid additional impact from a possible non-compliant ballast water discharge, and assist ships' Captains to evaluate the situation and decide on the most appropriate course of action;
- sample analysis shall not be used as a basis for unduly delaying the operation, movement or departure of the ship; and,
- that automated systems for ballast water sampling can be used, provided such systems are sufficiently progressed and can be validated.

The Guidelines (G2) provide a set of principles that, if properly applied, ensure a consistent approach and provide much needed certainty to the shipping industry. However, the IMO still need to compile further guidance on appropriate ballast water sampling and analysis protocols; uniform application of such protocols; and, the interpretation of the results arising from sample analysis. An aide-memoire has been developed to help compile guidance and an IMO circular on these issues. The IMO hope that the EMSA Workshop on Ballast Water Sampling

will carry out a candid evaluation of issues surrounding sampling and analysis and offer its findings to the international community to facilitate further progress on this complex matter, both at the BLG and FSI Sub-Committees.

At the end of the presentation the Workshop the delegates were informed of recent developments at BLG 14, which was held two weeks before the EMSA Workshop. The issue of the development of further guidance on sampling and analysis protocols and the interpretation of the results has been a high priority item for the BLG Sub-Committee over the last few years, however very little progress has been made and only two submissions on this matter from Brazil (BLG 14/5/2) and Germany (BLG 14-INF.06) were made to BLG. In the light of the work that the European Commission, through EMSA, was planning to undertake on this issue, the IMO asked if EMSA could co-ordinate the development of a base paper on this matter for discussion at BLG 15. After liaison with the European Commission, their Permanent Representative at IMO and the Member States, it was agreed that the findings of the workshop could be used for this purpose and an EC paper would be developed and submitted to the next meeting of the Sub-Committee. A statement to this effect was then drawn up and used to inform BLG 14 of our intentions. This statement can be found in Annex 2.

Port State Control

Brian Elliott then gave a presentation on the issues faced by a port State control (pSc) officer in checking a ship for compliance with the BWM Convention, specifically the D-2 Standard. Key issues that were covered in this presentation included:

- What, realistically, would the port/flag State control inspectors check on a ship;
- Is checking certification, documentation and record keeping a sufficient deterrent? Or do we need to sample?;
- When to take a sample - What is the trigger? or the threshold?;
- What are the "Clear Grounds" needed to stop a discharge?;
- Pollution liability issues that arise when allowing a vessel to continue discharging if there is a suspicion it is not in compliance with the D-2 Standard, and/or restarting the discharge to undertake testing; and,
- Ways to overcome these issues.

Extensive discussion followed on what exactly a pSc Officer can do in the short period he is on board, especially if he arrives during the ballast water discharge or after it has happened. Unlike other environmental legislation the BWM Convention offers the port State the opportunity to sample a very large discharge which takes place over a long time scale. There was some concern amongst some Member States that the pSc officers were not experts in this field and sampling for compliance should be done by trained professionals. Nevertheless, the logistics of calling on specialised personnel or experts to attend remote or distant ports was identified as a significant problem that would be costly and cause undue delay.

EMSA was thanked for raising the issue of the potential port State liability for any damage caused by the ballast water discharge once the pSc officer thinks there may be a problem, but doesn't have "clear grounds" to stop the discharge. None of the Member States had had experience of this problem with other discharges, mainly because testing methods are not based on biological standards. However, the point was made that there is in fact two sets of liability, one for the pollution and one for the undue delay that any halt in the discharge may cause, if it has

not been based on "clear grounds". This is especially difficult as under the new pSc Directive - EC Directive 2009/16/EC on Port State Control - it the Recognised Organisations and the Master/Owner of the ship are likely to challenge any pSc decision that will detain the vessel if there is no clear and common guidance. What is needed is some form of simple spot check sampling methodology that can provide "clear grounds" that an offence has been committed. This can then be added to the tools used by the pSc officer to decide if the ship is in compliance with the D- 2 Standard and whether the ballast water discharge needs to be stopped.

Sampling for Compliance

Stephan Gollasch of Go-Consult then gave a presentation on "Onboard Ballast Water Sampling for Compliance Control". His presentation covered the following issues:

- An overview of sampling methodologies for compliance control;
- Comparison of sampling methods for discharge directly after treatment and for treatment on uptake and then storage in the ballast water tank before direct discharge to the sea;
- Representativeness – statistical versus biological conflicts;
- Effect of homogeneity on representativeness;
- How to test for performance, i.e. sequence testing versus. Sampling over the entire discharge;
- Suitable sample volumes;
- Timing of the sample;
- Problems with concentrating a sample;
- Sample handling; and
- The pro's and cons of indicative sampling and full scale sampling.

He then finished his presentation outlining recommendations for sample frequency and size for full scale testing. Issues raised in the following discussion included:

- the time it takes for sampling a discharge event, bearing in mind that the discharge may occur continuously over a long time (for bulk carriers), or consist of many small individual operations (for container ships);
- the time it takes to get a sample to a laboratory and how to get it there, especially from remote ports, or in countries that have no facilities for analysis; and
- how the filtered water should be disposed of during sampling;

Additionally the question was raised as to whether there were any methods to undertake indicative sampling? A few methodologies were briefly outlined, however the issue of whether they are representative has yet to be tested.

Analysis for Compliance

Tracey McCollin of Marine Scotland then outlined the issues surrounding analysis for compliance. In her presentation she identified the differences between traditional plankton analysis methods and the specific analysis needed for compliance testing for the D-2 Standard. Issues surrounding the measurement of plankton, testing for viability, counting numbers of organisms and the robustness of statistical analysis were also discussed.

The discussion that followed raised some interesting points with regard to how to test, measure and record species that form colonies. Additionally, the potential need for an ISO Standard on this matter was discussed.

Experiences of Shipboard Testing and the Analysis of Samples

The next two presentations were given by Marcel Velhuis from the Royal Netherlands Institute for Sea (NIOZ) and August Tobiesen from the Norwegian Institute for Water Research (NIVA). Both of these organisations have been shipboard testing and analysing results for sometime now. Although, this testing and analysis has been focussed on certification through the type approval testing there are some parallels and lessons can be learnt for compliance testing.

Issues raised in these presentations included:

- Phytoplankton analysis and flow cytometry can be used but viability testing is difficult. The presence of some active substances for example can reduce the effectiveness of some of the stains used to test for viability, resulting in false positive results;
- There seem to be inherent flaws in the statistical calculation of how many samples are needed to test for representativeness. If the model being used was applied in the natural environment – the whole environment would have to be destroyed to sample it;
- The pro's and con's of manual versus automated sampling;
- Problems encountered with respect to the variation in organism size;
- The creation of false negative results from ballast water treatment system's that need time to take effect i.e. Ultra-violet systems;
- Significant dead volume in piping and tanks exist, which needs to be discharged before sampling can begin;
- Evidence of potential re-growth of organisms in the ballast water tank has been observed after the water has been treated on uptake;
- Intake water is never homogenous with respect to the type and number of organisms;
- On average systems are achieving 1 order of magnitude lower than the D2-Standard, however numbers of organisms can vary significantly in the discharge within the compliance limits of the D-2 Standard;
- Sampling for less than 10 organisms in any volume of water gives a 31% statistical variation, therefore part of the D-2 standard practically becomes "between 7 and 13 organisms";
- Presently a gap exists between the IMO definition of viability and what can be observed. Tests are done using strains that reflect the integrity of cell membranes or presence of DNA, however stains are needed to test for reproductive ability;
- Some organisms may die or be injured during the concentration process and movement in a concentrated sample may be limited; and,
- Although tests have been devised to count the number of viable organisms in the 10-50 µm size range, these are not suitable for all species, i.e. some species do not grow in test tubes.

During these presentations, some interesting methods of undertaking indicative analysis and sampling, and even full scale sampling, were raised. From using very basic statistics to identify the number of organisms over 50 µm in size and then extrapolating up to check that the D-2 Standard is being met – to creating a system where the vessel is told a set volume will be taken analysed for live organisms and then the results extrapolated to check for D-2 compliance. However, the issue of representativeness repeatedly came up, with questions

being raised on the meaning of the results of these proposals and whether they can be used as "clear grounds" to stop the discharge.

Later in the day, the discussion turned back to the pSc issue and the role of pSc officers in the process of sampling. However in this section of the workshop questions were specifically raised on the issue of when sampling would be needed and the fact that it would not be needed in every case. Therefore, some form of check list would be needed as a tool to help pSc officers conclude whether there are "clear grounds" that the ship is not meeting the D-2 Standard, and make a decision on further action.

The Member State's Perspective

Karin Schröder of the Bundesamt für Seeschifffahrt und Hydrographie (BSH – the Federal Maritime and Hydrographic Agency) then gave a presentation on issues that may need to be considered from a Member States perspective when considering compliance testing, based on the three documents available to the port State: Art. 9 of the BWM Convention; the Guidelines for Ballast Water Sampling (G2); and, the Aide-Memoire attached to the guidelines (G-2). Issues raised in this presentation included:

- The principles that need to be considered – no undue delay and sampling has to be safe to ship, inspectors, crew and operators, simple, feasible, rapidly applicable at the point of discharge and representative;
- The need to identify and define "clear grounds";
- Compliance testing means testing the ship's discharges for compliance to the D-2 Standard – not the BWTS. Therefore, port States need to also look and focus on the operation and use of the system by the ship;
- The focus is on indicative analysis rather than indicative sampling in the guidance to evaluate the potential of compliance or non-compliance, with the goal of identifying immediate mitigation measures;
- What happens after this point? – what mitigation measures can be used and is further sampling needed?
- The need for a feasible/practical sampling methodology using small sampling quantities; simple, standardized and fast methods; and, light equipment that does not require the user to attend a extensive training course to use (i.e. longer than a couple of days);
- Sampling and analysis is mentioned/planned for in the BWMC – so compliance should not only be based on "paper" inspection – therefore are we obliged to sample?;
- The potential need for an ISO Standard on Sampling and Analysis; and,
- Examples and potentially a definition of "clear grounds" are needed.

Following the presentation there was some debate over the terminology being used in the workshop, the BWM Convention and the new EC Directive 2009/16/EC on Port State Control. For example the different terminology being used for initial inspection and detailed inspection are not consistent and thus some confusion is starting to occur. This needs to be sorted out in any further documentation. The other non defined term being used is "clear grounds". Other points raised were the link between ballast water sampling and the ISM code and the fact that ballast water discharges are often not constant, depending on the loading pattern, the initial trim of the vessel and the water levels in the port.

The workshop then went on to discuss other issues that the Member States had with respect to sampling. These included:

- The need for representative and indicative analysis or sampling;
- The timing of the arrival of the pSc office in conjunction with the de-ballasting operations of the ship
- The need to fill the present gaps in the D2 Standard through development of the aide memoir
- Could the owner be made to take and analyse the sample? Or could this be linked to the interim and annual surveys? – this was discussed extensively, however the detention of the ship on the masters evidence was found to be a problem;
- The need for guidance on how to prove "clear grounds". In this way the vessel is then responsible for fixing the problems and there should not be any undue delay caused by the sampling methodology – (ie logistics and or time for equipment to be set up). The use of indicative analysis/ sampling would limit the grey areas where the pSc officer does not have "clear grounds" to stop the discharge and pass the responsibility over to the owner, but thinks there may be a problem and needs to confirm it. This is critical as it may take the owner weeks to fix any fault;
- What does pSc do if a ship reports a problem en-route into the port – what management options are legally available?;
- Awareness of other methods under B3.7 of the BWM Convention may be needed, although the method of compliance testing these should be available on the ship;
- The need to encourage or make use of data recording apparatus built into the systems for manufacturers to test whether a system is working; and,
- Looking for other key indicators , for example Japan are looking at testing for active substance by-products to indicate whether a system has worked; Australia are working with one manufacturer to develop specific indicative methods for their systems to aid pSC; and, Brazil are suggesting that sampling protocols for individual vessels and be held onboard or type of vessels.

However time and time again the debate returned to the key questions:

1). What does the port State control officer do?
2). How and when is sampling needed?
3). How can indicative analysis and sampling be incorporated in into the compliance testing procedure?
4). How can this be representative?

The Sampling Protocol

Matej David from the University of Ljubljana then gave a presentation on the ballast water sampling protocol and implications for pSc. He:

- split the compliance testing proceedure into stages from the pSc perspective to begin integrating pSc and ballast water compiance testing proceedure;
- discussed the role and scope of indicative analysis/sampling in ballast water compliace testing;
- discussed the difference between biological and statistical representativeness and the istantaneous and average treatment of results;
- discussed the impact of sediment load on the sample;
- provided recommendations for:
    - the appropriate sampling point;
    - safe sampling methods;
    - sample sizes,

  - handling and storage of samples and
  - what the port State could do in the
    - pre sampling stage both prior to going on a vessel, and on boarding a vessel;
    - during the testing procedure; and,
    - the post testing period.

The workshop then discussed the following major points:

- The uniqueness of the BWM Convention in that the consequence of the failure of a BWTS is major for the ship's operation and business;
- The need for long term monitoring of the performance of BWTS;
- Can indicative sampling be undertaken without full scale sampling? This would depend on whether it is representative and can provide "clear grounds";
- A common, colllective, consistent understanding on the approach to sampling is important for the EU as each individual Member State may not be able to formulate individual strategies on their own;
- The need to send a positive message to the industry that pSc take this issue seriously, however using indicative sampling only may undermine this message;
- pSc need to have a system that provides "clear grounds" of a violation so the discharge can be stopped, but Member States also have to consider any potential legal challenges based on undue delay or the specific reasons for the recorded violation;
- concerns as to whether the BWTS will meet the D-2 standard at all times as:
  - systems may not be able to deal with the large spikes in the number of organisms passing through the BWTS, that are caused by migrating plankton forming naturally occurring horizontal variation in the ballast tank;
  - the time lag that may be needed for a BWTS to begin working at full efficiency after being switched on; and,
  - the fact that some of the Type Approval testing is based on a regime that averages results. Despite evidence to the contrary – systems are proving to be at least ten times more effective than the D-2 Standard – and are made to meet the D-2 Standard at all times, there is still a concern whether systems can meet this standard at all times;
- pSc will not be able to do everything, a balance is needed through a staged appoach using indicative analysis and sampling, and then full sampling if needed;
- the need to define indicative analysis, indicative sampling and full scale sampling and whether or not the indicative tests can provide "clear grounds" or be representative;
- the potential to use samples before treatment and after treatment as an indicative analysis (to see if the BWTS is working). This would be difficult as there is only one sampling point and it would not be appropriate for UV systems with time lag effect or sytems that treat on uptake; and
- The potential to extrapolate the results of indicative analysis for compliance testing.

Day 2

Day 2 began with Henrik Ringbom, EMSA's Head of Unit B.3, and the Co-Chairman of the workshop, welcoming everyone back to the meeting.

A European Ballast Water Sampling Strategy (BWSS)

The only presentation of the day was then given by Brian Elliott from EMSA. This presentation began by identifying what a BWSS ideally should include – that is a system that easily identifies a ship whose ballast water discharge does not comply with the D-2 Standard. However, over the course of the workshop certain issues have been identified that complicate this ideal. These include: sample representativeness; sample homogeneity; the definition of "clear grounds"; inherent variability in results; liability; and, undue delay. Combined with the practicality, logistics and costs of sampling then there are some significant problems to be rectified. This ideal situation is also restricted by the traditional method of enforcement through pSc which is not set up to take samples and relies on other parties to progress enforcement matters past the point of inital concern and the order to stop any discharge.

The presentation went on to identify a practical methodology for enforcement, based on a staged approach - firstly through pSc, then Indicative Sampling (later changed to Indicative Analysis, followed by a new concept - Indicative Sampling - to be in line with the Guidelines (G-2)) and then full sampling. The use of each would depend on:

- when and how "clear grounds" can be found to ascertain whether the discharge is non-compliant and therefore stop the discharge;
- whether some form of analysis/sampling is needed to provide these "clear grounds"; and,
- whether full scale sampling is needed to gather data for enforcement procedures or restart the discharge.

A flow diagram of this procedure can be found in Annex 3.

Methods of how to undertake indicative analysis/sampling and full scale sampling were then discussed, with the emphasis on devising an indicative analysis/ sampling test that indicates whether a system is working or not. For example - if a BWTS does not work there will be a significant number of live individuals in a small sample of water, rather than one or two. Therefore, such a test maybe used in the meantime until the issues of representativeness, homogeneity and liability in full testing can be worked out and we can specifically test to the D-2 Standard.

The presentation then went on to discuss what can be in a BWSS for Europe and this is outlined in the Conclusions.

Following this presentation the following issues were raised:

- The possibility of automatic testing and the potential for this technology to mature in the future, either through flow cytometry or algal monitoring (which has been built into one system);
- The need to enhance the guidelines for pSc being developed at FSI. EMSA's pSc expert outlined the work that has been undertaken at FSI and indicated that there was a correspondance group discusing the pSc Guidelines on this matter. The group felt that there were some key issues

that had been bought up in this workshop and these needed to be passed to the Group. The Chair suggested that he would liaise with the respective Member State interested and present any issues to the IMO Correspondance Group through the EMSA Member contact point, and this was welcomed by the delegates;

- Instantaneous versus average testing – the chair started by stating that previously there had been no consensus on this issue and that there was unlikely to be at this meeting, therefore any EU BWSS would have to consider both options. After some discussion this conclusion proved to be right as there were opposing views between the Member States on how to interpret the results of any analysis;
- That this Strategy is meant to be guidance – MS can and may have to add to it to ensure compliance with the BWM Convention under their legal system;
- The need for training all the way through the process; and,
- The need for research – the chair put forward some views on what research needs to be undertaken and the workshop added to these. After some discussion it was felt that research was needed in the following areas:
    - How to test for representativeness of a discharge from a BWTS and a ballast water tank;
        - For a discharge from a BWTS, this can be achieved through testing the discharge prior to treatment and after it to see if there is any correlation between organism levels. This can also be used to see if a system can meet the D-2 Standard throughout the discharge cycle and deal with spikes in the numbers of organisms present.
    - How to undertake indicative analysis/sampling to provide "clear grounds" for stopping a discharge and/or enforcement; and,
    - The development of guidance for how to take and analyse a sample.

  In addition research on the long term efficiency of the BWTS was suggested for future research; maybe five years after the systems have been installed on vessels.

Brian Elliott then outlined proposals for future work on this issue which included the following actions:

- Papers will be put on the EMSA Website as soon as possible;
- Workshop report will circulated widely (EC, MS and speakers) by mid March;
- Input to the FSI correspondence Group by 16th March;
- Workshop report will be widely distributed for information and to pave the way for the BLG 15 paper – US, Can, NZ, Aus, Japan, Bz etc.;
- Workshop report used as basis of report to ICES meeting in mid-March;
- Preliminary European Ballast Water Sampling Strategy circulated for comment at the end of April/mid May;
- Research tender Sent out in Mid May; and,
- Draft paper for IMO sent out at the end of the summer 2010

The co-chairs then thanked everyone for attending and closed the workshop.

IV. Conclusions

The workshop concluded that an EU BWSS is valuable, but needs to focus on the following issues:

a. Pre pSC – Guidance for port States on what to do when a vessel indicates that they have a problem with their BWTS prior to entering a port;
b. pSc -
    i. bringing the specific ballast water issues that were raised in the workshop to the attention of the FSI Correspondance Group;
    ii. providing guidance on how "clear grounds" can be identified in the normal pSc inspection
    iii. providing guidance on, or procedures for, when a pSc office suspects there is something amiss, but needs some form of analysis/ sampling to prove "clear grounds";
    iv. providing guidance for the port State on management options for the vessel once a discharge has been stopped; and,
    v. providing training to pSc officers.
c. Indicative analysis/sampling
    i. Guidance on how to undertake indicative analysis/sampling within pSc inspections and/or supplementary to pSc inspections, the difference between indicative analysis and indicative sampling and how to interpret the results from these tests;
d. Full scale testing/analysis –
    i. Guidance on:
        1. the relationship between indicative analysis, indicative sampling and full scale sampling;
        2. preparations needed before sampling, including the use of Health and Safety Risk Assessements;
        3. going on board to sample;
        4. the sampling procedures (an EU, IMO or ISO Standard);
        5. Sample handling, transport and chain of custody procedures; and,
        6. the analysis procedure (an EU, IMO or ISO Standard);
    ii. Research and the development of standards to ensure representativeness:
        a. In situations where discharge takes place after treatment; and,
        b. situations where the discharge takes place after a holding period in the ballast water tank;
    iii. providing training to samplers and analysts
e. Research into;
    i. How to obtain a representative sample from a BWTS that is directly discharging into the sea;

ii. How to undertake indicative analysis/sampling to provide "clear grounds" for stopping a discharge and/or enforcement; and,
iii. The development of guidance on how to analyse a ballast water sample.

Annex 1: Participants

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Annex 2: The European Commission's Statement at BLG14

"The European Commission, through the European Maritime Safety Agency, in conjunction with the EU Member States, have begun to discuss ballast water sampling for enforcement and will continue debating and discussing it in various fora over the next few months. The European Commission will share the conclusions and results of this debate with the IMO Member States in due course. Based on the conclusions and findings of our discussions, we intend to present a paper to BLG 15 on this issue, that develops the existing "aide memoire" into a potential draft guidance document. The European Commission will welcome offers of help from any IMO Member State or observer who would like to assist us, help us in this endeavour, or potentially co-sponsor a paper."

Annex 3: A Flow Diagram of the proposed Staged Approach to Compliance Testing