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# **The Port Reception Facilities system concept (draft)**

*(22/08/09)*



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# **Introductory Part**

## **I - The overall objective**

The overall objective of the present study is to set up a comprehensive, efficient and harmonized PRF system along the Croatian coast

The overall objective is to improve the prevention of pollution from ships in the Adriatic Sea in line with the Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues. The goal is to enhance the administrative and technical efficiency of the Maritime Administration in implementing, monitoring and controlling a comprehensive, efficient and harmonized PRF system.

The protection of the sea from ships is emphasized in several strategic documents as an activity bearing the highest priority. In that respect the clearly articulated strategic approach is presented in the Pre-accession Maritime Transport Strategy developed in accordance with the opinion on Croatia's Application for Membership of the European Union. One of the goals of the Pre-accession Maritime Transport Strategy is the providing within ports of adequate facilities for the reception of oily waters, garbage and cargo residues including the setting up of necessary structures together with implementation, monitoring and control arrangements. In a more formal sense it is for Croatia to fulfil their obligations under the MARPOL Convention.

The Republic of Croatia became a party to the MARPOL Convention by the notification on succession in 1991. Since then Croatia has transposed into its legal system the provisions of the MARPOL Convention and more recently the provisions of the EU Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues as part of the EU accession process.

The Directive 2000/59/EC pursues the same objectives as the MARPOL Convention. However the Directive focuses on ship operation in ports and addresses in detail the legal, financial and practical responsibilities of the different operators involved in delivery of waste and residues in ports.

## **II - EC Directive 2000/59/EC**

### **II – 1 General requirements**

In November 2000 the European Parliament and the Council of the European Union declared its intention to protect the marine environment by ‘... reducing discharges into the sea of ship-generated waste and cargo residues’ (Directive 2000/59/EC). Such intent was to be achieved by a common policy in:

- Improving the availability and use of reception facilities; and
- Improving the enforcement regime.

Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues (the Directive) has therefore been developed in such a manner that a framework can be put in place in order to maintain environmental standards whilst at the same time allowing each of the Member States the right to decide how best to implement the requirements within its own existing internal system.

The environmental requirements of the Directive clearly state that:

- they should apply ‘...to all ships, irrespective of the flag they fly;
- adequate reception facilities should be made available in all ports of the Community’;
- such adequate port reception facilities ‘... should meet the needs of users from the largest merchant ship to the smallest recreational craft’.

### **II – 2 Specific requirements**

In order to achieve these general environmental requirements, the Directive has mandated Member States to invoke five key areas in waste management in order that the effectiveness of port reception facilities be improved, that discharges of ship generated waste be reduced and that the concept of the ‘polluter pays’ principle be adhered to.

The significant areas in question relate to:

1. Port shall prepare a waste management plan (Article 5)
2. The pre-notification by all vessels (except fishing vessels and recreational craft authorized to carry no more than 12 passengers) of their need to land waste (Article 6);
3. The requirement by all vessels to deliver their waste to port reception facilities before leaving port unless they have sufficient dedicated storage capacity for delivery at the next port of call without risk of discharge at sea (Article 7);

4. The payment of a fee to cover the costs of such reception facilities, set at a level to encourage the delivery of ship generated waste, and that are seen to be ‘...fair, non-discriminatory and transparent’ (Article 8); and,
5. Ships can be exempted due to “regular traffic” (Article 9).

## **II – 2.1 Port Waste Management Plans**

An appropriate waste reception and handling plan shall be developed and implemented for each port following consultation with the relevant parties (detailed requirements are set out in Annex I of the Directive).

## **II – 2.2 Prior notification**

The master of a ship to which the Directive applies bound for a port located in the Community must complete and submit a form (contained in Annex II of the Directive) to the authority or body designated:

- At least 24 hours prior to arrival, if the port of call is known; or
- As soon as the port of call is known, if this information is available less than 24hours prior to arrival; or
- At the latest upon departure from the previous port, if the duration of the voyage is less than 24 hours.

## **II – 2.3 Delivery of ship generated wastes**

Ships visiting a port in the Community must deliver all ship-generated waste to a port reception facility, unless the vessel can prove that there is sufficient dedicated storage capacity for ship-generated waste that has been accumulated and will be accumulated during the intended voyage of the ship until the port of delivery.

## **II – 2.4 Fees for ship generated waste**

Member States are required to ensure that the costs for providing the waste reception facilities are covered by the users whilst ensuring that there is also no incentive to discharge waste at sea. All vessels calling at a port will therefore be required to contribute to the costs of the facilities irrespective of the actual use of the facilities.

The Directive further requires that ships seen to be producing reduced quantities of ship generated waste be treated more favourably in the cost recovery system. Such treatment can rely on the ships environmental management, design, equipment and operation.

Cost recovery may be based on the category, type and size of ship or on the type and quantity of the waste actually delivered by the ship but in any case `... the amount of the fees and the basis on which they have been calculated should be made clear for the port users’.

## **II – 2.5 Exemptions under the EC Directive**

Ships engaged in scheduled traffic with regular ports of call may be allowed exemptions from certain obligations of the Directive provided evidence is given of an arrangement to ensure the delivery of ship-generated waste and payment of fees in a port along the ship’s route.

## **III – The Croatian legal and institutional framework**

Croatia has in place a recent comprehensive legal framework, and specific provisions for the establishment and operation of reception facilities for ship-generated wastes and cargo residues have already been incorporated in its legislation. That is the case for:

### **III – 1 The provision of reception facilities**

“Port authorities and concessionaires in special purpose ports shall undertake to equip the port with appropriate devices for handling and collecting solid and liquid waste, residues of cargo, oily and fecal waters as defined by the MARPOL Convention” (article 83 of the Maritime Domain and Seaports Act (NN 158/03, NN 141/06). Same obligation is repeated in article 3 paragraph 6 of the Regulation concerning the requirements that seaports must meet (NN 110/04).

### **III – 2 Port waste management plan**

“All ports open to public traffic as well as ports for special purposes must develop and apply a plan for the reception and handling of waste and cargo residues as defined by article 3 paragraph 7 of the Regulation concerning the requirements that seaports must meet” (article 62 of the Ordinance on terms and methods of maintaining order in ports (NN 90/05)).

### **III – 3 Prior notification**

“The master of a ship, other than a fishing vessel, bound for a Croatian port, must fully and accurately provide information about the ship’s waste and cargo

residues to the Harbour master and the port authority at least 24 hours prior to arrival at the port” (article 63 of the Ordinance on terms and methods of maintaining order in ports).

### **III – 4 Delivery of ship generated wastes**

“The master of a ship, the skipper of a yacht or a boat calling at a Croatian port shall, before leaving the port, deliver all the ship generated waste to the port’s reception facilities. Exceptionally, the ship can leave for the next port without disposing of the waste if there are evidences that there is sufficient dedicated storage capacity for all ship generated waste until the next port of delivery” ( article 64 of the Ordinance on terms and methods of maintaining order in ports).

### **III – 5 Fees for ship generated waste**

“The costs of waste reception in ports, including waste treatment and disposal, will be covered appropriately through the payment of a fee for using the reception facilities. The amount of the fee is determined by the Minister based on suggestion from port authority and it is determined according to gross tonnage, category and ship type. The fee can be set to a lower amount depending on the ship’s environmental management capabilities. The payment of a fee applies to all boats, except fishing boats. The port authority must informed of the fee rate in an appropriate way and in an appropriate location.” (article 65 of the Ordinance on terms and methods of maintaining order in ports).

### **III – 6 Exemptions**

“If passenger ships engaged in a regular domestic traffic deliver waste and pay fee in one of the port of the shipping line, they will be exempted from delivering waste and paying fee in other ports on this line”.(article 66 of the Ordinance on terms and methods of maintaining order in ports).

### **III – 7 Applicability of the provisions**

The above quoted provisions apply to:

- “ All ships, yachts and boats, irrespective of their flag, calling at Croatian ports, except for military and public ships;
- All ports normally visited by vessels listed above; and ,
- Ships that are excluded are requested to deliver their ship waste and cargo residues as much as possible in accordance with the provisions of the Ordinance” (article 61 of the Ordinance on terms and methods of maintaining order in ports).

### **III – 8 Responsibilities**

The responsibility for implementation and enforcement of these provisions rests at the national level with the Ministry of the Sea, Transport and Infrastructure and at the local level with the Harbour’s Master’s Offices and with the Port Authorities.

Regarding the legal regime applicable to the management of waste in general including the management of waste collected within ports, in particular the transport, the treatment and the final disposal of ship generated waste, the overall responsibility for its implementation and enforcement rests at the national level with the Ministry of Environment Protection, Physical Planning and Construction (hereinafter referred to as the Ministry of Environment). The Ministry of Environment is the regulatory body in this field. It delivers authorization and licenses, and fixes the environmental and technical standards.

#### **IV - The main characteristics of the existing Croatian PRF system**

To achieve the overall objective the project has been divided into three clearly different phases: the data collection; the analyses and study preparation; and, the study finalization its dissemination and discussion. The outputs of Phase I and Phase II were produced as **Annexes** (to the 5<sup>th</sup> Monthly Progress Report). These annexes relate to:

- The maritime traffic analyses **Annex I**;
- The ship generated waste analyses including considerations regarding calculation models **Annex II**;
- The analysis of the capacities for handling liquid oily wastes from ships **Annex III**;
- The analysis of the capacities for handling solid wastes from ships **Annex IV**;
- and,
- The financial evaluation of the cost recovery regime for handling ship generated waste **Annex V**.

An Interim Report containing a summary of the findings during the data collection phase together with preliminary conclusions was issued at the end of Phase I. The data collected were the basis for undertaking the above mentioned analyses. The goal was to carry out an assessment of the current situation and identify trends, anomalies, weaknesses and problems in the practical application, implementation and day-to-day management of the Croatian regulations by the authorities/entities that operate port waste management plans in Croatia as well as to consider possible improvements.

It is on the basis of the results of these analyses that the port reception facilities system concept has been prepared. These analyses also served to highlight the main characteristics of the existing Croatian port reception facilities system and the current practices of the Port Authorities. These are summarized below, while details could be found in the above mentioned Annexes to the 5<sup>th</sup> Monthly Progress Report.

## **IV – 1 Main characteristics of the maritime traffic in Croatian ports**

During the second phase of the project the Consultant carried out a thorough analysis of data on maritime traffic in Croatian ports, using as the source data sets from DOB database of the Ministry of Sea, Transport and Infrastructure, which were formatted and processed in order to serve specific needs of the present study. More detailed information on the methodology used by the Consultant and detailed results of the maritime traffic analysis are given in Annex 1 to the 5<sup>th</sup> Monthly Progress Report. The main characteristics of the traffic in Croatian ports, which are relevant for the study on port reception facilities for ship generated liquid and solid wastes, are summarized below:

- **a huge predominance of the domestic traffic as compared to the international one;**

The analysis of maritime traffic in recent years shows that in years 2007 and 2008 some 93% of all arrivals in all Croatian ports were arrivals from other ports in Croatia, and merely 7% were arrivals from other destination. According to the available data from DOB database only a negligible percentage of arrivals were from 'unknown' previous ports (0.1-0.2% of all arrivals).

- **the major part of the international traffic is to and from other ports in the Adriatic;**

The information contained in the same database indicates that in the last two years out of all international traffic in Croatian ports some 67% of arrivals were from other ports in the Adriatic (Albania, Italian Adriatic ports, Montenegro and Slovenia), or 4.75% of the total traffic including also traffic originating from Croatian ports.

- **the most important element of the domestic traffic is by far passenger (ferry) traffic between mainland and the islands, with one company providing major part of the services;**

In the period 2004-2008 domestic passenger ships and ro-ro vessels including ferries participated in the total number of arrivals in all Croatian ports with some 80-85% and with some 70-76% in main ports (six ports of special, international economic interest for the Republic of Croatia and Pula). These percentages are certainly somewhat lower since the category 'passenger ships' includes also 'cruise ships' which are engaged in international traffic, while category 'ro-ro ships' includes both 'ro-ro passenger ships' and 'ro-ro cargo ships'. It was reported that the national (State owned) ferry company "Jadrolinija" participated with some 96% in the total domestic passenger traffic.

- **a very large number of arrivals of ships below 300GT;**

Available data suggest that in 2008 approximately 75% of arrivals of all ships in Croatian ports can be attributed to the ships of less than 1000 GT, and that out of these some 60% were arrivals of ships of less than 300 GT, which could potentially be subject to a special regime once the new indirect fee system is

introduced in Croatia. Such special regime would in that case be applicable to some 475 smaller ships of below 300 GT, which are responsible for up to 45% of all arrivals of ships in Croatian ports. Since the Gross Tonnage would be only one of several criteria for the eligibility of ships for a special regime these percentages are likely to be somewhat lower.

- **passenger traffic, including also cruise lines, shows a significant increase during the summer season;**

In 2008 the total number of arrivals of all ships in all Croatian ports during the period January to April, and October to December varied between 4500 and 6500 per month, in May it stood at some 8400 arrivals, in June and September at around 10700, while in July and August the recorded number of arrivals was between 13000 and 14000. A similar trend could be observed in the areas under jurisdiction of all Harbor Master's offices except Ploče, where the seasonal fluctuations were much less pronounced.

The number of ships arriving in all Croatian ports during the same year (2008) also shows differences seasonal differences but these were much less prominent than the number of arrivals: in the winter period (January, February, March, November and December) the number of ships which called at Croatian ports was between 340 and 400, in April, May, June and October between 500 and 600, while during the three summer months (July, August, September) it stood just above 600 (600-630).

The fact that the number of arrivals of ships in July/August is more than 3 times higher than in December/January, while the number of ships which called at Croatian ports in July/August was only 1.8 times the number of ships which called at the same ports in December/January indicates that a significant increase in the number of arrivals in the summer months can be attributed to more frequent ferry connections between the mainland and the islands during the touristic season, which also further confirms the assumption that a vast majority of traffic in Croatia is passenger traffic on domestic routes.

#### **IV – 2 An outline of the current Croatian port reception facilities system**

- Croatia has in place a modern legal framework, congruent with MARPOL Convention and with the EU Directive 2000/59/EC, which *inter alia* addresses port reception facilities and collection of ship-generated wastes in its ports.
- All ports of special (international) economic interest for the Republic of Croatia and ports of county importance (significance) have Port Waste Management plans which address the issue of port reception facilities.
- Collection of ship generated liquid oily wastes and garbage is regularly provided to ships in all such ports.

- Cost recovery system currently in place in all Croatian ports is a direct payment system, i.e. ships or their agents pay the services of collection of liquid oily wastes and garbage directly to the providers of services. Port Authorities shall determine and publish the tariffs for such services.
- Port Authorities are not directly engaged in collection of liquid oily wastes and garbage from ships.
- Removal from ships of liquid oily wastes is provided by specialized companies to whom Port Authorities issue concessions for such activities. These companies must be registered and licensed by the Ministry of Environmental Protection for collection, handling, treatment and disposal of hazardous wastes.
- Collection of garbage from ships is carried out either by communal garbage removal companies which have concession agreements with the relevant Port Authorities (Pula, Rijeka, Zadar, Split) or by Port services who have "preferential" concession agreements with their respective Port Authorities (Šibenik, Ploče, Dubrovnik). Similar arrangements, based on concessions, exist with local communal companies for collection of garbage from ships calling in county and local ports.
- Local ports and pleasure craft ports (marinas) in Croatia are equipped with limited size containers for liquid oily wastes as well as with garbage containers.
- In Croatian ports there are no fixed reception facilities for either liquid or solid wastes.
- The service is provided by mobile units, i.e. dedicated tank trucks (road tankers) for liquid oily wastes or skips and dedicated garbage collection trucks for garbage, when the ships are at berth inside the port. In Rijeka and Split collection of liquid waste at anchor, by specialized vessels or barges, is also available. In Rijeka collection of garbage from ships at anchorage, by a boat carrying a skip on board, is also available upon request.
- Treatment and disposal of liquid oily wastes occur outside the ports' boundaries. Most of the providers of services (except a single company) do not have their own proper oily waste treatment plants and rely on third parties for the treatment of collected oily liquids.
- Garbage is transported from the port and disposed of in communal landfill sites.
- The treatment of waste oil and oily bilge water is in line with modern standards. The treatment and disposal of solid waste (garbage) is mainly far below modern standards, but it will be improved within a few years period. The measures for improvement of current practices are currently being undertaken by the Ministry of Environment and relevant Counties.

### **IV – 3 The volume of wastes collected**

All examined Port Waste Management Plans (PWMPs) and concession agreements between port authorities and concessionaires providing port reception facilities clearly stipulate reporting obligations concerning the volume of waste collected in Croatian ports, which should primarily serve as a basis for calculating variable parts of fees payable to the port authorities.

In most cases **it was not possible to obtain**, either from the port authorities or from their concessionaires, **the records** of quantities of different types of waste received in Croatian ports in recent years, despite the fact that, according to the PWMPs, concessionaires have an obligation to quarterly report to the relevant port authority the quantities of various types of liquid and solid wastes collected during the previous three months, and to report at the end of each year the total amount of wastes collected during that year. These obligations are also duly included in the concession agreements between port authorities and their concessionaires.

The data eventually obtained by the Consultant were incomplete, inconsistent and not sufficiently accurate to carry out a proper analysis.

The two main reasons for such situation are:

- The lack of proper reporting and record keeping scheme in place; and,
- The concessionaires often do not report to the port authorities the quantities of wastes collected in ports in accordance with their contractual obligations.

### **IV – 4 Observations of the Consultant**

Although Harbour Masters or their PSC inspectors interviewed during the mission did not indicate any problems related to the services for collection of ship generated liquid oily wastes and garbage in ports under their jurisdiction, the Consultant made certain observations indicating that the current system needs to be improved and harmonized both within the country and with the neighbouring countries, in particular the EU member States:

- Despite having in place a legal framework which transposed into the national legislation the provisions of the MARPOL Convention and of the EU Directive 2000/59/EC it seems that its implementation in particular at the level of ports is not always fully satisfactory, there are different interpretations, some provisions are not implemented due to the lack of control and enforcement procedures;
- Monitoring and control of the whole process of collection, handling, treatment and disposal of ship-generated liquid and solid wastes are not clearly defined and implemented;
- There are differences among various Croatian ports regarding the implementation of the fee regime and the tariffs;

- Tariffs applied in major Croatian ports differ significantly and are generally much higher than in the other countries in the Adriatic region;
- Practices regarding collection, segregation, treatment, recycling and disposal of solid wastes need to be revisited and improved;
- The question of availability of specialized facilities for the treatment and disposal of liquid oily wastes in the northern part of the Croatian coast needs to be addressed, taking into consideration that all contractors in that part of the country are at present relying on INA Refinery Rijeka.

## **IV – 5 Shortcomings of the current regime**

### **IV – 5.1 In the legal regime**

- Absence of clear and detailed guidelines which would ensure uniform implementation of the legal regime;
- Definitions and terminology regarding waste, hazardous waste, used oil etc. are different and do not have the same meaning in maritime laws and in environmental laws. That causes misunderstanding and confusion. It also creates additional problems for the personnel of Port Authorities responsible for reporting (to the Ministry, Croatian Environment Agency, etc.);
- The oily waste collected from ships is sometimes regarded as import of hazardous waste, and the import of hazardous waste is forbidden under article 47 of the Waste Act (NN 178/04, NN 111/06).

### **IV – 5.2 In the institutional and organizational set up**

- The Port Waste Management Plans are not always fully developed in accordance with the requirements of the Annex I of the Regulation concerning the requirements that seaports must meet. Some important topics are missing in the list of subjects to be addressed which is contained in the Annex I, such as the description of the charging system and the method for recording the amounts of ship generated waste received.
- The monitoring and control regime does not seem to be well defined and implemented in particular when it comes to the implementation and enforcement of the port waste management plans.

#### **IV – 5.3 In the operational and the managing arrangements**

Uncertainties regarding the availability in the future of treatment capacities for oily residues in the northern part of Croatian coast: the only treatment facility with sufficient capacity is the one owned by INA Refinery Rijeka, which has little or no interest in waste oily waters treatment.

Different types of solid wastes (garbage) which are segregated on board ships by the crew are often mixed by the waste collectors during collection.

#### **IV – 5.4 In the cost recovery regime**

The current regime is not fully in line with the cost recovery regime the EC Directive 2000/59/EC intends to promote.

There are differences in tariffs among Croatian ports.

The tariffs in Croatian ports are higher for the same type of services as compared to other countries in the region

Although the Croatian law (Ordinance on terms and methods of maintaining order in ports) provides for a lower fee for ships with good environmental management record and for exemption for passenger ships engaged in regular domestic traffic it does not seem that these provisions are implemented in a consistent manner by the ports visited.

### **V – Recommendations for improvement**

#### **V – 1 Of the legal regime**

- Developing clear and detail Guidelines for a uniform implementation of the legal regimes
- Harmonizing the terminology in maritime and environmental, waste related legislation, or at least providing clear and binding instructions concerning the use of the terminology (this may be done through the guidelines mentioned above);
- Clarifying the issue of “importing hazardous waste” as regards collection of waste oil, oily residues and oil/water mixtures from, in particular foreign, ships. The Waste Act should be amended or another workable solution should be found with a view to putting the legal regime in line

with the EU Regulation (EC) No 1013/2006 of 14. June 2006 which in its Article I specifies that waste generated from normal operation of ships should not be considered as import (as described in **Annex V** attached to the Interim Report).

## **V – 2 Of the institutional and organizational system**

- By re-defining and clarifying their responsibilities, the role of the port Authorities must be enhanced and strengthened;
- Introducing a strongest level of control by Port Authorities on its concessionaires regarding the quality of the services offered and of their performances in particular through a detailed contractual framework;
- Establishing a waste notification flow scheme with an easy access by all relevant actors (use of IT technology);
- Ensuring that delivery certificates are systematically issued;
- Maintaining a reporting and record keeping scheme (including a dedicated data base) and issuing to this end clear instructions for reporting (by concessionaires) of quantities of waste (liquid and solid) collected from ships, transported, treated and disposed of in terms of units used (volume or weight), periodicity of reporting (monthly, annually, ...), reporting format, etc.;
- Undertaking periodically assessment needs study;
- Maintaining strong communication links among the interested parties and ensuring proper publicity and up dated information flow.

## **V – 3 Of the practices for waste collection, transport, treatment and disposal**

- Harmonizing the practices of waste collectors (concessionaires) with the obligations of ships (according to international conventions) regarding e.g. separation of garbage, categories of oily waste, etc... ;
- Avoiding re-mixing on land (in port receptacles/containers) of different kinds of (solid) waste/garbage already separated on board ships;
- Harmonizing/standardizing conversion factors used in Croatian ports by concessionaires for conversion of volume into weight (in particular of garbage) for payment purposes.

## **V – 4 Of the financing regime**

- The cost recovery regime should move towards a generalized, harmonized, transparent and effective regime where:
  - All the waste delivery costs are included in an indirect fee;
  - The ships/agents will have to deal only with the PA;
  - The PA will collect the waste fees from the agents/ships;
  - The tariff will be negotiated with the waste operators and controlled by the PA.
- The cost recovery regime should be defined in clear, detailed guidelines and publicized as appropriate;
- The conditions under which a “green ship” can be granted fee reduction, as well as the conditions under which a ship can be granted exemption from the indirect fee regime should be specified.

## **VI - Introduction to the PRF system**

The setting up of a comprehensive, efficient and harmonized port reception facilities system shall be seen as a way forward to address the shortcomings and problems identified and to bring the current system fully in line with the EU Directive 2000/59/EC. The key element of the harmonized system proposed will be the introduction of a generalized and harmonized cost recovery regime. A cost recovery regime is a mechanism to generate revenue, which is used to cover the capital, operational and administrative costs of operating port reception facilities. The cost recovery regime proposed will be based on the indirect fee payment which should provide incentive to ships not to discharge their waste into the sea.

As a consequences of the introduction of a new cost recovery regime the institutional and organizational set up of the existing system will have to be revisited and adjusted accordingly. Therefore as indicated above it is to a large extent the setting up of a new PRF system which is proposed although it is not anticipated to recommend changes (except for very few minor amendments) into the existing legal regime which indeed will be the basis for the new system. One of the main goals being to ensure through appropriate measures an effective implementation and enforcement of the laws and regulations.

Among the main issues that the setting up of the new PRF system will have to address will be:

- The strengthening of the role of the port authorities;

- The establishment of a harmonized, transparent and effective indirect fee payment regime (method for calculation of fees, conditions for exemptions);
- Defining the contractual framework with the waste operators;
- The development of guidelines.

The present study aims at introducing the proposed port reception facilities system and its structure along four main parts:

1. The PRF network
2. The strengthening of existing capacities
3. The financial implications
4. The way forward and the time line

# **Part I: The PRF network**

## **Chapter 1: The cost recovery regime**

### **Introduction**

It should be recalled that under the Croatian law (Ordinance on maintaining order in ports – NN 90/05) all ships, yachts and boats, irrespective of their flag, calling at Croatian ports, excepted military and public ships, must deliver their ship generated waste (art 64) and they must pay a fee for using reception facilities (art 65). Ships calling at Croatian ports must deliver their cargo residues and pay a fee for the collection of cargo residues (art 67).

It should be also recalled that port authorities of ports open to public traffic and concessionaires of special purpose ports shall equip their port with adequate facilities to collect and handle solid and liquid and cargo residues, and they must develop and apply a port waste management plan. Under article 16 of the Regulation on classification and categorization of ports for nautical tourism, marinas must provide disposal equipments for collecting solid waste and oily waste (liquid waste).

Regarding the present cost recovery regimes the situation according to the law should be as follows:

- a) The marinas apply an indirect fee regime. The fee for the collection of waste is incorporated in the port due.
- b) The special purpose ports apply a direct fee regime. The tariff is negotiated between the waste collector and the user.
- c) The ports open to public traffic apply a direct fee regime. According to the law (art 65 Ordinance on maintaining order in ports) the tariff for collecting ship generated waste is fixed by the Minister based on suggestion from port authority and it is determined according to gross tonnage, category and ship type. The Ordinance does not specify whether the payment should be direct or indirect. In practice, and more in line with the article 63 of the Maritime Domain and Sea Ports Act, the port authorities fix the maximum amount of the fee and the concessionaire sets the tariffs he will apply to the user and collect from him. The tariff for solid waste is set for each visit and calculated according to the size of the ship, the tariff for liquid waste is set per category of waste and per volume.
- d) Regarding the cargo residues the regime is a direct fee payment negotiated between the cargo residue collector and the users.

When it comes to the cost recovery regimes the proposal for the setting up of a new PRF system is:

- a) To keep as is the cost recovery regimes for the Marinas, the special purpose ports and for the cargo residues;
- b) To introduce for the ports open to public traffic a generalized and harmonized indirect fee regime for the collection of ship generated waste (MARPOL Annex I and V wastes).

The following text describes the indirect fee regime

### **1.1.1. General principles of the indirect fee regime**

#### **1.1.1.1 The scope of the indirect fee regime**

- a) The indirect fee regime should be implemented in all Croatian ports that are open to public traffic (Ports of special economic interest, ports of county importance and ports of local importance).

An indirect fee regime will work only if it is implemented in the same way in all ports within the region (Croatia and the north Adriatic). For Croatia this can be achieved by applying the indirect fee regime to all Croatian ports that are open to public traffic. For other Adriatic ports this would be achieved through close co-operation with the other Adriatic countries. These countries are members of the European Union (Italy, Slovenia) or are engaged in the process for accessing to the EU (Montenegro, Albania ) and they should comply with the European Directive which promotes the indirect fee regime. Currently these ports adopted a partly indirect fee regime, which is different from the proposed fee regime in this document.

- b) Ship generated waste consists of a part that is ship related and a part that is cargo related. The indirect fee regime shall apply to ship related waste such as liquid waste (Annex 1) and solid waste (Annex 5).The ship related waste is the responsibility of the ship owner.

The removal of the cargo related waste (cargo residues, tank cleaning) is the responsibility of the owner of the cargo. A direct special fee regime shall apply involving the cargo owner directly with the waste collector.

- c) All ships that arrive in Croatian ports that are open to public traffic are subject to the indirect fee regime.

Subject to specific conditions ships or ports can apply for a special regime or an exemption (see Part II)

### **1.1.1.2 Characteristics**

- a) Basic principle: each ship that arrives in a port (which is not exempted) has to contribute a fixed amount per entry (waste due), irrespective of whether they discharge waste or not. In principle there is no limitation for the volume they can discharge as long as it is MARPOL Annex I and Annex 5 wastes. However the ship shall be charged for exceptionally large quantities in respect of normal use. This is to avoid that the ship abuses the system by waste tourism (industrial waste) or by holding the waste when calling in previous ports having a direct cost recovery system. If such abuse is suspected the ship has to prove the origin of the waste.
- b) There will be two regimes:
- Indirect fee for liquid wastes (Annex I)
    - Every sea-going ship has the obligation to pay for reception, handling and disposal of oily residues which is deemed to arise with the arrival of the ship in a Croatian port that is open to public traffic, irrespective of whether or not that particular ship will actually make use of the reception facilities which are available there.
  - Indirect fee for solid wastes (Annex V )
    - Every sea-going ship has the obligation to pay for reception, handling and disposal of solid waste which is deemed to arise with the arrival of the ship in a Croatian port that is open to public traffic, irrespective of whether or not that particular ship will actually make use of the reception facilities which are available there.
- c) The indirect fee covers the waste collecting, handling and processing including infrastructure. The indirect fee for liquid waste as well as the indirect fee for solid waste includes also a fee to cover the associated costs for the Port Authority.
- d) The level of the indirect fee should be the same in all the ports open to public traffic that are not excluded from the indirect fee regime. However in exceptional cases the level of the indirect fee may be different for individual ports when for these ports there are huge differences in cost price for reception, handling and disposal of waste.
- Therefore a different cost price has to be justified by the Port Authority concerned. Higher cost prices can be based on geographical differences and on differences in the relative quantity of disposed waste (economics of scale). Higher cost prices based on inefficiencies do not apply for a different fee.
- e) The collection of the waste is free of charge. The Port Authority distributes the collected fee over the contractors.

### **1.1.1.3 Calculation of the fees**

The level of the fees must be set in such a way that the total of the payment received from the ship covers at least the compensation for the services provided by the contractors and the associated supporting costs to be covered by the Port Authority.

- a) The fee as regards to the ships is a fixed amount depending on the category, type and size of the ship. It is possible for a ship to claim a discount on these amounts if the ship can prove that it treats the waste in an efficient and environmental friendly way. In this case the ship can apply for a "green ship certificate". Such certificate can be provided by the Ministry of Sea, Transport and Infrastructure. The process and the conditions to provide such certificate must be developed.
- b) The fee (compensation) as regards to the contractors is fixed within the concession contract to be signed between the Port Authority and the contractor; this compensation consist of 3 elements:
  - i. A fixed amount per period for the availability of the facilities
  - ii. An amount per collection of waste
  - iii. An amount per collected m<sup>3</sup> of waste.
- c) The fee as regard to the Port Authority is to cover the associated supporting costs of the Port Authority. These costs consists of:
  - i. Setting up and maintaining a system to collect the indirect fees;
  - ii. Setting up and maintaining a system to distribute the compensation for the collectors;
  - iii. Inspections;
  - iv. Setting up and maintaining a system to manage the exemptions regime (granting exemption will be the responsibility of the Ministry);
  - v. Reporting;
  - vi. Carrying out periodic needs assessment.

### **1.1.1.4 Method of charging**

The indirect fee shall be charged to all vessels that are not exempted and that are calling in ports where the indirect fee regime applies and shall be collected as part of or in addition to the port dues.

### **1.1.1.5 Payment**

- a) The indirect fee that the ship has to pay according to the tariff for liquid waste and for solid waste is due at the arrival of the ship. If the ship stays in port for more than 1 day there is no extra waste due to be paid. The payment shall be part of the regular invoice that the Port Authority sends to the agent of the ship.
- b) The compensation for the contractors will be based on the terms of the concession agreement (contract). These terms will be set in the tender process for the concession. The compensation will include:
  - i. A fixed amount for the availability of the facilities for waste collection, waste processing and removal.
  - ii. An amount per m<sup>3</sup> of collected waste.
  - iii. An amount per collection if there is more than 1 collection during the stay of the ship in the port.

In the compensation per m<sup>3</sup> it will be recognized that part of the cost price has already been compensated in the compensation for availability of facilities.

### **1.1.1.6 Building the tariffs**

The total of the fees collected by each Port Authority must cover at least the compensation for the concessionaires and the costs of the Port Authority.

The total of the collected fees depends on the number of arrivals in the port and the tariff.

The compensation for the concessionaires must at least cover the quantity of collected waste and the market price per unit. There are tariffs for liquid waste, for solid waste and for the costs of the Port Authority.

#### **1.1.1.6 (i) Liquid waste**

A starting point for setting the tariffs should be the market price per m<sup>3</sup> and the market price per arrival. The market price is the price that is normally charged by the concessionaire to a client to collect, process and remove a certain quantity (in this case 1m<sup>3</sup>) of liquid waste.

We assume that the market price for a m<sup>3</sup> of waste is HRK 710 (Euro 100) and that the average collection of waste per arrival is 0.5 m<sup>3</sup>. The market price per arrival can be calculated at HRK 355. The average fee per arrival is equal the market price per arrival. The market price is based on information received from Rijeka, information from other liquid waste collecting companies show that this price is in line with their prices. We conclude that this market price is reliable. In Koper (Slovenia) the tariff per m<sup>3</sup> is HRK 350 per m<sup>3</sup> for waste water and HRK 539 per m<sup>3</sup> for oil/water mixtures.

That is pure assumption which will have to be correctly calculated in the future and validated.

In Annex 5 a comparison was made between the tariffs of the Croatian State Ports, the following categories of vessels were used:

GRT
1 < 500
2 501-1000
3 1001-1500
4 1501-2500
5 2501-10000
6 >10000

We assume that category 3 GRT 1501-2500 is where the average fee per arrival is valid, we further assume that Category 1 delivers 50% less than the average category, Category 2 20% less and Category 3 10% less. Category 4 and 5 produce respectively 10 and 20% more than average. In this way we come to the following tariff structure:

tariff per arrival	HRK
1 <= 500	178
2 501-1000	284
3 1001-1500	320
4 1501-2500	355
5 2501-10000	391
6 >10000	426

#### **1.1.1.6 (ii) Solid waste**

A starting point for setting the tariffs should be the market price per m<sup>3</sup> and the market price per arrival.

However during the data collection we did not receive a reliable market price and could not use the same methods as for liquid waste for the building of the new tariff for solid waste.

In Annex 5 a comparison was made between the published tariffs of the Croatian State Ports

HRK	Rijeka	Zadar	Sibenik	Split	Ploce	Dubrovnik
0-500	363	435	170	320	575	284
501-1000	475	575	227	420	767	284
1000-1500	475	575	227	420	1434	369
1500-2500	775	930	369	680	1434	369
2500-10000	875	1055	426	770	1534	675
over 10000	900	1085	497	790	1534	1115

There is much difference between the published tariffs for solid waste in the public ports. The average of these tariffs is:

HRK	Average
0-500	358
501-1000	458
1000-1500	583
1500-2500	760
2500-10000	889
over 10000	987

It is clear that the average of the 6 ports comes close to the tariffs of the biggest port Rijeka. We propose to use the Rijeka tariff as a starting point with 1 amendment for passenger ships, for these ships we propose to use the tariff of Dubrovnik for the cruise ships with more than 100 passengers on board. Cruise ships with many passengers are known to deliver a relative big quantity of solid waste. (the tariff is HRK 1,115)

In this way we come to the following tariff structure:

HRK	New structure
0-500	363
501-1000	475
1000-1500	475
1500-2500	775
2500-10000	875
over 10000	900
passenger ship >100 passengers	1115

The new tariff structure for solid waste is relatively high when compared with the tariff of liquid waste. The level of the new tariff structure is based on the level of the existing system. The high level is certainly influenced by the fact that there is no competition for the collection of solid waste. In the coming round of renewal of the concessions this should be a point for negotiation.

The tariff is per arrival. A straightforward comparison with other ports in the region is not possible because the other ports have a tariff per day and the categories of vessels are different per port.

In order to get an impression we rearranged some categories and got the following comparison:

tariff per arrival	Croatia	Koper	Ancona	Ravenna
	Per arrival	Per day	Per day	Per day
1 <= 500	363			
2 501-1000	475	251	241	99
3 1001-1500	475	365	241	99
4 1501-2500	775	502	241	99
5 2501-10000	875	599	341	107
6 >10000	900	945	618	199
8 passengers >100	1115		1.037	426

### **1.1.1.6 (iii) Costs of the Port Authority**

We assume that the costs of the Port Authority are 10% of the average tariff for liquid waste and the average tariff for solid waste. The outcome is HRK 77,5 per arrival. This amount is charged on top of the charges for solid waste and liquid waste.

The charges per arrival of a vessel are:

HRK	Liquid	Solid	Administrative costs	Total
1 <= 300	178	363	57	598
1 <= 1000	284	475	56	815
2 1001-1500	320	475	56	851
3 1501-2500	355	775	56	1.186
4 2501-10000	391	875	56	1.322
5 >10000	426	900	56	1.382
7 passengers >100	426	1.115	56	1.597

### **1.1.1.6 (iv) Total revenue**

For the year 2007, the numbers of arrivals in the ports were:

	2007						
	Rijeka	Zadar	Sibenik	Split	Ploce	Dubrovnik	Total
per category							
GT							
1 <= 1000	319	148	28	571	114	172	1.352
2 1001-1500	110	24	7	44	18		203
3 1501-2500	552	37	109	133	118	3	952
4 2501-10000	45	63	58	266	198	9	639
5 >10000	379	29	20	37	94	3	562
Passengers	420	268	53	877	29	933	2.580
Total	1.825	569	275	1.928	571	1.120	6.288

The numbers of arrivals regard all vessels excluding vessels that arrive in a port more than 50 times a year and excluding vessels < 300 GT.

Using the before mentioned number of arrivals and the tariff structures, we can calculate the total collected fee per port:

HRK	Rijeka	Zadar	Sibenik	Split	Ploce	Dubrovnik	Total
Liquid waste	500728	99791	80053	343072	197380	54706	1275728
Solid waste	1246200	341010	199398	1150178	428168	614748	3979700
Costs for Port Authority	103113	32149	15538	108932	32262	63280	355272
<b>Total</b>	<b>1850040</b>	<b>472949</b>	<b>294988</b>	<b>1602182</b>	<b>657809</b>	<b>732733</b>	<b>5610700</b>

### **1.1.1.6 (v) Compensation**

#### 1.1.1.6 (v) (a) General

The total of the revenue forms the basis for the calculation of the compensation of the concessionaires.

The compensation consists of 2 parts, a fixed part and a variable part.

The fixed part is for maintaining the service demanded by the Port Authority. The data collection of this project did not produce a good basis for the calculation of the fixed fee. For a start this fixed fee is set at 20% of the budget.

The budget will be made each year on the basis of the tariff and the expected number of arrivals.

In order to avoid liquidity problems it is advised to start with a conservative budget.

The variable part of the compensation should cover the productions of collected waste and extra (more than 1) collection per arrival.

In order to simplify the calculations the production unit is introduced. All productions are reflected in the production unit. The collection of 1 m<sup>3</sup> of waste gives 1 production unit. All extra collections above 1 per arrival give 1 production unit.

The budget for variable compensation (80%) divided by the total of the production units gives the compensation per production unit. Before the calculation can be made it is necessary to make the budget and to estimate the number of m<sup>3</sup> and the number of extra collections.

The concessionaires can claim the compensation on the basis of the realized production units per period.

An example of the calculations per port and per waste type is worked out.

The Port Authority is in control of the incoming and outgoing funds. There will be positive or negative balances per period. But in the long run this should level out. The Port Authority reports in a transparent way about the flow of funds to the concessionaires and other stakeholders.

It should be noted that the new concession agreement also takes into account the vessels that are exempted from the indirect fee system. The contracts between the shipping lines and the contractors should be in line with the regulations in the concession contract and the contractors have to pay a fixed and a variable fee to the Port Authority of the port where the contractor exploits his contract with the shipping line.

#### 1.1.1.6 (v) (b) Solid waste

Solid waste		Rijeka	Zadar	Sibenik	Split	Ploce	Dubrovnik
Budget		1240000	400000	195000	1250000	400000	750000
Fixed part of the budget	20%	248000	80000	39000	250000	80000	150000
Variable part of the budget	80%	992000	320000	156000	1000000	320000	600000
Estimated number of arrivals		1.825	569	275	1.928	571	1.120
Estimated number of collected m3		913	285	138	964	286	560
Estimated number of extra collections		91	28	14	96	29	56
number of production units		1095	341	165	1157	343	672
<b>Compensation per production unit</b>		<b>906</b>	<b>937</b>	<b>945</b>	<b>864</b>	<b>934</b>	<b>893</b>

The compensation per Port Authority does not show much difference. The level of the budget and the other estimates can be used to level the differences.

### 1.1.1.6 (v) (c) Liquid waste

Liquid waste		Rijeka	Zadar	Sibenik	Split	Ploce	Dubrovnik
Budget		590.00	180.00	90.00	600.00	200.00	400.000
Fixed part of the budget	20%	118000	36000	18000	120000	40000	80000
Variable part of the budget	80%	472.00	144.00	72.00	480.00	160.00	320.000
Estimated number of arrivals		1.825	569	275	1.928	571	1.120
Estimated number of collected m3		913	285	138	964	286	560
Estimated number of extra collections		91	28	14	96	29	56
number of production units		1095	341	165	1157	343	672
Compensation per production unit		431	422	436	415	467	476

The compensation per Port Authority does not show much difference. The level of the budget and the other estimates can be used to level the differences. If there are more concessionaires in a port for one type of waste (as in Rijeka), the fixed part of the budget will be divided by the number of concessionaires, assuming that all will provide the same level of service. If there are discrepancies they should be reflected in the distribution of this part of the budget.

## **1.1.2 Special regimes and exemptions**

### **1.1.2.1 Principles**

#### 1.1.2.1 (i) General fee regime

Except for military and public ships the indirect fee regime applies to all vessels arriving in Croatian ports that are open to public traffic, unless these vessels are

subject to a special regime or these vessels have applied for and been given an exemption.

#### 1.1.2.1 (ii) Special fee regime

A special regime should apply to small boats which are regular users of a port open to public traffic:

- Ship/boat below 12m/15GT/12 persons should be exempted from certain requirements and will be subject to a different payment regime.
- Small passenger ships and taxi boats transporting passengers and cargo to islands may be exempted from the full obligations of an indirect fee regime. However these small boats shall pay their share via the port dues. In return the PA takes care of small facilities where the small boats can deliver their ship generated waste.
- Harbour craft, *i.e.* waterborne craft intended exclusively for service within the port including e.g. tug boats, floating cranes, work boats, boats, rafts and dredgers may be exempted from the full obligations of an indirect fee regime. However these boats shall pay their share via the port dues.

#### 1.1.2.1 (iii) Exemptions

The exemptions to the indirect fee regime apply to:

- Ships engaged in scheduled traffic with regular and frequent port calls
- All state ports and county ports in Croatia that are open to public traffic shall implement the indirect fee regime. However, when ports (ports of county importance or ports of local importance) demonstrate that they cannot apply the indirect fee regime they may be exempted of such a regime.
- Special purpose ports/shipyard

### **1.1.2.2 Exemptions for ships**

The Ministry of the Sea, Transport and Infrastructure will set up and maintain a mechanism for granting exemptions to vessels engaged in scheduled traffic with regular and frequent port calls. These vessels could apply for such an exemption if they meet the following criteria (2-2-1) and conditions (2-2-2).

#### **1.1.2.2 (i) Criteria for granting exemptions**

- a) Scheduled: The vessel in question must have a published or planned list of times of departures and arrivals, between nominated ports or terminals.

- b) Regular: The vessel must make repeated journeys between those nominated ports or terminals and no others (except in the case of an emergency, maintenance or for safety reasons).
- c) Frequent: The vessel must visit one of the Croatian ports at least once a week.

**1.1.2.2 (ii) Conditions, requirements and evidences for granting exemptions**

- a) A contract with a waste collector for disposal of their ship generated waste
- b) Maintain a garbage record book
- c) Maintain an oil record book

**1.1.2.2 (iii) Process of issuing exemption certificate**

- a) Exemption application procedure
- b) Authority issuing exemption certificate
- c) The exemption certificate is valid for one year with possible extension.
- d) The exemption can be revoked by the Ministry if the ship abuses the system

Exempted vessels are released from the following obligations:

- a) Prior notification before arrival of waste on board
- b) Mandatory delivery of waste on each arrival in a Croatian Port
- c) Payment of an indirect fee on each arrival in a Croatian Port.

**1.1.2.2 (iv) Conditions, requirements and evidences for acceptance of exemptions by PSC inspectors and PA**

- a) Exemption certificate
- b) Receipt of the last delivery
- c) Copy of the garbage record book
- d) Copy of the oil record book

### **1.1.2.3 Exemptions for ports**

All State ports and county ports in Croatia that are open to public traffic shall implement the indirect fee regime. However, when ports (ports of county importance or ports of local importance) demonstrate that they cannot apply the indirect fee regime they may be exempted of such a regime. These ports have to prove that they are unable to implement the indirect fee system. The exemption can be granted by the Ministry of Sea, Transport and Infrastructure if the size of the port and the strength of the staff of the Port Authority and the quantity of expected waste are too small to maintain an indirect fee system.

### **1.1.3 Time frame for the entry into force**

#### **1.1.3.1 For the ports of special economic interest (State ports)**

In the main Croatian ports or state ports (ports of special, international economic interest for the country), namely Rijeka, Zadar, Šibenik, Split, Ploče and Dubrovnik, the indirect fee regime could be implemented as soon as the new PRF system has been agreed upon at the national level. However, it is imperative that before implementation a due attention is paid to the following points:

- Adapting rules and regulations;
- Implementing the exemption regime;
- Drafting new concession agreements;
- Organising a tender for the new concessions;
- Negotiations between Port Authorities, concessionaires and shipping agents;
- Signing new concession agreements;
- Finalizing and publishing the new indirect tariff system.

It is understood that these activities will take time, however it is realistic to assume that the new system could be implemented as of 1 January 2011. It is suggested to evaluate and improve as necessary the functioning of the new system in state ports, during the two years period of 2011-2012.

#### **1.1.3.2 For the ports of county importance and port of local importance**

The county ports are not ready to implement the system in 2011. The county ports can start the process of adapting to the new indirect fee regime after an evaluation period. It is suggested to introduce the use of the new system in the county ports on 1 January [2014].

## **Chapter 2: Institutional and organizational set up**

### **Introduction**

The introduction within the port reception facilities system of an indirect fee regime for covering the cost of the provision of facilities for collecting and handling ship generated waste which will apply in the Croatian ports open to public traffic will have a number of consequences on the institutional and organizational set up. The consequences will not affect the existing institutional set up and responsibilities, they will remain as is, however the proposed indirect fee regime will have as consequences the addition of new responsibilities and redefining and strengthening the existing one. At the central level the Ministry of the Sea, Transport and Infrastructures (MSTI) will have certain new tasks and responsibilities, and at the local level the port authorities will play a much more important role with a redefinition of their responsibilities in this field. At the same time the cooperation between Harbour Master's Offices and port Authorities would be enhanced.

### **1.2.1 New tasks and responsibilities at the central level for the Ministry of the Sea, Transport and Infrastructures**

#### **1.2.1.1 Implementation and enforcement of the new port reception facilities system**

Although it is not *per se* a new responsibility, one of the first tasks of the Ministry will be to develop and issue a set of Guidelines. The aims of these Guidelines will be:

- a) First to ensure a uniform interpretation and application of the existing legal regime with the view to rectifying the current situation where there are different ways of interpreting and implementing the laws;
- b) Second to explain the new port reception facilities system in particular the indirect fee regime which will apply in the same way in all the ports open to public traffic, and to provide guidance regarding its implementation and enforcement;
- c) Third to explain in detail and specify the tasks and responsibilities of all the entities involved.

#### **1.2.1.2 Fixing the tariffs to be paid under the indirect fee regime**

In accordance with the article 65 of the Ordinance on terms and methods of maintaining order in ports it will be the responsibility of the Ministry to fix the tariffs which the ports authorities of ports open to public traffic will charge under the indirect fee regime.

The calculation of the tariffs will be done in cooperation with the port authorities and in consultation with the relevant stakeholders (waste contractors and main shipping companies and shipping agents). For the calculation of the tariffs the Ministry in cooperation with the port authorities and the Harbour Master's Offices should establish a mechanism (data bases) for providing accurate data on maritime traffic (ships type, arrivals, etc.) and volume of collected waste per port and at the national level which will be key elements for such a calculation. Such calculation shall be done periodically with the view to updating and adjusting the tariffs as necessary and to ensuring the financial viability and sustainability of the system.

### **1.2.1.3 Green ships certificate**

Pursuant to article 65 of the Ordinance on terms and methods of maintaining order in ports the fee for using reception facilities can be set to a lower amount depending on the ship's environmental management capabilities. It will be the task of the Ministry to establish the procedures and the mechanism for implementing this provision of the law which will be an important component of the PRF system and in particular the indirect fee regime. That will be an incentive for ship masters and ship owners to apply good practices for the minimization and environmentally sound management of ship-generated waste. With reference to the relevant IMO Guidelines (Guidelines for the implementation of Annex V of MARPOL and Guide to good practice for port reception facility providers and users) as well as to the ISO standards ( ISO standard for the management and handling of shipboard garbage- ISO/CD 21070) the Ministry, for the ships flying the Croatian flag or for the ships the administration of which (which is party to the MARPOL Convention ) has requested the Croatian administration to act on his behalf (regulation 8 of MARPOL Annex I ), can issue a green ship certificate to those ships that demonstrate that they use "green technologies" (special environment equipments); implement an advance ship board waste management plan (including the garbage management plan); and segregate the garbage. Such green ship certificate can be issue following a survey conducted by nominated surveyors or recognized organizations. A ship to which a green ship certificate has been granted shall normally get fee reduction for the use of reception facilities in Croatian ports. The green ship certificate shall be issued for a period of 2 years renewable. The certificate can be revoked at any time if an inspection (PSC) or a survey establishes that the ship is no more operating according to the standards which justified the granting of a green ship certificate.

For the foreign ships calling at Croatian ports, the Ministry shall instruct the port authorities to apply a fee reduction for the use of PRF to the ships the administration of which implement a similar policy and if the ship can produce equivalent documentation and evidences . The Harbour Master's inspectors will check the documentation and advice the port authority accordingly.

Instructions for the monitoring and control by the port State control inspectors of the validity of the green ship certificate shall be issued.

#### **1.2.1.4 Exemption certificate for ships**

The article 66 of the Ordinance on terms and methods of maintaining order in ports provides for an exemption regime that shall apply to passenger ships engaged in a regular domestic traffic and which deliver waste and pay fee in one of the ports of the shipping line. The scope of the exemption regime as currently drafted is more restrictive than the one proposed to apply under the indirect fee regime. That is mainly due to the fact that the conditions proposed for granting exemption do not refer specifically to passenger traffic or to domestic traffic (although as we know it is mainly this kind of traffic which will be involved) that means that a non passenger ship or a ship involved in an international traffic (in particular Adriatic traffic) may be exempted. That is a policy issue on which the Ministry will have to decide upon keeping in mind that it is very much related to the way the regional cooperation on that matter with other Adriatic countries will develop. If the Ministry decides to expand the scope of the exemption regime the article 66 of the Ordinance will have to be slightly amended.

Nevertheless, the Ministry will have to: officially set the conditions and requirements under which the exemption can be granted and what the exemption includes; and establish the procedures to follow for applying for exemptions as well as for granting exemption which will be a responsibility of the Ministry. The exemption certificate will be issued for one year renewable. The certificate will be automatically revoked if there are evidences that the ships do not comply with the conditions and requirements set for under the exemption regime.

Instructions for the monitoring and control by the port State control inspectors of the compliance of the exempted ship with the conditions and requirements of the exemption regime shall be issued.

Instructions to the port authorities for the implementation of the exemption regime and for the control of the exempted ships in cooperation with the PSC inspectors shall be issued.

#### **1.2.1.5 Communication and advance notification**

Parties to the MARPOL Convention should communicate information on their PRFs to the International Maritime Organization. To this end, the Organization has established the Port Reception Facilities Database (PRFD) within its Global Integrated Ship Information System (GISIS). The PRFD relies on up-to-date information being provided by port States. Therefore the port administration of the Ministry shall regularly seek accurate and up-to-date information from the port authorities with a view to maintaining entries in the PRFD and facilitating the dissemination of PRF information to the shipping industry.

In the meantime the port authorities shall be requested to develop their own website through which the shipping industry (in particular ship master, shipping agent and shipping companies) should obtain all the necessary information regarding each specific port.

Regarding the providing of advance notification the port authorities shall be requested to recommend that the ship masters use the standardized advance

notification form as developed by the IMO (MEPC.1/Circ.644) It should be recalled that the Ordinance requests that the advance notification be provided at least 24 hours in advance and this delay should apply uniformly in all the Croatian ports.

#### **1.2.1.6 Follow up of report on alleged inadequacy of port reception facilities**

Paragraph 5 of the Annex I to the Regulation concerning the requirements that seaports must meet, which are related to the content of the port waste management plan, refers to the reporting procedures on inadequacies of reception facilities. The paragraphs dedicated to that subject in the port waste management plans which were made available to the Consultant were not very explicit. Therefore with a view to having in place a stronger reporting and follow up system regarding inadequacy of port reception facilities it is proposed that the Ministry, in addition to the requirement it will impose on ships flying the Croatian flag, requests the port authorities to invite the masters of ships calling at their ports to report using the IMO format in each case where facilities are alleged to be inadequate (MEPC.1/Circ.469/Rev1). Such a report shall be transmitted among others to the port authority of the port in question which shall transmit it to the Harbour Master's Office and subsequently to the central administration. The Harbour Master's Office shall follow up the matter and ensure that the port authority will take the necessary actions to rectify the situation.

#### **1.2.1.7 Exemptions for ports**

It will be the responsibility of the Ministry to exempt from the application of the indirect fee regime a port of county importance or a port of local (municipality) importance, the port authority of which will have demonstrated that it cannot implement such regime and will have requested to be excluded of it.

The Ministry will decide when the indirect fee regime will enter into force for the ports of county importance and the ports of local (municipality) importance.

#### **1.2.1.8 Promoting regional cooperation**

The Ministry of Sea, Transport and Infrastructure shall take the lead in initiating and promoting regional cooperation for harmonizing port reception facilities policy in particular for harmonizing the cost recovery regime.

## **1.2.2 The port authorities will play a much more important role**

The new PRF system, and in particular the indirect fee regime as its most important feature, will require a much more active involvement of port authorities in its implementation and management. That will be the case in particular regarding the following main issues:

- The planning for handling ship generated waste;
- The recovery of waste fees and payment of and from the operators;
- The management and control of the waste notification system;
- The specification of all the procedures and monitoring and control
- The communication and information; and,
- The reporting and record keeping.

### **1.2.2.1 The planning for handling ship generated waste**

Pursuant to the Croatian laws the port authorities shall undertake to provide the port with facilities for collecting and handling ship generated liquid and solid waste and to that end they must develop and apply a port waste management plan which shall be approved by the Harbour Master's Office. As part of this planning process the port authorities will play a more important role in: defining the Terms of references for the waste operators (the concessionaires) and selecting them; preparing and negotiating a new detailed contractual framework; and in monitoring and evaluating the waste operator performances.

- a) Defining the Terms of references for waste operators and selecting them.

The port authority, on the basis of an in depth assessment needs of port facilities for the ships entering its port, shall define precisely the services which will be expected from the waste operators. The services shall include the collection, transport, storage, treatment, and final disposal. The port authorities shall ensure that, as much as feasible, the reception facility services will be adequately prepared to receive Annex V wastes as segregated on board and should supply suitable receptacles to facilitate the landing of segregated waste for recycling. The port authorities shall request that the whole process of handling the ship generated waste will be carried out in a way that will facilitate the integration among the shipboard and landside waste management practices and that will allow the ultimate disposal of ship generated waste to take place in an environmentally appropriate manner. The waste operators shall be requested to cooperate with the Inland waste managers responsible for developing the landside waste management and disposal strategies including waste segregation with a view to facilitating the reduction, reuse, and recycling of ship generated wastes.

The waste operator shall be authorized by and got a license from the Ministry of Environment. He shall apply the procedures and environmental standards established by the Ministry of Environment and use the best available

technology. The selection of waste operators should be done normally through a public tendering process with the possibility of exceptions as it is presently the case for port companies.

b) Preparing and negotiating a new detailed contractual framework.

The contractual arrangement, depending on the port, may cover two types of situations to be found under the indirect fee regime. The main one will be related to the application of the indirect fee payment, the other one will be related to the exempted ships which will be subject to a direct fee payment similar to the one which already exist.

- The contractual arrangements regarding the indirect fee payment: the port authority shall pay to the waste operator a fixed amount per year for the availability of the facilities and services the contractor is committed to provide according to the contract. Every month (or 2 or 3) the port authority will pay the waste operator an amount according to the number of collections made and of the volume of waste collected. These amounts shall be determined in the contract for a [one year period] and subject to revision following decision made by the Ministry regarding the tariffs for the indirect fee regime.
- The contractual arrangements regarding the direct fee payment for the ships to which an exemption has been granted: a ship to which an exemption has been granted will be exempted of providing an advance notification and of delivering waste and paying an indirect fee in each port of call. However an exempted ship will pay once for the delivery of its waste. The payment will be made directly to the waste collector on the basis of a contract between the waste operator and the shipping company. The tariffs to be charged shall remain within the limit of the tariffs fixed by the Ministry for the indirect fee regime. For each delivery the waste operator shall issued a delivery receipt, a copy of which shall be transmitted to the port authority. The waste operators shall use the standardized format for the waste delivery receipt as developed by the IMO (MEPC.1/Circ.645). The waste operator shall pay to the port authority an annual fixed concession fee and a variable fee representing 2% of the amount collected.

c) Monitoring and evaluating the waste operators' performances.

It will be the responsibility of the port authority to carry out periodical *in situ* checking of practices applied by the concessionaires while providing waste collection services within the port or ports managed by that respective port authority.

### **1.2.2.2 The recovery of waste fees and payment of and from the operators**

One of the main consequences of the introduction of the indirect fee regime will be that the port authorities will be actively involved and continuously dealing directly with the ships and the shipping agents and with the waste operators.

The port authority will have to set up administrative and financial arrangements for collecting the waste fees directly from the ships or the ship agents and for the payment of the waste operators in case of the indirect fee regime or the payment from the operators in case of exempted ships.

The main administrative tasks which the port authority will have to perform include collection of fees according to the determined tariffs, keeping records of the amounts collected (separate from other collected port dues), and payment of services to the concessionaires. Purposely designed accounting software might be required for properly managing the financial component of the PRF system, or possibly adaptation of the currently used accounting software.

Although the main responsibility for setting and reviewing the tariffs will rest with the MSTI, port authorities will have to play an active role in assisting the Ministry in the process of determining and adjusting the prices, by providing inputs regarding the specific situation in the ports, municipalities and counties in which they are based.

### **1.2.2.3 The management and control of the waste notification system**

The port authorities shall manage and control the waste notification system. Among the requirements the port authorities shall impose on the ships calling in their port is the mandatory requirement for the master of a ship, other than a fishing vessel, to send to the Harbour Master's Office and to the port authority an advance notification about the ship waste and cargo residues at least 24 hours prior to arrival. The master of the ship and his shipping agent shall be invited to use the standardized advance notification form as developed by the IMO (MEPC.1/Circ.644). The means of transmission shall be preferably through internet technology with the view to establishing a transparent system with an easy access for all relevant actors (Harbour Master's Office, port authority, master of the ship, shipping agent and waste operators). It will be one of the tasks of the port authority to develop and maintain an advance waste notification system using IT technology.

### **1.2.2.4 The specification of all the procedures and monitoring and control**

The port authorities shall issue relevant documents (port regulations) clearly specifying all the procedures that a ship will have to follow. Distinction shall be made between:

- a) The procedures which will apply to ships falling under the indirect fee regime including those ships possessing a green ship certificate (reduced fee);
- b) The procedures which will apply to ships to which an exemption has been granted by the Ministry; and,
- c) The procedures which will apply to small boats and harbour craft which are regular users of the port and which will be excluded by the port authority from the indirect fee regime and which will be subject to a special regime that will incorporate the cost of the waste recovery in the port due and for which the port authority will provide dedicated facilities.

More specifically clear procedures for the reception of segregated waste shall be issued. These procedures should parallel the standards for the Management and Handling of Shipboard Garbage as specified in ISO 21070.

Monitoring and control of the fulfilment by the ships and by the waste operators of the required procedures is another key prerequisite for the proper functioning of the new system. The monitoring and control will be done through:

- recording (entering into a purposely designed database) the quantities of waste for delivery declared by ships on pre-arrival Advance Notification Forms (by type and categories included in the Annex to the MEPC Circular MEPC.1/Circ.644, dated 4 November 2008, issued by the International Maritime Organization)
- verifying/checking these quantities against those actually collected by the concessionaires (observing the same types and categories) as reported (periodically) by them in accordance with the requirements of PWMPs;
- recording and proper filing of receipts issued to the ships (or their agents) by the concessionaires ("waste delivery receipts" in accordance with Annex to the MEPC Circular MEPC.1/Circ.645, dated 4 November 2008);
- recording and proper filing of receipts, certificates and other documents (e.g. delivery confirmations) issued to the concessionaires in relation to the treatment and disposal on land of wastes collected from ships, in accordance with the national rules and regulations addressing waste management.

### **1.2.2.5 The communication and information**

**(a) Port web site:** In order to provide efficient port reception facility services that meet the needs of ships calling at their port without causing undue delay, port authorities shall ensure that relevant information about the reception services available (type of facilities, capacity of the facilities and contact points), the associated cost (detailed description of the cost recovery regime) and the procedures the ships shall follow are communicated and easily accessible to ship operators and all the port users. In particular in order to ensure that the fees are fair, transparent, non-discriminatory and reflect the cost of the facilities and services made available the amount of the fees and, where appropriate, the basis on which the fees have been calculated should be made clear to the port

users. That will be achieved by populating the port web site accordingly. Such information might be downloaded electronically as required by the port users and other interested stakeholders.

**(b) Exchange of information** among port authorities participating in the national PRF system, will ensure that practices applied in various Croatian ports are harmonized and in line with the agreed national system, at the same time facilitating the control of the possible offenders. It will also facilitate revision and updating of tariffs and of the entire PRF system as necessary.

It could be achieved by designing a single, common relational database, accessible via internet, which all participants in the system or having an interest in it (ships, port authorities, MSTI, Harbour Master's Offices, environmental inspections and institutions, statistical offices, etc.) will have access to. The database users will be assigned different 'authorities'. The responsibility for regular (daily) updating of the database will rest with the port authorities, i.e. each port authority would be able to enter and manage data concerning ports for which it is responsible, and to view data entered by all other port authorities. Other participants in the system will be able to view (all or part of) data but will not have the 'authority' to enter or modify them. Moreover, all relevant information on the PRF system, tariffs, practices in different ports, etc. which might be of use for ships visiting Croatian ports could be made available on the same website.

#### **1.2.2.6 Reporting and records keeping**

The reporting and the records keeping are a very important component of a monitoring control and management policy. The port authorities as well as the concessionaires of a port have reporting obligations according to the laws. The concessionaires will have probably reporting obligations in the future under the new contractual framework. Therefore it will be an important task for the port authorities to take the necessary steps for ensuring that the port administration will fulfil its reporting obligation. And it will be the responsibility of the port authorities to ensure that the concessionaires comply with the reporting requirements of their concession agreements.

#### **1.2.3 Enhancing the cooperation between Harbour Master's Offices and port authorities**

When it comes to the control of the compliance of the ships with the requirements of the MARPOL Convention and the Croatian laws, the law enforcement officers are the port State control officers who carry out the inspections and in cases of infringement may initiate prosecution actions. Indeed

the Harbour Master Offices and in particular the PSC inspectors play a key role in the PRF system. Therefore the efficiency and functioning in general of a PRF system strongly depends on the close cooperation between port authorities and Harbour Master's Offices responsible for the area in which the port authorities are located. With the introduction of a generalized and harmonized indirect fee regime that cooperation will be enhanced and the Harbour Master's Office inspectors will have new tasks.

The responsibility of the Harbour Master's inspections regarding the control of compliance or otherwise of ships with the applicable international and national regulations in the domain of delivery and collection of different types and categories of ship-generated wastes will remain, as well as their role in controlling the implementation of the port authorities' PWMPs. However the introduction of a "green ship certificate" and of an exemption certificate for ships will lead the authorized inspectors to check when appropriate the validity of such certificates as well as all the relevant documentation (receipt of delivery, oil record book, waste management plan, garbage record book) and communicate the outcome of these inspections to the port authority.

Since it is deemed that it will be very difficult to add to the present workload of the MSTi and HMO inspectors additional responsibilities related to the monitoring and control of the PRF system, the introduction of a new category of MARPOL inspectors within the Ministry and operating at the local level (in major HMOs) should be considered. These inspectors would be responsible for inspection on board ships of all MARPOL requirements, monitoring and control of the implementation of the PWMPs of the port authorities, in addition to possibly some other duties at present performed by the Port State Control inspectors (officers) in HMOs, and duties related to accidental marine pollution prevention, preparedness and response.

Although the responsibility of inspecting and controlling the calling ships is with the port State control inspectors, that does not mean that the port authorities should not be involved in it at all. On the contrary the port authorities on this particular matter shall establish close dialogue with the port State control inspectors and ensure a continuous flow of information.

The mechanisms for regular daily collaboration of the 'MARPOL inspectors' of the Ministry or HMOs, and 'PRF and environmental officers' of the port authorities mentioned in the next part of the document will have to be included in their respective Terms of reference and 'descriptions of duties' but also in the PWMPs.

## **Chapter 3: Regional cooperation**

### **Introduction**

To avoid competitive distortions between ports located within the region, all possible efforts should be made to achieve as soon as possible and as much as feasible a harmonized ship waste management fee system for the ports of the Adriatic. The Adriatic States should endeavour to create all opportunities for developing and strengthening their cooperation on: the harmonization of the cost recovery regimes which they apply in their ports; implementing in coordinated manner exemption regimes (reciprocal); and making the maximum use of the PSC network

#### **1.3.1 Harmonization of the cost recovery regime**

One of the conditions for an indirect fee regime to be successful is that it should be implemented in a harmonized way in the ports located in the same sea area. A harmonized way does not mean that the indirect fee regimes together with the PRF system shall be fully identical but that they should be based on the same principles and that the conditions and tariffs will not create competitive distortions. It is through exchange of information and exchange of views that a dialogue can be initiated between port authorities on one hand and central maritime administrations on the other. Such a dialogue would pave the way for a more formal cooperation. The common ground for the cooperation should be the EU Directive 2000/59/EC and the IMO guidance documents. One of the first goals should be to agree on a common interpretation and implementation of the most important provisions of the EU Directive taking into account the past experiences since its adoption. The areas on which to concentrate the efforts should be:

- a) The cost recovery regimes for ship generated wastes(including exemption)
- b) The level of the tariff for the fees
- c) The waste notification system
- d) The procedures that a ship should follow

#### **1.3.2 Implementing in a coordinated manner the exemption regimes**

Due to the nature of the maritime traffic in the north Adriatic where a number of ships are involved in dedicated international trade between Adriatic ports, such as ferry or liner services including feeder services and which are engaged in scheduled traffic with regular and frequent port call, the Adriatic States/ports may agree to apply in harmonized and coordinated way exemption regimes. The Maritime administrations and the port authorities should agree to inform each other of their exemption regimes and of the ships exempted. In the same manner the maritime administrations of the Adriatic States should consider cooperating in applying in a coordinating way a reduced fee to ships with a good environmental record (green ship).

### **1.3.3 Making the maximum use of the PSC MOU network**

The port State control is an important element of the PRF system and the PSC inspectors are key players. In particular it is the PSC inspector who may authorize a ship to leave for the next port without disposing of its waste if there are evidences that there is sufficient dedicated storage capacity for all ship generated waste that has been accumulated and will be accumulated during the intended voyage of the ship until the port of delivery. There is a strong need of regular cooperation among PSC inspectors in the Adriatic ports on this particular matter of MARPOL implementation and enforcement. The existing network of the Paris MOU should be use intensively for that purpose.

# **PART II: The strengthening of the system and its existing capacities**

## **Chapter 1: Institutional and administrative (human resources)**

### **Introduction**

The introduction of the new PRF system will necessitate the strengthening of the capacities of institutions at both central and local, or rather county, levels, in particular in terms of human resources. At the same time the introduction of the new PRF system will require updating and adjusting some of the documents addressing the issue of port reception facilities, namely of Port Waste Management Plans and their appendices. The following text explains the reasons for the necessary strengthening of institutional capacities and for modifying relevant documents, and also outlines suggested changes. The envisaged measures are proposed taking into consideration the possible budgetary restrictions, and therefore should be considered as the minimum requirements for ensuring the proper functioning of the PRF system. Most new tasks could be allocated to the personnel already employed in central, regional or local offices of relevant parts of administration.

### **2.1.1 Central administration**

#### **2.1.1.1 Maritime affairs**

At the national level the responsibility for the implementation of the new PRF system shall remain with the Ministry responsible for maritime affairs, namely the Ministry of Sea, Transport and Infrastructures. Moreover, the introduction of the harmonized national PRF system, including the introduction of the indirect fee regime, will call for a strong support of the Ministry in its implementation, if its goals are to be achieved. In particular this refers to the role of the Ministry in monitoring and control of the practices of various participants in the system (port authorities, Harbour Master's Offices, shipping industry), ensuring a good level of communication between them, auditing the system and making as necessary adjustments in it. In order to ensure the proper functioning of the PRF system the capacities of the Ministry to provide such support will need to be reinforced.

It is therefore suggested, as a minimum, to **assign to an officer** within the Ministry (possibly at the Directorate for safety of navigation and marine environment protection) **a specific task to control, supervise and follow the development of the PRF system.**

If the suggestion to appoint specific MARPOL inspectors at the Ministry and HMOs (see below) is accepted, and if the budgetary limits permit, the setting up of a small **"MARPOL Implementation Unit"** within the above mentioned Directorate, dedicated specifically to the implementation at the national level of MARPOL Convention requirements, and in particular PRF system, might also be considered.

One of the tasks of the officer or Unit responsible for the PRF system would be to act as the **liaison officer** of the Ministry in all contacts with other relevant parts of the central administration, as outlined below.

### **2.1.1.2 Environmental affairs**

The responsibility for waste management at the national level rests with the Ministry responsible for environment, namely the Ministry of Environment Protection, Physical Planning and Construction. In accordance with the Waste Act (NN 178/04 and 111/06) the Ministry *inter alia* carries out administrative supervision over the implementation of the Waste Act and of the regulations passed pursuant to this Act, the legality of the operations and actions of state administration bodies, as well as bodies of local and regional self-government units. The Waste Act also stipulates that the inspectional supervision of the enforcement of the Waste Act and related regulations, specific acts, working conditions and operating methods shall be performed by the environmental protection inspection at the Ministry and at regional units of the Ministry.

At the central administration level there are two other relevant institutions in the waste management field. The first one, Croatian Environment Agency, is responsible for collection and processing data in accordance with the Waste Act, for maintaining a waste management information system, and for preparing relevant reports in the waste management domain. The other one is the Fund for Environment Protection and Energy Efficiency, which provides additional funds for financing projects, programmes and activities in the field of environment protection, but also has responsibilities in legislating on acts related to payment of fees and in keeping records of fee payers.

Since the ship generated garbage represents only some 0.5 to 6% of similar waste generated by the municipalities in the coastal counties, and ship generated liquid oily wastes equally small percentage of similar wastes in coastal regions, it is not considered necessary to strengthen, as a consequence of the introduction of the new PRF system, the existing mechanisms of waste management control at the central administration level.

On the other hand, one of the goals of the introduction of a new harmonized national PRF system is to dispose of ship generated wastes on land in an environmentally appropriate way and in accordance with the applicable national

waste management regulations. In order to achieve this goal, the introduction of the harmonized national PRF system will require closer cooperation between the central maritime and environmental authorities.

It is suggested that the Ministry of Environment, the Croatian Environment Agency and the Fund for Environment Protection and Energy Efficiency appoint **liaison officers** who will ensure coordination between their institutions and the Ministry of Sea, Transport and Infrastructure in all matters related to the management of wastes collected from ships in Croatian ports within the scope of the PRF system, in particular in the fields of inspection, monitoring, record keeping and reporting.

## **2.1.2 Port Authorities**

### **2.1.2.1 Human resources**

At present, persons responsible at the level of port authorities for monitoring and control of activities related to collection of wastes from ships are usually officers in charge of port safety or those in charge of hazardous cargoes, etc. The importance of these tasks might lead to neglecting the practices related to safeguarding the marine environment, and in particular collection of ship-generated wastes which is in hands of the concessionaires.

The consistent and harmonized implementation of the proposed national PRF system will necessitate re-defining, clarifying and in particular strengthening the role of port authorities in the control of the quality of service provided by concessionaires. This can be achieved through appointing "**PRF and environmental protection officers**", directly responsible for port reception facilities.

### **Ensuring that port authorities will perform their role in the PRF system:**

in order to ensure the proper functioning of the PRF system port authorities will need to appoint dedicated "**PRF and environmental protection officers**", whose main responsibilities would include monitoring and control of the implementation of the PRF system, the administration of the indirect fee regime, and updating and maintain of the above outlined information database. Additional responsibilities of "PRF and environmental protection" officers would also include different other responsibilities in the field of e.g. operational and accidental oil and chemical pollution prevention, preparedness and response, and in the environmental protection field in general.

With a view to ensuring the proper functioning of the proposed new national PRF system, the following improvements are also considered necessary:

### **2.1.2.2 Port Waste Management Plans**

Annex 1 to the Regulation concerning the requirements that ports must meet (NN 110/04) clearly indicates items which a Port Waste Management Plan (PWMP) must contain.

It appears that most PWMPs which were made available to the Consultant and examined were developed by following the same guidelines and in most cases the same model plan, however these plans do not contain all items prescribed by the above quoted Regulation and do not address specific characteristics and requirements of each port or group of ports to which the plan applies.

The items found most often to be missing in the current PWMPs were: (1) an exact assessment of needs for PRF based on the needs of ships calling at that specific port, (2) a detailed description of the type and capacity of available PRF, (3) an indication of type and quantity of collected and processed waste and cargo residues from vessels, (4) a description of the method of storing data on the actual usage of PRF, and (5) a description of the method of disposal of waste and cargo residues from ships.

Since all Croatian ports provide PRF through the services of concessionaires, all reviewed Croatian PWMPs address the collection of waste in the same way, i.e. indicating that all necessary activities related to the collection of wastes from ships will be carried out by concessionaires, giving only detailed information on the procedure which the ship (her master and/or agent) have to follow. In particular, PWMPs examined by the Consultant do not stipulate capacities of the equipment which the concessionaires have to have available for collection of waste from ships in each port at any moment.

Once the decision has been taken concerning the introduction of the new national PRF system, PWMPs of all port authorities will have to be revised with a view to introducing the missing parts required by Annex 1 to the "Regulation concerning the requirements that ports must meet". Even if the PRF services are provided by concessionaires, a technical description of the PRF and an outline of the collection, transport, treatment and disposal technology should be included in each PWMP, as well as the requirements (set by the relevant port authority) concerning minimum capacities of equipment for collection of ship generated wastes.

On the other hand PWMPs clearly stipulate that concessionaires have an obligation to inform the relevant port authority of the quantities of collected liquid and solid wastes every three months, and at the end of the year of the total amount of wastes collected during that year. These figures should serve as a basis for calculating variable parts of fees payable to port authorities.

Difficulties met by the Consultant in obtaining, from both concessionaires and port authorities, the records of quantities of collected waste, led to the conclusion that the above outlined reporting requirements, clearly stated in the PWMPs are not necessarily observed.

The revision of existing PWMPs of all port authorities will have to include introduction of much stricter rules on reporting procedures to be followed by concessionaires, including the possibility of revoking concessions in case of non-compliance with reporting requirements.

The current Annex 1 to the "Regulation concerning the requirements that ports must meet" (NN 110/04) does not require the description of the applicable cost recovery regime. It is however considered as important to introduce such a requirement into the quoted Annex with a view to ensuring the transparency of the harmonized national PRF system. The description should in particular clearly outline the criteria for exclusion of certain categories of ships from the standard regime.

A requirement to outline the cost recovery system in the PWMPs might be inserted into Annex 1 to the "Regulation concerning the requirements that ports must meet".

Although the current PWMPs explicitly address the issue of monitoring and control of the implementation of these Plans, it was the impression of the Consultant that the provisions of PWMPs were not strictly monitored (e.g. lack of records concerning amounts of collected wastes and their types, records on quantities delivered by ships, etc.). This can be explained by the fact that in present PWMPs the responsibility for controlling the implementation of such plans rests with the maritime safety inspectors of the MSTI and of the relevant HMOs, who are generally overloaded with control and inspections of ships and of their compliance with the applicable rules and regulations, in particular those related to maritime safety.

The problem of monitoring and control of the implementation of provisions of PWMPs can be resolved by appointing (as elaborated elsewhere in the text) of dedicated HMO's "MARPOL inspectors" whose responsibilities would be exclusively to control the implementation of rules related to the protection of marine environment.

### **2.1.3 Harbour Master's Offices**

Once the new PRF system is introduced Harbour Master's Offices and their inspections will remain the main instrument of control of compliance of ships with the relevant national and international regulations concerning ship-generated wastes, as well as of the compliance of the port authorities with the new system. It is foreseen that the control of the proposed "green ship certificates" and "ship's exemption certificates", in addition to the inspection of other relevant documentation (port and ship waste management plans, delivery receipts, oil record books, garbage record books) will increase the workload of the HMO inspectors.

In order to relieve the existing Port State Control inspectors (officers) of duties related to the implementation of the new PRF system, as well as of other duties related to the control of MARPOL requirements, PWMPs and practices of the port authorities, it is suggested to assign these duties to a specifically designated (authorized) "**MARPOL inspectors**". Their set of duties and responsibilities might be complemented with those related prevention, preparedness and response to accidental marine pollution.

Ideally, each Harbour Master's Office should have a "MARPOL Inspector", however if the budgetary limitations do not permit employment of their full complement, one "MARPOL inspectors' could cover the ports in the area of more than one Harbour Master's Office.

In their daily work the proposed 'MARPOL inspectors' would closely cooperate with the PRF officer (or Unit) of the Ministry, described earlier on, with the 'PRF and environmental officers' of the port authorities, but also with the environmental protection inspectors of the Ministry of Environment and its county counterparts.

### **2.1.4 County/local environmental protection inspections**

While the Consultant observed that the Harbour Masters' Offices inspectors exert a due level of control in their own domain, it was not possible to verify whether the same level of control is exercised by the environmental protection inspections of the MoE. This refers to the control of procedures required by the Waste Act and related regulations, from the moment the collected solid and in particular liquid oily wastes leaves the port until its final disposal.

In order to ensure that collection, handling, transport, temporary storage, treatment and final disposal of ship generated wastes on land are carried out in an environmentally appropriate way and in accordance with the applicable

national waste management regulations, the introduction of the harmonized national PRF system will require closer cooperation among the county or local environmental inspections, Harbour Master's Offices and port authorities.

The implementation of the new national PRF system will also call for the strengthening the role of environmental protection inspections in controlling the waste flow from the point of collection (port) to the point of its final disposal, aimed at ensuring that all relevant rules and regulations in the field of waste management are duly observed.

In this regard the Ministry of Environment will be expected to clearly instruct its environmental protection inspectors to intensify control of the practices of waste collectors providing port reception facilities. The inspection would cover all stages of waste management, including handling, transport, temporary storage, treatment and final disposal of ship generated wastes.

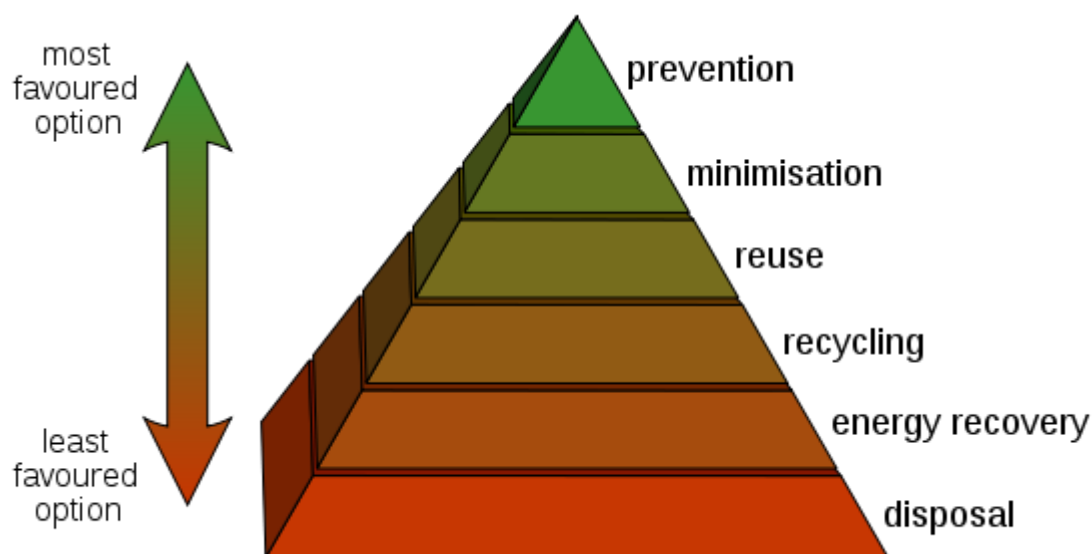
## **Chapter 2: Waste management practices and working procedures**

### **Introduction**

To define a waste management system first the principles of waste management must be taken into account. A second input consists of the environmental policy and regulations, both from the European Commission and the national government of Croatia.

### **2.2.1 Principles of waste management**

The requirements for waste management are based on the principles of effectiveness in protection of the environment regarding waste management. They are usually defined as the waste hierarchy. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste. Once waste is generated there are several options for recovery or disposal ranked by their desirability, as is shown in Figure 1.



**Figure 1 Waste hierarchy**

**Prevention** – Waste prevention is a primary goal. Waste prevention means that waste generation is avoided.

**Minimization** – (also "source reduction") Source reduction involves efforts to reduce hazardous waste and other materials by modifying industrial production. Source reduction methods involve changes in manufacturing technology, raw material inputs, and product formulation. A ship related example is the

thoroughly unloading bulk carriers, to minimize the amount of cargo residue. For proper unloading of tankers efficient stripping is a good practice.

**Reuse** – The reuse of a waste or its component for other purposes is encouraged. For instance returnable packaging has long been useful (and economically viable) for closed loop logistics systems. Inspection, cleaning, repair and recoupage are often needed.

**Recycling** – Recycling is the reprocessing of materials (pre- and post-consumer) into new products. Emphasis is focused on recycling the largest primary components of a waste: steel, aluminium, papers, plastics, etc. Small components can be chosen which are not difficult to separate and do not contaminate recycling operations.

**Energy recovery** – Waste-to-energy and refuse-derived fuel in approved facilities are able to make use of the heat available from waste components. For instance used oil can be used as substitute fuel in power plants or the cement industry, but also mixed shredded plastics, which are contaminated with e.g. oil can be used as substitute fuel.

**Disposal** – Incineration and placement in a sanitary landfill are needed for some waste materials.

Regarding maritime transport as a source of waste, prevention, minimization, and to a lesser extent reuse can be applied on board. IMO provides guidelines for that.

As soon as the ship-generated waste is collected it needs to be operated on the highest achievable level: reuse, recycling, energy recovery and final disposal (incineration or landfill). Achieving the highest level of the waste hierarchy imposes certain requirements on the waste management on board and during the waste collection and transport:

- waste which can be reused should not be damaged or mixed (i.e. contaminated) with other waste.
- waste which cannot be reused, should not be mixed with other waste, except when this cannot be avoided, and/or separation after collection is possible and economically feasible. For instance paper waste for newspapers cannot be reprinted, so it has to be reprocessed. The result is a lower quality recycled paper with limited uses. But when it is mixed with food waste it cannot be recycled anymore. One level lower – energy recovery – is then the best option.
- waste which can be used as a substitute fuel or used for the production of fuel should not be mixed with substances which:
  - cause high pollution of air and soil when used as fuel, e.g. chlorine in waste oil;
  - disturb the production process of (bio)fuel. E.g. too much inert material in the wet organic compound of domestic waste, cause troubles in the **mechanical**-biological treatment which will be applied in the Waste Management Centres, planned in Croatia.

Contamination with substances from mixed hazardous waste will kill the micro-organisms and stop the mechanical-**biological** treatment process.

### **2.2.2 Main policy for waste management**

The basic objectives of the current EU waste policy – to prevent waste and promote re-use, recycling and recovery with a view to reducing the negative environmental impact – are still valid and will be supported by an impact-based approach. The long-term goal is for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource. With high environmental reference standards in place the internal market will facilitate recycling and recovery activities<sup>1</sup>.

Croatia's basic principles for waste management in the period 2007 – 2025 are laid down in the Waste Management Strategy and its implementation in the Waste Management Plan 2007 - 2015. The waste management hierarchy is as follows.

- The main priority is to avoid and reduce waste generation, and to reduce harmful properties of waste.
- If the generation of waste can not be avoided or reduced, the waste must be reused - recycled and/or recovered.
- The waste that cannot be used in a rational way will be disposed in an environmental friendly manner.

Other principles include:

- The use of best available technologies, based on their cost-effectiveness and environmental acceptability.
- The reduction of emissions from waste treatment facilities and landfill sites, as much as practicable, and in the manner considered to be the most efficient from the technical and economic standpoints
- The principle that those who pollute the environment, must bear the entire cost of waste management, including adoption of preventive measures and elimination of damage caused by their activities.

The main goals for the Waste Management Plan 2007 – 2015 are (as far as relevant for this project):

- establishment of an integrated waste management system,
- development and establishment of regional and county centres for waste management, with pre-treatment of waste before final disposal or landfilling and,

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<sup>1</sup> Source: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste. 2005/1682.

- complete computerisation of the waste management system.

Through the implementation of this Plan the following shall be accomplished:

1. setting up a waste management system in each county according to the regional/county concept,
2. increase of the share of separately collected waste,
3. recycling and re-use of waste,
4. pre-treatment of waste before final disposal,
5. reduction of the share of biodegradable waste in municipal waste,
6. extraction of refuse-derived fuel (RDF),
7. reduction of quantities of waste deposited on landfills,
8. reduction of adverse impacts of waste on the environment,
9. self-sustainable financing of the municipal waste management system.

### **2.2.3 The waste management legal framework**

Two major directives define the legal framework for waste management: the Directive 2006/12/EC on waste and the Hazardous Waste Directive 91/689/EEC. Both directives are implemented in the Waste Act, NN 178/04 and NN 111/06 and the Ordinance on waste management, NN 23/07. Some other directives are also relevant for the present project:

#### **2.2.3.1 Directive 2006/12/EC on waste**

Known as the Waste Framework Directive, this Directive establishes a framework for the management of waste across the European Community. It also defines certain terms, such as 'waste', 'recovery' and 'disposal', to ensure that a uniform approach is taken across the EU. It requires Member States to:

- give priority to waste prevention and encourage reuse and recovery of waste;
- ensure that waste is recovered or disposed of without endangering human health and without using processes which could harm the environment;
- prohibit the uncontrolled disposal of waste, ensure that waste management activities are permitted (unless specifically exempt);
- establish an integrated and adequate network of disposal installations;

- prepare waste management plans;
- ensure that the cost of disposal is borne by the waste holder in accordance with the “polluter pays principle”;
- ensure that waste carriers are registered.

### **2.2.3.2 Hazardous Waste Directive 91/689/EEC**

It is particularly important to manage hazardous waste properly, due to the risks they may pose to the environment and human health. The Directive on Hazardous Waste is another example of framework legislation and complements the Waste Framework Directive by providing a framework for the control of hazardous waste.

It lists a number of properties of waste, which renders this waste hazardous (such as explosive, flammable, carcinogenic, or corrosive). Although the Directive does not substantially augment the requirements of the waste framework directive in regards to the permitting and registration of waste management facilities, it contains additional requirements concerning the mixing of hazardous waste, record keeping and international shipments of waste. The Directive requires:

- a record of every site where tipping of hazardous waste takes place
- the prevention of the mixing of non-hazardous and hazardous waste
- the separation of hazardous waste from other waste, where technically and economically feasible
- hazardous waste to be transported, packaged and labelled in accordance with international and European Union standards
- waste to be transferred with an identification form
- production and disposal sites to be inspected
- permitted sites to keep records for three years.

### **2.2.3.3 European Waste Catalogue**

The Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, mainly named the European Waste Catalogue has two functions:

- it classifies certain types of as hazardous waste, based on their properties;
- it provides a harmonised list of wastes, with a six-digit code for all types of waste.

This Decision is implemented in the Waste Act and the Regulation on categories, types and classification of waste with a waste catalogue and list of hazardous waste, NN 50/05.

Point of attention ->	The EWC does not contain all specified ship wastes, which makes it difficult to find the right waste code. The waste code is an instrument for classifying waste for monitoring and control. A 'translation table' is developed in co-operation with the Environmental Protection Agency and the Waste Department of the Ministry of Environmental Protection, Physical Planning and Construction. The use of this table will support the consistency of reporting of collected quantities and types of ship waste to Port Authorities and the Environmental Protection Agency, which supports proper monitoring and control.
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### **2.2.3.4 Individual waste streams**

#### **2.2.3.4 (i) Waste oil**

These Directives apply to any mineral-based lubrication or industrial oils which have become unfit for the use for which they were originally intended. Member States must ensure that waste oils are collected and disposed of (by processing, destruction, storage or tipping above or under ground). They must give priority to the processing of waste oils by regeneration, i.e. by refining. Where this process is not used, other methods may be considered: combustion, destruction, storage or tipping. The Directives stipulate the conditions under which this must occur; in particular, they allow undertakings to collect and/or dispose of waste oils.

The following are prohibited:

- any discharge into inland surface water, ground water, territorial sea water and drainage systems;
- any deposit and/or discharge harmful to the soil and any uncontrolled discharge of residues resulting from the processing of waste oils;
- any processing causing air pollution which exceeds the level prescribed by existing provisions.

Which is why:

- any undertaking which collects waste oils must be subject to registration and national supervision, possibly including a system of permits;
- any undertaking which disposes of waste oils must obtain a permit.

The Directives do not authorise the mixing of waste oils with polychlorinated biphenyl's and polychlorinated terphenyl's (PCBs and PCTs) or with toxic and dangerous wastes. Any oil:

- containing PCBs or PCTs must, without exception, be destroyed;
- containing toxic or dangerous products must be destroyed.

In Croatia the Ordinance on waste oil management NN 124/06 divides waste oils into waste lubricants and waste edible oils. The waste lubricant oils<sup>2</sup> are divided in four categories, which may not be mixed (with some exemptions).

Tanks for collection of waste oil must be closed, watertight and provided with the category code and the waste oil key number code.

*Life-cycle thinking has been applied to the waste oil legislation (Directive 75/439/EEC). This Directive regulates the disposal of waste oils and prescribes waste oil regeneration. Recent analysis, using the life-cycle approach, has shown that the priority given to regeneration of waste oils over use as a fuel is not justified by any clear environmental advantage. In addition, waste oil collection rates remain too low. So while improper disposal of waste oils can have substantial negative impacts and should be avoided, the current law is not achieving the desired results. Therefore, it will be repealed and replaced by a new provision in the Waste Framework Directive, which will maintain the obligation for Member States to ensure collection of waste oils but will not give priority to regeneration. This will secure the full implementation by the Member States of the collection obligation that addresses the greatest environmental issue of waste oils<sup>3</sup>.*

<sup>2</sup> In fact waste lubricant oils are defined as mineral or synthetic lubricant oil, insulation oil and thermal oil.

<sup>3</sup> Source: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste. 2005/1682.

Croatia introduced a **disposal fee** of 1,- HRK per litre for fresh lubricating oils which are imported or produced in Croatia and placed on the market. Collectors of waste edible oils receive a compensation for the costs of collection, pre-treatment/conditioning, temporary storage and transport. Collectors of waste edible oils receive a compensation of 0.40 HRK per litre. The waste oil fee system is managed by the Environmental Protection and Energy Efficiency Fund.

Waste oil from ships is also included in this fee system, but under certain conditions:

- the original oil must be bought on the Croatian market, which has to be proved by the waste oil operator (i.e. treatment plant);
- the compensation will be paid only for the oil which is separated from mixtures of oil and water.

The waste oil collector must accept waste oil **without charge**. Also the company for recovery and/or disposal of waste oils must accept the collected waste oil without charge.

Requirements -> different types of waste oil must be collected separated. Tanks for collection of waste oil must be closed, watertight and provide with the category code and the waste oil key number code.

#### **2.2.3.4 (ii) Packaging Waste**

The Packaging and Packaging Waste Directive aims to harmonise measures concerning the management of packaging and packaging waste and in particular, obligates the EU to meet targets for the recovery and recycling of packaging waste. The Directive covers all packaging placed on the Community market. Targets are set as a percentage of packaging flowing into the waste stream.

The Directive:

- sets targets for recovery and recycling
- requires the encouragement of the use of recycled packaging materials in the manufacturing of packaging and other products
- requires packaging to comply with 'essential requirements' which include the minimisation of packaging volume and weight, and the design of packaging to permit its reuse or recovery
- requires the implementation of measures to prevent packaging waste in addition to preventative measures under the 'essential requirements', which may include measures to encourage the reuse of packaging

It is specified in the EU Packaging and Packaging Waste Directive that Member States must organize a system for the collection and recycling of packaging waste, and that every Member State is free to adopt the collection method it deems most appropriate.

The Ordinance on packaging and packaging waste, NN 97/05 and NN 115/05, provides a legal basis and a system for the separate collection of packaging waste by type of packaging, and for the recovery (recycling) and disposal of packaging waste, which will be financed from the fee the waste producers and importers will be charged for the products they are offering to the market.

Requirements -> separately collected packages
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#### **2.2.3.4 (iii) Waste batteries and accumulators**

This legislation prohibits the placing on the market of most batteries and accumulators with a certain mercury or cadmium content and establishes rules for the collection, recycling, treatment and disposal of batteries and accumulators.

To ensure that a high proportion of spent batteries and accumulators are recycled, Member States must take whatever measures are needed (including economic instruments) to promote and maximise separate waste collections and prevent batteries and accumulators being thrown away as unsorted municipal refuse. They have to make arrangements enabling end-users to discard spent batteries and accumulators at collection points in their vicinity and have them taken back at no charge by the producers. Collection rates of at least 25% and 45% have to be reached by 26 September 2012 and 26 September 2016 respectively.

Member States also have to ensure that, from 26 September 2009 at the latest, batteries and accumulators that have been collected are treated and recycled using the best available techniques. Recycling must exclude energy recovery.

As a minimum, treatment must include removal of all fluids and acids. Batteries and accumulators must be treated and stored (even if only temporarily) in sites with impermeable surfaces and weatherproof covering, or in suitable containers.

Most waste batteries and accumulators are classified as hazardous waste (Waste Catalogue key number 16 06, from 01 to 03 and 06).

This directive is implemented in the Croatian legislation in the Waste Act and the Ordinance on waste batteries and accumulators management (NN 133/06 an NN 31/09).

Requirements -> separately collected to make recycling possible, weatherproof containers for collection.
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### **2.2.3.5 Movement of waste, import and export of waste**

Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste regulates the supervision and control of shipments of waste in a way which takes account of the need to preserve, protect and improve the quality of the environment. They incorporate into European legislation the provisions of the Basel Convention.

They apply to shipments of waste, both within and into or out of the European Union (EU), to waste transported between Member States but routed through one or more third countries, and to waste transported between third countries but routed through one or more Member States.

This directive is implemented in the Croatian legislation in the Waste Act and the Regulation on supervision of transboundary movement of waste (NN 69/06, NN 17/07, NN 39/09). The Waste Act bans the import of hazardous waste (Chapter 12. Transboundary transport of waste, a) Import of waste, Article 47, par. 1)

point of attention -> Article 1, paragraph 3 of the Regulation (EC) No 1013/2006 excludes the offloading to shore of waste, including waste water and residues, generated by the normal operation of ships and offshore platforms, provided that such waste is subject to the requirements of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (Marpol 73/78), or other binding international instruments. Until now, Croatia did not transpose article 1 of the Regulation in its relevant national legal acts.

### **2.2.3.6 Final disposal of waste**

#### **2.2.3.6 (i) Directive on the Landfill of Waste 1999/31/EC**

The Landfill Directive contains far-reaching legislation that impacts both the management of waste and the specific waste streams. The Landfill Directive aims to improve standards of landfilling across Europe, by setting specific requirements for the design, operation and aftercare of landfills and for the types of waste that can be accepted at landfill sites.

The Directive:

- requires a substantial reduction in the amount of biodegradable municipal waste (BMW) being landfilled;
- requires a plan for the reduction of all biodegradable waste in landfills to be produced by 2003;

- bans the landfilling of:
  - waste which is corrosive, oxidising, highly flammable, flammable or explosive
  - liquid hazardous waste, infectious hospital and other clinical waste
  - whole used tyres (from 2003)
  - shredded tyres (from 2006)

The Directive classifies landfills as hazardous, non hazardous, or inert waste and prevents the co-disposal of hazardous and non-hazardous waste after July 2004.

This directive is implemented in the Croatian legislation in the Waste Act and the Ordinance on the methods and conditions for the landfill of waste, categories and operational requirements for waste landfills (OG No. 117/07).

Requirements: Requirements for the development, maintenance and operation of new landfill sites in the Waste Management Centres is not within the scope of this project. However the demands of the WMC's arising from their proper management will have impact on the way ship waste should be collected and transported. It will mainly concern the way different types of waste are segregated.

#### **2.2.3.6 (ii) Waste Incineration Directive 2000/76/EC**

The aim of this Directive is to minimise the impact of negative effects on the environment and human health resulting from emissions to air, soil, surface and groundwater from the incineration and co-incineration of waste. The requirements of the Directive have been developed to reflect the ability of modern incineration plants to achieve high standards of emission control more effectively. It covers virtually all waste incineration and co-incineration plants. It is not concerned with the place of incineration in waste management strategies, but with ensuring that incinerators continue to be tightly regulated.

This directive is implemented in the Croatian legislation in the Waste Act and the Ordinance on methods and requirements for thermal treatment of waste (OG No. 45/07).

Requirements: No relevant requirements because ship waste will not be incinerated.

### **2.2.3.7 Ordinance on limit values of hazardous and other substances in waste water**

The Ordinance on limit values of hazardous and other substances in waste water (NN 94/08) concerns the collection, disposal, treatment and discharge of waste water from public sewerage systems (urban waste water) and the treatment and discharge of industrial waste water from certain industrial sectors.

The objective of this Ordinance is to protect the environment from the adverse effects of the above mentioned waste water discharges. The effluent of the process of treatment of used oil, bilge water, washing water and oil-contaminated ballast water has to meet certain limited values for substances. This Ordinance stipulates the limit values and the way to analyse them for 55 parameters or maximum concentrations of hazardous and other substances in industrial waste waters before their discharge into public sewerage systems or to surface waters. Some of them are presented in the table below.

<b>Parameters / substances and units of measurement</b>	<b>Surface water</b>	<b>Public sewerage system</b>
5. Sediment matter ml/l	0.5	10
6. Suspended solids mg/l	35	-
8. BOD5 mgO <sub>2</sub> /l	25	to be stipulated by the legal person in charge of the public sewerage system
9. CODCr mgO <sub>2</sub> /l	125	to be stipulated by the legal person in charge of the public sewerage system
10. total organic carbon (TOC) mgC/l	30	-
12. Mineral oils mg/l	10	30
13. Volatile aromatic hydrocarbons mg/l	0.1	1.0
14. Adsorbable organohalogenes mgCl/l	0.5	0.5
34. Lead mg/l	0.5	0.5
37. Iron mg/l	2	-
44. Chlorides mg/l	-	to be stipulated by the legal person in charge of the public sewerage system

## **Chapter 3: Technical efficiency and economic viability of the new PRF system**

### **Introduction**

The proposed harmonized system of port reception facilities in Croatian ports, covering liquid oily wastes and solid wastes (garbage), should satisfy a number of criteria as explained elsewhere in the present document, however, from the technical and economic point of view it should satisfy, as a minimum, the following ones:

- The new PRF system should ensure an effective protection of the environment, i.e. prevent the transfer of pollution from sea to land;
- It should be based upon best available techniques;
- It should be efficient in operational sense;
- It should be cost effective.

Requirements concerning proper waste management practices are outlined in Chapter 2 of this Part of the present document, while this Chapter will look at the treatment technologies best adapted to the current and future situation in Croatia and at the cost effectiveness of the possible technological solutions.

### **2.3.1 Best available techniques**

The IMO/UNEP Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)<sup>4</sup>, implemented in 2004 an EU funded MEDA Project on port reception facilities for collecting ship generated garbage, bilge waters and oily wastes in the Mediterranean (MED.B7.410097.0415.8). The results of that project provide an excellent overview and ranking of available techniques, which are summarised in the next paragraphs.

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<sup>4</sup> A Regional Activity Centre within the Mediterranean Action Plan (MAP) of the United Nations Environment Program (UNEP) administered by the International Maritime Organisation (IMO).

### **2.3.1.1 Oily liquid waste**

The results of the review and ranking of available techniques for oily liquid waste are presented in the table below.

<b>Technology</b>	<b>Free Oil</b>	<b>Technical result on</b>		
		<b>Mechanically formed emulsions</b>	<b>Chemically stable emulsions (oil in water)</b>	<b>Chemically stable emulsions (water in oil + suspended solids)</b>
API Separator	++	-	--	--
Hydro cyclone	++	-	--	--
Plate coalescer	++	++	-	-
Filter coalescer	+	++	-	-
IAF	++	+	-	-
Chem. Treatment + IAF	++	++	+	+
DAF	++	+	+/-	+/-
Chem. Treatment + DAF	++	++	++	++
Membrane Filtration	++	++	++	+
Decanter Centrifuge (+ chemicals)	+	+	++	++
Disc Bowl Centrifuge (+ chemicals)	+	+	++	++

- does not meet the objectives
- meets the minimum objectives
- + meets the objectives
- ++ exceeds the objectives

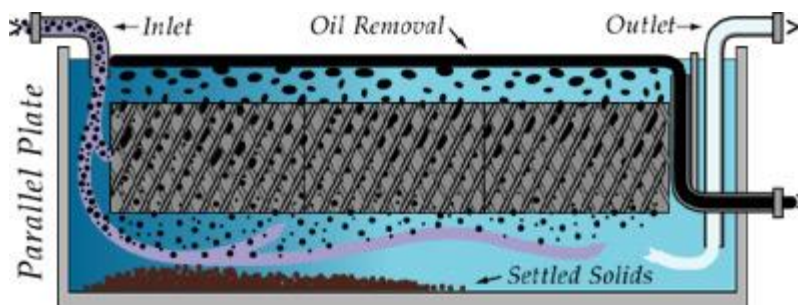
Technologies with a '+' and a '++' characterization are evaluated on criteria: proven technology, low effluent oil content, low maintenance, low utilities consumption, low space requirement and low investment costs. This evaluation is done for four kinds of processing: free oil removal and emulsified oil removal. The best technique(s) are:

- plate coalescer for free oil removal;
- DAF incl. chemical treatment for emulsified oil removal.

They are described in the next two paragraphs.

### **2.3.1.1 (i) Plate coalescer**

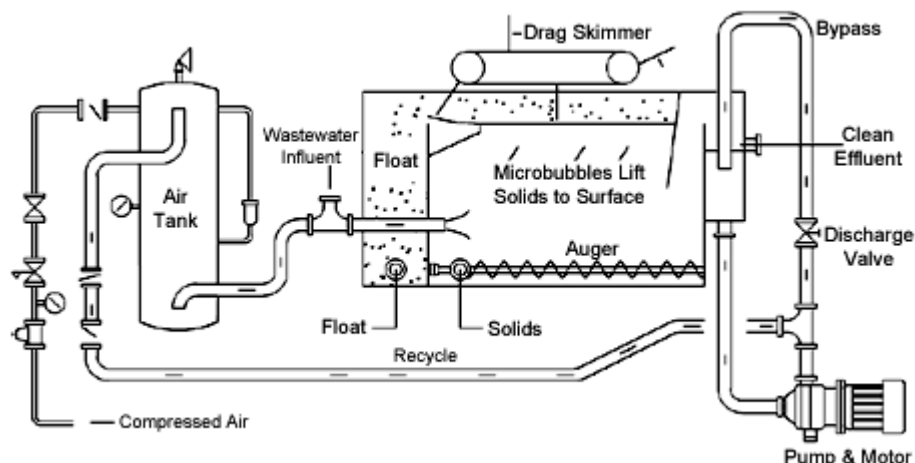
In chemistry, coalescence is a process in which two phase domains of essentially identical composition come into contact with one another and form a larger phase domain, for instance small floating droplets of oil in water stick together after hitting each other. The coalescing plate separator is a rectangular steel tank which is equipped with a corrugated plate pack. These plates are mostly made of plastic or steel and increase the separation efficiency by stimulated coalescence of small oil droplets to larger droplets, which are separated more easily. Solid particles are separated to the bottom of the system.



source: <http://oil-water-separator.net>

### **2.3.1.1 (ii) Dissolved air flotation**

The Dissolved Air Flotation (DAF) is a flotation system where very fine air bubbles are generated by saturating a small continuous flow of clarified water with air from a small compressor at a high pressure. The pressurized air/water feed is then injected into the flotation tank and the sudden pressure drop causes the release of very fine air bubbles. They attach to the flocculated oil/solids, which then rise to the water surface in the flotation tank and form a floating layer. A scraper/ skimmer removes the scum, with a typical 5% solids and oil, to the discharge hopper and the treated water is discharged.



source: <http://oil-water-separator.net>

### **2.3.1.1 (iii) Conclusions**

Based upon these results the following techniques were assessed to be suitable for reception and treatment facilities for oily wastes from ships.

<b>Source</b>	<b>Treatment</b>	<b>Technology</b>
Ballast water	Free oil removal	Plate Coalescer
Tank washings, Bilge water	Emulsified oil removal	DAF + Flocculation

Remark: the REMPEC study regards only the removal of oil from oil contaminated liquid waste. However other parameters also have to be taken into account, like BOD, COD, heavy metals and organohalogens. See also paragraph 2.2.3.7 about the Croatian rules on limit values of hazardous and other substances in waste water.

The separated waste oil can be used as a secondary fuel in cement kilns, brick factories and power plants (energy recovery), or be re-refined in an INA Refinery (re-use). The last option seems to be better, because it is higher on the waste hierarchy, but recent analysis within the EU based on life cycle analysis has shown that the priority given to regeneration of waste oils over use as a fuel is not justified by any clear environmental advantage<sup>5</sup>.

<sup>5</sup> Communication from the commission to the council, the European parliament, the European economic and social committee and the committee of the regions – "Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste", Chapter 4 of Annex I, Paragraph 'Management of waste oils'.

### **2.3.1.2 Garbage**

In order to recover or dispose the municipal waste and non-hazardous industrial waste Regional and/or County Waste Management Centres will be established in Croatia. The Centres will use the best available and suitable techniques. Waste treatment operations carried out in the WMC prior to the permanent deposition of wastes to a landfill for non-hazardous waste, which is at the same time a constituent part of the WMC, are as follows:

- acceptance, treatment of sorted or unsorted waste;
- collection of reusable or recyclable waste and collection and further transferring of hazardous waste;
- collection and distribution of waste that may be used for other purposes;
- energy recovery of certain waste fractions and
- deposition of treated waste.

In the WMC a combined technique will be used: Mechanical Biological Treatment (MBT). The MBT technology combines two key processes: mechanical (M) and biological (B) treatment of waste, whereby various elements of M and B processes may be configured in different ways to cover a wide range of specific goals:

- maximisation of recyclable raw material amounts (glass, plastics, paper, etc.);
- composting;
- production of energy-rich refuse-derived fuel (RDF) of defined properties;
- production of biologically stable material that can be landfilled and
- production of biogas to be used to generate heat and/or electricity.

MBT is inherently more flexible than incineration. If a new technology emerges that can efficiently generate energy from the MBT residues following maximum recycling, the residue could be diverted to this technology. In contrast, an incinerator will keep using the same technology throughout its long life. MBT is able to capture as much recyclable material in residual waste as possible after composting, including combustible material, and take advantage of new technologies to do so. For example, increasing numbers of councils are collecting PET bottles, but not collecting other types of PET. A good MBT plant could theoretically separate all PET materials after composting.

The energy consumption is probably covered by the energy production of the MBT process. Maintenance, space and investment cost do not fall under the scope of this project, because the development of the Waste Management Centres will be carried out in other projects under the responsibility of the Ministry of Environmental Protection, Physical Planning and Construction and the Counties.

Proper waste collection in ports is certainly a responsibility of the Port Authorities. The collection should support the waste treatment on the highest applicable level of the waste hierarchy, which in fact means that certain types of waste should not be mixed during collection and transport when delivered by the ship-operator separately. Which type can be merged and which should be kept separate, depends on the technology which will be used in the WMC's.

### **2.3.2 Operational efficiency**

The present high costs of collection of liquid and solid wastes in Croatian ports can be partly attributed to excessive transportation distances between the point of waste delivery by ships (the port) and the point of its treatment and disposal (the treatment plant). If possible the adopted solutions should be those which avoid any unnecessary transport of large quantities of e.g. water forming a major part of oil-in-water emulsions generated by ship operation. This could be achieved by opting for (a) temporary storage of collected, in particular, liquid wastes in or near ports to avoid transport of small quantities of such wastes over long distances, and for (b) pre-treatment of such oil-water mixtures as close as possible to the place of their collection from ships, prior to their transportation to final treatment and disposal site. The results of the pre-treatment would be three distinct fractions: (1) oil, (2) water and (3) sludge. Only oil and sludge would then need to be transported to a limited number of existing or future treatment plants (in Split and Rijeka). Depending of the quality (level of remaining pollutants) of the remaining water, it could be either disposed of in the sewage system or in the water purification unit of the nearest (future) Waste Management Center. The necessary equipment of pre-treatment plants is small scale and standardized.

Particular attention will have to be paid to the treatment and disposal capacities for oily water mixtures in the northern part of Croatian coast since the only treatment facility with sufficient capacity in that part of the coast is the one owned by INA Refinery Rijeka, which has little or no interest in waste oily waters treatment. The analysis of the present situation regarding this treatment facility is presented in Annex 3 to the 5<sup>th</sup> Monthly Progress Report.

A detailed description of the possible technical options, including a thorough analysis of transportation *versus* temporary storage and pre-treatment near the place of collection from ships, is given in the **Annex** to the present document.

### **2.3.3 Economic viability**

The **Annex** to the present document also contains analyses of the currently received and future projected solid waste generation from Croatian ports, the envisaged management of port reception facilities and identifies the required facilities that might be provided by waste contractors.

It needs to be emphasized once again that the Consultant could not obtain either from port authorities or from waste operators (concessionaires) reliable and consistent data on volumes of liquid and solid wastes collected in recent years in Croatian ports. The gap on consistent information and data, reported and recorded by various port authorities and waste management facilities is crucial, and therefore required input data have been calculated by interpolation or have been replaced by empiric figures or well-known benchmarks.

The Annex addresses in particular the current situation regarding the delivery of hazardous liquid wastes (namely waste oil and bilge waters) in main Croatian ports. Due to long distances between ports under observation, it was necessary to identify critical distances viable under reasonable tariff values and to analyse options involving storage and/or pre-treatment near the place of collection of ship generated liquid wastes.

An option for improving the present system of liquid oily waste treatment and disposal is to utilize future Regional Waste Management Centres as places for intermediate storage and pre-treatment of liquid oily wastes originating from ships. A perspective and potential impact of the use the Waste Management Centres planned to be established in the coastal counties of Croatia in the near future is also included in the Annex.

In order to explain in detail certain treatment options mentioned in the previous section, a plant concept for various pre-treatment processes for liquid oily wastes and a description of required installations and operational procedures, supported by flow-diagrams (schemes) aimed at illustrating the operational flow, have also been included in the Annex.

Finally, various options are analysed in the section of the Annex called "optioneering". This method allows combining various options to site-specific requirements and demonstrates the required investment requirements.