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INTERPRETATIONS OF, AND AMENDMENTS TO, MARPOL AND RELATED INSTRUMENTS

Information on the proposal to designate the Baltic Sea as a Special Area under MARPOL Annex IV

Submitted by the Cruise Lines International Association (CLIA)

SUMMARY

Executive summary:	This document contains background information in response to a proposal by Baltic States to amend MARPOL Annex IV to include the possibility of establishing Special Areas for the prevention of pollution by sewage and to designate the Baltic Sea as such a Special Area
Strategic direction:	7.1
High-level action:	7.1.2
Planned output:	7.1.2.1
Action to be taken:	Paragraph 53
Related documents:	MEPC 60/6/2, MEPC 60/6/3 and MEPC 60/INF.4

Background

1 This document has been prepared as a supplementary report to the submissions that will be made by CLIA to MEPC 60, to comment on documents MEPC 60/6/2, MEPC 60/6/3, and MEPC 60/INF.4. The purpose of these submissions is to assist the Committee in reviewing and reaching a conclusion on the proposal by Baltic States to amend the Guidelines for the Designation of Special Areas under MARPOL 73/78 (Assembly resolution A.927(22)), to include the possibility of establishing Special Areas for the prevention of pollution by sewage, and to request that the Baltic Sea be designated a Special Area under MARPOL Annex IV.

2 The proposal submitted by a number of Baltic States on behalf of HELCOM is one of a number of actions contained in a document entitled "Baltic Sea Action Plan" (BSAP) that was discussed and adopted at a High-level ministerial meeting in 2007, where key targets and timelines were agreed. The proposal targets a single sector of the maritime industry that, in the

words of the Helsinki Commission: "*If all sewage [from passenger vessels] were discharged into the sea, the percentage of this input, compared to the total annual nutrient input into the Baltic Sea could be < 0.035% for N and < 0.34% for P*" (see annex 1 to this document), despite several very positive developments and commitments given by the passenger industry to voluntarily adopt practices that will achieve the goals of the proposed MARPOL changes (see annex 2).

3 This document examines several factors that CLIA believes would lead an objective observer to determine that the proposal is inappropriate at this time:

.1 critical omissions and errors in the assessment and methodology used by VTT;

.2 the lack of any objective cost versus benefit studies that would justify the regulation;

.3 ongoing enhancements in treating wastewater on passenger ships where some treatment systems exceed most HELCOM land-based facilities of equivalent size;

.4 the proposed nutrient discharge criteria for passenger ships exceed the criteria for land based facilities which are responsible for the overwhelming majority of nutrient loading in the Baltic; and

.5 disregard of the significance of adequate port reception facilities.

Key observations and findings:

Critical omissions and errors in the assessment and methodology used by VTT

4 The draft proposal is based on a number of investigations by HELCOM, the pivotal study being the work done by VTT Research Centre in Finland. Its 2007 Report 2370, entitled "Estimated nutrient load from wastewater originating from ships in the Baltic Sea area", is the key supporting document, which unfortunately at a closer review is seen to contain a number of omissions and critical errors in both its methodology and overall approach to the entire issue of eutrophication in the region.

5 The 2009 update by VTT of Report 2370 states that it now addresses all the knowledge gaps and associated impacts relating to MARPOL Annex IV. There is no attempt however by VTT to conduct a preliminary Environmental Impact Assessment (EIA) of nutrient loading into the Baltic to compare costs versus benefits of the proposed regulations. The VTT study on port waste reception facilities (PRF's) did not accurately assess the "***Adequacy***" of the regional facilities pursuant to resolution MEPC.83(44): "Guidelines for ensuring the adequacy of port waste reception facilities". Ship to shore compatibility is vital in determining any waste management strategy on any type of ship. This fact was most recently recognized by MEPC last year under MEPC.1/Circ.671 "Guide to good practice for port reception facility providers and users". In recognition of its importance, ECC and CLIA conducted a short study of 25 passenger ports using the IMO guidelines above and concluded almost 90% of these PRF's in the Baltic region are inadequate. This is the polar opposite conclusion to that reached by VTT.

6 No detailed scrutiny of the capabilities of the receiving sewage treatment facilities in or adjacent to the ports was conducted. This review should have included nutrient removal (nitrogen and phosphorous) and conventional pollutant removal ($BOD_{5,}$ COD, Faecal Coli forms, TSS) to compare these to the HELCOM proposal and passenger ships. We believe that almost all these facilities cannot consistently meet the proposed treatment standards targeted for

land-based treatment facilities within the Baltic countries as part of the Baltic Sea Action Plan (BSAP). The intended timeline is compliance by 2018 which is significantly later than the proposed standards for passenger ships which may be as soon as 2013. Another important factor to be considered in this review is the recognition that some passenger ships fitted with Advanced Wastewater Treatment systems (AWTs) exceeds some of the envisaged effluent standards for conventional pollutants today.

7 HELCOM initiated a pilot project in 2004 to investigate and develop appropriate assessment methods for determining nutrient concentration in waters. A report entitled "*Development of tools for thematic eutrophication assessment (HELCOM EUTRO)*" failed to develop a suitable assessment methodology. One major area of concern is the determination of the reference conditions and subsequent assessment for the various water-bodies and basins contained within the region. This resulted in 13 out of 13 basins and 29 out of 29 water bodies being calculated as eutrophic problem areas. Unfortunately, this conclusion is inconsistent with the current known status of certain sea areas such as Bothnian Sea and Bothnian Bay which are considered non-problem areas for eutrophication by HELCOM. This highlights the need for further work on the assessment methodology, which the pilot project co-authors agree in their concluding remarks.

8 The U.S. Environmental Protection Agency (EPA) recognizes the difficulties in this holistic approach and has thus, developed a guidance manual for establishing nutrient criterion in estuaries and marine waters. They state: "Nutrient criteria need to be established on an individual estuarine or coastal water system basis and must be appropriate to each water body type. They **should not** consist of a single set of national numbers or values because there is simply too much natural variation. Similarly the expression of nutrient enrichment and its measurement varies from one water body to another.".

9 The use of Best Available Technology (BAT) and Best Environmental Practice (BEP) is cited under HELCOM recommendation 28E/4 Amendments to Annex III "Criteria and measure's concerning the prevention of pollution from land-based sources" of the 1992 Helsinki Convention for the assessment of technology to reduce pollution from agricultural activities. Yet this approach is omitted from the maritime review. Consequently, information as presented does not allow a holistic review and conclusion to be made in the proposal.

The lack of any objective cost versus benefit studies that would justify the regulation.

10 Both United States-based CLIA and various European-based cruise associations (ECC and PSA) have environmental policies which include on-going commitment to researching the best-available practices and which encourage wastewater technology suppliers and researchers both, directly with financial assistance, and indirectly by allowing pilot tests onboard ships, to examine improved technologies to reduce environmental impacts from their operations. At present there are a small number of ships undergoing trials to reduce nutrients involving a number of AWT suppliers. This work is being undertaken voluntarily and with the involvement of various United States environmental agencies such as the Alaska Department of Environmental Conservation (ADEC) and EPA. The review of the current status of sewage treatment systems onboard ships conducted by VTT and the conclusions reached by HELCOM based on the limited information and knowledge is considered an inaccurate representation of today's passenger industry.

11 On nutrients, shipboard AWT technology was extensively tested during 2004 and 2005 on four cruise ships. These ships were fitted with different Advanced Wastewater Treatment (AWT) vendor systems and technologies. These systems provided reductions in nutrient ranging from 40% to 98% of the influent loading, depending upon the technologies used, operational processes and influent characteristics.

Table 1

2004-2005		Average Concentration		
Nutrients	**Units**	**Influent**	**Effluent**	**% reduction**
Ammonia as N	mg/*l*	78.6	36.6 ± 5.0	58 to 74
Nitrate/Nitrite	mg/*l*	0.33	3.3 ± 0.7	NC
TKN	mg/*l*	111	32.5 ± 3.3	70 TO 76
Phosphorous	mg/*l*	18.1	5.1 ± 0.5	41 TO 98

12 Current AWT technology has been specifically developed to reduce various classic and priority pollutants such as bacteria, suspended solids, and faecal coliform. Other analyses such as nutrients and heavy metals have not undergone specific removal investigations until 2008; however, reasonable nutrient reduction rates were achieved as a by-product of the biological treatment process for soluble nutrients and the level of filtration in the AWT for insoluble nutrients. Over the last few years CLIA member lines have begun work to reduce nutrients such as removing phosphates at the source from detergents and cleaners.

13 There is limited data available on nutrient removal for conventional type II MSDs, but the small amount of data available suggests AWTs are around five times more efficient at removing nitrogen ammonia as *N* from sewage. The background data on current technology provided by the Baltic States in MEPC 60/INF.4 on AWT is considered to be a high-risk appraisal by the relatively new AWT manufacturer. In reviewing manufacturer's data it is based on a 25 person AWT desktop study primarily supported by laboratory trials. The influent design loading, a critical parameter in the AWT performance, is stated by the company to be 75% of a typical cruise ship loading. While the company in question has a 652 person AWT installed on a small cruise ship, it is believed that no specific shipboard proving trials for the HELCOM design on nutrient reduction has been conducted. To our knowledge, the proposed design has not been verified in full-scale at sea. The company has very little cruise ship experience involving AWT and, as such, the stated claims, both technical and commercial, are unproven and the data provided in the report should be regarded as "preliminary" at best. Interestingly, the same manufacturer during discussion with the consultant on the nutrient targets confirmed that absolute limit for nitrogen contained in the proposal is not currently feasible.

Ongoing enhancements in treating wastewater on passenger ships where some treatment systems exceed most HELCOM land-based facilities of equivalent size

14 Current status of AWT technology on passenger ships: Currently the vast majority of AWTs have some form of biological process within the system configuration, with most adopting membrane bio-reactor technology (MBR). Future development of AWTs for nutrient removal will favour biological technology for *TN* and chemical precipitation for *TP* reduction in nutrient loading:

.1 biological nitrification for ammonia;

.2 biological de-nitrification for total nitrogen removal and/or reduction; and

.3 chemical precipitation for total phosphorous removal and/or reduction.

15 All three processes above will require additional equipment and space; reactor volume will also be increased for the removal of *N*, possibly a 50% increase. Oxygen demand will also increase resulting in additional air blower capacity, possibly 40% more depending on efficiency.

Most designs favour chemical precipitation using metal salts (aluminium or ferric) to reduce *P*, that may be included within certain AWT systems where coagulation processes are already used or it will be added as a separate process activity. Both storage and ultimate disposal of the spent chemicals will require consideration. The result is that AWT processing will be far more complex than at present.

16 As part of the AWT evaluation process, a number of leading companies with their combined total of AWTs, who are manufacturing around 95% of the current shipboard installed base AWTs, answered questions as to the applicability of nutrient removal on existing systems and practicality of adopting the HELCOM proposal. Both the questions and key responses are reproduced below:

.1 *Q1* – Does your AWTS product currently reduce the total nitrogen concentration to less than 20 mg/*l* or at least 70% removal of influent load and total phosphorus concentration to less than 1.0 mg/*l* or at least 80% removal of influent load?;

.2 *Q2* – If the answer to the above question is no, to what level does your product reduce the concentration of *N* and *P* in the effluent in mg/*l* and %?;

.3 *Q3A* – Is your product with certain add-on equipment capable of reducing the levels of *N* and *P* to the levels identified in question 1 above? If so, what are the capital and life cycle costs, consumables, chemicals, and size and tankage requirements for such add-on equipment?;

.4 *Q3B* – What is the process philosophy to be adopted for the removal of the nutrients in line with the requirements? Is this equipment readily available? Is there a similar system currently operating on a ship or land based facility? Will the removal result in other adverse impact to the current effluent quality, such as chemical residues, metals, solids, etc.? Do any of the chemicals required pose an additional hazard (flammable, corrosive, reactive, toxic, etc.) for use on a large passenger ship?;

.5 *Q4* – If your answer to question 3 above is negative, do you believe that additional equipment capable of reducing nutrient levels to the limits specified in question 1 above is capable of being developed today? The next three years?;

.6 *Q5* – If the answer to question 4 above is affirmative, what do you estimate would be the Total Cost of Ownership (Initial Capital cost + Annual cost over 30 years) and size requirements (footprint and volume required) for such new equipment?

.7 *Q6* – Is your company actively engaged in developing technology which would meet the nutrient reduction targets identified in question 1 above, and what stage are you at in developing a timeline and how much longer do you envisage before you have a product commercially available?; and

.8 *Q7* – Will you be willing to certify such equipment as available and workable within three years without requiring replacement/retrofit of existing systems?.

Summary Findings

17 In general, those companies who have significant experience in shipboard AWTs have a more guarded approach to achieving the proposed standards, than the “land-based” companies contacted.

18 Current AWT shipboard technology performs some form of nitrogen reduction due mainly to the biological process. Independent results have shown some success in achieving the proposed percentage reduction target albeit not consistently. No company has achieved <20 mg/*l* *N* on ships although one company claims it achieves this on land. Most companies see this as a major challenge to consistently meet the absolute standard figure due to their past experiences on ships. On phosphorous removal, one company claims it can meet the standard by using chemical precipitation, although no shipboard trials have been carried out to verify this claim.

19 The process philosophy envisaged to meet the standards used similar processes with pre-treatment, bio-reactors nitrification of ammonia nitrogen (conversion to nitrates and nitrites) by an aerobic process. Denitrification of nitrates and nitrites (conversion to nitrogen gas) was done by an anoxic process, membrane filtration (to remove insoluble nutrients), chemical precipitation (for reduction of *P* by metal salts) and UV in some cases. The membranes are micro-filtration or ultra-filtration and submerged (in the reactor) or external (outside the reactor), flocculation and coagulation used in two systems.

20 A similar barrier to achieving the absolute results is the variability of influent and higher concentrations for *N* and *P* along with higher temperatures, these combined with ship constraints appear to increase the scale of the challenge materially. As such, all companies require detailed knowledge of influent, operating parameters and performance standards before fully committing on price and specification.

21 Two companies have pilot plants undergoing tests as part of the ADEC work and have shown reasonable percentage reductions in ammonia but no trials are underway on phosphorous reduction. The possibility to "pull-through" land-based technology and experiences is offered by one company.

Survey conclusion

22 No proven technology is available for immediate shipboard application.

23 Removal of nutrients from passenger ship waste waters is in its early stages of investigation with a small number of pilot plant or full scale trials initiated.

24 Using biological means to reduce the nutrients will increase the AWTP volume, energy, bio-residue, chemical consumption, and complexity.

25 Investigation of waste minimization practices and removal at source should be encouraged as a first step. The possibility of waste stream segregation looks appealing with suitable holding and/or treatment options investigated.

26 The consequences of additional treatment and the by-products will need scrutiny, e.g., the additional metals involved in precipitating phosphorous. The ECC and CLIA member lines will continue to adhere to the voluntary agreement reached with HELCOM in 2009 to discharge wastewater ashore where adequate facilities are available under the no special fee system.

The proposed nutrient discharge criteria for passenger ships exceed the criteria for land based facilities which are responsible for the overwhelming majority of nutrient loading in the Baltic

27 The impact of completely removing nutrient load from ship-borne discharges, results in 71 tons of *P* and 285 tons of *N* removal per annum (see annex 1 to this document) 0.21% total *P*

and 0.028% *N* being discharged into the sea area. From this it is evident that the proposed regulation targets passenger ships although they are one of the least influential contributors to the eutrophication issue.

28 For land-based industries, in particular agro-industries, it is clear that the use of Best Available Technology (BAT) and Best Environmental Practice (BEP) methodologies and assessment criteria have been suggested. The use of BAT and BEP should have been adopted in the VTT investigation to allow HELCOM to make a more informed judgement as to the overall effect and general benefit to the Baltic Sea. At present, it is clear that there is insufficient data to support a decision to move forward with the HELCOM proposal.

29 At the 2007 meeting HELCOM recommended that the maximum nutrient input that can be allowed into the Baltic Sea and ensure a good environmental status with respect to eutrophication is estimated at 21,000 tons *P* and 600,000 tons *N* annually. During this meeting, nutrient reduction targets were set at 15,250 tons for phosphorus and 135,000 tons for nitrogen. These reductions were distributed among the Baltic States with the exception of 1,660 tons *P* and 3,780 tons *N* waterborne pollution which were allocated to a common pool.

30 The nutrient reduction targets established at this meeting will be the subject of development of national programmes during 2010 and the effectiveness of these national programmes will be scrutinized and discussed further at a higher level ministerial meeting planned for 2013. The vast majority of key milestones were agreed for 2016-2018, which highlights that the scale of the challenge is recognized by HELCOM. It is unfortunate that this cautious step-wise approach in reducing the nutrient discharges from land-based industries is not extended to the maritime industry, particularly the passenger ship sector.

31 This is clearly illustrated by considering the position taken at the meeting on municipal sewage treatment plants, which plants to our knowledge are significantly below the capability of cruise ships fitted with AWTs in the vast majority of cases. The VTT report contained very little information on the capabilities of the municipal treatment facilities in the region using only Helsinki and Stockholm as reference standards. This crucial aspect appears overlooked in the VTT Scientific Report. It is clear that most of the receiving ports and their municipal treatment facilities appear to discharge effluent at a higher pollution load than the cruise ships fitted with AWTs, indeed many may well be discharging higher concentrations than the approved marine sanitation devices. This is clearly illustrated in tables 2, 3 and 4 below.

Table 2

BOD Standards (in mg/1 or % and Typical Treatment Performance					
Population equivalent	**UWWTD (95%ile)**	**BSAP (annual means)**	**IMO (geometric mean)**	**WWTP performance**	**Ship AWT performance**
>10,000	25 or 70-90%	15 or 80%	N/A	>95%	N/A
2,000-10,000	25 or 70-90% to fresh water	15 or 80%	25	>95%	<5 or >99%
300-2,000	No limit	25 or 80%		>90%	<5 or >99%
<300	No limit	40 (*Alt*2-BAT)		N/A	<5 or >99%

BOD – Biological Oxygen Demand
UWWTD – Urban Waste Water Treatment Directive (91/271/EEC)
WWTP – Waste Water Treatment Plant
BSAP – Baltic Sea Action Plan

Table 3

Faecal Coliform Standards and Typical Treatment Performance (MPN/100 ml)	
UWWTD (91/271/EEC)	No limit
BSAP (Baltic Sea Action Plan)	No limit
WWTP treated effluent	10,000-1,000,000 (End of pipe)
Bathing Water (76/160/EEC)	**2000 (Water quality standard)**
IMO resolution MEPC.159(55)	100 (End of pipe)
Shellfish water – United States/Australia	14 (Water quality standard)
Alaska standard	14 (End of pipe)
Ship AWT treated effluent	<2 (or BDL) (End of pipe)

Table 4

SS Standards (in mg/*l* or % and Typical Treatment Performance					
Population equivalent	**UWWTD (95%ile)**	**BSAP**	**IMO (geometric mean)**	**WWTP performance**	**Ship AWT performance**
>10,000	35 or 90%	No limit	35	>95% by secondary treatment >60-70% by primary treatment	N/A
2,000-10,000	60 or 70				<5 or >99%
<2,000	No limit				<5 or >99%

BOD – Biological Oxygen Demand
UWWTD – Urban Waste Water Treatment Directive (91/271/EEC)
WWTP – Waste Water Treatment Plant
BSAP – Baltic Sea Action Plan

32 When reviewing the DEVELOPMENT targets for the land-based treatment facilities, HELCOM has developed a number of recommendations for nutrient reduction as part of the Baltic Sea Action Plan; two of these recommendations are discussed below:

.1 **Recommendation 28E/5**: Discusses both development and treatment objectives for MUNICIPAL WASTEWATER TREATMENT facilities in the region;

.2 **Regarding development**: the plan recognizes the massive task in both upgrading and harmonizing the current sewerage system, with little or no information concerning the current capabilities and scale of the challenge ahead. There are major differences in the type, efficiency and capability of these types of facilities. The recommendation highlights the need to consider the urban sewage system and sewage treatment plant as a single unit when the pollution load is addressed. Sadly, this methodology and approach has not been considered for the maritime industry; and

.3 **Regarding treatment**: some of the standards to be achieved by land-based industries by 2018 are similar to resolution MEPC.159(55) and not as good as those achieved by AWTs. These land-based standards are categorized in accordance with the wastewater loading defined as a function of population. There are four categories of municipal facilities ranging from 300 persons to 100,000+ persons. The first two categories are considered comparable to cruise ships due to the size range (see table 5).

Table 5

Parameter	**HELCOM proposal**			**IMO MEPC resolution**	
	Land-Based		**Marine**	**2(VI)**	**159(55)**
Persons/Passengers	30-2,000	2,001-100,000	15 onwards	-	-
BOD_5	25 (80%)	15 (80%)	25	50	25
N	35 (30%)	(30%)	20 (70%)	-	-
P	2 (70%)	1 (80%)	1 (80%)	-	-

Notes 300-2,000 persons (equivalent to a small cruise ship)
2,001-10,000 persons (equivalent to a medium to large cruise ship)

These Municipal standards require the national governments to develop appropriate strategies to ensure these ***target values are achieved within the envisaged timescale. The timescales for the 300 to 10,000 persons range (Passenger ships) being quoted by HELCOM is 31 December 2018. The meeting also calls for three-year updates commencing 2010 and the plan to be reconsidered in 2015***; and

.4 **HELCOM Recommendation 28E/7**: This deals with phosphorous reduction in detergents, and recognizes the need to reduce these in laundry detergents and suggests a maximum limit of 0.2%-0.5% by weight. The cruise industry has already achieved substantial progress on this initiative (see paragraphs 14 to 26 above) with the majority of cruise lines replacing the phosphate containing detergents with more environmentally friendly cleaning products.

Disregard of the significance of adequate port reception facilities (PRFs) by HELCOM

33 The HELCOM proposal (MEPC 60/6/2) is drafted without a full and in-depth evaluation of the entire nutrient reducing scenarios involving the maritime community. In addition, if we consider the methodology adopted by MARPOL on PRFs, this further supports the case for rejecting the HELCOM proposal. The updated 2009 VTT report has five countries failing to provide any information whatsoever on PRFs in the country and therefore VTT appears to rely on 2005 data.

34 Due to the critical importance of these PRFs to support the HELCOM proposal, ECC and CLIA members conducted a short study on PRFs in the Baltic region where 24 passenger ports were investigated to determine the ***adequacy*** of the shore-side facilities. The findings illustrate the challenge facing the ship to shore interface, possibly explaining why so few ports responded to VTT. In summary:

.1 75% had no capability to discharge directly from the ship to shore-side;

.2 tank-trailers were used in most ports – these range from 8 m^3 to 36 m^3 with the majority vehicles in the 8 m^3-10 m^3 range, and too small to manage ship waste volumes;

.3 Tallin and St. Petersburg Ports utilized barge facilities in addition to tank-trailer, however the availability depended on the berth selection;

.4 of the six ports that had shore-side connections, Helsinki has 26, Stockholm 10 and Mariehamn six; and

.5 flow rates on shore-side ranged from 20 m^3/hr to 200 m^3/hr with most at 90 m^3/hr, at the maximum rating which in practice is not typically available.

35 Up to 90% of the Baltic ports may fail to reach the IMO adequacy definition for passenger ships in accordance with MARPOL Annex IV. This is supported by studying two typical passenger ships, one fitted with a **Conventional Marine Sanitation Device (MSD)** capable of meeting IMO MARPOL Annex IV, and the same ship fitted with an **Advanced Wastewater Treatment system (AWT)** capable of meeting Alaska discharge requirements.

36 From experiences during the 2008 and 2009 seasons even the most advanced port reception facilities, namely Helsinki and Stockholm, were shown to have limited discharge capacity due to lower than advertised flow rates. This limitation resulted in ships unable to fully discharge tanks and having to retain wastewater generated during the prior voyage and limit shore-side discharge to only that volume of wastewater being generated while the vessel was alongside!

37 **Case Study 1a: MSD** – Almost all passenger ships that are fitted with MSDs or AWTs use **biological treatment** within the process for treating sewage waste water. The volume generated by the ship depends on a number of factors: toilet system design, collection and transfer process (vacuum or gravity), hotel cleaning cycle and others.

38 The volume of sewage water generated on a passenger ship of 3,300 complement persons onboard can range from 50 m^3 – 100 m^3 per day. Based on the CLIA port study, using shore-side facilities with the most common10 m^3 tank-trailers, it would take from 5 to 10 independent discharge operations, (this can be reduced to around 2 to 4 if we use the most common 25 m^3 tank-trailers available for this). This is just the volume of wastewater produced while the vessel is alongside (and only if all operations can be conducted during the short time the vessel is in port). Using PRFs is far more complicated than HELCOM appreciates and creates an even greater problem for both the ship and port under their proposal.

39 **Case Study1b: AWT** – The cruise industry leads the world as far as MARPOL Annex IV is concerned; having voluntarily adopted enhanced operational practices within the International Safety Management (ISM) Code. A number of ships in CLIA membership are fitted with AWTs. The vast majority of AWTs require a **biological treatment** phase to reduce the organic load. A "mixing" or "equalizing" tank is included in the pre-treatment phase of the AWT, to stabilize the influent loading due to the fluctuating diurnal flow generated by the ship staff and passengers over a 24 hr voyage profile. The latest AWTs treat almost all wastewater generated on board including:

.1 sewage water;

.2 accommodation grey water;

.3 laundry grey water;

.4 galley wash grey water; and

.5 galley pulper grey water.

40 Due to the larger waste stream influent to AWTs the volume can range from anywhere between 500 m^3-800 m^3 per day for the same 3,300 complement passenger ship. This volume of wastewater cannot be adequately handled by the PRFs using tank-trailers; even the largest 36 m^3 unit would require a fleet of vehicles and there is also insufficient time at berth to discharge to this number of vehicles.

41 Direct shore-side connections, or possibly discharges to barges appear to be the only feasible solutions in this instance to avoid undue delay to the ship and most importantly, minimize safety and environmental risks during the discharge operation.

42 Similar to MSDs, the discharge of the AWT to shore-side total will disrupt and possibly destroy the **bioreactors in the AWT** and thus render the AWT ineffective. It may then take up to 10 days to restabilize the system.

43 IMO states: "*To achieve adequacy the port should have regard to the operational needs of the users and provide reception facilities for the types and quantities of wastes from ships normally using the ports*".

44 Highlighting the need to provide facilities that ships use, meet the needs of the ships, do not provide a disincentive to use them and contribute to the improvement of the marine environment. These port reception facilities must meet the needs of the ships normally using the port and allow for the appropriate disposal of ship's wastes to take place in an environmentally responsible manner. To do so, they must be at least adequate to address the type and volume of wastes from passenger ships, and there appears to be little alternative to high volume direct connections at cruise berths.

45 IMO states: "*The time to transfer (of waste) should be mutually agreed upon and transfer of waste should take place during the cargo-handling working hours of the port unless the ship's normal call at the port is not at a time within this period*".

46 To assist in this complex issue IMO published a document entitled "Comprehensive Manual on Port Reception Facilities" based on the difficulties in the implementation of MARPOL Annex I for tankers.

47 Due to the foregoing, it appears that neither rigorous scientific evaluation of nutrient discharges, nor an appropriate evaluation of the treatment levels and practicality evaluation on PRFs, has been conducted by HELCOM and VTT Research Centre.

48 The passenger ship industry has made a voluntary commitment under the Baltic Sea challenge (see annex 2 to this document) to achieve the same results as contemplated by the declaration of a Special Area.

Conclusion

49 The HELCOM conclusion on the effect of ships on eutrophication in the Baltic Sea is not supported by a rigorous evaluation demanded by IMO in determining if a sea area is to be classified as a Special Area.

50 As this is the first proposal related to MARPOL Annex IV, it is considered that a more rigorous evaluation is conducted in-line with the numerous IMO guidelines involving the maritime community. In its present form there are a number of key factors to be investigated and updated by the joint-cooperation between the relevant parties as illustrated.

51 The VTT study overestimates nutrient loading from sewage, due to:

.1 annual cruise passenger estimation visiting the Baltic Sea is 7.5 million;

.2 ECC study calculates 6.15 million including maximum passenger loading capability and crew using G.P. Wild figures for 2008;

.3 VTT study assumes 15 g/p/d for *N* and 5 g/p/d for *P* despite the referenced scientific paper having a range of 8.22-13.7 for *N* and 2.74-4.11 for *P*;

.4 ECC Study uses 13 g/p/d for *N* and 3 g/p/d for *P*; this conservative figure is also suggested by Denmark; and

.5 no shipboard sewage treatment is assumed in the study, implying a 0% nutrient reduction, yet HELCOM assume 100% treatment with approximately 80% nutrient removal ashore by the PRFs receiving facilities.

52 Additional "worst-case" margins are used by VTT:

.1 cruise ship takes the total nutrient load during the entire vacation;

.2 no shore excursions or passengers landing ashore during the cruise;

.3 assumes no treatment on board;

.4 no discharge ashore; and

.5 no shipboard operational study considered.

Action requested of the Committee

53 The Committee is invited to take note of the information provided in this document.

***

ANNEX 1

THE "WORST-CASE" SCENARIO APPROACH ADOPTED BY VTT SIGNIFICANTLY OVERESTIMATES THE POTENTIAL ENVIRONMENTAL IMPACT FROM ALL SHIP TYPES, BUT PARTICULARLY CRUISE SHIPS

Using actual cruise figures from 2008, ECC study has calculated that **the estimated nutrient load from cruise ships is 0.007% for Nitrogen and 0.052% for Phosphorous**. These figures, and indeed those of VTT, indicate that the influence and impact of cruise ship waste water discharge is extremely small. ECC member lines remain committed to working with HELCOM to minimize their impact as much as is feasible and practicable.

VTT update and ECC comparison

Table 1

Nutrient Origin by Source	VTT Update				ECC Study			
	tons/year		% total		tons/year		% total	
	N	P	N	P	N	P	N	P
Atmospheric	264,100		26.1652		264,100		26.1652	
Water-borne	744,900	34,500	73.7995	99.6568	744,900	34,500	73.7995	99.6568
Ship–borne	**356**	**119**	**0.0353**	**0.3432**	**285**	**71**	**0.0282**	**0.2054**
Total Load	**1,009,356**				**1,009,285**			

Table 2

Ship-borne Nutrient Origin by vessel type	VTT Update				ECC Study			
	tons/year		% total		tons/year		% total	
	N	P	N	P	N	P	N	P
Ferries	113	38			101	25		
Cruise	**113**	**38**	**0.0112**	**0.1098**	**74**	**18**	**0.0073**	**0.0521**
Cargo/Tank ships	131	44			110	28		
Ship–borne	**356**	**119**	**0.0353**	**0.3432**	**285**	**71**	**0.0282**	**0.2054**

ECC Study on passenger volumes and nutrient load in Sewage during the Baltic 2008 season

This section reviews sewage loading on Cruise ships using scientific data on urine and faeces to determine an estimate of Nitrogen and Phosphorous that can be expected to be generated onboard a cruise ship and transferred to an AWP or MSD or discharged ashore. It also compares data submitted by VTT in 2007 and the 2009 update report.

Cruise passengers visiting the Baltic have increased by 30% from 2006 to 2008 (2.95 mm in 2006, 3.26 mm in 2007 and 3.75 mm passengers in 2008) highlighting the need to review the operational practices and importantly develop an accurate methodology for any environmental impact assessment to be established.

Nitrogen and Phosphorous:

Surprisingly, there appears to be little scientific data available examining this subject, with *N* ranging from 7 to 15 g/p/d and *P* 2 to 5 g/p/d. VTT has chosen to use the larger loadings in both cases. ECC study considers approximately 12 g/p/d and 3 g/p/d more appropriate with recent studies at the Ecological Sanitation Research in Sweden confirming these figures as shown in table 3.

Table 3

Highest Figures	Nitrogen		Phosphorous		Lowest Figures	Nitrogen		Phosphorous	
	kg/p/yr	g/p/d	kg/p/yr	g/p/d		kg/p/yr	g/p/d	kg/p/yr	g/p/d
Kirchmann *et al.*									
Urine	4.30	11.78	1.00	2.74	Urine	2.50	6.85	0.70	1.92
Faeces	0.70	1.92	0.50	1.37	Faeces	0.50	1.37	0.30	0.82
Sewage	5.00	13.70	1.50	4.11	Sewage	3.00	8.22	1.00	2.74
Schouw *et al.*									
Sewage		7.90		1.70	Sewage		7.90		1.70
Jonsson *et al.*									
Urine	4.00	10.96	0.37	1.00	Urine	4.00	10.96	0.37	1.00
Faeces	0.55	1.51	0.18	0.50	Faeces	0.55	1.51	0.18	0.50
Sewage	4.55	12.47	0.55	1.50	Sewage	4.55	12.47	0.55	1.50
Sewage		**11.35**		**2.44**	**Sewage**		**9.53**		**1.98**

HELCOM estimation of nutrient loading of sewage from cruise ships in the Baltic:

The VTT study derived an estimate of 7.5 million passenger days (read total ships complement days) in the Baltic Sea including 2.25 million passenger days in the Gulf of Finland; these are calculated by VTT assuming 250 cruises annually, 3,000 passengers per cruise with an average duration of 10 days. The nutrient loading derived by HELCOM is 113 tonnes *N* and 38 tonnes *P* using the theoretical loading of 15 g/p/d for *N* and 5 g/p/d for *P* in the generated sewage.

Table 4

VTT 2370 update		**Baltic Sea**	
		N 15 g/p/d	P 5 g/p/d
Passengers	3,000		
Ships	250		
Voyage duration in days	10		
Passenger day visits	7,500,000		
HELCOM Nutrient (tonnes)		**113**	**38**

The VTT study states it must be emphasised that this theoretical worst-case scenario normally applies to cargo vessels and cruisers, which represent a small proportion of the estimated passenger figures. The volume of wastewater generated on board a cruise ship can vary significantly depending on system design and operational practices. However, it is considered prudent to use these for comparative purposes.

ECC and CLIA estimation of nutrient loading of sewage from cruise ships in the Baltic:

The ECC study uses actual data on ships supplied by the cruise experts G.P. Wild, this will allow a more accurate determination of the cruise complement volumes (complement is defined as: crew + maximum passengers). The voyage duration includes all days for the voyage which in many cases includes transit days to and from foreign ports to the Baltic. In addition it assumes that all passengers use WCs toilets on board all day with no reduction or recognition of allowance for passengers disembarking in ports for excursions in the Baltic cities. The ECC study calculates 6.15 million days from 288 voyages using 63 ships with complements ranging from 154 to 4,813 – table 5.

Table 5

European Cruise Council – Study 2008			
Number of ships visiting Baltic	63		
Number of Lower Berths	66,514	Lower Berths	1,056
Maximum Passengers	78,651		
Number of Crew	30,247		
Maximum Complement	108,898	Complement	1,729
Total number of Voyages	288		
Total voyage days	2,940	voyage length	10
Total Lower Berth days	3,750,932		
Total Maximum Passenger days	4,457,990		
Total Crew days	1,689,502		
Total Complement days in 2008	**6,147,492**		

Nutrient estimation:

If we use the "***maximum***" derived figures from the 2008 season study and we use 12 g/p/d for *N* and 3 g/p/d for *P,* which is considered to be the highest level in this "theoretical worst-case" scenario then we can see a dramatic reduction as shown below:

Table 6

European Cruise Council – Study 2008				**N**	**P**
				12 g/p/d	**3 g/p/d**
No. Visiting Ships:	63				
No. Lower Berths	66,514	L Berths	1,056		
Max. Passengers	78,651				
No. Crew	30,247				
Max. Complement	108,898	Complement	1,729		
No. Voyages	288				
Voyage Days	2,940	Duration	10		
Lower Berth Days	3,750,932				
Max. Passenger Days	4,457,990				
Crew Days	1,689,502				
Complement Days	6,147,492				
Maximum BW Nutrient Load Range (tonnes)				**74**	**18**

This shows a 35% reduction in nitrogen and a 53% reduction in phosphorous compared to the VTT study as shown below:

Table 7

Comparison	**VTT Study**		**ECC Study**	
	N 15 mg/*l*	P 5 mg/*l*	N 12 mg/*l*	P 3 mg/*l*
Total Nutrient (tonnes)	**113**	**38**	**74**	**18**
% HELCOM			**65%**	**47%**

Examination of sewage treatment technology on cruise ships in the Baltic

Of the 63 cruise ships that visited the Baltic during the 2008 season 22% are understood to have installed Advanced Wastewater Processing systems (AWP's) with the remaining 78% having conventional systems (STP/MSD) fitted. The cruise ship sizes range from the smallest at 158 to the largest at 4,850 maximum complement. While only 14 of the visiting cruise ships are fitted with AWP, these are characterized by large ships and greater voyage days. As such, these results in the actual AWP Baltic Loading ratio for cruise ships are approaching 50%, as shown in table 8.

Table 8

Comparison – AWP/MSD 2008 Baltic Season	**Sewage Treatment Technology**			
	AWP	**MSD**	**Total**	**% AWP**
No. Cruise ships	14	49	63	22
Total voyages days	960	1980	2940	32
Total complement days	2,844,971	3,302,521	6,147,492	46

***

ANNEX 2

THE EUROPEAN CRUISE COUNCIL AND ITS MEMBERS ARE COMMITTED TO THE FOLLOWING:

1 to protecting the environment and evaluating the environmental impact of business activities on the regions and destinations which they visit;

2 to working with IMO, HELCOM, the Baltic Sea Action Group, the EU (particularly via the application of its Baltic Sea Strategy), Environmental groups, Ports and other stakeholders to reduce eutrophication by the reduction of nutrients in the region;

3 to discharging sewage ashore at Baltic ports with adequate port reception facilities which operate under a "no special fee" agreement. Port reception facilities are considered to be adequate where a port can receive all such effluent produced from the previous port visit with adequate reception facilities via direct line/shore side pipe connection at its cruise berth which can then be effectively treated at the municipal waste water treatment plant;

4 to actively working with the above stakeholders to undertake a comprehensive inventory/assessment of, and future needs for, port reception facilities in the Baltic. As far as consistent with commercial confidentially and EU competition rules, this would involve the exchange of all relevant technical information;

5 to keeping under active review all technical possibilities for the cost effective on board treatment of waste and to liaising closely with manufacturers to assess and share information on the needs and performance of technological developments in that context. Such co-operation would be in strict compliance with commercial confidentiality and the competition rules of the European Union;

6 to exploring with the above stakeholders, particularly the EU via the application of existing European schemes, the possibilities of public funding of such facilities in the region; and

7 to achieving the overall goal of establishing adequate port reception facilities throughout the Baltic consistent with the needs of the cruise industry in the coming years.

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MARINE ENVIRONMENT PROTECTION COMMITTEE
60th Session
Agenda Item 6

MEPC 60/6/XX
January XX, 2010
Original: English

INTERPRETATIONS OF, AND AMENDMENTS TO, MARPOL AND RELATED INSTRUMENTS

Information on the proposal to designate the Baltic Sea as a Special Area under MARPOL Annex IV

Submitted by the Cruise Lines International Association (CLIA)

Executive summary:	This document contains background information in response to a proposal by various Baltic States to amend MARPOL Annex IV to include the possibility to establish special areas for the prevention of pollution by sewage and to designate the Baltic Sea as such a Special Area.
Strategic direction:	7.1.
High-level action:	7.1.2
Planned Output:	7.1.2.1
Action to be taken:	Paragraph 8
Related documents:	MEPC 60/6/2; MEPC 60/6/3; MEPC 60/INF.4; MEPC 60/INF.22, MEPC 60/6/XX

Background

1. This document is submitted in accordance with the provisions of paragraph 4.10.5 of MSC-MEPC.1/Circ.2 and comments upon important issues raised in submissions by the Helsinki Commission (HELCOM) member states in documents MEPC 60/6/2 and MEPC 60/6/3 supported by MEPC 60 INF. 4 and explains why the co-sponsors believe that the proposal is not justified at this time.

Summary

2. The proposal submitted by a number of Baltic States on behalf of HELCOM, found at MEPC 60/6/2 MEPC 60/6/3 and MEPC 60/INF.4., describes the threats from eutrophication to the Baltic Seas. However, these papers do not accurately describe the state of development of shipboard treatment technology for removal of nutrients. Nor do the papers accurately describe the adequacy of port reception facilities in the Baltic ports for receiving wastewater from passenger ships. The submission also does not compare the costs versus benefits of alternative approaches using best available technology (BAT) and Best Environmental Practices (BEP).

   The proposal targets a single sector of the maritime industry that, in the words of the Helsinki Commission, “If all sewage [from passenger vessels] were discharged into the sea, the percentage of this input, compared to the total annual nutrient input into the Baltic Sea could be < 0.035% for *N* and < 0.34% for *P*”. It should also be noted that the review carried out on behalf of the cruise industry utilizing the VTT method and actual cruise industry passenger numbers, concluded that these figures themselves are not accurate and that if actual passenger and crew numbers were used the contribution from cruise shipping is less than VTT estimates.

VTT Study

3. Critical omissions and errors exist in the assessment and methodology used by VTT as this study did not compare the costs versus benefits of the proposed regulations. Nor did the study determine the adequacy of port reception facilities in accordance with existing guidelines developed by IMO. In particular, the capabilities of the shoreside facilities for removing the volumes of wastewater necessary to be deemed adequate were not properly addressed. Nor was the capability of these port reception facilities to treat all pollutants contained in wastewater adequately analyzed.

AWT Systems

4. On-going enhancements in treating wastewater on passenger ships where some treatment systems exceed most HELCOM land-based facilities of equivalent size were not addressed. Adequate information has not, in our view, been received from Advanced Wastewater Treatment System providers to accurately advise of the state of development of this technology or when the technology will be available to meet the suggested nutrient removal requirements. It is clear that this technology is not currently available and has not been installed to this date on any shipboard AWT systems for large passenger ships.

Nutrient Criteria

5. The proposed nutrient discharge criteria for passenger ships are more stringent than the criteria for land based facilities which are responsible for a large percentage of nutrients loading in the Baltic. While passenger ships are responsible for a small fraction of 1% of nutrient loading into the Baltic, the HELCOM proposal requires hard targets for nutrient removal from ships. In contrast, the Baltic Sea Action Plan for land based reductions calls for aspirational goals to be re-evaluated over the coming years. This disproportionate exercise of authority makes little sense when passenger ships have already agreed to utilize land based facilities when they are available and adequate for their intended purpose.

Port Reception Facilities

6. Despite HELCOM's assertions that adequate wastewater reception facilities are readily available in the Baltic. CLIA conducted a survey of 24 Baltic passenger ports to determine the *adequacy* of the shore-side facilities. The findings illustrate the challenge facing the ship to shore interface and possibly explaining why so few ports responded to VTT, in summary:

    a. 75% had no capability to discharge directly from the ship to shore-side.
    b. Tank-Trailers were used in most ports, these range from $8m^3$ to $36m^3$ with the majority vehicles in the $8m^3$ -$10m^3$ range, and too small to manage ship waste volumes.
    c. Tallin and St Petersburg ports utilized barge facilities in addition to tank-trailers, however the availability depended on the berth selection.
    d. Of the six ports that had shore-side connections, Helsinki has 26, Stockholm 10 and Mariehamn 6.

e. Flow rates on shore-side ranged from $20m^3$/hr to $200m^3$/hr with most at $90m^3$/hr., at the maximum rating which in practice is not typically available.

Up to 90% of the Baltic ports may fail to reach the IMO adequacy definition for passenger ships in accordance with MARPOL Annex IV. From experience during the 2008 and 2009 seasons, even the most advanced Port Reception Facilities, namely Helsinki and Stockholm, were shown to have limited discharge capacity due to lower than advertised flow rates. This limitation resulted in ships being unable to fully discharge tanks. Of necessity, ships had to limit shore-side discharge to only that volume of waste water is being generated while the vessel was alongside and thus had to retain wastewater generated during the prior voyage between ports.

f. IMO states: *'To achieve adequacy the port should have regard to the operational needs of the users and provide reception facilities for the types and quantities of wastes from ships normally using the ports'*

.
This highlights the need to provide facilities that ships can actually use, that meet the needs of the ships, which do not provide a disincentive for use and which contribute to the improvement of the marine environment. Port Reception Facilities must meet the needs of the ships expected to use the port and allow for the appropriate disposal of ship's wastes to take place in an environmentally responsible manner. To do so, they must be at least adequate to address the type and volume of ship wastes from passenger ships, and there appears little alternative to high volume direct connections at cruise berths.

Due to the above there appears insufficient rigorous scientific evaluation of nutrient discharges nor an appropriate evaluation of the treatment levels, or a practical evaluation on PRF's have been conducted by HELCOM and VTT Research Centre.

CLIA engaged a consultant; Enviromar Consulting limited UK to review the current status of advanced wastewater treatment systems as well as the adequacy of port reception facilities in the Baltic. This study can be found at MEPC 60/ INF. 22

Conclusion

7 The HELCOM conclusion on the effect of ships on eutrophication in the Baltic Sea is not supported by a rigorous evaluation demanded by IMO in determining if a sea area is to be classified as a Special Area.

As this is the first proposal related to a MARPOL Annex IV special area, it is suggested that a more rigorous evaluation is necessary to be conducted in-line with the numerous IMO guidelines involving the maritime community.

The passenger ship industry has made a voluntary commitment under the Baltic Sea Challenge to achieve the same results as contemplated by the declaration of a special area.

Action Requested of the Subcommittee

8. The Committee is invited to consider the proposal and decide as appropriate.

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MARINE ENVIRONMENT PROTECTION COMMITTEE
60th Session
Agenda Item **6**

MEPC/60/6/XX

Original: English

INTERPRETATION OF, AND AMENDMENTS TO, MARPOL AND RELATED AMENDMENTS

Proposal to Amend MARPOL Annex IV to Include the Possibility to Establish Special Areas for the Prevention of Pollution by Sewage and to Designate the Baltic Sea as such a Special Area

Submitted by the Cruise Lines International Association (CLIA), The International Chamber of Shipping; INTERFERRY

***Executive summary*:**	This document responds to a proposal by Helsinki Commission (HELCOM) member States to amend MARPOL Annex IV to establish special areas for the prevention of sewage pollution from passenger ships and a proposal to designate the Baltic Sea a Special Area which includes new criteria for the removal of nutrients from sewage discharges from passenger ships sailing in this Special Area.
Strategic direction:	7.1
High-level action:	7.1.2
Planned Output:	7.1.2.1
Action to be taken:	Paragraph 11
Related documents:	MEPC 59/14; MEPC.1/Circ.685; MEPC 60/6/2; MEPC 60/6/3; MEPC 60/INF 4; MEPC 60/INF 22; MEPC.2(VI); MEPC.159(55); and resolution A.927(22)

Introduction

1 This document is submitted in accordance with the provisions of paragraph 4.10.5 of MSC-MEPC.1/Circ.2 and comments upon important issues raised in submissions by the Helsinki Commission (HELCOM) member states in documents MEPC 60/6/2 and MEPC 60/6/3 supported by MEPC 60 INF. 4 and explains why the co-sponsors believe that the proposal is not justified at this time.

Background

2 The co-sponsors recognize the ecological status of the Baltic Sea and the damage that it is suffering due to eutrophication, caused, in the main, by non-point source nutrient run off

from agricultural land. As stated in page 14 of MEPC 60 INF4, "If all sewage [from ships] were discharged into the sea, the percentage of this input, compared to the total annual nutrient input into the Baltic Sea could be < 0.036% for nitrates (N) and < 0.35% for phosphates (P)". Taking into account the voluntary measures adopted by the industry[1] and the principle of proportionality, the co-sponsors contend that this vital industry (89.5 million passengers carried) is already making a significant contribution to reducing the nutrient load in the Baltic.[2]

3 Therefore, in view of several very positive developments and commitments given by the passenger and cruise industry to work together with the nine member States of HELCOM, it is disappointing that a sector of the maritime industry is being disproportionately targeted before allowing sufficient time for the agreed voluntary measures to have effect.

Port Reception Facilities

4 The proposed amendments to MARPOL ANNEX IV suggested in MPEC 60/6/2 Annex I do not require, as a precondition to imposing passenger ship discharge restrictions into the special area, that adequate port reception facilities be available to passenger ships, this is despite Regulation 12 of Annex IV. If adequate reception facilities are not available, this designation would serve to severely curtail the operation of passenger ships in Annex IV special areas. While it is noted that the submissions claim that adequate port reception facilities are readily available, in our experience this is not the case, see MEPC 60 INF 22. It should be recalled that reception facilities that are designed for cargo ships carrying some 20 or so persons are totally inadequate for the modern passenger ship. Indeed it is our experience that, as of today, there are only two (2) ports in the Baltic that have reception facilities that are near adequate for passenger ships[3].

Onboard Treatment Technology

5 The HELCOM proposals **c**ontain an entirely new standard for onboard treatment technology for discharges should an operator choose to use that route for compliance. It is further suggested that such technology is available to meet the new standard and that it can be fitted for a few million U.S. dollars. The co-sponsors respectfully disagree.

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[1] CLIA and the European Cruise Council (ECC) have voluntarily agreed not to discharge sewage into the Baltic where adequate port reception facilities exist in their ports of call, as was advised at MEPC 59.

[2] In addition it should be noted that despite what MARPOL Annex IV allows, all cruise ships that belong to members of CLIA and the ECC treat their sewage prior to overboard discharge.

[3] 75% of the ports have no capability to accept discharges directly from the ship to shore-side. Tank-Trailers are used in most ports – these range from $8m^3$ to $36m^3$ with the majority vehicles in the $8m^3$ -$10m^3$ range, and too small to manage ship waste volumes. Tallin and St Petersburg Ports utilise barge facilities in addition to tank-trailers, however the availability depends on the berth selection. Of the 6 ports that have shore-side connections, Helsinki has 26, Stockholm 10 and Mariehamn 6, the others at 1 each. Flow rates on shore-side range from $20m^3$/hr to $200m^3$/hr with most at $90m^3$/hr., at the maximum rating which in practice is not typically available.

6 During the last decade the cruise industry has committed time, manpower, funding and ships for many pilot trials, working with vendors and national and regional governments to develop Advanced Wastewater Treatment systems (AWTs). These AWTs have been developed independently from any legislative mandate, and they treat wastewater to a better effluent quality than most land based facilities. Although these AWTs have targeted the classic constituents i.e. bacteria, total suspended solids and faecal coliform, there is some objective evidence that these systems are also fairly effective at reducing nutrients. However, where data exists, the equipment does not meet the level of nutrient reduction contemplated by those who propose to create this Special Area.

7 It is crucial for all involved to fully understand that the development of these systems for shipboard application requires the AWT to be far more efficient than land-based facilities due to the size constraints and required speed of effluent treatment. The leading manufacturers recognize the scale of the challenge and suggest that at least 3-years are needed to fully develop a robust system to meet the proposed nutrient targets. The claims made in the background information paper MEPC/60/INF 4 are merely a desktop study predominantly based on land-based trials of a 25 person AWT system in a laboratory rather than a passenger vessel with several thousands of persons onboard. This is representative of neither the cruise industry nor the AWT industry at large and should be considered with caution.

8 Land-based manufacturers will state that they can develop equipment that will meet the requirements for the shipboard environment and perform to these treatment standards. This must be done effectively and efficiently within the space and operational constraints of a ship, and unfortunately, such promises have not always been kept. Equally important, the equipment must be robust and reliable as AWT specialist technicians are not readily available on a ship thousands of miles away from the manufacturer. In addition, this new requirement would apply to any ANNEX IV special area that might be adopted, and not just for the Baltic as so designated by IMO. Therefore, such a new requirement represents considerable challenges taking into account the complete lack of type tested equipment.

Conclusion

9 Clearly, the Baltic Sea area is suffering significant damage through high nutrient loading. Shipping’s contribution to this is minute. The contribution of passenger and cruise shipping is just a fraction of the contribution from shipping. The proposals disproportionately target one single sector of the maritime industry, without taking a holistic approach to the problem. The co-sponsors invite the Committee to note the following points:

a. Shipping carries over 89.5 million passengers in this area.
b. Shipping contributes < 0.036% N and < 0.35% for P to the Baltic nutrient loading.
c. The vast, overwhelming, source of nutrients is from over fertilized agricultural land.

d. The proposal, if accepted, would only apply to one sector of the maritime industry.
e. Existing advanced water treatment systems are unable to meet the proposed standard.
f. New technology will take several years to develop.
g. The proposal, if accepted, imposes no requirement for adequate port reception facilities to be available.
h. Existing agreements are in place to discharge ashore where adequate port reception facilities are available. (‘Adequate’ is interpreted to mean that all of the wastewater can be effectively and efficiently discharged ashore directly from the vessel to be then effectively treated at the municipal waste water treatment plant and operating under the no special fee agreement.)

10 The Co-sponsors contend that, until such time as adequate port reception facilities are available or technology is commercially available to treat wastewater onboard, it is inappropriate to focus on a single sector of the maritime industry representing a very tiny percentage of nutrient loading into the Baltic Sea area, particularly so in light of all the developments and progress outlined above. This sector of the shipping industry has voluntarily agreed to operating practices, where adequate port reception facilities are available, that meet the goals of the proposed changes to MARPOL ANNEX IV.

Action Requested of the Committee

11 The Committee is invited to consider the proposals above and decide as appropriate.