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HELCOM interim guidance on technical and operational aspects of delivery of sewage by passenger ships to port reception facilities

This document is a part of the

2013 HELCOM Ministerial Declaration

and was endorsed by the 2013 HELCOM Ministerial Meeting

Baltic Marine Environment Protection Commission

HELCOM interim guidance on technical and operational aspects of sewage delivery to port reception facilities

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1. Aim of this interim guidance

The aim of this interim guidance is to facilitate the work on upgrading reception facilities for sewage in ports and terminals used by passenger ships in the Baltic Sea. This is done through identifying existing problems and different stakeholder's points of view regarding adequate port reception facilities for sewage. The guidance is sharing best practices and providing recommendations for technical and operational solutions of sewage delivery and handling.

The interim guidance puts forward remaining challenges which are not yet solved; those are titled outstanding issues. The interim guidance follows the chain of sewage disposal: delivery by a ship, reception in a port and treatment in a wastewater treatment plant. Recommendations and outstanding issues are consolidated at the end of the document.

By identifying concrete and specific challenges this interim guidance provides an intermediate step toward providing adequate PRF capacity in the region by 2015 according to the decision of IMO MEPC 62 in 2011 and HELCOM Commitments.

The guidance will be subject to continuous review during 2013-2015 as new knowledge and experience is gained.

1.1 Background

This interim guidance is an outcome of work of the Cooperation Platform on Port Reception Facilities in the Baltic Sea established in 2010 under the Helsinki Commission (HELCOM) to promote a dialogue on provision of adequate port reception facilities for sewage in ports and terminals used by passenger ships in the Baltic Sea among the key stakeholders. The cooperation has included representatives from ports and terminals used by passenger ships in the Baltic Sea, shipping industry, national administrations and agencies of the coastal countries as well as municipal wastewater treatment plants.

Within the framework of the Cooperation Platform, a questionnaire was sent out to relevant stakeholders and a workshop was organised in September 2011, which resulted in an outline for a guidance. The outline was presented to HELCOM Maritime 10/2011 and the meeting agreed to establish a correspondence group consisting of the nominated members of the Cooperation Platform to complete the draft interim guidance. The document, which was the result of two commenting rounds, was presented to HELCOM Maritime 11/2012. A final version incorporating work on outstanding issues during spring 2013 was considered by HELCOM Maritime 12/2013.

The section about Fees has been developed under the lead of Finland and includes input from the Joint Workshop on no-special-fee system which was held in November 2012 in Copenhagen. The interim guidance has been developed under the overall lead of Sweden and WWF.

The interim guidance was endorsed by the HELCOM Ministerial Meeting on 3 October 2013.

1.2 Outstanding issues

It should be noted that even if this guidance summarises available information and stakeholder positions regarding many key issues the work to find further solutions and a common understanding continues within the HELCOM framework. Chapter 11 provides a

consolidated list of outstanding issues identified by June 2013 requiring further work. These issues are discussed in more detail in chapters 3-9.

2. Introduction

With the Helsinki Convention of 1974 and 1992 the Baltic Sea countries and the European Union have taken an international legal commitments to restore and maintain good environmental status of the Baltic Sea by addressing all sources of pollution to the sea: from land, sea and airborne sources. The Articles 8, 10 and 11 as well as Annexes IV and V of the Convention aim explicitly to minimize the environmental impact of shipping activities. The Baltic Strategy for Port Reception Facilities for Ship-generated Wastes and Associated Issues, originally adopted by HELCOM Contracting Parties in March 1996, provides the framework for this specific topic in the Baltic Sea.

The regional work of HELCOM supports the global regulation work carried out within IMO.

2.1 Nutrient pollution in the Baltic Sea

Since the early 1900s nutrient pollution from human activities on land and at sea has turned the Baltic to a marine environment suffering from excessive nutrient levels. Nutrient pollution is today recognized as one of the main environmental problems of the Baltic Sea.

In the same way as fertilizers in agriculture, inputs of main nutrients (nitrogen and phosphorous) stimulate productivity in the Sea. Excessive input to the sea lead to a chain of events which have been termed the process of eutrophication:

- changes in species composition including an intense increase in algal growth: excess of filamentous algae and phytoplankton blooms;
- resulting in excessive production of organic matter;
- resulting in an increase in oxygen consumption near the sea-bed due to decaying organic matter;
- eventually resulting in complete oxygen depletion with death of benthic organisms, including fish;
- resulting in release of nutrients from sea bed to water -strengthening the described chain of events through feedback loops.

Nitrogen and phosphorous loads from ship's sewage contributes to the described nutrient pollution of the Baltic Sea. Even if the total amount of nutrient load from ships sewage is not at the same scale as the total nutrient load from land-based sources; it still represents a significant amount. In addition, releases of ship sewage take mainly place during summer when it is directly available to the Baltic algae blooms.

2.2 Baltic Sea as a special area for sewage

To combat eutrophication problem, the coastal countries of the Baltic Sea agreed as part of the HELCOM Baltic Sea Action Plan of 2007 to have, by 2009, a joint submission to the International Maritime Organization (IMO) with the aim to develop new regulations for discharges of sewage from passenger ships operating in the Baltic Sea.

In 2011, based on a submission by HELCOM Countries, IMO (MEPC 62) approved new regulations under Annex IV of the MARPOL Convention and designated the Baltic Sea as a Special Area for sewage for passenger ships (Resolution MEPC.200(62). A passenger ship is defined in MARPOL Annex IV as a ship which carries more than twelve passengers.

Sewage is defined by MARPOL Annex IV as:

- drainage and other wastes from any form of toilets and urinals;
- drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs, and scuppers located in such premises;
- drainage from spaces containing living animals; or
- other waste waters when mixed with drainages.

Under the new regulation all sewage discharges into the sea from passenger ships will be prohibited unless it has been processed with an approved on-board sewage treatment plant. Such equipment should e.g. reduce nutrient concentrations according to established concentration standards. Alternatively, untreated sewage could be delivered to a port reception facility (PRF).

2.3 Toward adequate port reception facilities for sewage in the Baltic Sea

The new MARPOL Annex IV regulation for the Baltic Sea will enter into force when the HELCOM countries have notified IMO that adequate port reception facilities for sewage are available in their ports and terminals used by passenger ships. Each Baltic Coastal country undertakes to ensure that:

- facilities for the reception of sewage are provided in ports and terminals which are in a special area and which are used by passenger ships;
- the facilities are adequate to meet the needs of those passenger ships; and
- the facilities are operated so as not to cause undue delay to those passenger ships.

At the 2010 Moscow Ministerial Meeting the HELCOM Contracting Parties agreed to take all the necessary measures to ensure availability of adequate port reception facilities for sewage in their ports and terminals used by passenger ships as soon as possible, preferably by 2013, and the latest by 2015 according to the IMO "Guidelines for ensuring the adequacy of port waste reception facilities (Resolution MEPC.83(44)" and the requirements of the new regulations of Annex IV to MARPOL Convention. The HELCOM Road Map for upgrading port reception facilities for sewage in ports and terminals used by passenger ships in the Baltic Sea area, adopted at the same 2010 meeting, prioritizes ports according to their size and type of passenger ships visiting them on a regular basis. This document provides further guidance to reach adequate PRF capacity according to the agreed timeline.

3. Composition of sewage from passenger ships

According to the MARPOL definition the term sewage covers all waste water from toilets and urinals, also when mixed with drainage from medical premises via wash basins, wash tubs and scuppers located in such premises and from spaces containing living animals or other waste water when mixed with drainages.

This means that in contrast to household sewage on land sewage from ships does not only cover black water (fecal and urinal waste) and mixtures of black water, grey water (generated from activities such as laundry, dishwashing, and bathing) and food stuffs, but may in some cases also include mixtures with oil and other substances like chlorine. Sewage sludge and bio-residues from on board Advanced Waste Water Treatment Plants (AWTS) falls also under the MARPOL definition of sewage.

Nevertheless, most common waste water mixture from passenger ships consists of black water mixed with grey water, and sometimes with food stuff. For ships with AWTS mixing

black and grey water is needed to ensure the functioning of the treatment system. Other ships might need to mix black and grey water to avoid clogging.

The specific composition varies due to several factors, e.g. ship type, number of passengers, length of the voyage and use of on board wastewater treatment systems. Determining the composition of sewage through sampling is challenging due to the high amount of solid particles and potential inclusion of substances beyond normal black and grey water. It is also difficult to get a representative sample since there is no recommendations on how and where to take the sample.

3.1 Typical waste water from cruise ships

Cruise ships make commonly short stops (around 8-11 hours) in a large number of ports, have indicative and flexible itineraries which vary from year to year and have no contractually obligation to deliver passengers to set points. Bigger ships have commonly capacity to carry more than two thousand persons on board, consisting of both passengers and crew. Sailing distances can be long and the volumes of sewage generated in one passage can thus be large. Further, a large number of people remain on board while the ship is at berth and considerable volumes of sewage are produced also in port.

Roughly a quarter of cruise ships have AWTS installed which mix and treat grey and black water producing a bio-residual or sewage sludge that needs to be retained for discharge ashore. Mixing of black and grey waters is fundamental for the functioning of the AWTS resulting in increased volumes of sewage. Many of the cruise ships not carrying AWTS have in use a Marine Sanitation Device (MSD) Type II. In combination of either of the two, Membrane Bioreactor (MBR) Systems are sometimes used to reach higher treatment standards.

Content of waste water from cruise ships depends on the type of on-board water treatment system:

<u>Cruise Ships with Advanced Wastewater Treatment Systems (AWTS):</u>

- Heavy metals
- Nutrients, with varying degrees of nutrients removed
- H_2S
- Other; Pre-screening materials and bio-residue, ships with MBR produce permeate

<u>Cruise Ships with Marine Sanitation Device (MSD) Type II:</u>

- Heavy metals
- Nutrients, with varying degrees of nutrients removed
- H_2S
- Other; Sea water, Chlorine, pre-screening materials and bio-residue, ships with MBR produce permeate

3.2 Typical waste water from ferries

Ferries normally operate between fixed destinations and the average duration of a ferry voyage is generally shorter than the duration of a cruise voyage and the number of passengers on board will typically be smaller and therefore smaller amounts of sewage are produced. Ferries usually leave the sewage ashore daily and do not have advanced onboard treatment systems. Several ferry companies operating in the Baltic Sea are already discharging their sewage to a port reception facility. There are, however, still ferries that either discharge untreated sewage or sewage that has been treated according to older standards into the sea.

As most ferries that do discharge sewage to PRF do not have any waste water treatment equipment on board, there is a potential problem with build-up of hydrogen sulphide (H_2S) in the ferry´s sewage tanks.

The content of sewage from ferries typically consists of:

- Heavy metals
- Nutrients
- H_2S

3.3 Sewage with Hydrogen Sulphide H2S

Formation of hydrogen sulphide (H_2S) in sewage is a matter of concern for ferries, cruise ships, ports as well as municipal waste-water treatment plants. H_2S is developed in an anaerobic (oxygen free) environment commonly generated during extended on-board storage of sewage. The problem with hydrogen sulphide generation concerns mainly ferries since they often store their sewage on-board for discharge at port. Cruise ships often treat their sewage which prevents extensive formation of H_2S.

High levels of H_2S are problematic as it can cause odour, health risks, and corrosion in pipelines and reduced efficiency of treatment plants.
Formation of H_2S in sewage tanks can be reduced through e.g. pre-treatment on-board (aeration), ozone injection, stripping, scrubbing, biological filters, chemicals and bacterial treatment as well as minimizing storage time by discharging sewage at every port. Mixing sewage with food stuff increases the problem with formation of H_2S. Several ferry companies have reported fewer problems with H_2S after separating sewage and food stuff.

Cruise ships with Advanced Waste Water Treatment systems have procedures in place to minimize formation of H_2S since excessive formation will stop the functioning of the AWTS completely. H_2S levels are monitored with alarms for high levels. AWTS systems with membrane bioreactor (MBR) cannot go anaerobe.

3.4 Mixed sewage with chemicals

The broad MARPOL definition of sewage is problematic for the onshore treatment of sewage as municipal treatment plants are designed to receive sewage from households and primary for reducing nutrients. They cannot usually treat sewage mixed with oil and other substances like Chlorine.

Since municipal waste water treatment plants are not able to treat such mixes these will likely be classified as industrial waste once it is discharged in port. As a result the ports are forced to find other, likely expensive, solutions to treat such mixed sewage from the shipping industry. The increased cost of treatment will most probably be reflected in the harbor dues (see chapter on Fees).

3.5 Sewage sludge/bio-residuals

Sewage sludge and bio-residuals are residues from onboard waste water treatment plants. This is a type of sewage with higher viscosity and solid content which is generated by prescreening (filtering), solids separation and clarification. It usually consists of 1-3% solids as well as various polymers and coagulants used in solid separation. Amounts and specific requirements when discharging at PRF have not been clarified yet but there are indications that sewage sludge and bio-residuals will be pumped ashore together with sewage when the new MARPOL Annex IV regulation enters into force. The cruise industry has expressed wishes to discharge up to 270 m^3 per port call.

3.6 Epidemiological threat

Ports have pointed out the necessity of ensuring disinfection by the ship of sewage from its medical premises because they may cause epidemiological threat when pumped ashore to a PRF.

3.7 Recommendations related to sewage composition

- Separate on-board drainage of black and grey water from that of other types of waste water would enable municipal waste water treatment plants treatment of a large share of ship sewage.
- Best practice to avoid formation of H_2S is to separate food waste stream from black- and grey water and minimize "residence" time by discharging at every port.
- Advanced on board treatment, or if not available, pre-treatment of sewage (e.g. aeration and ozonation).

3.8 Outstanding issues related to sewage composition

- It is difficult to determine the composition of sewage through sampling since it contains high amount of solid particles and potential inclusion of substances beyond normal black and grey water, but it might affect the cost for handling and treatment, therefore there is a need to make an agreement on unified sampling methodology and parameters for sewage composition.
- There is a need to make information available to decision makers, ports and other stakeholders, on cruise ships operating in the Baltic Sea, with particular respect to their sewage treatment technologies, including needs to discharge sewage sludge/bio-residuals.
- There is a need of drawing up technical descriptions and best practices on how and where to monitor the H_2S levels onboard ships.

4. Information from ports and notifications from ships

Information on port reception facilities for sewage has to be made available to give passenger ships a possibility to determine the availability of adequate reception facilities in the ports of call included in their itinerary. It is a prerequisite for ships to notify their intentions to discharge waste not only due to legal obligation but also to ensure an efficient and timely operation.

4.1 Information on Facilities

The information on PRF for sewage should be included in the waste reception and handling plans in each port. The content in the plans is regulated by both IMO MARPOL and, in the case of EU Member states, EU regulations. Concerning sewage it is additionally important that the information includes receiving capacity of the PRF.

The Port Reception Facility (PRF) module of the IMO's GISIS (Global Integrated Shipping Information System) contains information regarding available port reception facilities for the delivery of the ship-generated waste, as provided by the competent authorities of the IMO Member States. The HELCOM Contracting States are recommended to regularly update the information on adequate PRF in GISIS.

4.2 Notification of intention to use

Notification of ship's wastes, ships are obliged to notify the port their intention to discharge waste and waste volumes 24 hours before arrival or at the latest when departing previous port.(Russian "Sanitary norms and regulations for ships" and "Water Code", Directive 2000/59/EC and HELCOM Recommendation 23/1). The format for notification recommended in HELCOM Recommendation 23/1 and Directive 2000/59/EC are the same.

IMO has developed a Standard Format for the Advance Notification Form (MEPC.1/Circ.644) to enhance the smooth implementation and uniform application of this recommendation, thus minimizing the risk of a ship incurring delay.

4.3 Recommendations related to information exchange

- Ports waste reception and handling plans ought to include receiving capacity of sewage to PRF.

4.4 Outstanding issues related to information exchange

- Baltic-wide and port-wise information on the capacity to receive sewage (flow and total volume) which would enable sewage discharge planning by ships.

5. Sewage delivery

5.1 Ship-shore sewage connections

MARPOL Annex IV (Regulation 10) has specified standard dimensions of flanges for sewage discharge connections to enable pipes of reception facilities to be connected with the ship´s discharge pipeline. The same regulation refers to that all ships subject to Annex IV, irrespective of their size and of the presence of a sewage treatment plant or sewage holding tank, shall be provided with a pipeline and the relevant shore connection flange for discharging sewage to port sewage treatment facility.

5.2 Pumping capacity of ships

Ships pump sewage into the reception facility; it is the ship that is responsible for the pumping capacity. Pumping capacity of ships should have a certain minimum level, at the same time keeping in mind the wide variety of ship types calling to Baltic ports. As an example Copenhagen port requires ships to have the capacity to pump black water at a rate of at least 30 m^3/h and grey water at a minimum rate of 50 m^3/h per berthing place. Typical pumping capacity of cruise ships is 200-300 m^3/h.

It is in the ships interest to have sufficient capacity to manage their sewage discharge in an efficient pace. Required pumping capacity is not defined for ships; however such limits may be useful to be set on a local port level.

Instead of defining a minimum pumping capacity, it might be possible for the ports to differentiate the fee based on minimum pumping capacity. When a ship has a low pumping capacity it will affect the overall time of getting the discharge to PRF done in a reasonable time.

5.3 Receiving capacity of ports

There is a wide diversity of ports across the Baltic Sea regarding the availability of PRF as well as the numbers and volumes of passenger ships visiting them on a regular basis. Passenger ships have different needs to discharge sewage depending on size, number of passenger, length of voyage, drainage and onboard treatment systems. Ports should have PRF to meet the needs of the ships normally using the port (Resolution MEPC.83(44).
Ports are recommended to clearly state their overall receiving capacity to their users and in IMO-GISIS. It is beneficial for the ships if the information is specific, e.g. on berth by berth basis. The capacity depends on the number of vessels pumping at the same time, the quality of the pumped water etc.

Cruise ships often make port visits for around 8 - 11 hours, which means all sewage have to be discharged in approximately 6.5 -9,5 hours. As sewage volumes might be large the receiving capacity has to be high to avoid undue delay of the ship.

Based on the needs of larger cruise vessels the cruise industry have expressed wishes to discharge 800 – 1200 m^3 sewage per port call with a rate of 200 – 300 m^3 sewage per hour, in addition to a discharge of up to approximately 270 m^3 of higher density sewage sludge per port call.

Ports of many established ferry routes have procedures in place already today with regular discharges of sewage to port reception facilities. The ferry industry has expressed a need to discharge up to 200 m^3 sewage per port call in the future.

5.4 Use of barges and tank trucks

Some ports use barges and tank trucks instead of fixed sewage links (pipelines/hoses) for receiving sewage from passenger ships. As barges or trucks have only limited capacity larger volumes have to be discharged in smaller parts and larger cruise vessels might not be able to complete a full discharge within the timeframe of a normal port call. Connecting and disconnecting multiple times involve safety, spill and odor risks which should be considered as a disadvantage compared to fixed links.

However, limited space at existing quays might in some ports hinder arranging fixed systems to receive, store and pump sewage to treatment plants. These ports will have to find other ways of receiving sewage without causing undue delay to the ships discharging, maybe at other quays or arranging discharge through efficient barge or tank truck systems, without causing undue delay to ships.

5.5 Delivery/reception of sewage sludge

Systems for delivery and reception of sewage sludge at the PRF should be in place in addition to the systems for delivery and reception of sewage.

5.6 Connections to municipal WWT systems

Beyond the quality (see “Composition of sewage from passenger ships”), also the quantity of ship sewage might be an issue for municipal WWT systems. Connections to, and capacity of, the municipal sewer system sometimes limit how much, and at what speed, sewage water can be delivered at ports.

When the port is connected to a big city, and therefore a large treatment plant, average flows from ships are relatively small compared to normal residential sewage flow and problems related to sewage volume arise rarely.

Renewing of municipal sewer networks and treatment plants to cater for larger discharge volumes is a time-requiring process. Arranging for intermediate storage of sewage at the port enables larger discharge volumes also in areas with smaller municipal treatment plants.

5.7 Recommendations related to sewage delivery

- Discharge connections referred to in MARPOL Annex IV are recommended for use in the Baltic Sea.
- Due to the disadvantages of barges and tank trucks berths are recommended to have a fixed link.
- For certain ports with space limitations hindering fixed arrangements and smaller anticipated volumes, discharge through barges or tank trucks remain as an alternative.

5.8 Outstanding issues related to sewage delivery

- Define through port-shipping company cooperation, on port by port basis, the needs of regularly visiting ships in terms of anticipated quantities (min-max) and qualities of waste water
- Identify ports with space limitations hindering fixed arrangements and exchange experiences on different solutions for sewage reception facilities in narrow ports.
- Identify ports where barges and tank trucks can be considered adequate for regular operation but where irregular visits from larger cruise vessels might be foreseen.
- Clarify which technological solutions that are needed in the ports to receive sewage sludge/bio-residue.

6. Adequacy of port reception facilities

Adequacy of Port Reception Facilities in the Baltic Sea is the central issue to be solved before the MARPOL Annex IV special area designation can enter into force. Umbrella definitions of adequacy have been adopted by IMO, and EU has used the same definitions in Directive 2000/59/EC.

Explicit definition of adequateness of receiving capacity is highly dependent on the variable context of individual ports and the nature of ships regularly using them. This section puts forward the different concerns from the diversity of ports and passenger ships operating in the region.

In the end it will be up to each State around the Baltic Sea to evaluate whether their ports have PRFs which are adequate to meet the needs of regularly visiting ships.

6.1 Adequacy according to IMO

At MEPC 43 IMO agreed that to achieve adequacy the port should have regard to the operational needs of users and provide reception facilities for the types and quantities of wastes from ships regularly using the port. Further IMO has in place two Guidelines which can serve as a useful basis for the evaluation and assessment of the adequacy of PRF and are recommended for use in the Baltic Sea.

Guidelines for Ensuring the Adequacy of Port Reception Facilities (Resolution MEPC.83(44) from 2000), is intended to assist States in planning and providing adequate port waste reception facilities and encourage States to develop environmentally appropriate methods of disposing of ships´ wastes ashore.

In the Guideline for Ensuring the Adequacy of Port Reception Facilities, adequate facilities can be defined as those which:

1. mariners use;
2. fully meet the needs of the ships regularly using them;
3. do not provide mariners with a disincentive to use them; and
4. Contribute to the improvement of the marine environment.

The facilities provided by the port must:

1. meet the needs of the ships normally using the port; and
2. Allow for the ultimate disposal of ships' wastes to take place in an environmentally appropriate way.

The Assessment Procedure for Ports, as included in the annex 2 section C in the Guidelines for ensuring the adequacy of port waste reception facilities, can serve as an example for a period of review regarding the PRF facilities.

Guide to Good Practice on Port Reception Facilities (MEPC.1/Circ.671 from 2009) is written with the aim of enabling ship owners/operators and PRF operators to comply with the MARPOL Convention.

Relevant for EU members of the Baltic Sea, adequacy is also regulated by Directive 2000/59/EC. Article 4 of this Directive is dedicated to the availability of PRF adequate to meet the needs of the ships normally using the port without causing undue delay to ships. In order to achieve adequacy, the reception facilities have to be capable of receiving the types and quantities of ship-generated waste and cargo residues from ships normally using that port, taking into account the operational needs of the users of the port, the size and the geographical location of the ports, the type of ships calling at that port and the exemptions provided for under Article 9.

Member states have to establish procedures, in accordance with those agreed by the IMO, for reporting to the port State alleged inadequacies of PRF.

According to Article 5 and Annex I of Directive 2000/59/EC, the results of the upgrading of PRF for sewage reception should be reflected in the port's Waste Reception and Handling Plan (WRHP). In case these plans are developed in a regional context, the need for and availability of PRF have to be specified for each individual port.

6.2 Need for adequacy as described by stakeholders

Several proposals have been put forward by stakeholders:

6.2.1 Adequacy according to the cruising industry

The cruise industry has expressed that adequate PRFs from their position would mean:

- direct shore-side connections with discharge capacity of 200-300 m^3 per hour, and port capacity to receive 800-1200 m^3 per cruise ship, to cater for the needs of the larger cruise vessels
- possibility to discharge up to 270 m^3 of sewage sludge and bio-residuals per ship.
- that reception facilities are available at all time and at all berths and not cause inconvenience or have health implications for passengers
- back-up plans are in place for situations when the reception facilities are offline/inadequate

- that a full range of different connections/flanges in use by the shipping industry should be available at the ports
- that there is minimum use of barges

The cruise industry have also expressed that the ports should proceed on the basis that cruise ships will need to discharge all sewage ashore at least until the 2014 IMO review will determine that required removal standards for Nitrogen and Phosphorus are met by type approved sewage treatment plants.

6.2.2 Adequacy according to the ferry industry

The ferry industry has defined their requirements on adequate PRFs as;

- direct shore-side PRF connections
- port receiving capacity of 200 m^3/h
- reception facilities should be available at all berths
- non-availability clause when PRFs are not working
- agreed hose and flange dimensions
- no use of barges or trucks
- discharge under the No-Special-Fee

The ferry industry has clarified that with presently available technology in mind they will not invest in on-board treatment but continue to discharge at PRFs.

6.2.3 Adequacy according to Ports

Adequacy according to Baltic Port Organizations is to follow the IMO regulations and guidance on adequacy. Ships should discharge all sewage at each port call, to prevent the discharge of too large volumes and to be justified to make a “undue delay” complaint.

6.3 Recommendations related to adequacy

- Follow general principles according to IMO Guidelines: Resolution MEPC.83(44) from 2000 and MEPC.1/Circ.671 from 2009.

6.4 Outstanding issues related to adequacy

- definitions of regularly visiting ships, normal use

7. Operational issues and malfunctions

7.1 Operational problems related to sewage delivery

Clogging of pipes during discharge operations might cause leakage and odor problems. Under-dimensioned piping and mixtures of black and/or grey water with food stuff containing grease are two main reasons for clogging. If sewage sludge or bio-residue is discharged separately using the same system as used for sewage, it can also block piping and back flush valves.

To prevent odors it is necessary to ensure pipes are sealed and vented and flushing of pipes with water or air after discharge is recommended. Discharging pipes into open drains is not recommended due to odor problems.

During wintertime usage some ports have reported problems with movable, heavy pipelines, but most ports have not reported to have such problems.

Pipes have been bursting due to lack of pressure testing, ports should have procedures in place to pressure test pipes prior to use. Minimizing hose lengths is one way to reduce bursting of hoses in the vicinity of passengers and dock workers.

Malfunctioning PRF is an issue of national concern. Best practice for the ports could be to carry out risk assessments and establish contingency plans (covering different sewage types and sewage sludge) the outcome of which should be reflected in the port´s waste reception and handling plans. The peak needs and unusual berth place situations should be addressed as appropriate.

Other means to avoid emergency situations in case of malfunctioning PRF:

- Implement incentives and other measures promoting frequent sewage discharges to PRF resulting in more free dedicated storage capacity on board;
- Promote and make use of cooperation, including cross-border, between all the involved and interested parties (authorities, ports, users); for EU countries the mandatory exchange of information (inter alia, on advance waste notification) as of 2015 in SafeSeaNet following Directive 2010/65 (report formalities) is one example of such cooperation;
- Establish ways and procedures to ensure that relevant information, including that on abnormal situations, reaches the intended recipients without delay.

7.2 Information on temporary malfunctions/inadequacy of PRF

The IMO Revised consolidated format for reporting alleged inadequacy of port reception facilities (MEPC.1/Circ.469/Rev.1) is recommended to report incompliance of the port reception facilities. For EU countries Article 4 of Directive 2000/59/EC establishes procedures, in accordance with those agreed by the IMO, for reporting to the port State alleged inadequacies of port reception facilities. According to Annex I of the Directive, these procedures have to be included in the WRHP and made available to the port users.

7.3 Procedures during temporary malfunctions/inadequacy of PRF

If there is a temporary technical failure of PRF facilities, a port should be in the position to offer alternative solution/facilities until normal operation is resumed, i.e. mobile PRF, barges or storage space for sewage. Temporary reductions of PRF capacity should be entered in IMO-GISIS – port reception facilities database by either the Port State (if notified by the port itself) or by the flag state of the ship. In the case of temporary reduction in PRF capacity the port should make best efforts to inform all ships scheduled to call at the port for the expected duration of the non-available PRF

If a ship does not receive information on temporary reduction of PRF capacity in due time and arrives at a Port which should have capacity to receive volumes for ships of its size class finds that the PRF cannot receive its discharge it should:

- Make best efforts to achieve compliance in cooperation with the port authorities excluding deviations from its intended voyage or undue delays.
- Maintain a record on board of the due actions taken to attempt to achieve compliance.
- Notify the Administration of the flag state and the competent authority in the port State of the situation. The flag state shall notify the IMO and the port State of the

situation, the port State should consider the report and respond appropriately informing IMO and the reporting flag State of the outcome of its investigation.

7.4 Recommendations related to operational issues and malfunctions

- Avoid mixing food stuff (especially with grease) with sewage and to flush the pipes with water or air after discharge reduces the risk of clogging. Discharging grey water after black water is another measure to reduce clogging risk.
- Hoses and flanges should be pressure tested regularly and hung so they are not in contact with the ground. Pipes should be kept clear of passenger/vehicle areas/routes and information on this could be recorded in the ports procedures.
- Renovations of sewer piping and installations of pressure sewers to enable more reliable functioning of reception systems.
- Elevated ventilation of the sewage pumping stations with new type of filters to enable odorless operations.
- Port should be in the position to offer alternative solution/facilities in the case of temporary technical failure of PRF facilities until normal operation is resumed. Alternative solutions could be mobile PRF, barge, storage space for sewage.
- Temporary reductions of PRF capacity should be entered in IMO-GISIS – port reception facilities database by either the Port State (if notified by the port itself) or by the flag state of the ship.

7.5 Outstanding issues related to operational issues and malfunctions

- "Emergency dumping"

8. Fees

The Baltic Sea ports have implemented the no-special-fee system based on the HELCOM Recommendation 28E/10 and the EC Directive on port reception facilities for ship-generated waste and cargo residues 2000/59/EC.

No-special-fee system is a charging system where the cost of reception, handling and disposal of ship-generated wastes covered by MARPOL Annex I (oily wastes from machinery spaces), Annex IV (sewage) and Annex V (garbage), originating from the normal operation of the ship is included in the harbor fee or otherwise charged to the ship irrespective of whether wastes are delivered or not.

To specify the ship's contribution to the no-special-fee system, the gross tonnage is usually taken as the basis of calculation by the port. Basis of calculation of oil (bilge water, sludge), garbage (different types) and sewage may depend on the type and size of the ship as well as the number of crew and passengers. The fee should be independent of the volume of the wastes delivered to PRF.

There are basically two approaches to implement the no-special-fee system. Some ports have a so called 100 % no-special-fee where all ships contribute fully to the costs of PRF system irrespective of the use of the facilities and ships can deliver ship-generated waste without any volume limits. Majority of the ports, however, have a system where ships contribute partially to the costs of PRF irrespective of the use and can deliver waste up to a certain limit (e.g. depending on the geographical area of the last port of call). The fee system can also be mixed for different waste categories (no limits for garbage, limits for oily waste and sewage).

For EU countries, according to the EC Directive 2000/59 (currently under revision), the part of the costs which is not covered by the significant contribution to the PRF, if any, shall be covered on the basis of the types and quantities of waste actually delivered by the ship.

In both of the cases the fee includes a delivery right which motivates ships to deliver their waste since full or partial payment is already made. If the no special fee is only partial, there is an additional fee if the amount of waste delivered to PRF exceeds the defined reasonable or excessive amount.

Some ports charge additional fees if the ship does not comply with the port's waste delivery requirements, such as advance notification or have not sufficient pumping capacity (technical/operational requirements for the vessel). The other special charges may be invoiced if for example waste is received on Sundays or outside working hours. Some ports apply a system whereby it is possible to reduce fees based on ship's waste management practices, such as minimization of waste and waste segregation.

8.1 Type of sewage

The passenger ships while in the Baltic Sea (Annex IV special area), may discharge treated waste water into the Baltic sea if the ship has in operation a type approved sewage treatment plant meeting the revised standards in the 2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants (MEPC.227(64). Another option is to deliver the sewage and waste water in the port reception facilities.

Based on the sewage definition and Annex IV Regulation 9 "Sewage Systems", passenger ship's sewage and waste water to be delivered to port reception facilities will range from

- untreated sewage (black water in holding tanks),
- sewage that has been treated onboard in type approved waste water treatment plants not meeting the 2012 standard,
- mixed sewage and grey water treated in type approved waste water treatment plants not meeting the 2012 standard,
- comminuted and disinfected sewage, and
- sewage sludge/bio-residual.

Due to the different types of sewage and also different operational practices (such as mixing galley waste with sewage) it is necessary to categorize the type of sewage and waste water that the ports have to arrange adequate port reception facilities for. The port also requires information about the type and the amount of sewage/waste water the ship intends to deliver to port reception facility (advance notification).

One of the issues that has to be agreed between the port and the municipality is whether the sewage received from passenger ships can be considered comparable to municipal household waste water or industrial waste water. In case of the latter, there are some limit values for certain parameters since high concentrations of these substances could lead to damage of the bacterial bed used in the biological treatment used by the treatment plant. Also they may have an impact on the condition of the sewerage network and the equipment at the treatment plant.

Regarding the fee system, additional charge for the type of sewage exceeding permitted concentrations of sewage characteristics may be necessary if the port has to agree to the industrial wastewater contract with the municipality.

8.2 Environmental measures of ships

The application of reduced fees due to ship's environmental performance can relate to for example to on board waste segregation, minimization of waste or the most advanced waste water treatment systems regarding sewage.

8.3 Availability of information on fee structure

In order to ensure that the fees are fair, transparent, and non-discriminatory and reflect the costs of the facilities and services made available, the amount of the fees and the basis on which they have been calculated should be made clear for the port users. To this end, the Port's Waste Management Plan has to comprise the description of the charging system and this information has to also be made available to all port users. It is recommended that the framework for fees is harmonized across the all ports in the Baltic Sea.

8.4 Recommendations related to fees

- Due to the no-special-fee system as agreed by HELCOM contracting parties, the fees should not directly depend on the quantity of received waste. Furthermore, the fees should ensure non-discriminatory treatment, be transparent, fair and reflect the total costs of the facilities.
- Sewage fee for passenger vessels should be differentiated based on the GT (size) and and/or number of crew and passengers. Other criteria can include among others the geographical area of the last port of call and if necessary, the pumping capacity of the vessel (relating to technical/operational requirements for the vessels).
- Fees may be reduced if the ship's environmental management, design, equipment and operation are such that the ship produces reduced quantities of waste.
- Port Waste Management Plan should comprise the description of the charging system and this information has to also be made available to all port users.

Outstanding issues related to fees

- Defining specific type of sewage which could be charged additionally to the standard contribution to the costs of PRF irrespective of the use of the facilities (no-special-fee).
- Defining a common criterion for the critical values for concentrations of certain substances in sewage which could be used for defining an additional fee for ships delivering sewage exceeding the defined concentrations.
- The no special fee system waste fee should not depend on the quantity of received sewage; however the type of sewage could be taken into account in the fee criteria if the contractual agreement with the municipality is based on the industrial wastewater contract (critical values for certain concentrates). Industrial wastewater agreements take into account particular characteristics of industrial wastewater. The maximum concentrations of certain substances permitted have been set by national regulations concerning waste water delivery.

9. On-shore handling, treatment and final disposal of sewage

9.1 Port waste management plans

The development of waste management plans for ports is an efficient control measure of appropriate ashore handling and final treatment of ship-generated waste in order to prevent the introduction of harmful substances, stemming from such wastes, to the environment.

HELCOM Recommendation19/12 “Waste management plans for ports” recommends that the Governments of the Contracting Parties shall ensure that waste management plans are developed for the ports according to the guidelines attached to the Recommendation.

Directive 2000/59/EC requires that appropriate Waste Reception and Handling Plans (WRHP) are developed and implemented for each port of the EU member states according to the detailed requirements of Annex I of the Directive.

Annex I of Directive 2000/59/EC requires e.g. that the person or persons responsible for the implementation of the plan should be indicated in the plan. Also, the list of contact points is among the information that should be made available to the port users. The WRHPs should address the quantities of sewage received and handled and describe the methods of recording the actual use of the PRF.

Russian requirements for waste management plans are found in Instruction of the Federal Agency of Maritime and River Transport.

9.2 Waste water treatment and disposal

The limit values for nutrients and other substances from urban waste waters discharged into sensitive areas have been regulated, for the HELCOM countries being EU members by European Council Directive 91/271/EEC since the early 2000s and for Russia – by “Sanitary regulations”. Sensitive areas are identified in the Directive as areas that are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken. For example, total phosphorus levels must not exceed 2mg/l (or 80% reduction) for waste-water treatment plants of 10,000 – 100,000 people and 1 mg/l (or 80% reduction) if the population exceeds 100,000 people. Total nitrogen for the same population groups must not exceed 15 mg/l (or 70-80%) or 10 mg/l (or 70-80%) respectively.

In the Baltic Sea even more stringent nutrient limits are set out by HELCOM Recommendations 28E/5 and 28E/6 that were agreed upon by the Ministers of the Environment of the Baltic Sea as a part of the Baltic Sea Action plan in 2007. According to Recommendation 28E/5, effluents from waste-water treatments plants with a population equivalent (p.e.) of more than 100,000, discharging directly into a marine environment, should not contain more than 0,5 mg/l P (or 90% reduction) and 10 mg/l N (or 70-80 % reduction).

Slightly less stringent reduction levels are required of waste-water treatment plants for smaller populations. According to Recommendation 28E/6, even single family homes and settlements below 300 p.e. should treat their wastewaters to levels corresponding to 5mg/l P (or 70% reduction) and 25 mg/l N (or 29% reduction). These recommendations entered into force between 31.12.2010 and 31.12.2018 depending on the size of the population.

The implementation of the 1992 Baltic Sea Joint Comprehensive Environmental Action Programme (JCP), created to facilitate the implementation of pollution reduction measures at the most polluted sites in the Baltic Sea catchment area, has resulted in deletion of 44 municipal hot spots from the hot spots list, thanks to major investments in municipal sector and wastewater treatment.

9.3 Recommendations related to on-shore handling, treatment and disposal

- Port facilities for pre-treatment of ship sewage through e.g. aeration and/or chemical treatment (e.g. lye) enhance the quality of sewage directed to the municipal sewage system.

- Ports and municipalities are encouraged to co-operate in handling ships sewage and improving, if needed, the municipal sewer systems and waste water treatment plants in order to receive sewage from ships and treat it according to the HELCOM municipal waste water treatment requirements.

9.4 Outstanding issues related to on-shore handling, treatment and disposal

- Compatibility between municipal waste water treatment demands on sewage composition and the composition of sewage from ships should be studied in more detail, if feasible on a port-by port basis.
- A need to provide best practice regarding compatibility between international discharge/receive regulation of shipping and the water treatment regulation which is of national, or even sub-national.
- Municipal treatment plants are designed to receive sewage from households and primary for reducing nutrients. Solutions to the treatment of sewage containing chlorine, oil-and other atypical substances should be sought for in cooperation between shipping, ports and municipal treatment plants.

10. Consolidated list of recommendations

Recommendations related to sewage composition

- Separate on-board drainage of black and grey water from that of other types of waste water would enable municipal waste water treatment plants treatment of a large share of ship sewage.
- Best practice to avoid formation of H_2S is to separate food waste stream from black- and grey water and minimize “residence” time by discharging at every port.
- Advanced on board treatment, or if not available, pre-treatment of sewage (e.g. aeration and ozonation).

Recommendations related to information exchange

- Ports waste reception and handling plans ought to include receiving capacity of sewage to PRF.

Recommendations related to sewage delivery

- Discharge connections referred to in MARPOL Annex IV are recommended for use in the Baltic Sea.
- Due to the disadvantages of barges and tank trucks berths are recommended to have a fixed link.
- For certain ports with space limitations hindering fixed arrangements and smaller anticipated volumes, discharge through barges or tank trucks remain as an alternative.

Recommendations related to adequacy

- Follow general principles according to IMO Guidelines: Resolution MEPC.83(44) from 2000 and MEPC.1/Circ.671 from 2009.

Recommendations related to operational issues and malfunctions

- Avoid mixing food stuff (especially with grease) with sewage and to flush the pipes with water or air after discharge reduces the risk of clogging. Discharging grey water after black water is another measure to reduce clogging risk.
- Hoses and flanges should be pressure tested regularly and hung so they are not in contact with the ground. Pipes should be kept clear of passenger/vehicle areas/routes and information on this could be recorded in the ports procedures.
- Renovations of sewer piping and installations of pressure sewers to enable more reliable functioning of reception systems

- Elevated ventilation of the sewage pumping stations with new type of filters to enable odorless operations.
- Port should be in the position to offer alternative solution/facilities in the case of temporary technical failure of PRF facilities until normal operation is resumed. Alternative solutions could be mobile PRF, barge, storage space for sewage.
- Temporary reductions of PRF capacity should be entered in IMO-GISIS – port reception facilities database by either the Port State (if notified by the port itself) or by the flag state of the ship.

Recommendations related to fees

- Due to the no-special-fee system as agreed by HELCOM contracting parties, the fees should not directly depend on the quantity of received waste. Furthermore, the fees should ensure non-discriminatory treatment, be transparent, fair and reflect the total costs of the facilities.
- Sewage fee for passenger vessels should be differentiated based on the GT (size) and and/or number of crew and passengers. Other criteria can include among others the geographical area of the last port of call and if necessary, the pumping capacity of the vessel (relating to technical/operational requirements for the vessels).
- The no special fee system waste fee should not depend on the quantity of received sewage; however the type of sewage could be taken into account in the fee criteria if the contractual agreement with the municipality is based on the industrial wastewater contract (critical values for certain concentrates). Industrial wastewater agreements take into account particular characteristics of industrial wastewater. The maximum concentrations of certain substances permitted have been set by national regulations concerning waste water delivery.
- Fees may be reduced if the ship's environmental management, design, equipment and operation are such that the ship produces reduced quantities of waste.
- Port Waste Management Plan should comprise the description of the charging system and this information has to also be made available to all port users.

Recommendations related to on-shore handling, treatment and disposal

- Port facilities for pre-treatment of ship sewage through e.g. aeration and/or chemical treatment (e.g. lye) enhance the quality of sewage directed to the municipal sewage system.
- Ports and municipalities are encouraged to co-operate in handling ships sewage and improving, if needed, the municipal sewer systems and waste water treatment plants in order to receive sewage from ships and treat it according to the HELCOM municipal waste water treatment requirements.

11. Consolidated list of outstanding issues

Outstanding issues related to sewage composition

- It is difficult to determine the composition of sewage through sampling since it contains high amount of solid particles and potential inclusion of substances beyond normal black and grey water, but it might affect the cost for handling and treatment, therefore there is a need to make an agreement on unified sampling methodology and parameters for sewage composition.
- There is a need to make information available to decision makers, ports and other stakeholders, on cruise ships operating in the Baltic Sea, with particular respect to their sewage treatment technologies, including needs to discharge sewage sludge/bio-residuals.
- There is a need of drawing up technical descriptions and best practices on how and where to monitor the H_2S levels onboard ships.

Outstanding issues related to information exchange

- Baltic-wide and port-wise information on the capacity to receive sewage (flow and total volume) which would enable sewage discharge planning by ships.

Outstanding issues related to sewage delivery

- Define through port-shipping company cooperation, on port by port basis, the needs of regularly visiting ships in terms of anticipated quantities (min-max) and qualities of waste water
- Identify ports with space limitations hindering fixed arrangements and exchange experiences on different solutions for sewage reception facilities in narrow ports.
- Identify ports where barges and tank trucks can be considered adequate for regular operation but where irregular visits from larger cruise vessels might be foreseen.
- Clarify which technological solutions that are needed in the ports to receive sewage sludge/bio-residue.

Outstanding issues related to adequacy

- Definitions of regularly visiting ships, normal use

Outstanding issues related to operational issues and malfunctions

- "Emergency dumping"

Outstanding issues related to fees

- Defining specific type of sewage which could be charged additionally to the standard contribution to the costs of PRF irrespective of the use of the facilities (no-special-fee).
- Defining a common criterion for the critical values for concentrations of certain substances in sewage which could be used for defining an additional fee for ships delivering sewage exceeding the defined concentrations.

Outstanding issues related to on-shore handling, treatment and disposal

- Compatibility between municipal waste water treatment demands on sewage composition and the composition of sewage from ships should be studied in more detail, if feasible on a port-by port basis.
- A need to provide best practice regarding compatibility between international discharge/receive regulation of shipping and the water treatment regulation which is of national, or even sub-national.
- Municipal treatment plants are designed to receive sewage from households and primary for reducing nutrients. Solutions to the treatment of sewage containing chlorine, oil-and other atypical substances should be sought for in cooperation between shipping, ports and municipal treatment plants.