

**Project ECOPORT 8**

**ENVIRONMENTAL MANAGEMENT OF TRANSBORDER CORRIDOR PORTS**

**Code SEE/A/218/2.2/X**



**WP 6 – Act 6.1.**

**Drafting of a common and shared guidelines document  
determining the effectiveness of the measures adopted by  
each port as part of a wider network**

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## **Introduction**

### **1. European context of environmental guidelines addressed to ports**

In the context of large worldwide concerns regarding environmental problems, ports are often blamed for not being enough preoccupied of environmental problems that are caused by their activities.

Protection of the maritime environment has become a priority of the EU in the last few years, as the threats towards this, ranging from the loss or degradation of biodiversity and changes in its structure, loss of habitats, contamination by dangerous substances and possible future effects of climate change, turned to be more visible. Measures to control and reduce these pressures and threats have been developed in a sector by sector approach resulting in a patchwork of policies, legislation, programmes and action plans, but still at EU level there is no overall, integrated policy for protection of the marine environment. Therefore, the European Commission decided to develop an integrated approach taking into account all the pressures on the marine environment.

In this light, the Strategic objectives of the Commission for 2005-2009 aimed at developing a thriving maritime economy and the full potential of sea-based activity in an environmentally sustainable manner. In its Communication of 2 March 2005 "Towards a Future EU Maritime Policy: an European Vision for Oceans and Seas," the Commission committed itself to presenting in the first half of 2006 a Green Paper defining the scope and priority issues to be considered as part of the development of a new EU Maritime Policy.

As a response to the increasing awareness in regard of environmental consequences of port activities all over the continent, European Sea Port Organization's Environmental Committee published in 1993 the "European Environmental Code of Practice". It consisted of two main elements, to the co-decision procedure, which means that Parliament and Council must agree on the same terms in order to adopt a text jointly.

Regulations are binding in their entirety and directly applicable in all Member States; Directives bind the Member States as to the results to be achieved; they have to be transposed into the national legal framework and thus leave a margin for manoeuvre as to the form and means of implementation, namely the general principles of an environmental approach backed up by more technical sections on issues such as waste management, monitoring the environment and port planning. In April 2003, the Code was revised in the light of EU legislative changes and of the progress achieved by the port sector in developing sustainable port policies.

Part I of the Code sets out 10 objectives which the EU port sector should aim to achieve (Environmental Policy Code).

Part II highlights the achievements of the port sector in the past years in the field of the environment and recalls the European policy context (Environmental Port Policy Background).

Part III of the Code presents an overview of (current and coming) environmental legislation, its effects on ports as well as guidelines for port administrations for managing the implementation of EU legislation in accordance with the principles highlighted in the "Environmental Policy Code" (Handbook of recommended environmental practices). Finally, a library of Environmental policy and guidelines is available, as an Annex to the Code. The Code is not binding for ESPO's members, participation in its application being voluntary. However, ESPO advises port administrations, with or without direct environmental responsibility, to use this Environmental Code of Practice to help them in developing tools to manage environmental issues.

## BASIC GUIDELINES DOCUMENTS

### ESPO GUIDELINES:

ESPO. 1994. Environmental Code of Practice

ESPO. 2001. Environmental Review. Brussels: ESPO

ESPO. 2003. Environmental Code of Practice. Brussels: ESPO

ESPO. 2010. Code of practice on societal integration of ports

### European Code of Conduct for Coastal Zones

Another important normative act but without binding effect is the *Pan-European Code of Conduct for Coastal Zones*. This Code was first proposed by the European Union for Coastal Conservation (EUCC) in 1993, as a means to provide practical guidance to public agencies, local authorities, coastal users, and others with regard to ecologically sustainable development in the coastal zone. It deals with direct threats (habitat destruction) as well as indirect threats (habitat degradation and health impacts on wildlife and humans as a result of pollution). It represents a vital effort to put the principles of sustainable development into practice at all levels of society (**3<sup>rd</sup> Meeting, Geneva, 19 April 1999. Document established by the Secretariat General Direction of Environment and Local Authorities**).

### Horizontal legislation

Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 allows voluntary participation by organisations in a Community Eco-Management and audit scheme (EMAS).

The objective of the new Community eco-management and audit scheme (**EMAS**) is to promote improvements in the environmental performance of organisations in all sectors through:

- compliance to relevant environmental legislation;
- continuous improvement of environmental performance through the introduction and implementation by organisations of environmental management systems as set out in Annex 2 to this Regulation;
- objective and periodical assessment of those systems;
- training and active involvement of the staff of such organisations;
- provision of information to the public and the other interested parties.

Horizontal legislation refers to legislation which does not address a specific environmental problem but aims to improve the environment from a general perspective. This Regulation replaces Regulation (EC) No 761/21 of 19 March 2001 allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme.

### ISO 1400 family ([http://www.iso.org/iso/iso\\_14000\\_essentials](http://www.iso.org/iso/iso_14000_essentials))

The ISO 14000 family addresses various aspects of **environmental management**

- ISO 14001:2004 and ISO 14004:2004 deal with environmental management systems (EMS).

- **ISO 14001:2004 provides the requirements** for an EMS (specifies the requirements for such an environmental management system). Fulfilling these requirements demands objective evidence which can be audited to demonstrate that the environmental management system is operating effectively in conformity to the standard)
- **ISO 14004:2004 gives general EMS guidelines** (provides guidelines on the elements of an environmental management system and its implementation, and discusses principal issues involved)

The **other standards and guidelines in the family** address **specific environmental aspects**, including: labelling, performance evaluation, life cycle analysis, communication and auditing.

An EMS meeting the requirements of ISO 14001:2004 is a **management tool** enabling an organization of any size or type to:

- identify and control the environmental impact of its activities, products or services
- to improve its environmental performance continually
- to implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.
  - **ISO 14001:2004 does not specify levels of environmental performance.**
  - The intention of ISO 14001:2004 is **to provide a framework for a holistic, strategic approach to the organization's environmental policy, plans and actions.**
  - ISO 14001:2004 gives the **generic requirements** for an environmental management system.
  - This has the effect of **establishing a common reference for communicating about environmental management issues between organizations and their customers, regulators, the public and other stakeholders.**
  - However, **a commitment to compliance with applicable environmental legislation and regulations is required**, along with a commitment to continual improvement – for which the EMS provides the framework.

**ISO 14001:2004 is a tool that can be used to meet internal objectives:**

- provide assurance to management that it is in control of the organizational processes and activities having an impact on the environment
- assure employees that they are working for an environmentally responsible organization.

**ISO 14001:2004 can also be used to meet external objectives:**

- provide assurance on environmental issues to external stakeholders – such as customers, the community and regulatory agencies
- comply with environmental regulations
- support the organization's claims and communication about its own environmental policies, plans and actions
- provides a framework for demonstrating conformity via suppliers' declarations of conformity, assessment of conformity by an external stakeholder – such as a business client – and for certification of conformity by an independent certification body.

The **environmental condition indicators** are translated into environmental aspects. This step is compatible with the classification step in the ISO 14042 standard (Manual for Policy Controlled, CPM Report 2004:11)

The environmental condition indicator (ECI) is defined in ISO 140313, ISO 14031:1999 (1999): Environmental management – Environmental Performance Evaluation – Guidelines) as a “specific expression that provides information about the local, regional, national or global condition of the environment”. The environmental condition indicators can be grouped into different impact categories (global warming, acidification, ozone depletion etc), and the environmental condition indicator representing that group is then called category indicator.

#### References

**COMMITTEE FOR THE ACTIVITIES OF THE COUNCIL OF EUROPE IN THE FIELD OF BIOLOGICAL AND LANDSCAPE DIVERSITY**, Strasbourg, 16 December 1998. **3rd meeting, Geneva, 19 April 1999**. Document established by the Secretariat General Direction of Environment and Local Authorities

## 2. The Ecoport8 common Eco-guideline

### Reasons and objectives

#### ■ Reasons for creating this eco-guideline

- to help Ecoport8 ports to get awareness of the complex environmental context in which they operate and their impacting activities
- to provide an useful, practical and an easy way for guiding the future implementation actions taken for obtaining a sustainable economical, social and environmental development at national and trans-national level, stimulating the competitiveness in the context of EMS certification

#### ■ Objectives

As the principal aim of **ECOPORT 8** is to define reference actions to prevent the pollution of (sea) water, air, ground, and preserve all natural resources in port areas and nearby coastal zones, through close cooperation of scientific institutions and local port authorities, **this guideline pursues to:**

- highlight the legislative context which might permit to Ecoport8 ports to promote an environmental management drawn to adoption of the best available practices on solving environmental problems
- weigh the effectiveness of monitoring plans proposed in the context of assessing the environmental impact of Ecoport8 ports' activities
- to draw the main steps/actions and best available practices in order to reducing environmental impact and supporting its continuous improvement of environmental performance in the partner port areas;
- to asses the framework for environmental management system implementation in Ecoport8 ports

### 2.1. The Eco-guideline background within Ecoport8 project

The basic information provided in this guideline represents the results:





- a. of analysis of European legislation, IMO regulations and particularly of national legislative framework in countries where the ports analyzed are located **(WP4 results)**
- b. of analysis of ports' general design and especially infrastructure in domain of environmental protection **(WP4 results)**
- c. of environmental monitoring plans and guideline developed by each SEE country involved in the project **(WP5 results)**
- d. of analysis of recommendations, practices, solutions and actions adopted by different Ecoport8 ports and other ports from Europe or beyond (WP6.1. in course)
- e. of training process and capacity building **(WP6.2.)**
- f. of questionnaire addressed to port authorities (WP6.1.)

### 3. Environmental policy in Transborder Corridors Ports within Ecoport8 Project

#### 3.1. Port of Bari – Italy

It is not yet established an environmental policy

#### 3.2. Port of Bar – Montenegro

The Port of Bar is committed to ensuring the best practicable protection of the environment under its jurisdiction and responsibility commensurate with its overall mission and sustainable development. The Port management recognizes the need to conserve the natural environment and waters under their control through sound environmental management. In that regard, responsibilities of the management and other stakeholders for activities related to the improvements of Port environmental performances are clearly defined.

#### 3.3. Port of Varna/Burgas – Bulgaria

It is not yet established an environmental policy

#### 3.4. Port of Constanta

The High Management of the Port of Constanta by the structures that he leads undertakes through its policy to maintain environmental quality and continuously improve the integrated management system implemented in accordance with the requirements of SR EN ISO 14001:2005 standard.

The Port Management provides:

- Legal requirements and services in compliance with environmental aspects. In this way, the main directions are:
  - Offering to the port customers, the shipping infrastructure managed by the port management and giving quality and competitive services , safe and in compliance with environmental requirements
  - Encouraging and attracting traffic of goods, in an efficient and in harmony with the natural environment
- Further investment activity for the modernization and development of **waste management**
- Conduct business in full compliance with legislation and other requirements applicable to environmental issues arising from our activities and services and risks that may occur throughout the port.

The main directions are:

- To correlate the effective functioning of various departments so that environmental issues arising from our activities and services (air pollutant emissions, solid waste, liquid waste), to fit the legal requirements and other requirements in our field, avoiding the possible pollution incidents
- To take all control measures to reduce the number of accidents that can lead to pollution
- To cooperate with all authorities to continuously reduce the environmental risk
- Increase their staff aware and working on behalf of the company, to develop good communication for active participation in the objectives and environmental management programs
- Continuous communication with all port operators to increase environmental responsibility of every person that works inside the Port of Constanta

- Special attention and unconditional support for the operators that are manipulating with dangerous cargos, hazardous substances and any other dangerous goods.
- Continuous improvement in environmental performance environmental quality, in particular by adopting environmental measures.

The General Manager of the Port of Constanta is committed to provide resources to maintain and continuously improve the effectiveness of Integrated Environmental Management System. All employees are responsible to actively assume Strategy for environment protection and the authority and responsibility for maintaining and improving environmental system are assigned to the Head of Environmental Protection Office for the Port of Constanta

### 3.5. Port of Igoumenitsa

Respect for the environment, in which the port is located, is a high priority along with the satisfaction of the customers' needs. Therefore, the management of the Port of Igoumenitsa aims to conform to all legal environmental demands and makes a number of commitments to achieve that aim:

- Meet customers' expectations with regard not only to specified requirements but also to others not explicitly set, while maintaining maximum respect for the environment regarding all port operations.
- Comply with the environmental legislation in force, all environmental requirements and other applicable environmental obligations, regularly reviewing the environmental behaviour and security of all establishments.
- Take measures to prevent, eliminate and minimize the environmental impact of the port operations, making rational resource usage and minimizing the waste generation, greenhouse gas emissions and effluents to the extent practicable
- Attempt to achieve constant, reasonable improvement of the quality of the port services and its environmental behaviour.
- Provide the organisational structure with appropriate human and material resources to meet the above commitments, including the prevention of pollution, within the scope of its powers and resources.

The management of the Port of Igoumenitsa further refines the definition of its environmental policy, with the following action principles:

- Constantly evaluate and supervise the environmental consequences of the port operations.
- Implement an integrated environmental management system to foster and assure the participation and involvement of all port personnel in the maintenance of the environmental policy.
- Make the environmental policy available to all the port staff and provide sufficient training, enforcing worker participation.
- Initiate a management program, to establish and pursue specific environmental objectives and targets based on the environmental policy, defining the actions to be taken to reach these goals and facilitating the review of these targets and actions.
- Carry out regular audits and reviews of the integrated environmental management system, implementing any mechanisms necessary in the event of any incompliance.
- Regularly publish the environmental declaration to report on the port environmental behaviour, environmental policy, integrated environmental management system, environmental goals and any significant related issues.
- Evaluate any potential side effects on the environment of any changes or alterations made to the port facilities.

- Develop cooperative working relationships with the local and port authorities towards enhancing the port environmental performance.
- Apply measures to ensure that suppliers and contractors related to the port are aware of and apply the environment-related standards in force at the Port of Igoumenitsa.

### 3.6. Port of Patras – Greece

The strategic goal of the management of the Port of Patras is to provide a service with levels of environmental responsibility in accordance with its clients' needs and those of the environment in which it is located.

The management of the Port of Patras tries to comply with all legal environmental requirements and makes the following commitments:

- Satisfy clients' expectations with regard not only to specified requirements but also to others not explicitly set, while maintaining maximum respect for the environment regarding all activities at the port.
- Assure permanent compliance with the applicable environmental legislation, requirements and commitments, regularly reviewing the environmental behaviour and safety of all facilities.
- Develop actions to prevent, eliminate and minimize the environmental impact of the port activities, making rational use of resources and reducing as much as possible the waste production, emissions and effluents.
- Strive to achieve continuous, reasonable improvement of the quality of the port services and its environmental behaviour.
- Provide the organisational structure with appropriate human and material resources to meet the above commitments, including the prevention of pollution, within the scope of its powers and resources.
- The management of the Port of Patras further refines the definition of its environmental policy, with the following action principles:
  - Permanently assess and supervise the environmental repercussions of the port activities.
  - Implement an integrated environmental management system to foster and assure the participation and involvement of all port personnel in the maintenance of the environmental policy.
  - Disseminate the environmental policy among all the port personnel and implement appropriate training schemes, enforcing worker participation.
  - Develop a management programme for the port, including specific environmental goals and targets based on the environmental policy, defining the actions to be taken to reach these goals and facilitating the review of these targets and actions.
  - Carry out regular audits and reviews of the integrated environmental management system, implementing any mechanisms necessary in the event of any incompliance.
  - Regularly publish the environmental declaration to report on the port environmental behaviour, environmental policy, integrated environmental management system, environmental goals and any significant related issues.
  - Assess in advance any repercussions on the environment of any changes or alterations made to the port facilities.
  - Work with the local and port authorities towards enhancing the port environmental performance.
  - Take appropriate measures to ensure that suppliers and contractors related to the port are aware of and apply the environment related standards in force at the Port of Patras.

### 3.7. Port of Durres – Albania

According to the National Albanian Legislation, International Maritime Conventions signed by Albanian Government with National and International Maritime Institutions, Durrës Port Authority is an independent institution and manages: port territory and basin, port services and facilities, environmental issues which are directly connected with Durrës Port.

According to Durrës Port Authority (DPA) Environmental Strategy, Durrës Port is committed to managing environmental matters as an integral part of our business. In particular, it is our policy to assure the environmental integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:

- Compliance
  - We will comply with applicable laws and regulations and will implement programs and procedures to assure compliance. Compliance with environmental standards will be a key ingredient in the training, performance reviews and incentives of all employees.
- Risk Reduction, Prevention and Resource Management
  - We will seek opportunities, beyond compliance requirements, for reducing risk to the environment and we will establish and meet our own quality standards where appropriate. We will employ management systems and procedures specifically designed to prevent activities and/or conditions that pose a threat to the environment. We will look for ways to minimize risk and protect our employees and the communities in which we operate by employing clean technology, including safe technologies and operating procedures, as well as being prepared for emergencies.
  - We will strive to minimize releases to the air, land or water through use of cleaner technologies and the safer use of chemicals. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.
  - We will manage scarce resources such as water, energy, land and forests in an environmentally sensitive manner.
- Communication
  - We will communicate our commitment to our employees, vendors and customers. We will solicit their input in meeting our EMS goals.
- Continuous Improvement
  - We will continuously measure our progress. We will review our progress at least on an annual basis. We will continuously seek opportunities to improve our adherence to these principles and will periodically report progress to our stakeholders.

## 4. Environmental Key Aspects in Ecoport 8 Ports

### 4.1. Water quality of port aquatorium

#### 4.1.1. Legislative background

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Participating countries in the Ecoport8 project benefit of legislative prerogatives proper to accomplish the targets regarding water quality standards in port aquatorium. However, their national legislation and measures taken reflect more or less the requirements of WFD (The European Water Framework Directive 2000/60/EC) and other important European directives in the field. In most of the cases, parameters for quality of water body characterization are set, but they are not specifically addressed to ports aquatorium.

National standards for water quality are regulated in **Italy, Montenegro, Romania, Bulgaria, Albania** – see “Sensible parameters chp.2 of Standard analysis” - limits of concentration of sensible parameters identified according to national standards), but few steps were made towards harmonizing of European legislation for **definition of ecological status of water bodies**.

**In Bulgaria** there is no normative document regulating the seawater parameters in the port aquatorium waters. The allowable norms are specified in Regulation No.8 on the quality of coastal marine waters of the Ministry of Environment and Water, Ministry of Regional Development and Public Works and Ministry of Health (SG 10/02.02.2001).

**Italy and Romania** adopted technical criteria for characterization of water bodies, and basin management plans.

#### 4.1.2. Monitoring procedures

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Certification process of environmental performance brings to port authorities the obligation to implement an integrated monitoring programme as well as identification and documentation of environmental aspects.

Although the national monitoring programmes were defined in some countries, some ports had no self monitoring programmes or monitoring applied until recently.

However, ports in countries studies have a *quality management of inland port waters*, and often quality parameters of inland port waters are monitored by several authorities (such as Port Administrations or national institutions) i.e. in the port of Durres these are monitored by Harbor Master, Environmental Directory port, Regional Environmental Agency and Public Health Institute (biological and physical-chemical); in Constanta, water monitoring is performed by the Port Administration, National Institute Grigore Antipa, Apele Romane Dobrogea Litoral (biological, physico-chemical, radioactivity pollution) in respect to national laws and norms and, as in any port examined, the Port Administration provides the installations and logistic for intervention in case of pollution.

The ports’ activities identified as potential factors of pressure on water quality were classified as:

**Pointed sources:**

- cargo handling, transportation and storage carried out in terminals – loading/unloading (impact factors: fertilizers, oil leakages, minerals etc) (further discussed in chp.5.10.)
- bunkering (impact indicators: hydrocarbons leakage) (further discussed in chp.5.11.)
- non-treated first flush water (impact Indicators: residuals, heavy metals) (further discussed in chp.5.2)
- wastewater discharged in port aquatorium (impact indicators: hydrocarbons residuals from tanks in water) (further discussed in chp.5.2)

#### **Diffusive sources:**

- dredging activities (impact indicators: physical loss: smothering, sealing of sediments, contaminants accumulation and releases, turbidity) (further discussed in chp.5)
- shipping (impact indicators: physical disturbance: underwater noise, changes in thermal and salinity water regime, liquid and solids waste) (further discussed in chp.4)
- port development (impact indicators: systematic or unintentional introduction of synthetic substances: cements, heavy metals, oil slicks, concretes etc)

As part of Ecoport8 project, a comprehensive analysis was performed to identify the environmental sensible parameters fitting with the situation identified in water quality assessment in ports aquatorium and the related European and national standards, protocols and legislation regulating sampling and analysis procedures.

An overall monitoring programme of water quality was prefigured:

- Goals
- Selection of monitoring parameters
- General remarks on sampling
- Sampling frequency
- Points of monitoring
- Choice of instruments
- Data processing
- ISO and other standards applied in sampling procedures

According to this plan, quality of port aquatorium must be assessed based on:

- Hydro dynamical and hydro physical parameters (currents velocity profile, bathymetry)
- Physical- chemical parameters (temperature, dissolved O<sub>2</sub>, PSU, pH, conductance, TSS, N total, P total, BOD, COD, heavy metals, hydrocarbons)
- Biological parameters (phytoplankton & zooplankton composition, abundance, biomass, microbiological indicators)

Monitoring of water quality in two pilot ports Burgas (Bulgaria) and Bar (Montenegro) ongoing now will make definitive recommendations for water quality assessment in ports aquatorium. Monitoring results/outputs (September 2011-April 2012) reported by Burgas Port showed that critical parameters often exceeded were microbiological ones and nutrients (ammonia, total phosphorus), dissolved oxygen and extractable substances caused by insufficient treatment of municipal wastewaters and influence of waters from Vaya Lake.

#### **4.1.3. Existed and recommended best practices (including environmental objectives, targets and actions foreseen by ports to improve the environmental performance according to the requirements of ISO 14001)**

Water quality of port aquatorium represents a major aspect with complex implication in ports' activities, economic development, and ecological sustainability. As was mentioned, and should be emphasized is that in all Ecoport8 ports have been identified technical resources and legislative instruments to take preventive actions against major pollution sources. Good

practices were seen in all ports regarding cargo handling, bunkering operations, due to the fact that European Directives and IMO regulations are implemented in their national legislation.

#### a. Port of Bar

- **Existed operational control (monitoring procedures) of water quality**

**In the period April - November 2010, it has been performed monitoring of marine waters at the Port of Bar, once a month, in three locations (1. middle of Pier; 2. coastal station near Port of Bar; 3. Marine Station: 1 mile away from the coast) being measured the physical and chemical and biological parameters established through monitoring plan developed through WP5.**

Once a month from April to May, 2012, manual monitoring of marine waters was conducted in two points in the port of Bar:

- GAT-2 (in the port of Bar in the middle of the Pier 2)
- MNE-3 (one mile away from the coast)

From October to May 2012, the measurements were performed by helping of an automatic water monitoring station. This station provides results of the sensible parameters in the real time.

- **Foreseen investments for water quality improvement of the port aquatorium**

The Water and Sewage Utility of **Bar (Montenegro)** intends to contract firms within the project: "Water Supply and Sanitation Adriatic Coast III – Bar". Hereby ViK Bar receives support through Vodacom, the Joint Service and Coordination Company for Water and Waste Water Service for the Montenegrin Coast and the Municipality of Cetinje.

This Project is for the executive design, construction and commissioning of a centralised **wastewater treatment plant** for Bar in Volujica within the final design horizon ending in 2033 including pipe connection from an existing sewer and a new pressure pipe to the plant. Furthermore the WWTP has to be connected to a new build effluent sewer from which the cleaned effluent will be transported to the sea outfall and discharged into the sea. It also includes staff training and plant operation for a period of 3 years until taking over by the employer.

The wastewater treatment plant will comprise wastewater treatment units and sludge handling facilities. The plant will be constructed on Volujica Hill, with a capacity of 91.000 PE on limited space. The discharge of treated wastewater into the Adriatic Sea would call for invoking the less stringent discharge requirements of European Legislation (91/271/EEC) for discharge into a less sensitive recipient. As a result hereof all treated wastewater discharged within into the Adriatic Sea next to Volujica shall be the end product of a wastewater treatment plant incorporating, as a minimum, carbon removal. Within this Contract, implementation of the new main pumping station Volujica for the connection of the Centre Part of Municipality Bar to the new WWTP Volujica is foreseen. Besides the construction works the contract will include staff training and assistance of the operational team. Furthermore an operation period of three years is foreseen.

#### b. Port of Constanta

- **Existed technology for wastewater treatment**

The sewage wastewater is treated in the new automatic treatment plant functioning since 2007.



It collect, treat and depurate the industrial waters from the economic port operators, bilge waters, runoffs waters, domestic and ships delivered wastewaters.

It has 3 phases: mechanical, biological and sludge treatment.

Mechanical pre-depuration of oily waters is performed in 2 reservoirs with the capacity of 10,000 cubic meters each, where the waters are stocked and a homogenization process by means of spiral mixers is applied.

The reservoirs are equipped with minimum and maximum gauge sensors, pumping station, separators and grease and small suspensions decanters.

Water is gravitationally separated by the oil product and then pumped towards the biological tank, having a capacity of 300 cubic meters.

The biological phase consists of aerobically treatment of wastewater in order to insure the conditions for denitrification by aerobic microorganisms within water and to increase their own biomass. The floccules resulted precipitate and separate of clear water from above. The enriched biomass is extracted in clarifier with pumps, where after clarification, is flocculated (injecting polymer) and is sent in circular basin. The sludge remains in the centre of the basin and the water is decanted. The clear water is passed through 2 filtration systems and then discarded to emissary.

The sludge extracted from the circular basin (by pumps means) is then dehydrated, treated with ferrous chloride and calcium hydroxide. It is transferred then to filter press from which result slurry tarts and water. The latter is mechanically treated again in the tampon tank, having a capacity of 300mc. The new slurry tarts resulted are finally transported to the ecological landfill of the port.

The whole system is equipped with regulator sets and automatically controlled for pH, O<sub>2</sub>, dosage units for H<sub>2</sub>SO<sub>4</sub>, NaOH, FeCl<sub>2</sub>, and NaHPO<sub>4</sub>. The measured values of parameters related to processes and information stations are displayed using a visualization system.

Before releasing of waters to emissary (sea water), these are analysed. In case of inappropriate results, the waters from the clearing basin are passed again through filtration process. The filtration system consists of 2 sand filters and 3 activated carbon filters, which retain even the smallest particles. Then, the waters are released to sea. The volume of evacuated water is about 814, 000 mc/year.

The laboratory performs analysis of in-flowing and out –flowing waters every 2 days.

Wastewater treatment plants have been designed so that the COD (chemical oxygen demand) of wastewater is reduced by 80%. Cleaned wastewater will meet the minimum prerequisites of emissions at discharge into the sea.

Water quality analyses are performed for:

- Aquatorium area: 2 times/year
- Potable water: 1/month

#### • **Foreseen actions for water quality improvement of the port aquatorium**

Furthermore, the analysis performed in Constanta port during “The Building capacity” training, revealed the necessity to establish **new objectives and targets** to improve the control of water quality discharged in the port aquatorium.

**Env. Objective** - Improvement of the discharged water from the waste water treatment plant (source: WP6.2.)

**Target #1** · Reduction of the residual organic components discharged into the sea after the treatment process

### **Actions**

- Building of a settling tank with the capacity of 1000 mc
- Collaborate with liquid bulk terminals in order to reduce the quantity of substances sent to the treatment plant
- Create a long term program in order to change old technology with new ones for all port operators
- Create a program in order to change the treatment plant technology with a new one

### **Operational Controls**

- Daily analysis for the discharged water

Responsible person

- Environmental Manager
- Port Operational Manager

### **c. Port of Bari**

- **Foreseen investments for water quality improvement of the port aquatorium**

Strengthen the water-port and coastal areas control system by implementing of a radar system maintained by coastguards (planned spending of € 625.000,00).

### **d. Port of Patras**

- **Existed operational control**

Within the Port Area there is a pollution treatment service owning the boat and equipment as well as a service handling the solid and liquid boat refuses 24 hours per day.

### **e. Port of Durres**

- **Existed operational control**

Water quality analysis is performed in periodical campaigns by the Public Health Institute contracted by DPA Environmental Directory:

- Aquatorium area: 1 time/year,
- Potable water: 2 times/year

All Ecoport8 ports have implemented **Emergency Preparedness and Response procedures** in case of accidents in order to identify the potential for accidents and emergency situations and respond to them and also to prevent and mitigate the environmental impacts that may be associated with them

### **Recommendations for environmental management improvement based on assessment of present practices encountered in Ecoport8 ports**

Analyzing the legislation and actions taken into **ECOPORT8 ports**, it is clear that most ports encounter deficits in quality of water discarded in port aquatorium.

- In **Durres Port** were identified problems regarding the infrastructure for run offs and flush waters collecting system and lack of the procedures for wastewater control from bulks cargoes. The quality of port aquatorium could be affected unless the control of all these sources is set.
- In **Igoumenitsa (Greece)**, the management of wastewater should be planned as such as to implement the measures recommended in Directives that are not in force yet. Should be defined the indicators for water quality of effluent and also to estimate the impact over the ecosystem before any action of discharge of treated wastewater.

- In **Patras Port** the sewage and drainage networks of the Port of Patras are quite old and linked to the corresponding networks of the Municipality of Patras. It should be noted that the sewer system in some positions is combined, i.e., it drains both rainwater and wastewater, while in other positions is separate, i.e., it only accepts wastewater. It should be highlighted that all outfall pipes discharge within the port harbours (nine outfalls of wastewater and seven outfalls of rainwater), therefore, untreated wastewater from either a port facility or the city of Patras, is disposed. Also, wastewater from washing Port Authority vehicles, which contains oily components, heavy metals and solid particles, ends up at the port sewage network and finally into the sea.

The North pier and the Astiggos pier, where heavy vehicles are parked and packed loads, containers and waste are stored, are not covered by the port drainage network. Therefore, rainwater stagnates on the pier surface or ends up directly into the sea carrying dissolved or airborne pollutants.

Within the port, there are no tanks or pump stations for the wastewater. Wastewater transport is achieved by tank trucks only when this wastewater is received by ships and it ends up in the wastewater treatment plant of the city of Patras. Finally, the sewage network at the Gounaris pier, near the administration building, presents problems of overflows and odours.

**Measures** are demanding in order to create: new separate collecting and draining systems, strict control of sources of pollution of water. Facilitate the transport of wastewater to wastewater treatment plant or create alternative biological buffer systems (natural or artificial environment) for domestic wastewater (phytoremediation technology). E.g. Water Hyacinth (*Eicornia crassipes*), Water Lettuce (*Pistia stratiotes*), *Salvinia sp.*, willow (*Salix sp.*), different species of seagrass and algae were successfully used for nutrients and heavy metals decontamination. There are recommended controlled mediums for growing in order to keep under surveillance the plants spread as to avoid second effects like natural flora destruction. Also, so called hyperaccumulator species such as those from Brassicaceae Family were found suitable for adsorption of great quantities of heavy metals.
- In **Bari Port (Italy)**, are not defined the rules for water quality in port aquatorium, therefore the operators in accordance with Water Directive recommendations should keep a strict monitoring of waters discharged. The sewage system must comply with the methodology of collecting on different categories of water and to respect the rules for discarding.
- In Bulgarian **port Bourgas**, must be established and regulated an integrated management plan for wastewater collecting from all potentially polluters (as for ex., ports and quays design, reconstruction or modernization; dredging).
- In **Constanta port**, wastewater discharges and oil spills from oil terminals were identified as being the main causes for water quality deterioration in port aquatorium. The most important sources of water pollution are: the untreated waste from the harbour sewage basin (safety spillway pumping station SP0 (Berth 34), safety discharges at pumping station SP0 (Berth 64), "Frigorifer", etc.) and those treated in Constanta South treatment station and which are then discharged in the port waters (Berth 86). Spatial distribution of hydrocarbon concentrations in seawater determined inside and near the port of Constanta evinced the effect of concentration of the pollutant-specific oil port activities provided by those coming from treated wastewater discharge from municipal sewage treatment plant Constanta South or untreated and discharged through storm safety overflow.

It is recommended that wastewater draining system to be capacitated by adding new collectors and draining tubes and a system for treating first flush water before entering

into water aquatorium. Wastewater from tanks, cargo should be collected separately and handed over to the operators in charged.

## **General recommendations for environmental management improvement (including managerial, operational, monitoring and technological recommendations)**

### **1. Recommendations for managerial control**

- For an overall good management coordinated by port authorities, pollution sources should be documented and centralized in a data base and periodic updated.
- It is recommended that ports having a management plan for all sources of wastewater and to impose to operators/contractors to act in accordance with it.
- Should be met good relation between economic welfare assured from taxes and fees and ecological investments
- Ports authorities must strength their efforts to impose to each operator or subcontracted part strictly responsibilities regarding measures to reduce, prevent, evaluate risks and monitor their environmental impacts. If an environmental policy is engaged by the port authorities, this must be put in view to all and also the obligation to comply with it.

### **2. Recommendations for operational control (monitoring procedures)**

- For monitoring of water quality, further methodologies should be implemented according to WFD and MSFD requirements. Categories and type of waters depending on their uses must be delimited as to better define their ecological status.

Physical-chemical and hydro-morphological elements as well biological elements of water quality should finally conduct to establishing the environmental status of water quality.

In accordance with port authorities as well as with regional or national environmental authorities, ports operators have to establish the water quality indicators and frequency of monitoring.

On the base of monitoring program should stay:

- analysis of contamination risk with different chemical pollutants from pointed and diffusive sources,
- hazard posed by contaminant emission,
- degree of extent of the contaminant emission, recovery potential of water bodies,
- social and economic costs.

According to Annex X of WFD, 33 priority substances, synthetic or natural, responsible for defining the chemical quality of water bodies, is today the only standard reference in this matter.

For further description of water quality status it is useful to be established indicators or descriptors of good environmental status according to Marine Framework Strategy that must be implemented in each European country by the end of 2015. Descriptors play a great importance for overall environmental management of water quality and help to identify the gaps and correlative feedback actions within EMS. Such descriptors could be:

- Sea floor integrity
- Alteration of hydrographical conditions
- Concentration of contaminants
- Properties and quantities of marine litter
- Introduction of energy, including the underwater noise
- Human induced eutrophication
- Contaminants in fish and other sea-foods
- Integrity of marine food webs
- Biological diversity etc

Analysis performed by training group in each port within WP6 building capacity showed that water quality in ports area it is one of the most problematic issue because lack of clear regulations, norms, legislation applied to ports and sometimes to precarious technological performance (e.g. releases of untreated or bad treated wastewater in port aquatorium, weak education, discipline or neglecting of human element, natural hazards, lack of plans and means for preventing, reducing risks of pollution or repairing of damages in due time.

### 3. Recommendations for technological control

#### Technological advanced solutions for reducing the environmental impact

Installing of WWTP in ports area can be suitable for ports which not beneficiate yet of connection to municipal infrastructure or if the latter is overwhelmed or technological outdated. Advanced technologies for WWTP projects pursue the complying with wastewater effluent discharges norms of quality for different capacity of treatment, according with Directive 91/271/EEC requirements.

New desiderates of WWTP is the reduction at minimum of total nitrogen (15mg/L- 10.000-100.000 p.e.; 10mg/L- > 100.000 p.e.; Minimum percentage of reduction in relation to the load of influent: 80%) and total phosphorus concentrations (2mg/L- 10.000-100.000 p.e.; 1mg/L- > 100.000 p.e.; Minimum percentage of reduction in relation to the load of influent: 70-80%) in effluents. Heavy metals concentration and microbiological contaminants also must be reduced.

Depending of geographic and climatic conditions of ports location, the Ports sewer systems usually need to comprise two separate collecting systems:

1. **Sanitary** - that carries all wastewater generated (residential, commercial and industrial). Unless, the WWPT owns to the port, industrial sites must prior treat their emissions to eliminate the dangerous substances. Then, it flows to the sewage treatment plant where the water is treated prior to discharge.

2. **Storm** - carries only rain and snow water. It collects the water and carries it to the discharge point, usually port aquatorium or any other confined area. If it proves that could affect the receptor, this water requires treatment before discharge.

Once the technology for WWTP has progressed, the possibility to install a plant in ports area created the possibility to ports authorities of increasing the management efficiency in case of effluents quality discharges coming from their activities and in addition to create an energy efficiency system based on reuses and recycling of byproducts such as methane gas. Much of the treated water could be reused for cleaning and spraying of asphalt and green areas of ports, toilets flushing, machines washing etc.

Examples of WWTP performed technologies based on integrated systems for contaminants/nutrients reduction and energy saving

1. **Moving bed bio reactor (MBBR)** offers few times the loading in much less time. With this technology it is possible to handle extremely high loading conditions without any problems of clogging, and treat industrial and municipal wastewater on a relatively small footprint.

2. **Submerged aerated fixed film** utilizes an aerobic fixed film process that is a combination submerged attached growth and activated sludge processes. This system is designed to be installed into a two compartment, where the first compartment provides majority of BOD removal, and the second compartment polishes the BOD. Rigid block-type media is submerged within the treatment module, providing surface area for microbial growth.

3. **Membrane bio reactor (MBR)** process is a technology that consists of a suspended growth biological reactor integrated with an ultrafiltration membrane system, using the hollow fiber membrane. Essentially, the ultrafiltration system replaces the solids separation function of secondary clarifiers and sand filters in a conventional activated sludge system. Ultrafiltration membranes are immersed in an aeration tank, in direct contact with mixed liquor.

## ENVIRONMENTAL PERFORMANCE INDICATORS

In Annex III 3.3 of the EMAS Regulation participating organizations are encouraged to use environmental performance indicators where appropriate. The use of such indicators will enhance the reporting of environmental performance by converting raw data into information that can be easily understood by the intended audience. Environmental performance indicators summarize extensive environmental data to a limited number of significant key information sets. This will assist organizations in quantifying and reporting environmental performance. Another important function of environmental indicators is to assist organizations in the management of their environmental aspects and impacts. Besides that, organizations such as ranking agencies and financial advisory firms are becoming increasingly interested in environmental performance

### I. Operational Performance Indicators (OPIs)

#### 1. Input indicators

- Treatment of effluent (wastewater, first flush water) prior discarding in water aquatorium
- Port facilities plan management: operational control, technological process, technical equipment
- Spill Contingency Plan: technical, financial and human resources
  - o Services supporting the organization's operation;
- Antipollution services
- Waste collecting and treatment

#### 2. Physical facilities and equipment indicators

- o Wastewater plant and port facilities design: landscape impact, friendly-environmental technology and architecture
- o Operation: accessibility, technical performance comparing with the BAT
- o Maintenance: failures rate in an operational cycle, the financial and technical efforts

#### 3. Output indicators

- Quality of treated effluent discarded in port aquatorium (according to norms of quality foreseen in national legislation)
- Efficiency of solving the request of ships calling ports to use port facilities
- Technical performance/ecological efficiency/economic feasibility of Spill Contingency Plan

### II. Management Performance Indicators (MPIs)

#### 4. System indicators

- o Implementation of policies, and programs
  - Number of programs implemented by operators for activities with negative impact on water quality
  - Advanced technologies implemented in order to produce improvements of processes affecting water port aquatorium
- o Conformance
- o Financial Performance
- o Employee involvement

#### 5. Functional area indicators

- o Administration and planning
- o Purchasing and investments
- o Health and safety
- o Community relations

### III. Environmental Condition Indicators (ECIs)

#### 6. Environmental media indicators

- o Water

- Sea floor integrity
- Alteration of hydrographical conditions
- Concentration of contaminants
- Properties and quantities of marine litter
- Introduction of energy, including the underwater noise
- Human induced eutrophication
- Contaminants in fish and other sea-foods
- Integrity of marine food webs
- Biological diversity etc
- 7. Bio- and anthroposphere indicators
  - Flora: diversity and abundance, functionality within ecosystem
  - Fauna: diversity and abundance, functionality within ecosystem
  - Humans: aquaculture, fishing, sailing
  - Aesthetics, heritage and culture: local underwater tourism

Table 1. Following are presented general best practices in water quality management recommended to ports

BEST PRACTICES			
Environment al aspect	Actions	Operational control	Performance Indicator
Water quality	1. Impose strictly controlling measures for discarding of wastewater in port aquatorium 2. Implement ERA and tracking systems/ monitoring for each contaminant entering in the water aquatorium 3. Implement and periodically refine the <u>Oil Spills Contingency Plans</u> (set clear regulation for each element of the plan: hazard identification, vulnerability analysis, risk assessment, response action) 4. Prepare detailed <u>Emergency, Preparedness and Response Plan in case of accidents</u> (inclusive for natural and hazardous events that may affect the quality of port aquatorium) 5. Impose obligations to all operators to report in due time to Port Authority the pollution events 6. Improve professional	1. Keep regularly records of quantity of wastewater produced by different ports' operations/sectors 2. Keep evidence of recorded quality parameters of water and evidence exceeded limits 3. Keep evidence of activities where are often recorded irregularities 4. Keep evidence of actions taken to improve/prevent/combat the infringement from standards of quality 5. Implement and periodically update a PLAN-DO-CHECK-ACT system in order to make effective the management of water quality in port aquatorium	<ul style="list-style-type: none"> <li>• Wastewater quality reached in the port aquatorium</li> <li>• Performance of technology used for water treatment</li> <li>• Performance of programmes used to prevent, limit and repair the damages on environment and human health</li> <li>• Efficiency of training programmes implemented to increase the professionalism and environmental awareness of decision factors, operators and workers</li> </ul>

BEST PRACTICES			
Environmental aspect	Actions	Operational control	Performance Indicator
	<p>level and awareness of workers to act responsible in relation with the environment</p> <p>7. Impose to all operators to have documented operational plans for any activity performed and the measures taken to prevent the polluting events</p>		



## 4.2. Discharges to water

### 4.2.1. Legislative background

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In **Albania**, in compliance with **Law N° 8905 dt 6.6.2002 "On sea environment protection from pollution and damage"** one collection facility company namely "PDD" Ltd is established in Durres and operates in the cleaning activities within the port aquatorium daily.

A treatment plant outdoors is established for the oil waste treatment collected from ships (bilge, sludge and slops) of 2500-5000 cbm capacity.

In **Bulgaria**, **WATER ACT (prom. S.G. 67/27 Jul 1999, amend. SG. 59/20 Jul 2007)** introduced measures to control the correspondence between the capacity of the sewage systems/treatment plant and the quantity of waste waters as well as between efficiency of treatment plant and quality of wastewaters discharged and established obligatory self monitoring of the functioning of the treatment facilities.

**Regulation No 6 on the Limit Values for Admissible Contents of Dangerous and Harmful Substances in the Waste Water Discharged in the Water Bodies (prom. SG. 97/28 Oct 2000, amend. SG. 24/23 May 2004)** imposes limit values for admissible contents of certain dangerous substances in waste water from industrial plants discharged into water bodies and from urban waste water treatment; and Stipulates that emission standards for nitrogen indicators (total) and phosphorus (total) must be applied to wastewater discharged into sensitive areas

In **Italy**: **Legislative Decree 24 June 2003, no. 182 "Implementation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues"** establishes that ships are charged with the obligation of separating and recycling waste

In **Greece**: **Joint Ministerial Decision 4859/726/01** gives measures and restrictions for the protection of the water environment from releases to water and more specifically setting the limits of some hazardous substances which are included in the Catalogue II of the EU Directive 76/464.

In **Montenegro**:

**Law on Ports (Official Gazette of Montenegro 51/08, 22.08.2008)** recognizes the problems and provides sanctions for non legal releases.

In **Romania**:

**L. of waters 107/1996** (OM 244/08.10.1996) modified and completed with L.310/2004 and norms (OM no. 584/30.06.2004)

**L. 6/1993** (O. M. 57/18.03.1993) – transposes the 1973 Marpol International Convention – for the preventing of pollution from ships, and modified by the London Protocol since February, 17<sup>th</sup>, 1978

**L. 573/2002** (O.M. 695/01.11.2001) for the acceptance of the amendments to the Annex of 1978 Protocol regarding the International Convention for preventing the pollutions from ships, adopted by IMO through Resolution 95(46) of Committee for the Protection of Marine Environment, on April, 27th 2001, London

**O.M.T.C.T. 322/2006**

- Stipulates the obligations of Harbour Authorities to draw up the Management Plans for Waste from ships and bulks residuals
- Protection of human health and the environment from negative impacts of the waste water, defining the rules for their environmental treatment, as well as the obligations toward the waste water polluters.

**G.D.188/20.03.2002** modified and completed with **G.D.352/11.05.2005** (Directive 91/271/CEE) published in O.M. no. 187.20.03. 2002

*NTPA-011 -2002, NTPA-002/2002*

NTPA-001/2002

Establishes that Laboratory control is realized periodically:

- twice on year in aquatorium area
- once per month for potable water
- once per month for waste water.

None of the involved countries has a monitoring system on *special liquid waste production*, or on the *Sewage flow rate*, either on the *Whitewater flow rate*.

#### 4.2.2. Monitoring procedures

In order to comply with Water Framework Directive 2000/60/EC Annex V 1.3.2 Guidance document No. 7 - MONITORING UNDER THE WATER FRAMEWORK DIRECTIVE, 2.8.2, significant chemical pressures from **pointed sources** (Table 2) must be monitored as to identify their magnitude and impact. In general, pollutants released from **diffuse sources** (Table 2) are not quickly detected and therefore may have a long residence time in environment. Over time, they are bioaccumulated or chemically bound/ converted.

Table 2. Summary of sources of pollution of water aquatorium

POINTED SOURCES	DIFFUSIVE SOURCES
<ul style="list-style-type: none"> <li>• Shipyards (cutting, blasting, grinding, painting etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Re-suspended contaminated sediments</li> </ul>
<ul style="list-style-type: none"> <li>• Cargo-handling terminals (manipulation of metals scrap, liquid and solid chemicals, fertilizers, coal, cement, cereals in bulk etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Run-offs from the land</li> </ul>
<ul style="list-style-type: none"> <li>• Oil terminals</li> </ul>	<ul style="list-style-type: none"> <li>• Air-borne pollution</li> </ul>
<ul style="list-style-type: none"> <li>• Wastewater discharge</li> </ul>	
<ul style="list-style-type: none"> <li>• Bunkering</li> </ul>	

For the coastal marine waters the following parameters are important to consider in monitoring programmes:

- Transparency, fluorescence
- Temperature
- pH
- Conductivity, salinity
- Water flow (hydrophysical properties)
- Dissolved oxygen,
- BOD<sub>5</sub>,
- Total dissolved solids,
- Suspended particulate matter (SPM)
- Inorganic nitrogen – ammonium, nitrite and nitrate
- Total phosphorus and orto-phosphate
- Heavy metal pollution (Cu, Cd, Pb, Mn, Ni, Cr, Zn)
- Total petroleum hydrocarbons (TPH)
- Polyaromatic hydrocarbons (PAH) Acenaphtene, Acenaphthylene, Benzo[A]anthracene, Benzo[B]fluoranthene, Benzo[GHI] perylene, Chrysene, Dibenzoanthracene, Fluoranthene, Fluorene, Indeno[1,2,3-CD]pyrene, Naphtalene, Phenanthrene, Pyrene
- Organochlorine pesticides in the near-shore sediments (HCB, lindane, heptachlor, aldrin, dieldrin, endrin, DDE, DDD, DDT).
- Total Faecal Colliforms

Emission limit values are established in EU directives; procedures of monitoring are showed in Chapter 2 of GMP.

#### 4.2.3. Recommended best practices

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**1. Wastewater** is one of the main land sources of pollution on marine coastal waters (see Chp. 4.1.)

**2. Liquid waste discarded in ports by calling ships:**

**a. Waste oil** (according to Annex I MARPOL 73/78)

Reception of oily wastes can be carried out in a number of ways. Barges are a good option for floating facilities. On-shore collection can be carried out by tank trucks or at a central collection facility. In all cases, storage tanks with pumping facilities for oily wastes will be required to which ships, collection barges or collection vehicles can discharge their (collected) wastes.

**b. Noxious liquid substances** (according to Annex II MARPOL 73/78)

These wastes usually result from tank cleaning activities. It is feasible to combine tank cleaning facilities with reception facilities which require pumps and storage tanks. The most important aspect for reception of Annex II wastes is ensuring chemicals are not mixed, as they may create very dangerous situations.

**c. Sewage** (according to Annex IV MARPOL 73/78)

If the port area is served by a sewerage system, it may be possible to discharge ship-generated sewage into the sewer system either by direct connection (e.g. by hose or pipe) or by transfer using tanker trucks

If there is not an adequate sewerage system then a waste management strategy should facilitate an integrated approach to the collection, treatment and disposal of sewage generated both on land and on ships.

In accordance with MARPOL 73/78 Annex I, II and IV, liquid waste

Reception of both Annex I and II wastes needs to be followed by the treatment of these wastes.

**3. Solid waste discarded in ports by calling ships:**

**a. Regulation 7 of Annex V**

**b. Regulation 17 of Annex V**

It is based on the fundamental requirements established in MARPOL and the guidance provided in the Organization's Comprehensive Manual on Port Reception Facilities (1999) and the Guidelines for Ensuring the Adequacy of Port Waste Reception Facilities (Resolution MEPC.83 (44)).

Building on the Manual and the Guidelines, this Guide suggests how modern environmental management systems and procedures can assist with the improvement of MARPOL residue/waste delivery ashore. Procedures recommended by the Organization include communication and reporting procedures and the use of standardized forms.

Of particular importance in the ultimate elimination of marine pollution from ships are the more restrictive requirements in force in Special Areas and Emission Control Areas (ECAs) as defined in MARPOL (among them are: Mediterranean Sea and Black Sea)

To ensure better port reception facilities and services should be considered best port waste management procedures to promote and improve port reception facilities, in particular considering the following factors:

- traffic volume and the size of ships visiting the port
- time of staying in ports
- location of facilities as to be in a handy position in ports' area
- existence of catering service for all types of stream wastes usually entering the ports
- costs that must not be prohibitive as to present a disincentive to users

Obligations that ports' authorities should met regarding requirements from MARPOL 73/78 Annex V

#### 4. Garbage (Source: IMO Manual)

Discharge/disposal anywhere at sea of garbage is prohibited through the MARPOL Convention. Dumping of plastic or synthetic materials anywhere at sea is prohibited under the London Convention/Protocol.

- A variety of containers/bins and dumpsters can be used for the collection of garbage. These need to be functional in terms of their capacity, type and transportation.
- Segregation of various types of garbage may be useful or in some cases necessary (e. g., quarantined wastes). Receptacles used for the collecting of recyclables should be easily distinguishable from those used for non-recyclable garbage.
- Receptacles should be chosen with characteristics to discourage their abuse or misuse.
- Receptacles for garbage disposal may be placed on the ships while in port, therefore requiring wire sling attachments. Receptacles must be compatible with the maximum load of the available cranes and constructed of durable materials and equipped with lids to contain vermin, prevent litter spreading and offensive odours.
- Stationary compactors or baling equipment may be used to reduce the volume of the garbage.

An annual report document needs to be prepared for the composition, volumes and quantities of generated waste and adopted by ships to fill the Public Register of Waste and the Information System of Waste coming from ships.

#### **Objectives, targets and actions foreseen in Ecoport8 ports to achieve environmental performance in port aquatorium quality:**

**Igoumenitsa Port** (WP6.2. Project work in Greek ports results - Appendix of "Igoumenitsa Port EMS records"):

**Objective:** Reduction of effluent contaminants discharged into port water area.

**Target #1:** 5% less effluent contaminants discharged into port water area during bunkering.

**Actions:**

1. Any spills occurring at sea must be collected from a boat used for this reason.
2. Fuel storage tanks should be equipped with a leak detection system and an overflow warning system.
3. In case of leak the pumps should stop operating automatically.
4. After supply tanks with fuel and before release the supply system, a check should be made in order to confirm that the pipes are empty.

**Operational Controls:**

- Regular inspection of pipelines transporting fuel to detect leaks.
- Regular inspection of fuel storage tanks.
- Monitoring of water quality.

**Target #2:** 5% less effluent contaminants discharged into port water area during oil wastes removal

**Actions:**

1. The port must have sufficient and organized processes for receiving ships oil wastes.

2. Equipment used for collecting ships oil wastes must be clean and well-maintained.
3. Oil waste must be collected and stored separately in closed tanks
4. Oil wastes storage tanks must be emptied regularly.
5. Oil waste must be driven into refineries.

#### **Operational Controls**

- Regular inspection of oil waste storage facilities.
- Regular inspection of pipelines used for transporting oil waste.
- Recording of oil wastes delivered by ships.
- Monitoring of water quality.

**Target #3:** 5% less effluent contaminants discharged into port water area during ships wastewater removal

#### **Actions:**

1. The port must have sufficient and organized processes for receiving ships wastewater that would be immediate and will not delay or complicate ships operation.
2. Equipment used for collecting ships wastewater must be clean and well-maintained.
3. During wastewater collection, tank-trucks must enter the ship in order to collect any occurring leaks and not allow them to end up into the sea.
4. After collection, wastewater must be driven into the wastewater treatment plant of the Municipality of Patras.

#### **Operational Controls**

- Regular inspection of equipment and machines used for collecting ships wastewater.
- Recording of wastewater delivered by ships.
- Monitoring of water quality.

**Target #4** 5% less effluent contaminants discharged into port water area by surface runoff.

#### **Actions:**

The port must have a network for collecting surface run-off that should be connected to the drainage network of the port.

2. A network of channels must exist in buildings roofs in order to collect rainwater and drive it to green areas.
3. Trash bins must be placed in covered areas in order to avoid being washed out by rain.
4. The area where trash bins are stored must be cleaned on a regular basis, using a street cleaning vehicle and not water.
5. Collected solid waste must be removed immediately from the port land area in order to avoid being washed out by rain.

#### **Operational Controls**

- Regular inspection and maintenance of drainage network.
- Monitoring of water quality.

**Target #5** 10% less effluent contaminants discharged into port water area during repairing, washing and fuel supplying port's vehicles and machines.

#### **Actions**

1. Avoid repairs and maintenance during severe weather conditions.
2. The area where repairs and maintenance take place must be closed.
3. Paint works must take place within a closed area and be done using brushes and not sprays.
4. Ecological paints should be used.
5. The use of dissolvers must be reduced.
6. The disposal of paints into waste channels must be avoided.
7. Used material must be collected and carefully stored.

#### **Operational Controls**

- Regular inspection of maintenance facilities.
- Monitoring of water quality

**Durres Port (WP6.2. Project work in Durres port: "Port of Durres Records"):**

### Environmental Objective # 1: Prevent and reduce emission of wastewater

**Target:** Reduce emissions into the water

**Actions:**

1. Installation of Wastewater Treatment Plant with sufficient capacity
2. Inspection and monitoring of water in discharge points
3. Removing of sludge

### Good practices implemented in some European Ports others than Ecoport8 ports:

**Port of Livorno (Italy).** In order to manage releases to water, the collection of liquid/solid waste from ships is entrusted in concession to third parties. The service is provided based on timetables, fares and special procedures established through Regulation by the Port Authority. The Regulation has the following objectives:

- Provide a complete service to vessels in all stages of waste management
- Provide services that meet the criteria of ease of access, efficiency and economy;
- Realize the separate collection of waste;
- Have monitoring tools that allow continuous monitoring of quality of service.

**The Poole Harbor (England)** receives treated sewage discharges from three main Sewage Treatment Works (STWs) which all have provided secondary treatment for many years and treat sewage to a high standard. Wessex Water Services Ltd run these STWs and is also responsible for maintaining sewers and outfalls. They have a statutory duty to treat and discharge sewage, under consent from the Environment Agency, and to ensure that discharges do not adversely affect the waters of the Harbour in complying with EC Directive standards.

Table 3. Following are presented general best practices recommended to ports for management of discharges to water

Environmental aspect	Actions	Operational control	Performance Indicator
Wastewater & First flush water (Domestic & Industrial polluted waters from shipyards, cargo handling of chemical and metals scrap, run-offs)	<ol style="list-style-type: none"> <li>1. Monitor quantity and quality of effluents coming from different industrial or domestic sectors/ activities</li> <li>2. Improve the collecting systems by building separate draining systems</li> <li>3. Limit the amount of contaminants that enter into the collective draining system</li> <li>4. Use antipollution and treatment systems on the spot to improve the quality of waters discharged</li> <li>5. Create alternative ways to reuse the domestic wastewater (e.g., less polluted water could be used to create sprinkle systems for green zones)</li> <li>6. Implement step by step advanced/clean technologies for reducing and treating of wastewater</li> <li>7. Impose strictly conditions for discarding of wastewater in port aquatorium</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep regularly records of quantity of wastewater produced by different ports' operations/sectors</li> <li>2. Keep evidence of recording water quality parameters and evidence exceeded limits</li> <li>3. Keep evidence of activities where are often recorded irregularities</li> <li>4. Keep evidence of actions taken to improve/ prevent/ combat the infringement from standards of quality</li> <li>5. Keep record of natural and hazardous events that may affect the quality of port aquatorium and take measures to reduce the consequences</li> <li>6. Implement a PLAN-DO-CHECK-ACT system in order to make effective the management of water quality in port aquatorium</li> </ol>	<ul style="list-style-type: none"> <li>• Quality and quantity of wastewater entering in the port basin</li> <li>• Performance of the technology used</li> <li>• Efficiency of collecting system</li> </ul>
	1. Implement <u>Port Reception</u>	1. Implement a Safety Check	• Efficiency of

Environmental aspect	Actions	Operational control	Performance Indicator
Black bilge water from ships calling at ports & Oil leakages (from bunkering)	<p><u>Facilities service</u> for handling over the bilge water from ships and tanks</p> <p>2. Treat and recycle residual oils and hydrocarbons in a manner proper for reusing or safety degradation</p> <p>3. Prepare detailed <u>Emergency, Preparedness and Response Plan</u></p> <p>4. Implement <u>Oil Spills Contingency Plans</u> (set clear regulation for each element of the plan: hazard identification, vulnerability analysis, risk assessment, response action)</p>	<p>Management (ISM) according to international rules, regularly inspections and procedures to all operations starting from ships calling at port, operational manoeuvres in port aquatorium up to ships/tankers leaving the port</p> <p>2. Regularly verify the effectiveness of operational and technical procedures designed for bunkering and shipping operations</p>	implemented operational plans and programs
Ballast water from ships calling at ports	<p>1. Implement Port Reception Facilities service for handling over the ballast water from ships and tanks</p> <p>2. Take actions for reducing the risks of spillage, discarding or contamination with exotic species or pathogens through ballast water</p>	<p>1. In case that Ballast Water Convention is not implemented in the national legislation and there are not special port facilities designed, port authorities should impose strictly procedures for declaring and discarding of ballast water coming from calling ships (according to international regulations)</p>	<ul style="list-style-type: none"> <li>Results of bio-monitoring of exotic species in port aquatorium</li> <li>Technology and operational programs implemented to control and prevent the discharges into port aquatorium</li> </ul>
Solid waste (marine litter) from land & ships)	<p>1. Implement Port Reception Facilities service for handling over the solid waste from ships and land sources</p> <p>2. Close contracts for trade-offs recycling materials</p> <p>3. Reduce the hazardous nature of waste by using the system of Classification of waste according to European Waste List (EWL) proposed by Waste Framework Directive</p>	<p>1. Keep a strict evidence of type and quantity of solid waste inside port area</p> <p>2. Implement a system for strictly surveillance of waste movement inside port area and ways for disposal or valorisation</p>	<ul style="list-style-type: none"> <li>type and quantity of solid waste</li> <li>type and quantity of solid waste recycled</li> </ul>

### 4.3. Air quality

#### 4.3.1. Legislative background

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**Albania and Bulgaria** have no specific law for air quality in port area, or any document to stipulate measures for monitoring or reducing of emissions. It should be necessary to establish specific limit values and specific prevention measures, in particular for waterfront areas.

**Greece.** Directive 2008/50/EC hasn't been yet transposed in Greek legislation. The Hellenic Coast Guard inspects the ships regarding their emissions and their compliance with obligations derived from Annex VI of MARPOL Convention.

**Italy.** Neither law nor specific documents were elaborated for the air quality control in harbor area. There are not implemented measures for emissions' reducing.

The Ministerial Decree n.261 on 1<sup>st</sup> October, 2002 "Regulation with technical disposition for the evaluation of air quality deals with the zones where it is simply "hypothesized" a high concentration of pollutants and establishes that Regions, without specifying which of them, have to choose the most appropriate measures for reducing emissions". It would be necessary to establish specific limit values and specific measures according to zones characteristics', in particular for waterfront areas.

**Montenegro.** National legislation aims to comply with EU legislation, and impose to entities and operators within ports to respect certain limits of emissions, which are not necessary referring to the EU Directives.

**Romania** has transposed in the national legislation **the most important European Directives with special reference to limit values of certain pollutants (M.O. 592/2002** for the approving of limit values, threshold values and of criteria and methods for the analysis of SO<sub>2</sub> and nitrite oxides, particles in suspension (PM<sub>10</sub> and PM<sub>2,5</sub>), Pb, CO, and O<sub>3</sub> in the air; **G.D. 1856/2005** on national emission ceilings for certain atmospheric pollutants); **national programmes dedicated to reducing of most contributing components to air pollution (G.D. 1879/2006** on the approval of the National Program for Progressive Reduction of sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia emissions); **norms and technical requirements to limit volatile components (M.O. 337/2001** Norms on the testing facilities, equipment and devices used to limit emissions of volatile organic compounds from storage, loading, unloading and distribution terminals and gasoline stations; **G.D. 568/2001** establishes the technical requirements to limit emissions of volatile organic compounds from storage, loading, unloading and distribution terminals and gasoline stations – republished; **G.D. 470/2007** regarding the norms for reducing the sulphur concentration in liquid fuels; **MO 806/2004** for the amendment of **MO 115/2004** on the approval of the Procedure for sampling system to control compliance conditions concerning the sulphur content of liquid fuels; **M.O. 742/2004** approving the system for monitoring the quality of petrol and diesel). Special interest for Constanta ports presents the ratified MARPOL 73/78 Annex VI relating to air pollution prevention from ships.

Air pollutant emissions from industrial sources and traffic are constantly monitored by different institutions that follow that not being exceeded the maximum limits set by law. However, not all port operators and economic entities that work in the port area applying the provisions on limits of air pollutant emissions.



#### **4.3.2. Monitoring procedures**

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Air quality is an important part of the environmental monitoring in ECOPORT8 project. (See details in chapter 3 of GMP).

To control the environmental impacts on air quality, following parameters were chosen to be observed and measured:

- Meteorological parameters.
- Physico-chemical parameters.
- Physical parameters – noise.

Every observational program of the synoptic coastal station is regulated by the guides of the World Meteorological Organization (WMO, No8, Seventh edition, 2008). The standard observational program includes all day round 3-hourly or hourly surface observation over grass in open space of the following atmospheric parameters

- Wind speed and direction
- Atmospheric pressure
- Air temperature
- Relative humidity
- Precipitation (rainfall)

It has to be noted that in port areas, due to the specific structures, large areas and local circulations, the meteorological monitoring might be split or performed at several locations depending on the Air quality programme of the port. In order to be ready for modelling activities in case of accidents or other situations, wind measurements have to be performed at a location suitable to characterise the upcoming flow (for example, with broad fetch from sea when the risk or protected area is at the coast). Separately, all air quality monitoring stations need meteorological data for the purpose of chemical analysis and identification of specific features of the location.

In order to characterize the air quality in port areas must be monitored the following physico-chemical parameters:

1. Particulate matter PM10
2. Sulphur dioxide
3. Nitrogen oxides
4. Persistent Organic Pollutants (POPs)
5. Volatile organic compounds (VOC)
6. Asbestos
7. Heavy metals (Lead, Mercury, Tin)
8. Odours

Emission Limit Values and Environmental Quality Standards are given for all physico-chemical parameters in Chapter 3 in the GMP.

#### **4.3.3. Recommended best practices**

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The diesel engines at ports, which power ships, trucks, trains, and cargo-handling equipment, create vast amounts of air pollution that affect the health of workers and people living in nearby communities and contribute significantly to regional air pollution.

Major air pollutants from diesel engines at ports that can affect human health include particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NOx), and sulphur oxides (SOx).

The European Union has made some headway in using lower sulphur content fuels. Before Annex VI of MARPOL was officially ratified, the European Union had adopted a directive (E.U. Directive 99/32/EC) to strengthen sulphur limits in marine fuels so that member countries should comply in the meantime. The directive will impose a 1.5 percent (15,000 ppm) sulphur limit on all vessels that travel in the North Sea, the English Channel, and the Baltic Sea. Additionally, it is being strengthened to require all passenger vessels in regular service to or from any port in the European Union to use fuel with a sulphur limit of 1.5 percent.

Ports must commit to protect local communities and the environment, not only during expansions but also during regular operations. Following are suggested measures used by select ports worldwide to successfully decrease impacts on local communities and ecosystems. These measures should be employed at all container ports to clean up their operations, and local activists should be aware of these options to advocate for their implementation. Ports should consider the negotiation of new or modified leases as an important opportunity to require a combination of the mitigation measures, such as the use of cleaner fuels and equipment.

In addition to the mitigation measures ports should implement on their own, a number of policy and regulatory actions needed to protect human health and the environment from the large, industrial, and high-polluting operations at marine ports. Ordinarily, such activities would be subject to stringent regulation, but oversight of ports falls between the regulatory cracks, defeated by confusion over jurisdictional authority and the ongoing efforts of a strong industry lobby.

### **Good practices implemented in other European Ports**

#### **Shipping**

- **Commercial shore side power installations.** The Swedish **Port of Göteborg** alone has reduced 80 tons of NO<sub>x</sub>, 60 tons of SO<sub>x</sub>, and 2 tons of PM emissions annually because of shore side power used by ferries and several cargo vessels. Efforts are currently under way to **replace fossil-fuel-based shore side energy with nearby wind energy**.
- More than 100 large ships, mostly in the **Baltic Sea area**, have installed **selective catalytic reduction (SCR)** to reduce drastically the smog-forming nitrogen oxides (NO<sub>x</sub>) coming out of their smokestacks.
- In **California**, four large oceangoing vessels and one dredging vessel use **SCR systems**.
- In addition to the Swedish harbor fee system, Finnish and Norwegian ports have either proposed or implemented similar programs to **reduce port fees or taxes for cleaner vessels**.
- Swedish harbor **deter dirty ships**. In 1996, the Swedish Maritime Administration, the Swedish Shipowners' Association, and the Swedish ports made an agreement to implement stringent pollution reduction measures, which aimed to reduce emissions by 75 percent by the year 2000. In an attempt to achieve this goal, the organizations decided to **provide economic incentives in the way of differentiated fairway and port dues**. Ships that used lower-sulfur bunker fuel and controls to decrease NO<sub>x</sub> emissions would pay smaller shipping costs. For example, an oil tanker carrying a cargo of mineral oil products in bulk that has attained an emission level of a maximum 2 grams per kilowatt-hour (g/kWh) is charged the minimum amount. Following a linear scale, with an increasing rate of 6 percent per g/kWh, the amount for an emission level exceeding 12 g/kWh will increase by 60 percent. For other vessel types, the amounts increase at a rate of about 7 percent per g/kWh.

- Additionally, to promote the installation of emission controls, the Swedish Maritime Administration **reimburses the fairway dues that are paid for a five-year period.** The cost of installations that qualify for **the reimbursement can be as high as 40 percent of the investment cost if emission controls are installed before the year 2000, and up to 30 percent** for installations thereafter. Finally, ships are given an additional rebate per unit of the ship's gross tonnage if the sulfur content of the bunker fuel is lower than 0.5 percent (5,000 parts per million) for passenger ships and 1 percent (10,000 parts per million) for other ships. Following Sweden's lead, Finnish and Norwegian ports have proposed or implemented similar programs, reducing port fees or taxes for cleaner vessels.

### Shipyards

- Regeneration of waste solvents. Besides ecological benefits, there at least two reasons for recovering the waste solvents. As the technology is available, economic advantages could be obtained. Solvents could be treated in order to be utilized for its caloric value directly as fuel or mixed with others or could be reconverted to be used again as solvent-material (principle of separation consist in phase separation due to different densities).
- Reducing the use of VOCs in industry is one of the main challenges facing Europe's environment policy (*Council Directive 1999/13/EC of 11 March 1999*). The new technology proposed by Hasco made possible a consistent reducing of environmental and human's health impact. Dutch Hasco Lakfabrieken company developed a tri-component epoxy paint based on water rather than solvents which met the highly specific needs of the metal industry and was compatible with modern spray-painting equipment. The three components are the base paint, the mixing paint and water. The distinctive feature is the unconventional ratio of ingredients in the first two components. In Hasco's base paint the pigment is combined with the hardener and not with the resin. In the mixing paint, epoxy resin is the main component. As the mixing paint is not water soluble, a good mix of the first two components is indispensable. (*Industrial pollution, European solutions: clean technologies - LIFE and the Directive on integrated pollution prevention and control (IPPC Directive)*)

### Ecoport8 best practices

#### Port of Bar

Monitored parameters:

- Daily weather and oceanographic - meteorological factors
- **PM10** (E.g., average daily values close to the silos for dry bulk cargo handling, exceeded 5 times the average limit values of PM10; average limit values for PM10 is 50µg/m<sup>3</sup> prescribed by the Law) (01.03.2011)
- Analyses of PM10 were undertaken also on the presence of heavy metals and the results showed that values of lead exceeded significantly the average limit values. Also presence of benzo-pyrene in PM10 was above average limited values (01.03.2011)

**Environmental indicator:** Emissions of pollutants into the atmospheric air

#### Burgas & Varna Port

Air monitoring was implemented during Ecoport8, covering an integrated meteorological and air quality parameters assessment, which aims to operate in accordance with WMO standards and norms in the field. After assessment of the emission sources by the port authorities, a numerical modelling system will be developed to determine the distribution pattern of pollutants in real time and scale.

## **Durres Port**

Through project "Electronic system and equipment for environmental monitoring", Durres Port has implemented an automatic system for data collecting and processing of different air quality parameters (NO<sub>x</sub>, SO<sub>x</sub>, CO<sub>2</sub>), which are permanently assessed by comparing with standards imposed by BRD and EU framework.

## **Bari Port**

During Ecoport8 project, beginning with 13.03.2012, mobile automatic stations for air quality monitoring were installed in 3 stations/points inside the port (Varco area commerciale, Varco servizio Molo S. Vito, Area di sosta 'Pizzoli - Marisabella'). The objective was to assess the impact of different port activities regarding the releasing of suspended particulate matter (PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>4</sub> and PM<sub>10</sub>), and comparing the results with surrounding city area. The station recorded all the above parameters at every half an hour, 24 of 24 hours.

**Igoumenitsa Port** is the only port where is performed an olfactory impact monitoring.

## **Objectives, targets and actions foreseen in Ecoport8 ports to achieve environmental performance in air quality:**

### **Port of Bar - Montenegro**

**Environmental Objective # 1** Prevent and reduce emissions of steam into the air by burning of oil in petroleum transformers

#### **Target**

In the next three years, reduce emissions of steam into the air to the limits prescribed by law by burning of oil in petroleum transformers

#### **Actions:**

- Installation and maintaining the steam reducing systems
- On-loading/off-loading and storage areas will be paved to reduce steam emissions

**Environmental Objective # 2** Prevent and reduce emissions into the air from oil terminals

#### **Target**

Reduce emissions into the air from hydrocarbons manipulation and storage by limits for parameters prescribed by Law in next three years

#### **Actions:**

- ensuring all equipment in proper working order
- ensuring chemicals stored are compatible with tank material
- developing Emergency Spill Response Plan

**Environmental Objective # 3** Prevent and reduce emissions of dusts and entrainment of sediments in runoff from dry bulk storage and handling activities

#### **Target**

Reduce emissions in order that the parameters related to air pollution are within the limits defined by relevant legislation in next three years

#### **Actions:**

- Cover storage and handling facilities where practicable and necessary
- Install dust suppression mechanisms
- Utilization of water sprays where practical
- Consideration of installing drainage swales, filter berms, drainage inlet protectors such as fabric or gravel, sediment traps, or sediment basins

### **Port of Constanta**

**Env. Objective #1** Reduction of gases and particles emissions into the atmosphere

**Target #1** Reduction of ships and vehicles emission of gases and particles into the atmosphere with 30% in the next 3 years

#### **Actions:**



- Impose speed limits for vehicles in the port and for the ships in the port area
- Request ships not to use their main engine in the port area
- Request ships to use the minimum energy when they are operated

**Operational Controls**

- Daily analysis for the air

**Target #2** \* Reduction of the particles from the bulk terminals and from the bulk operations with 30% in the next 2 years

**Actions:**

- Build fences for the dry bulk terminal
- Use only special equipped vehicles and railway wagons for the transport of dry bulk terminal and for the grains terminal

**Operational controls**

- Daily monitoring of the air in the port area.

**Table 4.** Following are presented general best practices in air management recommended to ports

Environmental aspect	Actions	Operational control	Performance Indicator
Fine particulates (PM <sub>2.5</sub> ), SO <sub>2</sub> , O <sub>3</sub> -forming NO <sub>x</sub> and hydrocarbons (HC), asbestos (from cargo handling equipment, trucks, locomotives, tugboats, ferries and ships); emissions from fuel oil combustion (distillate oils and residual oils)	<ul style="list-style-type: none"> <li>• Replace fossil-fuel-based shore side energy with alternative energy</li> <li>• Install Cold Ironing Power on docks for ships calling at port</li> <li>• Reduce port fees or taxes for clean vessels</li> <li>• Provide economic incentives in the way of differentiated fairway and port dues</li> <li>• Replace old diesel power engines of vehicles, which work within port area</li> <li>• Use for e.g., biodiesel, renewable fuel manufactured from new and used vegetable oils and animal fats, blended with petro-diesel.</li> <li>• Limit the traffic as much as possible (introduce alternatives in workers' transport: bicycles, electric vehicles etc)</li> <li>• Keep clean roads free of dust or other easy suspending materials</li> <li>• Reducing idling time of vehicles, vessels and equipment operating in, near, or around port terminals</li> <li>• Add verified emissions control devices (retrofitting)</li> <li>• Install scrubbing systems to reduce SO<sub>2</sub> emissions in process of burning of oil in oil-fired boilers</li> <li>• Reduce NO<sub>x</sub> emissions in oil-fired boilers by process of fuel alteration of heavy oil by mixing with water and an emulsifying agent or other combustion/post combustion control techniques</li> <li>• Install ventilated, wet and fenced areas in cargo terminals</li> </ul>	<ul style="list-style-type: none"> <li>• Keep evidence of "clean" / "non clean" ships calling at port</li> <li>• Keep evidence of number of trucks, the traffic route, the timetable and type of vehicles travelling day-by-day within port area</li> <li>• Recordings of periodical technical controls and permits for every vehicle</li> <li>• Calculate the CO<sub>2</sub> footprint, SO<sub>2</sub>, NO<sub>x</sub> emissions inside port area since the limitation of on board engine powering of ships within port area, traffic</li> </ul>	<ul style="list-style-type: none"> <li>• CO2 footprint</li> <li>• SO<sub>2</sub>, NO<sub>x</sub>, VOCs, suspended particulate matter concentration /time/space</li> <li>• Economical benefices coming out from replacing the old engines with new and modern ones</li> <li>• Evidence of economic savings coming out from replacing the fuel with biodiesel based on organic materials</li> </ul>
Shipyard (coating, blasting, cutting, painting using solvents, solvent-laden paints operations) generate: <b>VOC, PM2,5, PM10, lead, NO<sub>x</sub>, SO<sub>x</sub>, As, asbestos etc</b> Bunkering generate: <b>VOC, Hazardous Air Pollutants</b>	<ul style="list-style-type: none"> <li>• Use filters to reduce emissions</li> <li>• Use high quality substances with less volatile compounds for painting products (e.g., use a type of paint based on tri-component epoxy paint based on water rather than solvents)</li> <li>• Use safety hoses and rapid detection systems for VOC or HAP emissions) in bunkering operations or other generating activities</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect the areas where the bunkering operations are carried out and check the compliancy with legal and technical safety procedures of operation</li> <li>• Check the existence of facilities and personal capacity to cope with emergency situations (accidents, threats)</li> <li>• Keep records of dangerous</li> </ul>	

Environmental aspect	Actions	Operational control	Performance Indicator
		substances in special "Dangerous Substances Register's" in accordance with their regime (see the "Regulatory framework for the management of chemicals"	

## **4.4. Waste (including electrical and electronically waste) (author UPT)**

### **4.4.1. Legislative background**

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Waste management is a very important aspect regarding environmental protection in general and especially for port areas and coastal zones. Many examples have already demonstrated that unsatisfactory waste handling and/or even illegal dumping take place in many ports around the world due to inefficient waste management operations, lack of control, recovery systems and inefficient information flow. Especially the International Convention MARPOL 73/78, and European Council Directive [2000/59/EC, 91/156/EEC, 2008/98/EC, 2002/84/EC] provide on international framework on management of ship and port wastes.

However, in contrast to the Convention, which regulates discharges by ships at sea, the Directive 2002/84/EC focuses on ship operations in Community ports and addresses in detail the legal, financial and practical responsibilities of the different operators involved in delivery of waste and residues in ports. The Directive targets: all ships, whatever their flag, including fishing vessels and recreational craft, putting in at a Member State port, apart from warships and ships belonging to or operated by a State for non-commercial governmental purposes; and, all Member State ports.

The legal framework in regard to waste management is quite optimal for Italy, Greece Bulgaria and Romania. There are not sufficient DCM, regulations, orders, guides etc in regard to hazardous and urban solid waste, in Albania and Montenegro. For monitoring procedures Albania and Montenegro should use the EU environmental standards on waste.

### **4.4.2. Monitoring procedures of waste management**

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In case of contamination, in the remediation plan should be foreseen characterization of contaminated sites through investigation of level of concentrations of chemical substances in soil, and removing of contaminants as to reach at least the acceptable concentration limit (ACL) values. These are considered safe for human health and natural environment, as required by Directive 91/156CEE. There are two possible level of contamination:

- a contamination surveillance limit (CSC)
- a risk-based values (CRS)

If a substance in soil is above the surveillance limit during the preliminary investigations the site is called potentially contaminated. After this must be a site- specific risk assessment. If level of contamination results minor than CSR it will be necessary a monitoring plan. It has to be better understood when applying the above mentioned inside ports.

The sampling should be carried out according to EU Environmental Standards and the samples depend of the type of waste. The sampling plastic recipients should be appropriate labelled with the name, type of waste, time, and date. Usually are used plastic bags and vessels labelled according with type of waste i.e. biodegradable organic waste, paper and paperboard, rubber, plastics glass, steel, aluminium, electrical, and electronic waste, car batteries and others. The sampling frequency should be at least one per month, in case of contamination and hazardous waste, to examine the concentration of several chemical substances.

A strict monitoring of waste should be maintained in the ports area including the ships. The points of monitoring should be in the port area. The number of monitoring points depends of the risking activities within the port areas. It is necessary to monitor the quantity, the volume and the composition of the wastes (types), not only in the port area. The same method should be applied also within ships, where the operators should collect the solid waste in plastic bags



according to their composition and handle them in this form to different operators (sub-contractors) that are specialized for re-use and recycling

According to stipulations of Directive 2000/59/EC the obligation to ensure the availability of adequate port reception facilities let to the Member States a high degree of freedom to arrange the reception of waste in the most suitable manner and permits them, inter alia, to provide fixed reception installations or to appoint service providers bringing to the ports mobile units for the reception of waste when needed. This obligation also implies the obligation to provide all services and/or other accompanying arrangements necessary for the proper and adequate use of these facilities.

Port reception facilities, i.e. installation, equipments and supporting services are very relevant operational aspects that could be monitored through appropriate Operational Performance Indicators (**OPI**), referring to ISO14031.

The main instruments that are used for solid waste collection, transport and disposal are plastic bags and vessels useful for monitoring of the above mentioned parameters, which means the weight and the volume according to the composition of the waste. The plastic bags with the appropriate tags where it is written the name and type of the waste, i.e. biodegradable organic waste, paper and paperboard, rubber, plastics, glass, steel, aluminium, electrical and electronic waste, car batteries and others. In the port area, instead of plastic bags vessels should be used with the appropriate tags that have a standard volume

### **Existed practices in Ecoport8 ports**

In **Italy and Greece** waste management in ports can be done either by the ports if they have the required facilities (most of the new parts of the ports have included such facilities) either by private companies authorized by the ports after succeeding in the public procurement.

However, in **Bulgaria and Romania**, there are issues in regard to waste management law implementation and finding the right approach and mechanisms for putting them to work. According to Bulgarian legislation on waste, ports are required to have issued permit as holders of waste. Waste management program is based on the principles of waste hierarchy; source separation, collection and recycling of priority waste streams (Directive 2006/12/EC). Waste prevention promotion (Directive 2008/98/EC). It is a Waste Management Plan for ship-generated waste and cargo residues. In regard to ship-generated waste the legislation set an economic regulator to minimize waste – eco-fees may be reduced if the ship's environmental management, design, equipment and operation are such that can be demonstrated that the vessel produces reduced quantities of ship-generated waste.

In **Romania** the domestic waste and garbage removal from the economic port agents is made by specialized economic entities for carrying on of these activities in the Romanian maritime ports, which concluded a contract with the port administration for such services performance. Each vessel arriving in port is obliged to collect the domestic waste in containers or plastic bags, according to the Annex 5 of Marpol Convention. The installations capacity for waste disposal, elimination, recycling must be kept at proper capacity with the real necessities.

The situation of waste management in **Albania** is just at its beginnings. The environmental infrastructure management is based on general laws on waste management and hazardous waste. Still there are not sufficient regulations in regard to hazardous and urban solid waste. The only measure taken so far is the collection of urban waste in containers set within domestic residences and their disposal in some dump sites during the night time. This is organized either by the public or private sector. Albanian's municipality has been contracting private entities which obligations are the collection, disinfection, transport, deposition in dump sites, road cleaning. However there are problems even within this simple scheme of waste management

such as waste burning in the containers, overloaded containers, etc. The solid waste deposited in dump sites is also often burned, polluting the air with toxic substances. Very often there are temporary dump sites created by local people, usually located close to rivers and sea, which often leads the waste to go to the river beds and the sea, which are often transported to long distances, crossing the Adriatic Sea up to Montenegro and Croatia.

#### **4.4.3. BEST PRACTICES in Ecoport8 ports**

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##### **Port of Bari (ITALY)**

- The waste management in the port is regulated by the urban waste plan of the city (Bari)
- The waste management is in the initial phase and it is included in the environmental protection system of the port

##### **Port of Igoumenitsa (GREECE)**

- The waste management in ports can be done either by the ports if they have the required facilities (most of the new parts of the ports have included such facilities) or by private companies authorized by the ports after succeeding public procurement
- There is a "Plan of collection and waste management of ships" that is being implemented by the port of Igoumenitsa, however, in the port of Patras the reception facilities of the solid waste consist of ship loaders and other hauled barges; and then the solid waste is transferred to the disposal centre.

##### **Port of Constantza (ROMANIA)**

- According to Order 322/2006 in regard to harbor installations for the reception of the waste generated by the ships and the cargo residues, port administration provide all facilities to collect and trade the residues from ships
- The Environmental Department of Constanta Port monitors and keeps the evidence of the quantity and type of waste produced by different activities in the port area, according to UNI EN ISO 14031
- Data are centralized and reported to environmental agency and other institutions acting in the environmental field

##### **Port of Burgas (BULGARIA)**

- Holders of waste must have issued permits
- Waste management program based on the principles of waste hierarchy; source, collection and recycling of priority waste streams according to the directive 2006/12/EC and UNI EN ISO 14031
- There is a waste management plan for ship generated waste and cargo residues
- Adequate reception facilities and activities to ensure the environmental and health requirements and the collection of waste without undue delay to ships
- Written contracts with third parties involved in waste management of ports
- Annual report documents about the types, volumes and quantities of generated waste and adopted by ships to fill the public register of waste and the information system for wastes from ships
- There are plans and programmes on environmental assessment for setting the framework for future development of any projects in the area of waste management (National Program for Development of Public Transport Ports 2008-2015, Program for waste management in port as integral part of the municipal environmental programmes);
- Environmental Impact Assessment of any development proposals for installations for hazardous and non-hazardous waste neutralization and installations for household waste treatment is obligatory;
- During construction activities associated with the development and modernization of the port infrastructure or specialization of port terminals certain measures need to be taken to limit the harmful impact of waste

#### Port of Durres (ALBANIA)

- The port authorities through a tendering procedure organizes the cleaning maintenance of the port basin and port areas (private entity)
- Ship generated waste and residues are disposed by a private entity authorized by the Port authorities
- Environmental Impact Assessment of any development of the port infrastructure, specialization of port terminals or other activities (e.g. dredging in port of Durres) is obligatory by the Albanian legislation
- All used electronic equipments of DPA are exported for recycling (through a private company) to a Greek Reuse/Recycling Company

#### Port of Bar (MONTENEGRO)

- The waste management in ports is aiming to comply with the EU standards

**Table 5. Following are presented general best practices in waste management recommended to ports**

Environmental aspect	Actions	Operational control	Performance Indicator
Waste management	<ul style="list-style-type: none"> <li>• Close contracts with third parties involved in the waste management of ports</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare annual reports for the composition, volumes and quantities of generated waste and adopted by ships to fill the public register of waste and the information system of waste coming from ships</li> </ul>	<ul style="list-style-type: none"> <li>• Efficiency of waste management/economic costs</li> </ul>
	<ul style="list-style-type: none"> <li>• Insure adequate reception facilities and operational flow</li> </ul>	<ul style="list-style-type: none"> <li>• Verify the existence and functionality of each facility</li> </ul>	<ul style="list-style-type: none"> <li>• Efficiency of installations (as number, type, function)</li> <li>• Functionality of operative plan for waste management in accordance with established Port Reception Facility Plan</li> <li>• Customers' appreciation</li> </ul>
	<ul style="list-style-type: none"> <li>• Set the framework for future development of any projects in the area of waste management ("Environmental Assessment of Plans and Programmes", National Program for the Development of Public Transport Ports 2008 – 2015, Program for waste management in port as integral part of the municipal environmental programmes).</li> </ul>	<ul style="list-style-type: none"> <li>• Regularly verify the compliance with the legislative framework related to waste in every stage of the projects development</li> </ul>	<ul style="list-style-type: none"> <li>• Number of successfully projects designed in accordance with EIA and other environmental programmes' requirements'</li> </ul>
		<ul style="list-style-type: none"> <li>• Regularly verify the compliance with the legislative framework in</li> </ul>	<ul style="list-style-type: none"> <li>• Number of successfully projects designed in accordance</li> </ul>

- Set the EIA for any development proposals for installations for hazardous and

Environmental aspect	Actions	Operational control	Performance Indicator
	non-hazardous waste neutralization and installations for household waste treatment, etc.	every stage of the projects related to waste	with EIA and other environmental programmes requirements'
	<ul style="list-style-type: none"> <li>During construction activities associated with development and modernization of port infrastructure or specialization of port terminals certain measures have to be taken to limit the harmful impact of waste.</li> </ul>	<ul style="list-style-type: none"> <li>Set environmental indicators to demonstrate the compliancy with environmental best practices and norms</li> </ul>	<ul style="list-style-type: none"> <li>Quantity of waste remained in place after finishing of works</li> <li>Level of contamination of soil, water or air</li> </ul>
	<ul style="list-style-type: none"> <li>Disposal of waste for its recovery by means of recycling, re-use or reclaiming or any other process with a view to extracting secondary raw materials, should be done in accordance to the European Directive EN ISO 14031 and Rec. CE 532/2003.</li> </ul>	<ul style="list-style-type: none"> <li>Set environmental indicators</li> </ul>	<ul style="list-style-type: none"> <li>Percent of recycled/delivered materials to specialised tenants/per time (monthly, yearly)</li> </ul>
	<ul style="list-style-type: none"> <li>Set economic regulators to promote waste prevention, re-use, recycling and recovery leading to a general applied scheme for waste management consisting of collecting, transportation and disposal.</li> </ul>	<ul style="list-style-type: none"> <li>Set environmental, social and economic indicators</li> <li>Produce periodical questionnaires, communications and economic reports to present the benefices of recycling</li> <li>Set rewards, compensations for those operators that respect the best practices in waste management</li> </ul>	<ul style="list-style-type: none"> <li>Percent of economic savings once that quantity of waste delivered to waste landfill decreased</li> <li>Level of improvement of environmental parameters</li> <li>Number of workers, operators voluntary involved in waste recycling activity</li> <li>Stakeholders support</li> </ul>
	<ul style="list-style-type: none"> <li>The management plan has to comprise risk assessment analysis and measures taken to eliminate the contaminants in case of pollution.</li> </ul>	<ul style="list-style-type: none"> <li>Check periodically the and revise the information regarding risk assessment and preventive actions</li> </ul>	
	<ul style="list-style-type: none"> <li>The responsibility of rehabilitation of the areas where the waste was deposited (like treatment plants and landfills after closing of the activity) has to be strictly assigned.</li> </ul>	<ul style="list-style-type: none"> <li>Establish clear responsibilities for rehabilitation of polluted areas with waste</li> <li>Check the resources and operational plans</li> <li>Keep a list of operators, tenants and inspection organizations that intervene in</li> </ul>	



Environ mental aspect	Actions	Operational control	Performance Indicator
		emergency situations	

## 4.5. Dredging

### 4.5.1. Legislative background

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Many marine and inland waters must respond to the need of economical and social development but also to the environmental protection requirements. With the transport corridors building, new interventions in order to maintain and renew ports' infrastructure were requested. While a period, the dredging activities were simply considered under general national framework, within new European framework, such as Habitat Directive, Water Framework Directive, Waste Directive and regional Conventions, many issues have appeared for carrying out the dredging activities

#### **BULGARIA:**

- For issuance of a permit for dredging is prior required a study of **Environmental Impact Assessment (EIA)**.

The measures for reducing environmental impacts include: preliminary study, preliminary determination of disposal site, monitoring of water quality and control during dredging

- There is not a detailed particular regulation about dredging of sediments
- Lack of long-term strategy for management of dredging masses, includes: classification of dredging masses; standards for the treatment of dredging masses, regional plans for dredging sites, monitoring programs in landfills, and others
- Management of dredging masses is assigned to the respective municipality, which refers it to the issue of waste management

#### **ROMANIA:**

- **Law 108/2010** regulates any dredging activity. The port administrations are not allowed to perform extraction dredging activities in the ports belonging to public property.

Works in the Romanian seaport basins, dredging works included, can be performed under the legal provisions in force, only after their previous authorization by the Port Administration, that shall be given according to the Romanian maritime ports' development and maintenance plans.

Port Administration is obliged to make public for the harbor master's office and the economic entities specialized in any modification of the sea bottom in the port basin because of dredging works pilotage.

- **MTI Order 287/2003, as amended**, establishes the **criteria for authorization of specialized companies** performing **extraction dredging** operations:
  - to present a list of **specialized vessels**, proving that the following requirements are fulfilled : safe shipping, **environmental protection measures**, work and health conditions;
  - to prove that the company is the owner of the vessels or the existence of a leasing or hire contract for minimum 1 year, registered to the national competent authority;
  - to present a list of employees with qualification in this field;
  - to prove that they are accepted by the port administration;
  - optional: insurance for vessels and employees.

#### **ALBANIA:**

There are no specific Law, DCM, Regulations for dredging activities (hydrodynamic monitoring – turbidity analysis, sediment dispersion, particular weather condition).

It will be useful to rule all dredging activities taking into account: sediment quantity and characteristics, site characteristics (bathymetry, meteorology, hydrodynamics, etc.), type and place of storage. Actually, these activities are managed by EIA Law which requires EIA for every project or activities.

#### **ITALY:**

Present Italian rules for the dredging operations are applied only to SIT (National Interest Site). Italian legislation is too complicated regarding some aspects, as for example, dredging materials are often classified as "special waste" so their reuse is impossible or too expensive. Except for ICRAM studies, there are no laws on hydrodynamic monitoring of dredging activities (turbidity analysis, sediment dispersion in particular weather condition)

#### **GREECE:**

There isn't any particular regulation about dredging of sediment, but any dredging works conducted within the ports are based on environmental studies.

### **4.5.2. Monitoring procedures**

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#### **Examples:**

**Port of Bari** ("Dredging operations in the port of Bari: from the Characterization Plan to the Management of Dredged Material")

**The parameters** used to study the effects of dredging on the marine environment:

- Water depth (morphology, bathymetry) and quantity of dredged material;
- Level of turbidity and concentration of suspended solids (turbidity plume), in the waters of the area affected by dredging and of the surrounding area;
- Possible changes of communities (benthic and demersal fish) of high natural value;
- Potential increasing of concentrations of those contaminants that were resulted at risk (in the characterization phase of the sediment), in the water column and in the seabed of surrounding areas;
- Variations in the bioavailability and mobility of contaminants through the use of biomarkers.

It was anticipated that for some parameters, such as bathymetry and morphology of the seabed, the monitoring intend to "photograph" the physical reality (morphology and bathymetry) after the passage of the dredge. For other parameters, the benthic population for example, it is intended to follow the temporal evolution of the given parameter (e.g. the population) until the achievement of new equilibrium condition

#### **Port of Constanta**

Dredged material is placed in locations and conditions established by the Romanian National Waters Administration. These areas are:

- inside the Pier III-S southern of port of Constanta;
- artificial inland onto river in shipping sector area (filling);
- 3 predefined areas within the port of Midia (at the northern part of Constanta)

The major seabed material parameters tested are chemical, physical, heavy metals, hydrocarbon and biological.

The sediments removed are analysed according with present environmental rules. The tiers followed are:

- assessment of physical properties
- assessment of chemical properties
- assessment of biological properties

Dredging is an usually activity in Constanta Port which require technical and technological progress in order to surpass the environmental issues regarding the requirements of Habitat Directive referring to conservation and preservation of natural sites.

#### 4.5.3. Recommended best practices

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It is considered that without an **ISM Code (International Safety Management)** it is not possible to act in a synergic way to achieve the standards for environmental protection in the best possible way in the shipping industry. In particular, seagoing dredgers fall under the scope of ISM, but some requirements do not fit operational practice on-board dredgers (Eu DA Annual Report 2003). It was recommended by the ICS (the International Chamber of Shipping) that this code should be interpreted pragmatically into a workable Safety Management System (SMS) rather than adapting ship operations to formal Code requirements (examples are: frequency of drills, indoctrination of ship procedures during crew change and navigation in shallow waters). Therefore, the legislation to make ISM compulsory was developed.

In the more recently regulations coming out from **Marine Strategy Framework Directive** were given new directions of coping with the challenges of dredging activities.

Why is the MSFD relevant for dredging activities?

The MSFD mainly applies to marine waters (normally beyond 1 nautical mile), and will influence activities including:

1. Sediment management
2. Sand mining/aggregate dredging
3. Laying of cables and pipelines
4. Dredging for the offshore and wind farm industries
5. Navigation dredging
6. New constructions (harbours, breakwaters, bridges, and tunnels)
7. Land reclamation
8. Coastal protection

Of interest to the navigation sector is the development of criteria and standards for determining Good Environmental Status (GES). The MSFD lists 11 qualitative descriptors that will be used to quantify GES. Those of particular relevance to the navigation and dredging sectors include:

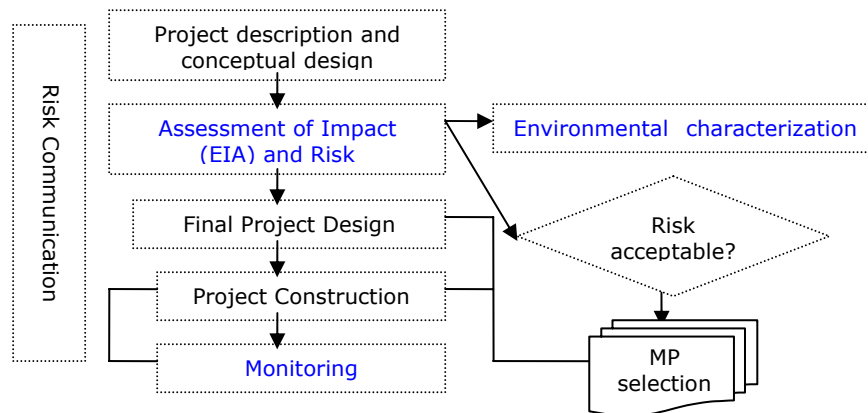
- Biological diversity
- Non-indigenous species
- Sea-floor integrity
- Hydrographical conditions
- Concentrations of contaminants
- Energy (including underwater noise)

In vision of **International Association of Dredging Companies** the BMPs (Best Management Practices) in dredging industry are state-of-the-art measures applied on a site specific basis to reduce, prevent, mitigate or avoid adverse environmental or social impacts.

BMPs can only be decided upon after complete impact assessments, evaluation of alternative practices and appropriate stakeholder participation. They are then determined to be the most effective, practical and sustainable means of achieving a good environmental outcome during dredging and maritime construction projects (Recommendations of **IADC** (International Association of Dredging Companies): Dredging Management Practices for the Environment, 2009)



## Logical scheme for BMP selection process (according to PIANC Report no. 100)



See further specific information related to dredging activities planning at:

[http://www.iadc-dredging.com/images/stories/pdf/facts\\_about\\_dredging\\_management\\_practices-for-the-environment.pdf](http://www.iadc-dredging.com/images/stories/pdf/facts_about_dredging_management_practices-for-the-environment.pdf)

**Operational control of dredging activities** (example from Hay Point Coal Terminal Expansion Project – Environmental Management Plan)

### Proactive Management

Operational measures to reduce the generation of turbid plumes must be implemented during dredging and disposal operations and also during reprocessing of oversize material.

### Dredging and Disposal Operations

The following management measures must be implemented throughout the dredging and spoil disposal program:

1. Operational procedures for dredging must be optimized to reduce the mobilization and dispersion of suspended sediment. Such measures include:
  - a. The use of a backhoe dredge, which is known to reduce turbidity generation relative to other types of dredge;
  - b. The operator should minimize spillage of material from the bucket into the surrounding water.
2. All dredging equipment and barges will be maintained in proper and efficient condition. Hopper door seals will be maintained in proper and efficient condition to ensure minimum loss of sediment during transport;
3. Disposal of dredged material will occur only within the designated disposal site
4. Hopper dewatering will be confined to the dredging and spoil disposal areas.

### Spoil Reprocessing

If and when a TSHD (Trailing Suction Hopper Dredger) is used to reprocess oversize material at the disposal site the following operational measures must be used to minimize suspended sediment mobilization:

1. Dredging equipment will be selected to minimize turbid plume formation, for example by ensuring that the type and size of the dredge head matches the characteristics of the suction pump;
2. All dredging equipment will be maintained in 'proper and efficient working order';
3. The TSHD will be fitted with an "environmental valve", which minimizes turbidity generated by overflow;
4. Operations will be conducted in favourable weather, tide, and current conditions to the extent practicable.

Trailing suction hopper dredges (TSHDs) can move rapidly between different areas of the world, but in change, they may translocate exotic species between different geographic

regions. The risks from this source of exotic species do not appear to have been assessed separately from that of other international shipping, although the amount of unwanted sediment transported by TSHDs is likely to be much greater than contained in most ballast.

**Table 6.** Following are presented general best practices in dredging management recommended to ports

Environmental aspect	Actions	Operational control	Performance Indicator
Dredging	<ul style="list-style-type: none"> <li>Based on existing knowledge, consider whether or not dredging or disposal is likely to affect status at water body level (whether "good status" or lower if an alternative objective has been set).</li> </ul>	<ul style="list-style-type: none"> <li>Analyse and compare the existing and historical information on site</li> </ul>	<ul style="list-style-type: none"> <li>Good knowledge of environmental status</li> </ul>
	<ul style="list-style-type: none"> <li>Understand the scope of assessment required for each potentially-affected environmental parameter. <ul style="list-style-type: none"> <li>Minimise the need for dredging and spoil disposal as much as possible</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Investigate the environmental data and potential risks of dredging <ul style="list-style-type: none"> <li>Create different scenarios for the quantity and quality of extractable sediments and assess their possible effects on environment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Set the key environmental indicators</li> </ul>
	<ul style="list-style-type: none"> <li>Minimise physical effects of spoil disposal</li> </ul>	<ul style="list-style-type: none"> <li>Keep evidence of changes occurred in environment</li> </ul>	
	<ul style="list-style-type: none"> <li>Use spoil as a resource where possible</li> <li>Maintain natural coastal processes.</li> <li>Assess ecological significance of proposed new disposal sites.</li> </ul>	<ul style="list-style-type: none"> <li>Create an operational flow and control management of dredging process</li> </ul>	<ul style="list-style-type: none"> <li>Create ecological and economical opportunities/advantages</li> </ul>
	<ul style="list-style-type: none"> <li>Minimise effects of contaminated sediments <ul style="list-style-type: none"> <li>Develop sediment-sampling plan to adequately characterize sediments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Assess chemical contamination</li> <li>Document history of site where contamination is suspected</li> </ul>	
	<ul style="list-style-type: none"> <li>Minimise effects on water quality</li> </ul>	<ul style="list-style-type: none"> <li>Assess releases of contaminants from sediments</li> <li>Select appropriate dredging method.</li> <li>Install silt screens where practical and sediments are fine.</li> <li>Dredging should be timed to occur when impacts are minimised.</li> </ul>	
	<ul style="list-style-type: none"> <li>Optimise dredging and disposal methods</li> </ul>	<ul style="list-style-type: none"> <li>Optimise dredging technology</li> </ul>	
	<ul style="list-style-type: none"> <li>Assess Biological Impacts on the Seabed</li> </ul>	<ul style="list-style-type: none"> <li>Monitor nutrients and algal blooms</li> <li>Monitor turbidity and seagrass health</li> </ul>	

**Further recommended documentation sources:**

• **BEST PRACTICE ENVIRONMENTAL MANAGEMENT - GUIDELINES FOR DREDGING** (EPA Publication 691), October, 2001 (These guidelines have been developed to advise Agencies of environmental requirements for dredging in Victoria waters, Australia). It is a comprehensible guide comprising, among others, environmental controls of impacts,



environmental management solutions and technical specifications related to dredging operations)

- **DREDGING “BEST MANAGEMENT PRACTICES”** – (Best Management Practices (BMP) are the actual practices - including the forms, procedures, charts, software references, etc.-- actually used by dredgers to minimize consequences of dredging and disposal on water quality. Common BMPs include Silt Curtains, Gunterbooms, and Operational Controls).
- **CLEARING THE WATERS – Marine dredging and the Water Framework Directive**
  - **STAGE ONE: THE SCREENING STAGE** (Environment Agency – „A user guide for marine dredging activities”), April, 2010
  - **STAGE TWO: THE SCOPING PROCESS** (Environment Agency – „A user guide for marine dredging activities”), April, 2010
  - **STAGE THREE: ASSESSMENT** (Environment Agency – „A user guide for marine dredging activities”), April, 2010
  - **STAGE FOUR: IDENTIFICATION AND EVALUATION OF MEASURES**

[http://www.pianc.us/workinggroups/docs\\_wg/envicom-wg10.pdf](http://www.pianc.us/workinggroups/docs_wg/envicom-wg10.pdf)

*Environmental Risk Assessment of Dredging and Disposal Operations* – Report of Working Group 10 of the ENVIRONMENTAL COMMISSION, 2006

**Environmental Management Plan (Marine Ecology) for Dredging and Dredged Material Disposal. Hay Point Coal Terminal Expansion Phase 3 (HPX3), 2011**

## 4.6. Noise

### 4.6.1. Legislative background

Noise management is among the environmental priorities of the European port sector and becomes with higher significance over recent years (ESPO Review 2004, 2009). According to ESPO 2010 the noise is among the first top 10 environmental priorities in the environmental agenda ranking of the European ports import zones or close to urban or populated areas. Determining port area noise capacity consists of setting the limits for permissible noise levels for the port area as a whole.

The Directive 2002/49/EC (Environmental Noise Directive - END) aims to define a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects on the human health and the environment, including annoyance, due to exposure to environmental noise and the following 2 actions shall be implemented progressively:

- a) the determination of exposure to environmental noise, through Noise mapping, by methods of assessment common to the EU member states;
  - b) adoption of Action plans, based on noise-mapping results, with a view to prevent and reduce environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health, and to preserve environmental noise quality where it is good.
- The assessment and management of environmental noise in END requires that ports to be included in Strategic noise maps (**not later than 30 June 2012**) and Action plans (not later than 18 July 2013) for the management of noise, including noise reduction, if necessary.

**In Albania - Law No. 9774/12.07.2007** 'On the Assessment and Administration of the Environmental Noises' - the local authorities apply the domestic regulation for the safety and protective clothing during work in port;

**GUIDE No. 8/27.11.2007** 'For the limit values of noise in certain environments' of the Ministry of the Environment and of the Ministry of Health - control only via campaign analyses for the noise values in port area.

**In Bulgaria, ENVIRONMENT NOISE ACT** (*prom. SG. 74/13.09.2005, amend. SG. 30/11.04.2006*) - The accent is put on preventive control. Ports are referred to the agglomerations and are therefore under the control of the mayor of the relevant municipality.

**In Italy - Legislative Decree 195/2006/10.04.2006** implementation of Directive 2003/10/CE of the European Parliament and of the Council of 6 February 2003 on the **minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise)**

**Decree of the Italian Prime Minister of November 14, 1997** "Establishment of limit values of sound sources" aims to establish emissions, releases, and attentions' limit values, and the quality values of noise sources mobile and motionless. Classify the homogenous areas.

**Legislative Decree n 194 of August 19, 2005** transposes the Directive 2002/49/CE of the European Parliament and of the Council.

According to the legislation the public is involved at the procession of "noise plans". The port areas have to transmit the noise plan within December 31, 2011 to the Authority. There is a complete legislation about noise, it is referred too at waterfront areas and takes into account the involvement of workers in Italy:

- Are established limit values, but are not specified monitoring of noise emissions (Noise monitoring is really expensive!)
- Are established public information and involvement at the procession of "noise plans".

Waterfront areas have to transmit their noise plan at the authority within December 31, 2011.

**In Greece: Presidential Decree 149/2006** for the to integrate the **Directive 2003/10**

**Ministerial Decision 13586/724** for the defining measures, conditions and methods to assess and manage the environmental noise according to the Directive 2002/49/EC of the

European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise

**In Montenegro: Law on environmental noise**

(Official Gazette of Montenegro 45/06, 17.07.2006) – aims to prevent or minimize harmful effects of noise on human health and environment. There is variety of measures.

**In Romania: O. M.M.D.D 1830/2007** of the Minister of Environment and Sustainable Development for the approval of the Guide for the realization, analyzing and evaluation of the strategic maps of noise - the strategic noise maps have been elaborated taking into consideration the industrial noise, railroad traffic, road traffic and also the LZSN indicators (noise indicator for daylight-evening-night)

#### 4.6.2. Monitoring procedures

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The main sources of noise in ports are cargo handling equipment, traffic of goods and transport systems (railway, auto transport), and port activities in industrial part of ports. The ports work unceasing 24 hours a day and can produce noise levels over those allowed in the surrounding urban areas, mainly at night, causing a disturbance in sleep patterns of some people.

According to ESPO 2010 the noise is among the first top 10 environmental priorities in the environmental agenda ranking of the European ports in port zones or close to urban or populated areas.

Since the noise is very harmful to human health, the purpose of noise monitoring is to avoid, prevent or reduce harmful effects caused by human exposure to noise in order safe and healthy conditions for workers and nearby living people.

The ports work unceasing 24 hours a day and can produce noise levels over those allowed in the surrounding urban areas, mainly at night.

Determining port area noise capacity consists of setting the limits for permissible noise levels for the port area as a whole. The Directive 2002/49/EC (Environmental Noise Directive - END) aims to define a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects on the human health and the environment, including annoyance, due to exposure to environmental noise and the following 2 actions shall be implemented progressively:

a) the determination of exposure to environmental noise, through Noise mapping, by methods of assessment common to the EU member states;

b) adoption of Action plans, based on noise-mapping results, with a view to prevent and reduce environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health, and to preserve environmental noise quality where it is good. The assessment and management of environmental noise in END requires that ports to be included in Strategic noise maps (not later than 30 June 2012) and Action plans (not later than 18 July 2013) for the management of noise, including noise reduction, if necessary.

Noise is mainly characterized by sound pressure, sound power and duration.

Noise levels are measured in decibels (dB), based on a logarithmic scale correction for ear sensitivity at lower levels that is expressed by the A-weighting dB(A). Noise indicators are typically an average of volume and duration over a fixed period of time. Because noise level changes all the time, averaging is termed equivalent noise level (**Leq**).

**Leq** refers to the energy equivalent average sound pressure level measured using the A-weighting which is most sensitive to speech intelligibility frequencies of the human ear. As the same noise is judged differently between day time and night time, the EU proposed time periods for calculations are:

- L day is the A-weighted long-term average sound level 07:00- 19:00 (12 hours)

- L evening is the A-weighted long-term average sound level 19:00- 23:00 (4 hours)
  - L night is the A-weighted long-term average sound level 23:00- 07:00 (8 hours)
- The overall day-evening-night noise level is expressed by the Lden indicator. Lden is a descriptor of noise level based on energy equivalent noise level (Leq) over a whole 24 hour day with a penalty of 10 dB(A) for night time noise (23.00-7.00) and an additional penalty of 5 dB(A) for evening noise (19.00-23.00).

Exposure limit values and exposure action values according Directive 2003/10/EC is:

- exposure limit values: LEX,8h = 87 dB(A) and Ppeak = 200 Pa (1) respectively;
- upper exposure action values: LEX,8h 85 dB(A) and Ppeak = 140 Pa (2) respectively;
- lower exposure action values: LEX,8h = 80 dB(A) and Ppeak = 112 Pa (3) respectively

#### 4.6.3. Existed and recommended best practices

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The port of Auckland, New Zealand has set an e-mail and a 24-hour hotline for public feedback and complaints. The port has implemented range of noise-control initiatives, including:

- Additional soundproofing and noise reduction features fitted to new straddle carriers and other equipment
- Elimination or reduction of the majority of warning sirens on heavy machinery
- Ship horns no longer being used to signal departure from the Fergusson container terminal; these are used only for safety such as on foggy mornings
- Elimination of rail crossing alarms
- Minimisation of rail shunt moves
- Fitting of alarm mufflers to two gantry cranes
- Requiring as many container ships as can safely do so to berth bow south, minimizing the impact of generator noise on neighbours
- Working with the shipping lines to further reduce the noise from ship generators
- Seeking to ensure new developments, in close proximity to the Port have adequate soundproofing.

The port, also, seeks every possible way to minimize the traffic noise. There are:

- Vehicle Booking System (VBS) that requires trucks to book slots in advance.
- Programme to encourage "Best Available Unit" utilization of container trucks. Its aim is all trucks visiting the port to carry full load in and out.
- Driver education to encourage truck drivers to minimize the noise from air braking at night.

Other good practices in use (Petroleum Operators)

Sundre Petroleum Operators Group apply daily operational procedures, such as:

- Keep compressor station doors and windows closed,
- Use belt dressing,
- Inspect and repair mufflers,
- Maintain sucker rods to prevent squealing,
- Run fans slower at night (Variable frequency drive, VFD),
- Use vent silencers on buildings,
- Soundproofing (insulation/lagging),
- Troubleshoot transient noise,
- Minimize flaring and venting,
- Consider gravel pack around compressor building skids.

**Table 7.** General Best Practices for reducing noise level and operational procedures

General Best Practices for reducing noise level	Long-term operational procedures
<ul style="list-style-type: none"> <li>• Receive adequate feedback from complaints and suggestions of the society.</li> <li>• It is best if the cargo handling is as far away from residential areas as possible.</li> <li>• Regular inspection and maintenance are guarantee for proper work of the equipment with no excessive noise.</li> <li>• Doors and windows of the engine room should not be left open during operation.</li> <li>• Installation of enclosures or sound barriers</li> <li>• Lubrication application to moving parts of machinery</li> <li>• Special care for loading or unloading heavy or metal objects (consider wooden or rubber mats on the ground, etc.)</li> <li>• Cargo operations should be consistent with the day time (e.g. no noisy operations between 23:00 h and 07:00 h, etc.)</li> <li>• Use of loudhailers should be avoided (substituted with walky-talky, for instance)</li> <li>• Ships should avoid using horns</li> <li>• Use of components with insulation, absorbing building materials, inertia blocks, vibration isolation - isolation pads, silencer, acoustic louvers, soundproof doors, etc.</li> <li>• Consider low noise electric drives versus engine driven compressors</li> <li>• Design cooler fans for low tip velocity</li> <li>• Orient noise sources away from residents</li> <li>• Use acoustical pipe lagging</li> <li>• Install VFDs on coolers.</li> </ul>	<ul style="list-style-type: none"> <li>- Conduct regular assessment of noise control opportunities,</li> <li>- Use best practical technology for noise control,</li> <li>- Maintain communication links with neighbors and community,</li> <li>- Work to eliminate sources of odours, noise and aesthetically unpleasing sites,</li> <li>- Respond quickly and seriously to any noise concerns,</li> <li>- Be aware of noise from contractors (service rigs, etc) and ensure they meet best practice expectations,</li> <li>- Schedule work to create the least amount of noise impact on neighbours and keep neighbours informed.</li> </ul>

## 4.7. Odours

### 4.7.1. Legislative background

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Odor is an important environmental pollution issue because it can affect public amenity and the community's quality of life. The European Standards (EN) define a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow. The primary application is to provide a common basis for evaluation of odorant emissions in the member states of the European Union. The national standards of EU countries have to be replaced by the EN13725:2003 standard, that has been introduced in April 2003.

**In Albania, Law No 8905 dt 6.6.2002 "On sea environment protection from pollution and damage"** - There is specific legislation for odours emission in waterfront areas. In waterfront areas odours are a real problem. Upon the establishment of an objective method for measuring odour concentration, it will be necessary to find out rules, methods to avoid, prevent or reduce bad odours emission in the port air environment.

**In Bulgaria, CLEAN AIR ACT** (*prom. SG. 45/28 May 1996, amend. SG. 6/ 23 Jan 2009*)

In BG legislation Air quality is connected with ODOURS

**In Italy: UNI EN 13725:2004** (implementation of the EN 13725:2003 "Air quality-determination of odour concentration by dynamic olfactometry") aims to define a method for objective determination of odour concentration of a gaseous sample using dynamic olfactometry with human assessors and emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow. This document defines a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow

**In Greece: Ministerial council's act 34/02** There are some regulations regarding the prescriptive and limits of the quality of the atmosphere regarding the dioxide of sulphur, dioxide of nitrogen and nitrogen oxide, particles of lead. In addition the regulations regarding air quality set some limits and regulations regarding emissions and odours as well

**In Montenegro:** N/A

**In Romania:** The only identified rules are those stipulated by the laws which regulate the emissions of volatile organic compounds and the other pollutants such as sulphur dioxide, nitrates oxides.

### 4.7.2. Monitoring procedures

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Odours are the cause for most air pollution complaints reported by people living near odorous facilities, such as wastewater treatment plants, ports, marinas, landfills, compost, and etc. A conceptual model for what makes an odour episode become a people complaint is the "People Complaint".

Four parameters make up the hierarchy in this odour episode:

- 1) character/offensiveness,
- 2) strength,
- 3) duration,
- 4) frequency



The cumulative effect of these four parameters creates the nuisance experience and the likely people complaint. This conceptual model helps define odour episodes and assists in the development of a credible odour monitoring program.

The analytic methods for odours monitoring could be subdivided into physical (the gas chromatography), and chemosensory method.

When measuring odour, there is a difference between emission and imission measurements. Emission measurement can be conducted by olfactometry using an olfactometer to dilute the odour sample. On the contrary, olfactometry is rarely used for imission measurement because of the low odour concentrations. The same measuring principles are used, but the judgment of the air assay happens without diluting the samples.

The measurement of odour concentration is the most widespread method to quantify odours. It is standardized in CEN EN 13725:2003. The method is based on dilution of an odour sample to the odour threshold (the point at which the odour is only just detectable to 50 % of the test panel). The numerical value of the odour concentration is equal to the dilution factor that is necessary to reach the odour threshold. Its unit is the European Odour Unit, ouE/m<sup>3</sup>. Therefore, the odour concentration at the odour threshold is 1 ouE/m<sup>3</sup> by definition. This standard defines a mass that is just detectable when evaporated into 1 m<sup>3</sup> of neutral gas, as equivalent to 123 µg n-butanol. In other words: 1 ouE/m<sup>3</sup> or 40 ppm/v.

Standard odour monitoring practices include four elements: 1) monitoring protocol, 2) area map, 3) monitoring route, and 4) data form. The odour monitoring program incorporates these elements into a working plan that is clearly understood and used by the observers and can be easily explained to the general public.

The monitoring protocol is a written document that describes the purpose of the odour monitoring program (e.g. proactive to improve community quality of life), the scope of the odour monitoring (e.g. eighteen months), resources required (e.g. dollars and personnel hours), references (e.g. previous enforcement actions), geographic area (e.g. parts of the community involved), detailed procedures (e.g. when and how frequent to conduct odour monitoring), and outcomes (e.g. how the data will be summarized and the results used).

- Odours pollution is presented usually by dispersion models, which need representative meteorological data sets (Piringer et al, 2007; Schauburger et al., 2011).
- Good design and operation can prevent and minimize odours problems

It has to be noted that in many cases the odours complains cannot be related to specific air pollutants and therefore online or continuous monitoring and modelling activities can be very limited.

#### **4.7.3. Existed and recommended best practices**

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Suggestions for odour reduction:

- It is important to bring the community on side as part of the problem-solving process, both to help identify where problems lie and to negotiate solutions, including timeframes for implementation. Methods for communication include public meetings, community working parties, mail drops and a phone line for complaints and enquiries;
- Conduct odorous operations during weather conditions that are most favourable for dispersion where no other mitigation option is available (e.g. avoid early morning and evenings, consider wind direction in relation to sensitive areas, avoid hot humid weather);
- Ensure odours sources are adequately enclosed;
- Green belts with suitable species of plants /trees and other physical methods may be adopted for control and prevention of odor pollution.



## References

EN 13725:2003(E), Air quality-determination of odour concentration by dynamic olfactory. CEN, Brussels, March 2003

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## 4.8. Energy efficiency

### 4.8.1. Legislative background

Even though, most of ECOPORT8 member countries have currently in place legislative documents complying with the EU directive on energy efficiency (Directive 2006/32/CE), the majority of them do not apply an energy consumption monitoring system in ports operation. Practical difficulties due to the complicated and fragmented nature of the relevant (or not so relevant) legislation have been noticed in certain member countries (Bulgaria, Italy, Greece and Romania) emphasizing the need for more detailed regulations and monitoring techniques to be developed and applied for a successful energy monitoring scheme of port activities and infrastructure.

The main EU legislative and Standardization documents on energy efficiency are:

- The Directive 2006/32/CE on energy end-use efficiency and energy services repealing Directive 93/76/CEE"
- International Standard for Energy Management ISO 50001:2011 (based on the BS EN 16001 - Energy Management Systems)

It provides useful guidance on implementing the processes necessary to evaluate the baseline energy usage, on putting in place action plans, targets and energy performance indicators for reducing consumption and on identifying and prioritize opportunities for improving energy performance. The primary objective is to continuously reduce energy consumption and the associated energy costs. Based on concrete data, energy-saving measures are identified, developed and implemented. Utilization of such systems, in general, improves the energy efficiency of processes, equipment and devices, and reduces costs, energy consumption and CO2 emissions

#### **Port of Durres (Albania):**

The legislative document complying with EU Directives on a more general sense is "Law No. 9379 Dt. 28.04.2005 - On Energy Efficiency". The law contributes to the efficiently use of the energy sources, minimizing the harmful impact on the environment and of ensuring a sustainable development of the society. However, there are no particular rules or regulations regarding the environment protection of port areas.

#### **Port of Bourgas (Bulgaria)**

- Environmental Protection Act (*prom. SG. 91/25 Sept. 2002, last amend. SG. 103/29 Dec 2009*);
- Energy Efficiency Act (*prom. SG. 98/14 Nov 2008, last amend. SG. 82/16 Oct. 2009*)  
The **Energy Efficiency Act** regulates the public relations connected with the implementation of the state policy on increasing the energy efficiency and the execution of energy efficiency services.
- Law on Renewable and Alternative Energy Sources and Bio Fuels (*prom. SG. 49/19 Jun 2007, last amend. SG. 82/16 Oct 2009*).

The **Law for Renewable and Alternative Energy Sources and Biofuels** regulates the public relations connected with the stimulation of the production and consumption of electrical and thermal power and /or energy for cooling from renewable sources and from alternative energy sources and of the production and consumption of biofuels and other renewable fuels in the transportation sector.

However, the absence of control on implementation of the measures for energy efficiency has been noted. Furthermore, in August 2009 the Bulgarian National Audit Office ascertained weaknesses in the implementation of target programs written in Art. 11 of the Energy Efficiency Act, of whom main purpose is to encourage end-users to reduce use of energy resources.

#### **Greece**

A new law (in progress) which will transpose the 2006/32/EU Directive of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC. In addition, new energy efficiency plans and regulations are under discussions and development. Furthermore any new government works/buildings constructions are based on environmental studies and energy efficiency plans.

#### **Italy**

- Regional Law n.31 of October 21, 2008 "rules about *renewable energy sources*, and for pulled releases' reduction and about environment";
- Legislative Decree n.115 of May 30, 2008 "Implementation of Directive 2006/32/CE on energy end-use efficiency and energy services repealing Directive 93/76/CEE";

The obligation of renewable sources use is important but in the Law there is no more information about waterfront areas. Use of renewable sources is well defined in the Italian legislation, but it could be useful to improve energy and-use efficiency in waterfront areas maybe with the creation of "energy district" into ports, or establishing "energy governance" typical for portal areas.

The aim would be to make possible that ports provide for themselves at the treatment of sludge's as energy source.

#### **Montenegro**

- Law on Energy (Official Gazette of Montenegro 39/03, 30.06.2003, 53/09, 07.08. 2009).
- Environmental Protection Act (Official Gazette of Montenegro 51/08, 21/09)

In 2006, the government completed a final draft of the National Sustainable Strategy that was based on the concept of sustainable development, identification of environmental problems, natural resource management, and economic and social development.

#### **Romania**

- **G. O. no. 22/2008**
- National Strategy for Energy Efficiency - GD no.163/2004;
- Law no.199/2000, amended by the Law 56/2006;

Establish the fiscal incentives for the increase of energy efficiency and the quota of the renewable energy resources at the final consumers. These incentives are targeting the development of a market for energy services, efficient energy equipments and the promotion of the manufacture of such products

### **4.8.2. Monitoring procedures**

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Energy consumption in port terminals can be a significant overhead cost for terminal operators. Energy use has possibly the greatest environmental impact on port lands. The primary source of energy is fossil fuel. Burning non-renewable fossil fuels to generate electricity, for example, leads to greenhouse gas emissions and global warming. With the utilization of an Energy Management Program, these cost and emissions can be minimized.

Energy, in terms of electricity used, fuel, or natural gas, is required on every aspect of the ports activities, such as developmental (civil works, maintenance-retrofitting), administrative and operational. Typical operational activities may include cargo handling and storage, port

traffic, vessel repair/maintenance, vehicle and equipment maintenance, site cleaning, bunkering and grounds maintenance. Representative energy consumption requirements, derived from characteristic ports' activities (Peris-Mora et al, 2005; Darbra et al, 2004; 2009) are given in Table 9.

**Table 9.** Energy consumption derived from typical ports' activities

Activity	Issue
Storage, loading- unloading of containerised bulk solids, of non-containerised bulk solids and merchandise Handling/pumping of oil-based derived products, bulk liquids Lighting	Energy Consumption (Electrical Energy)
Fuel consumption in land traffic Fuel consumption in machinery used for the storage, loading and unloading of containerised merchandise Fuel consumption in machinery used for building and repairing vessels	Energy (fuel) Consumption
Emission of combustible gasses CO, NOx, SO2 from maritime traffic Emission of combustible gasses CO, NOx, SO2 from loading and unloading machines (cranes, water spouts, ramps, etc.) for containerised merchandise Emission of particles from civil works Emission of particles from building and repairing vessels In port vessels emissions	CO <sub>2</sub> emissions

A detailed and continuous data acquisition of energy and water consumption is the first step that needs to be taken for the successful implementation of any environmental management system. Such types of information can be obtained, under the scope of environmental monitoring and assessment schemes, by utilizing modified solutions of Digital Energy and Utility Monitoring products (Mysiak et al, 2005). Typically a measurement system with automatic data readout placed over the various network levels (multilevel) is utilised. These systems collect interval-based consumption data for electricity, natural gas, thermal energy and other utilities such as propane, purchased steam and environmental measurements.

#### **4.8.3. Existed and recommended best practices in Ecoport8 ports**

##### **Port of Bar (Montenegro)**

An energy consumption monitoring system is performed by the Port services of Bar. After an initial identification of energy inefficiencies, a better management of energy use has been achieved, according to the most of the uses described in Table 9.

However, particular care should be paid in enforcing an "in-port vessels' emissions scheme". On that note, a number of initiatives to improve the eco-management of the Port and to comply further with national, international and EU regulations has been incorporated in the Business Plan of the Port of Bar up to the Year 2021 (a project directed to development of Environmental Protection System is to be realised)

### **Port of Igoumenitsa (Greece)**

A Building management system (regulation of infrastructure energy consumption) has been introduced and operates in the port of Igoumenitsa. Electrical Energy consumption values are measured, according to the uses described in Table 9.

The port of Igoumenitsa has initiated the procedures to become certified as an Ecological Port from ECOPORTS-ESPO.

#### **4.8.4. Best practices in other ports than Ecoport8**

##### **Port Authority of Algeciras Bay (Spain) („Benchmarking and Best Practices Report - MEditerranean PORTs' Contribution to CLImate Change Mitigation – Climeport Project)**

- Installation of transformers in accordance with Standard HD 428.1 S1 (According to the document "The Scope for energy saving in the EU through the use of energy-efficient electricity distribution transformer" (European Cooper Institute, in collaboration with the European Commission), the total losses of electricity in the distribution networks in the UE represent the 6.5% of total electricity generated, and the 40% of these losses occur in transformers.)
- Energy optimization of interior lightning systems in buildings by installing occupancy sensors in areas of transit and buttons timed
- Replacing standard incandescent and fluorescent lamps: It is advisable to use high-efficiency lamps due to their high luminance, lower consumption and longer life. Electronic compact fluorescent lamps provide quality ambient lighting, and are essential for their low power consumption for those places where lighting is required for long periods of time. These lamps can be used widely as they consume five times less than incandescent bulbs, with a life tenfold. On the other hand, they have the same cap that traditional light bulb which makes them very simple to implement.
- Replacement of magnetic ballasts with electronic ones: fluorescent tubes have greater efficiency, which in terms of lighting means you get a light level several times higher than incandescent bulbs to equal consumption, but the traditional ballasts dissipate much heat.
- Incorporation of Renewable Energy Sources (solar thermal system, wind farms)

##### **Port of Koper (Slovenia) („Benchmarking and Best Practices Report - MEditerranean PORTs' Contribution to CLImate Change Mitigation – Climeport Project)**

- Energy efficient outdoor lighting system
- Vessel speed reduction entering in the port
- Active front end technology (AFE) for port cranes (A.F.E Open Drive is a pulsed rectifier-regenerative feedback unit comprising an inverter with IGBT modules, admirably suited for regenerating the power back into the line in the form of sinusoidal current. Thanks to an intelligent conversion system based on IGBT technology, A.F.E Open Drive guarantees extremely low harmonics: the power drawn from the line supply or fed back into the line supply is in the form of sinusoidal current.)

##### **Port of Livorno (Italy) („Benchmarking and Best Practices Report - MEditerranean PORTs' Contribution to CLImate Change Mitigation – Climeport Project)**

- Energy production by renewable production power (installing power plants by the use of vegetal oils)

**Port Authority of Marseille (France)** (*„Benchmarking and Best Practices Report - Mediterranean PORTs’ Contribution to CLIMATE Change Mitigation – Climeport Project*)

- Building Integrated Photovoltaic (these photovoltaic plants are realized on warehouses, on workshop and on harbour station)
- Electric consumption monitoring
- Promotion of the setting-up of wind farms

**Port Authority of Piraeus (Greece)** (*„Benchmarking and Best Practices Report - Mediterranean PORTs’ Contribution to CLIMATE Change Mitigation – Climeport Project*)

- Improvement of buildings energy efficiency (A green roof project was implemented in the roof of main administration building of Container terminal)

**Port Authority of Valencia (Spain)** (*„Benchmarking and Best Practices Report - Mediterranean PORTs’ Contribution to CLIMATE Change Mitigation – Climeport Project*)

- Promote the incorporation or replacement of equipment of high efficiency (E.g.: fluorescent).
- Verification of losses in electrical wiring for overloaded lines (reactive compensation)
- Promote the management of electricity demand:
  - Analysis of quarter hours, alarms overruns, load test.
  - Establishment of consumption patterns
- The replacement of luminary and lamps of 250 W to 75 W and the introduction of flow reducers improve energy efficiency and CO<sub>2</sub> emissions reduction
- Change the temperatures of consignment in industrial refrigeration equipment (better utilization of the thermal inertia)
- Improvements in energy management of concessionaries companies (Implementation of a quality assurance system of energy management certifiable by third parties according to UNE-EN 16001 and 14001)

**Port of Amsterdam (The Netherlands)**

- Utilization of sustainable energy through wind turbines (inside the port area is a large wind farm with a capacity of 125 million kWh)
- Utilization of bio-energy, in terms of biofuels (in liquid form) used in combustion engines, produced from organic residues such as used frying oil and organic waste (two biodiesel factories are now situated at Port of Amsterdam, namely Greenmills and Vesta Biofuels Amsterdam).
- Producing energy by incinerating waste (48% of the supplied waste being biomass). As the waste absorbs the same amount of CO<sub>2</sub> during growth as is released on incineration, the process is therefore CO<sub>2</sub>-neutral. The power plants have a capacity of 124 megawatt and produce 1 million megawatt hours annually. This is sufficient electricity for some 320,000 households (75% of Amsterdam’s total).
- Applying clean coal technology techniques (gasification). To further reduce emissions, research is being conducted into underground CO<sub>2</sub> storage. Efforts are being made to replace coal with biomass, which will cut CO<sub>2</sub> emissions even more.

**Portsmouth International Port (United Kingdom)**



- Utilisation of eco-friendly building materials and technology on ports terminals. It is the first building in Britain to use thermal energy from the sea for heating and cooling - slashing energy consumption for these by 80% (Portsmouth Commercial Port, 2009).

#### **Port of Dover (United Kingdom)**

- Incorporation of energy efficient building methods and materials in future developments
- Capturing and recycling of refrigerant gases

Electricity consumption was reduced from 2008 by 5.46%, equivalent of saving of 1,119,001kWh or 567 tonnes of CO<sub>2</sub>. Gas oil consumption has been reduced from 2007 by a massive 17.69%, which equates to a saving 207,794 litres or 629 tonnes of CO<sub>2</sub> equivalents. Between 2008 and 2009 carbon emissions decreased by 13% which equates to a saving of over 2060 tonnes of CO<sub>2</sub>. CO<sub>2</sub> equivalent emissions from gas were reduced by 42% and for gas oil by 18%, due to improved monitoring and control. Reductions of over 21% from owned transport and over 5% from electricity have been measured. A massive reduction in fugitive emissions of over 66% has been achieved by a new monitoring and maintenance regime which captures the refrigerant gases from cooling units and recycles them into new units, thus preventing them escaping into the atmosphere. Efforts are being made to ensure that, where practicable, future products used in operations or developed by the port authority are sustainable and made out of environmentally friendly and recyclable materials.

#### **Port Authority of Antwerp (Belgium)**

- Utilisation of energy-efficient technology solutions and renewable sources of energy.
- Utilisation of wind power complements the basic maritime and industrial activities of the port, in addition to solar energy (photovoltaic systems).

A major breakthrough on sustainable development and a significant advance in the fight against port-related CO<sub>2</sub> emissions, available in Port of Antwerp, is the utilisation of shore power. Shore power (or shore supply) is a power source from land used to power marine vessels when in port. The availability of shore power means that ships at berth do not have to run their polluting diesel engines in order to power their electrical systems. Shore power has environmental benefits in several different ways. These include immediate, significant reductions in pollutants such as CO<sub>2</sub>, NO<sub>x</sub>, F, VOS, N<sub>2</sub>O, CO and particulates. Using shore power cuts CO<sub>2</sub> emissions by more than half. NO<sub>x</sub> emissions are reduced by as much as 97%, while CO emissions are practically eliminated (Table 2). These reductions form an important contribution towards combating the greenhouse effect.

#### **Port of Alicante (Spain)**

- Rationing the consumption of resources used in port activities.
- Electrical consumption was considerably reduced by 50 % and 30 %, in offices and public areas respectively (Port Authority of Alicante, 2009).
- Purchasing of electricity from accredited renewable energy generators (wind power) the CO<sub>2</sub> emissions were reduced by 20%.

#### **Energy Management Programs**

Energy management programs should include the following elements:

- Identification, and regular measurement and reporting of principal energy flows within a facility at unit process level
- Preparation of mass and energy balance;
- Definition and regular review of energy performance targets, which are adjusted to account for changes in major influencing factors on energy use



- Regular comparison and monitoring of energy flows with performance targets to identify where action should be taken to reduce energy use
- Regular review of targets, which may include comparison with benchmark data, to confirm that targets are set at appropriate levels

### Energy Efficiency

For any energy-using system, a systematic analysis of energy efficiency improvements and cost reduction opportunities should include a hierarchical examination of opportunities to:

- Demand/Load Side Management by reducing loads on the energy system
- Supply Side Management by:
  - Reduce losses in energy distribution
  - Improve energy conversion efficiency
  - Exploit energy purchasing opportunities
  - Use lower-carbon fuels

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## 4.9. Soil contamination

### 4.9.1. Legislative background

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The main European legal framework dealing with soil contamination is Commission Communication COM/2002/179 "Towards a Thematic Strategy for Soil Protection".

The best European legislative instruments related to soil contamination prevention and management (until the **Soil Framework Directive** implementation) is referring to:

- **The Environmental Impact Assessment Directive (Council Directive 97/11/EC)** requires an environmental assessment for certain private and public projects. Inter alia the likely impact on soils has to be examined. Under the chemicals legislation risk assessments and risk reduction strategies are produced for a considerable number of substances.
- The risk assessments carried out under the **Existing Substances Regulation** (Council Regulation (EEC) No 793/93), address the risks related to emissions of the substances to the soil compartment.
- **The Habitats Directive** is of particular relevance since it defines a number of terrestrial habitats that depend on specific soil characteristics, such as dunes, peat lands, calcareous grasslands and wet meadows.
- **The Industrial Emissions Directive (formerly IPPC) requires:**
  - Introduction of periodic monitoring of soil (and groundwater)
  - Establishment of a baseline report prior to operating the installation/first update of permit
  - Obligation to remediate the site to its original state upon closure of the installation (no-degradation approach)
- **Directive 2006/118/EC (new GWD) and WFD Directive (obtaining of good chemical status of GW)**
- **ICZM and LUP**

For ports future projects of development could be of interest the European development of networks for soil surveillance: **LUCAS survey** (2009), the **European Network on Soil Awareness (ENSA)**, and studies on **best practices to mitigate the negative effects of sealing** (2010), the **Contaminated Land Rehabilitation Network for Environmental Technologies, CLARINET**, a policy-orientated expert network on the management of contaminated land.

- **Landfill Directive (Council Directive 1999/31/EC)**

No specific regulations have been identified in **Italy, Albany, Greece** but rather regulations having a large field of legislative application, for instance in agriculture, waste management etc.

In **Bulgaria** - ("Regulation on limit values of pollutants in soil"),

**Montenegro** ("Rulebook on allowable concentrations of dangerous and harmful substances in soil and methods of their testing"),

**Romania** (Order 756/1997, which specifically is referring to limits of allowable concentrations of some pollutants in soil: PAHs, heavy metals).

Legislative links with soil contamination issue are implemented in national legislations through adoption of Directive 2008/50/CE, Directive 80/68/EEC (old GWD), Directive 2006/118/EC (new GWD), Directive 2000/60/EC (WFD), The Industrial Emissions Directive (formerly IPPC), Directive 91/156/EEC "On Waste" amending Directive 75/442/EEC, Directive 2008/98/EC "Waste prevention promotion", The Environmental Impact Assessment Directive- EIA Directive (Council Directive 97/11/EC)

#### 4.9.2. Monitoring procedures

In case of soil contamination monitoring, no special recommendations have been made within Monitoring plan elaborated by Ecoport8 team projects. The impacting activities were treated in separate sections of the monitoring plan (e.g., first-flush water, water and sediments, air monitoring). Land used by ports is partially artificial structures, taking the aspect of large asphalted platforms. On the other hand, large areas of natural habitats have been occupied during the construction and future development projects will require new territories. Special monitoring and safety procedures must be designed in order to avoid leakages or other accidents in case of oil tanks, pipelines buried underground.

The monitoring should be designed within port area in a similar way as the water monitoring is. It is recommended to implement an Operational Monitoring Program. This must be relied on ERA procedure, consisting of: 1. the assessing of contamination/hazard risks: identification of sources, the generating causes of the pollutant existence, identification of pollutants, source path, and flow diagram. If the path-source has been identified, the next step should consist of taking the decision of further risk assessment based on: 2. sampling of air, soil, water, type of pollution, historical data and studies; 3. estimate severity and frequency; 4. elaborate risk matrix and ALARP. Monitoring measures must be a part of risk management and could be used for taking the management measures for reducing the frequency and magnitude of the pollution and a permanent feedback control.

The "Hazard assessment" is a quantitative assessment based on physicochemical characteristics of various soil samples taken from soil profiles for different depths. For quantitative evaluation specific, measurable, available, relevant, timely - (SMART) indicators are needed:

- **Specific** / Specifics concentration (mg / mc);
- **Measurable** / measurable - by calculation or laboratory tests;
- **Available** / available (acceptable cost, laboratory equipment available);
- **Relevant** / relevant standardized indicators;
- **Timely** / time - when the risk assessment is done it is necessary to take into account the phenomena of weathering (from pollutant discharge up to the moment evaluation, it is possible some phenomena to occur).

The main soil contamination sources in Ecoport8 ports' area identified were:

- Local/pointed
- Diffusive

##### **Local/pointed soil contamination**

- Waste landfills (e.g., Constanta Port, Albany)
- Sludge from treatment of industrial waters in wastewater plant (Constanta Port)
- Yards (paintings-spraying, cutting, abrasive blasting, coating)
- Oil, chemical and grain cargo handling terminals
- Bunkering (leachate)
- Underground oil pipelines, tanks

##### **Diffuse soil contamination and physical structure changing**

- Atmospheric deposition due to emissions from industry
- Oil, chemical and grain cargo handling terminals
- First- flush waters run-offs
- Traffic

##### **Parameters/indicators that are subject of monitoring:**

- Pedological indicators (pH, humus nitrogen, salt content, texture, soil permeability, soil porosity, soil texture)
- Hydro- geological indicators (aquifer depth and direction, chemical properties)
- Pollutants from identified sources (e.g., incinerators, bunkering, ships or other vehicles traffic:

- Deposition of airborne pollutants releases into soils acidifying contaminants (e.g. SO<sub>2</sub>, NO<sub>x</sub>), heavy metals (e.g. cadmium, lead arsenic, mercury), and several organic compounds (e.g. dioxins, PCBs, PAHs)
- Total petroleum hydrocarbons (THP)
- Persistent hydrocarbons and persistent and bioaccumulation organic toxic substances.
- Antifouling (organic arsine, copper, stannous)
- Cyanides
  - Metals and their compounds.
  - Arsenic and its compounds.
- Nutrients organic loading (TN and TP)
  - Physical changes
    - Soil sealing
    - Soil compaction

#### **4.9.3. Existed and recommended best practices**

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##### **a. Practices in Ecoport8 ports related to soil contamination derived from different ports activities**

###### **1. Port development**

Ports relies their development on land reclaimed from sea or hinterland. Their impact on soil is a major one both during their construction and functioning. In the present, Ecoport8 ports exploit large areas of land on several thousands meters. The ecological pressures are high due to sealing and compaction on one hand and activities carried out, on the other hand. In almost all Ecoport8 ports there are planned large projects of extension and modernization, which consist of new terminals construction (Burgas: 4 new terminals, Durres: new container terminal), expansion of capacities (Bar Port), new commercial port in Igoumenitsa Port, expansion and renovation of cruise Terminal (Bari Port), construction of the New Port on Dymaeon coast that will be formed of 4 jagged wharfs (Patras Port). The ports' development is regulated according to Urban Plans and programmes implemented through different development projects. Ports must be encouraged to use ICZM, LUP and SEA instruments for further development planning. According with Habitat and Birds Directive, ports should plan the development as to prevent the damages on protected sites.

###### **2. Waste**

All project countries have ratified the MARPOL Convention 73/78 Annex V and Basel Convention 1989 "On the control of Transboundary Movements of Hazardous Wastes and their Disposal".

- Italy and Greece have implemented the EU Directives regarding this issue, but it is not well known the range of legislative documents' application inside ports.
- Bulgarian and Romanian national legislation is well developed but there are not enough economic regulators to promote waste prevention, reuse, recycling and recovery included in a general applied scheme for waste management consisting of collecting, transportation and disposal.
- In Montenegro there is a "Rulebook on Waste Classification and Methods of Waste Disposal".
- In Albania, the act or regulation for the coordination of actions between port actors & factors, especially, environment unit of the port authority and harbours master as an executive body is missing.
- In Constanta Port there is a landfill which receives the solid wastes coming from ships that are not under "Hazardous wastes" category.

### 3. Sludge from treatment of industrial waters in wastewater plant

European legislation is very restrictive regarding the treatment, disposal and use of sludge resulted in treatment of industrial waters in wastewater plants.

- Directives 75/439/EEC (waste oils), 2006/12/EC (waste framework) and 86/278/EEC (sewage sludge and soil)
- Commission Decision 97/622 relates to Directives 91/689/EEC (hazardous waste framework) and 94/62/EC (packaging and packaging waste)
- Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)
- Directive 2000/76/EC on waste incineration;
- Council Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture, as amended by Directive 91/692/EEC and Regulation (EC) No. 807/2003

**No port but Constanta** have a treatment plant (**Bar Port has one in project**) designed for industrial waters' treatment. Due to heavy metals content, which still exceed the legal limits, sludge resulted from the treatment plant it is separately collected and handed over to a subcontractor. The deposit on soil is forbidden.

### 4. Tanks management

Tanks management (fuel storage, bilge water storage, sanitary waste water collection and dumping tanks, meteoric water tanks)

**Port of Igoumenitsa - black bilge water** is collected in special tanks based on the Plan of Collection and waste management of ships that calling on port.

**Port of Constantza** - the residuals and mixed hydrocarbons from the ships are temporary stocked in non propelled barge SN 101 where they are gravitational separated through successive transfer between barge's compartments. The treating station is projected for the purification of waters containing hydrocarbons residuals through physical, chemical and biological treatments, having a capacity of 814,000 mc/year. At the end of treatment process, the effluent is discarded into the port area. The quality of the effluent is periodically verified in respect of legally ranged limits through laboratory analyses, performed by specialized laboratories.

**Port of Bourgas** – Waste management activities are stipulated in WHRP (Waste Reception and Handling Plan), which transpose the Directive 2000/59/EU regarding port reception facilities. Bulgarian Ports Infrastructure Company has specified port operator PCHMV JSCo for performing of services in the refuse management, resulting from the shipping activity – liquid refuse, resulting from the shipping activity.

#### **Underground oil pipelines, tanks**

*Receiving, storage, conditioning and delivery of crude oil, petroleum, petrochemical and liquid chemical products.*

Petroleum products' handling is an activity with a major impact potential on the environment, this activity for instance in Constanta Port (2 locations: North Storage Farm and South Storage Farm) being developed for a period of over 100 years. As a consequence of this activity, historical pollution of soil occurred. Impact on environment in South storage farm has occurred at Black Sea' coast area' interface. After 1990, studies have been made in areas, thought to be polluted. These studies confirmed soil, undersoil and water table' pollution and identified water table flow' direction, arisen on surface in the coastal area.

#### Measures taken in view to limit pollution in South Storage area (Constanta Port)

The first adopted measure was to identify the location of water with petroleum product drawing out and monitoring drillings.

Above water table layer that is seized about depth of 8 - 9 m, a petroleum product thin layer is noticed or even a layer of some centimetres.

Researches made in the storage farm area put in light the followings:

- thickness of contaminated sedimentary layers varies from a minimum of 0.4 m up to 10.1 m, the most polluted layers have thicknesses between 1-3 m;
- in most of the cases, the hydrostatic level occurs inside the contaminated sedimentary layers, but there are cases when the contaminated layers are above or under the hydrostatic level.

In time, by eliminating pollution supply sources, by drawing out contaminated water from monitoring drillings, hydrocarbons content gradual reducing was determined in water table – a slow depollution occurred; in the filling area, where water table springs arise on surface, now product traces occur very rarely.

#### **5. Rehabilitation of Polluted Areas**

- Italy and Greece have implemented the EU Directives regarding this issue. Definition for potentially contaminated site is given based on contamination surveillance limits (CSC) or risk based values (CSR) in soil or water but, there is no DCM, Guide or Regulation on concentration limit (ACL) values in case of contamination, which are considered safe for human health and natural environment. There are no specific rehabilitation regulations regarding the port areas, in Greece.
- In Romania the law complying with the Directive 2004/35/EC aims to repair, rehabilitate or replace the prejudiced natural resources and/or deteriorated services or to provide an alternative for the respective resources and services.
- In Bulgaria monitoring of the rehabilitation measures implementation is provided.
- There is no identified law for this issue, in Albania & Montenegro.

### **Best practices recommended**

#### **1. Tanks' management**

**Brief recommendations according to "International Safety Guide - Chapter 24 for Inland Navigation Tank-barges and Terminals Precautions on tanker and terminal during cargo handling" - Edition 1**

##### **Segregated Ballast Tank Lids**

- Segregated ballast tank lids may be opened before discharge of ballast is commenced, to allow the surface of the ballast to be inspected e.g. for contamination. Segregated ballast tank lids should, however, normally be kept closed when cargo or ballast is being handled because petroleum or chemical vapours could be drawn into them. Segregated ballast tank lids must be clearly marked to indicate the tank they serve.

##### **Tanker and Shore Cargo Connections**

- Flanges for tanker-to-shore cargo connections at the end of the terminal pipelines and on the tanker's manifold should be in accordance with International or National legislation.
- Flange faces, gaskets and seals should be clean and in good condition. When in their storage location, flange faces should be suitably protected from corrosion/pitting.
- Where bolted connections are made, all bolt holes should be used. Care should be taken when tightening bolts as uneven or over tightened bolts could result in leakage or fracture.
- Improvised arrangements using 'G' clamps or similar devices must not be used for flange connections

##### **Removal of blank flanges**

- Each tanker and terminal manifold flange should have a removable blank flange made of steel or other approved material, such as phenol resin, and preferably fitted with handles.

- ° Precautions should be taken to ensure that, prior to the removal of blanks from tanker and terminal pipelines, the section between the last valve and blank does not contain product under pressure. Precautions must also be taken to prevent any spillage.
- ° Blank flanges shall be capable of withstanding the working pressure of the line or system to which they are connected. Blank flanges should normally be of a thickness equal to that of the end flange to which they are fitted.

#### **Emergency Release**

- ° A special release device can be used for the emergency disconnection of cargo hoses or arms.
- ° If possible, the hoses or arms should be drained, purged or isolated as appropriate before emergency disconnection so that spillage is minimized
- ° Periodic checks should be made to ensure that all safety features are operational.

#### **Accidental Product Spillage and Leakage**

##### **Spill Containment**

- ° A permanently fitted drip tray, provided with suitable means of draining, should be fitted under all tanker and shore manifold connections. If no permanent means are fitted, portable drip trays should be placed under each connection in use to retain any leakage.
- ° The use of plastic should be avoided unless provision for bonding is made.

##### **Tanker and Shore Cargo Pipelines not in Use**

- ° The tightness of valves should not be relied upon to prevent the escape or seepage of products. All shore pipelines, loading arms and hoses not in use at a berth must be securely blanked.
- ° All tankers cargo pipelines not in use must be securely blanked at the manifold.

##### **Fire-Fighting Equipment**

- ° When a tanker is alongside a berth, fire-fighting equipment is to be ready for immediate use.
- ° On board the tanker, this is normally achieved by having fire hoses with spray/jet nozzles ready for use. Having portable dry chemical powder extinguishers available in the cargo area provides additional protection against small flash fires.
- ° On the jetty, fire-fighting equipment should be ready for immediate use. While this may not involve the rigging of fire hoses, the preparations for emergency operation of the fire fighting equipment should be apparent and communicated to the tanker. Consideration should be given to having portable extinguishers available for use adjacent to the jetty manifold area.

## **2. Landfills management**

In waste landfills leaching can be emitted to the surrounding soil and soil parent material and subsequently enter groundwater and/or surface water. Of particular concern are those that operate or have operated in the past, without complying with the minimum set of technical requirements set by the Landfill Directive (Council Directive 1999/31/EC).

Landfill must be organized in accordance with requirements of Landfill Directive and relative ones (Directive 75/442/EEC – Waste Directive; Directive 91/689/EEC on hazardous waste; Directive 2000/76/EC on the incineration of waste; Directive 2002/96/EC - Waste Electronic and Electrical Equipment Directive; Environmental Liability Directive -2004/35/EC; Regulation establishing a European Pollutant Release and Transfer Register (No. 166/2006) etc

##### **Management requirements**

- Ensure that landfill sites are located, constructed and operated in accordance with specified standards (Arts. 8, 14 and Annex I of Landfill Directive).
- Ensure that certain types of waste are not accepted at landfill sites, and that waste is accepted only in accordance with specified criteria and procedures, which include inspection and documentation procedures (Arts. 5, 6, 11 and Annex II).

- Prohibit the dilution of waste simply to satisfy waste acceptance criteria (Art 5).
- Ensure that applications for landfill permits contain specified minimum information (Art. 7).
- In the case of sites permitted to remain open, provide for them to meet the requirements of the directive as soon as possible but not later than the stipulated deadline (Art. 14).
- Ensure that permits contain at least the information specified in the directive.
- Ensure that the minimum price charged by landfill operators for the disposal of waste in landfills covers all the costs involved in setting up and operating the site, including, as far as possible, the costs of providing financial security, and the estimated costs of closure and aftercare (Art. 10).
- Require operators of landfill sites to notify the competent authority of any waste that was not accepted for disposal at the site (Art. 11).

#### **Monitoring requirements**

- For each landfill, the monitoring of a range of parameters is required, to ensure that processes within the landfill proceed as desired, that environmental protection systems are functioning as intended, and that permit conditions are fulfilled. The competent authority should ensure that the operator implements an appropriate programme of monitoring, using a competent laboratory for analysis.
- For as long as the competent authority considers that a landfill is likely to cause environmental hazards, the operator will be responsible for monitoring gas emissions, leachate generation and the groundwater regime in the vicinity of the site.

### **3. Oil, chemical and grain cargo handling terminals operational management**

#### **Operational Good practices**

If all the legal operational procedures are respected, there are minimum risks in terms of environment contamination due to relative safe handling, transportation and deposit of cargo in ports area. Such operational recommendations are provided by IMSBC Code, as follow:

##### **◦ On Arrival Port, Prior Commencing Cargo Operation**

- 1) The composition of cargo watch personnel shall be decided and duties well understood.
- 2) All personnel involved in the cargo watch shall be briefed regarding the expected operations and provided with a *Cargo Discharge Plan*

##### **◦ On Receiving Cargo Stowage plan**

- 1) The Cargo Stow Plan file provided by Terminal planner / Local agent shall be imported into the vessels loading computer for confirming acceptability.

When considering acceptability of a container cargo stowage plan, the following procedures/guidelines concerning hull strength & stability shall be taken into account:

- a) Draft, Trim and Heel Draft restrictions at berth, approaches, passage and next port shall be taken into consideration and vessels maximum draft must be maintained within the applicable restriction

##### **◦ During cargo operations**

- 1) Progress of cargo operations shall be monitored by cargo watch personnel to confirm operations are as per the approved loading and discharge plans. Any deviations must be brought to the attention of the terminal planner.

- 2) Close monitoring is especially required for special containers like reefer units, DG units, out of gauge containers etc. Handling dangerous cargo requires special care due to the inherent hazardous nature of the cargo and applicable carriage regulations.

When containers are carried on deck, the ship is required to be approved for that purpose and the containers themselves are secured with twist locks and lashings. These usually consist of steel rods and turnbuckles.

#### **Good practices related to measures recommended for preventing pollution of environmental factors including soil**

- Reduce risks of accidents by implementing for all legal procedures requested by cargo-handling operations stipulated in *Port and terminal information books* prepared by terminal



operators, port authorities or both that should contain the information relating to their site specific requirements;

- Establishment of segregated and access-controlled storage areas with the means to collect or contain accidental releases;
- Implement *Emergency response procedures specific to dangerous goods*.
- Includes provision of specialized oil spill response equipment (e.g. containment booms, recovery devices, and oil recovery or dispersant application vessels)
- Oil and chemical-handling facilities should be located with consideration of natural drainage systems and environmentally-sensitive areas (e.g. mangroves, aquaculture projects, and beaches, providing physical separation/distance whenever possible);
- Ports should include secondary containment for above ground liquid storage tanks and tanker truck loading and unloading areas;
- Hazardous materials storage and handling facilities should be constructed away from active traffic and protect storage areas from vehicle accidents. Covered and ventilated temporary storage areas should be provided for leaking hazardous cargo and designed to facilitate collection of leaks and spills (e.g. slope surface to allow capture of spills, use valves catch basins that allow spills and releases to enter a dead-end sump from which spilled materials can be pumps
- Install energy efficient equipments (electric portal cranes, rail gantry cranes, mobile cranes, tractor tugs, forklift trucks, front loaders, chassis, truck scales cranes
- Install air filters where is possible as in storing pulverized coal and pet-coke in silos
- Use vacuum collectors
- Use wetting systems to reduce dust spreading
- Keep transfer equipment (e.g. cranes, forklifts, and trucks) in good working condition
- Upgrading the land vehicle fleet with less-polluting trucks and vehicles, and using alternative fuels and fuel mixtures
- Encouraging reduction in engine idling during on-and off-loading activities

#### 4.Yards (paintings-spraying, cutting, abrasive blasting, coating)

##### Good practices

- **Reduce the use of lubricants in cutting operations** by implementing less polluting (for water, soil, air, phonic level) and energy-saving techniques. The technique uses dry cutting technology developed by ITEC GmbH. Dry cutting technology is based on the extreme thinness of the saw blade combined with load-dependent feed regulation. In comparison with conventional saws, Dry Tech saws require less energy leading to less energy converted into heat. Cutting speeds are very high, from 1 000 to 1 500 m/min, increasing output by 65% and reducing burr and noise. Equipment costs are reduced because blades can be ground up to five times. The whole process leaves no lubricant residues, producing savings on various items of expenditure and in terms of operating time. Additionally, there is an inestimable benefit in terms of human health, working conditions and conservation of the environment.
- **Regeneration of waste solvents.** Besides ecological benefits, there at least two reasons for recovering of waste solvents. As the technology is available, economic advantages could be obtained. Solvents could be treated in order to be utilized for its caloric value directly as fuel or mixed with others or could be reconverted to be used again as solvent-material (principle of separation consist in phase separation due to different densities).
- **Collecting /Regeneration of waste oils.** Economically, this practice was proved really feasible. Thus, was calculated that it only takes 1.3 tonnes of used oil - compared to 10 tonnes of crude oil - to produce one tonne of high-grade base oil for the lubricant market. Furthermore, even the leftover fraction of the recycling process can be recovered for use in industrial heating. From a life-cycle perspective, waste oil recycling is far superior to

combustion. As example, a technology invented by Mineraloel–Raffinerie Dollbergen GmbH (LIFE00 ENV/D/000318) made essential progress on improving the classical technique for extraction of semi-synthetic and fully synthetic base oil fractions using non-toxic solvents. It is used a technology based on liquid-liquid extraction, using a highly selective non-toxic solvent N-methyl pyrrolidone (NMP) soluble in water and biologically harmless that permitted to be repeatedly and completely recovered and re-used in the process. The process achieved also the elimination of PAHs to less than 1 mg per kg (=1 ppm). The average base oil yield within the process is about 91%. The base oils produced have superior properties, including a high viscosity index, low evaporation loss during use and high oxidation stability, providing excellent lubrication at different temperature levels and over time.

## **5. Remediation of contaminated soil in ports areas**

### **Good practices**

#### **On site tested/applied treatment of soil (DEC technology applied in different ports)**

- Bioremediation
- Physical-chemical treatment (e.g., Port of Antwerp, Belgium)
- Thermal treatment (e.g., Port of Zeebrugge, Belgium)
- Stabilization/solidification (Zwevegen, Belgium)
- Soil Washing process

#### **In situ treatment of soil and groundwater without the need to excavate**

- Soil vapour extraction and remediation of groundwater
- Air sparging and soil vapour extraction
- Chemical oxidation
- Bioremediation

### **More information on:**

<http://pubs.acs.org/doi/abs/10.1021/es00010a011>

[http://www.google.ro/patents/US5631160?printsec=description&dq=Soil+remediation+in+port s+area](http://www.google.ro/patents/US5631160?printsec=description&dq=Soil+remediation+in+port+s+area)

<http://www.ghd.com/global/projects/port-of-townsville>

[remediation/http://www.decnv.com/EN/techniques/soil\\_and groundwater](http://www.decnv.com/EN/techniques/soil_and_groundwater)

## 4.10. Bunkering

### 4.10.1. Legislative background

All “bunkering” operations are regulated in SEE countries according to international conventions (“Bunkers Convention”- except Italy and Montenegro, International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990) – except Montenegro, 1992 Protocol to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1992)-except Montenegro.

The **Bunkers Convention** provides a free-standing instrument covering pollution damage only. “Pollution damage” means:

- Loss or damage caused outside the ship by contamination resulting from the escape or discharge of bunker oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken; and
- The costs of preventive measures and further loss or damage caused by preventive measures.

In 1987, in response to the demand of the marine and petroleum industries for standardization of marine fuel quality, ISO introduced the first international standard for marine fuel. This standard, **ISO 8217**, which was revised in 1996, specifies 11 parameters for residual fuels and 14 parameters for distillate fuels. These parameters include viscosity, density, carbon residue, ash content and percent sulphur (Vis, 2003a).

A work group of ISO is in the process of revising ISO 8217 (Secretariat of ISO/TC 28/SC4, 2002). It is anticipated that, in addition to ensuring conformance with the new sulphur limits specified in MARPOL Annex VI, these revisions will include a provision to curb the (albeit limited) practice of adding used oil to bunker fuel (Lloyd's List, 2001).

However, in **Italy** (“Circular of July 19, 2002, and annex, of Ministry of infrastructure and transport to port authorities”) and Montenegro (“Law on protection of the sea against pollution from ships”), there is national legislation that provides clear regulations to fight against pollution and provisions for polluters’ obligations. For instance, in Italy, the above law stipulates that:

- Mobile bunkering will be authorized only in special situation by Maritime Authority.
- In the annex are defined the guide lines for safety in the operation of bunkering. If there are any loss, dangerous events or situation, the Captain of the ship and services suppliers have to inform immediately the Maritime Authority, and stop the operations of bunkering. Penalties of rehabilitation, in those cases, have to be covered by the service suppliers or by the ship, as much as their guilty. Here in are also described and regulated all operation of bunkering on quay and mobile bunkering.

In **Bulgaria**, the bunkering operations are regulated through “Compulsory rules for sea ports of Republic of Bulgaria” which define conditions and orders for:

- Loading, discharging, declaring and labelling of dangerous and special cargoes (Art. 44. “It is prohibited taking of fuel, giving oil-water mixtures, and standing of other vessels on board of ships having on board dangerous goods classes ... during operations of loading/unloading in port, unless explicitly authorized by the Director of the Maritime Administration Directorate”).
- Rules on ensuring the protection of the sea against pollution by ships;
- Rules of safety for prevention and fighting against fire

○ **Art.49 to Art. 52**

**Art.49(1).** Ships being in port or roadstead, bunker fuels from a ship after taking the necessary precautionary measures to prevent spills ...

**Art. 50.** The master of a ship that caused a spill, dumping or discharge into the sea ports in the area of jurisdiction of the Maritime Administration Directorate must immediately notify the Director of the Directorate ... and make an entry in the logbook.

**Art. 51.** The owner and master of the ship, who caused an oil spill or any other contamination in the area of the open Bulgarian sea ports, are responsible for all costs of detecting, tracking and eliminating the effect of pollution and also for damages.

**Art. 52. (4).** Constantly monitoring for spillage must be provided while carrying out loading operations. (5) The master of any vessel engaged in loading/unloading of petroleum products and bunkering in the area of ports and anchorages must ensure readiness for action of the ship's crew according to the *Ship's Oil Pollution Emergency Plan (SOPEP)*.

In **Albany** are provided the International obligations according to *Bunker Convention* and others related. For moment, the bunkering is not a current, well developed operation in Durres port. Only one oil company is operating loading/unloading of gas oil, heavy fuel etc, stored in oil storage tanks within the port area. Recently, a private oil terminal northern of Durres Port has been built and operations are regulated via internal rules. There is no bunker supply for ships.

**Romania and Greece** operates under several international Conventions transposed in their legislation – *Bunker Convention, Marpol Convention (Annex I and II), International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990)*, etc.

#### **4.10.2. Monitoring procedures**

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Analysis of potential risks on environmental factors must stand at the base of further monitoring action and documented plan for initiation and applying the measures for preventing the damages.

Spillages and leakages during bunkering operations are a primary source of oil pollution. Many of the bunker overflows and spillages that do occur can be attributed to human error.

Main impacts come from accidental spillage of oils while loading from tankers, from oil used in washing operations of tankers (that affect water, sediments and soil), while loading caused by inappropriate hoses could cause releasing of **volatile compounds (VOC)** that affect air quality.

While analyzing the potential sources of pollution and their location, the main characteristics must be known:

- the vicinity with sensitive areas (protected areas) or populated zone (city)
- the potential interactions with other operations
- the possibility for fast intervention in case of accident
- the hydro-geologic, hydrodynamic, climatic and biodiversity of the zone

The risk analysis must also be relied on hazardous risk scenarios of contaminants effects in different environmental conditions. Petroleum poses a range of environmental risks when released into the environment (whether as catastrophic spills or chronic discharges). In addition to physical impacts of large spills, the toxicity of many of the individual compounds contained in petroleum is significant and even small releases can kill or damage organisms from the cellular-to the population-level. Compounds such as polycyclic aromatic hydrocarbons

(PAH) are known human carcinogens and occur in varying proportions in crude oil and refined products.

**In Constanta Port** there is an integrated operational monitoring system based on network informatics tools and video surveillance.

To meet and apply the requirements set in the International Conventions as SOLAS/1974, SAR/1979, MARPOL 1973/1978 and OPRC/1990, Romanian Naval Authority has been legally appointed as the responsible authority to perform also the management and mission of co-ordination for SAR activities, prevention and oil pollution response activities and also to monitor the vessel's traffic within the area under Romania responsibility, through *Maritime Co-ordination Centre*.

MRCC Constantza has been designated as a National Operational Contact Point (NOCP), according to the National Contingency Plan for Oil and HNS pollutions, being also the Coordinator of the Division for Marine Operations during marine response pollution activities.

Therefore, VTMIS, RoRIS, AIS, SafeSafeNet, CleanSeaNet, LRIT and other services and systems, concerning the safety of navigation, environment, passengers, ships and cargoes within the maritime waters and inland waterways, were initiated during the last years.

**CleanSeaNet – Satellite based monitoring system for marine oil spill detection**

- CleanSeaNet Service is a satellite based monitoring system for marine oil spill detection, tracing and surveillance by checking on scene the satellite images, offered by EMSA (European Maritime Safety Agency) to all Member States, according the provisions of Directive 2005/35/EC.
- CleanSeaNet delivers oil spill alerts in almost real time (30 minutes) to both, the Coastal State (Operational contact point) and EMSA for detected slicks as well as giving access to the satellite image(s) and associated information over the web.
- The alert message can be transmitted via phone call, e-mail, fax or SMS, depending on which alert means the Coastal State has defined.
- Each Coastal State has access to the CleanSeaNet service through the dedicated CSN Browser. This web map interface tool allows the viewing of all low resolution images, together with oil spill detection analysis results, location of the spill, speed and direction of wind and other additional information. High resolution images are delivered by EMSA upon request.

**Maritime Co-ordination Centre (CMC)**, consists of SAR & Pollution Department (high MRCC) and VTS Department, performs activities regarding search and rescue, prevention and response to marine pollution, as well as the surveillance and management of the vessel's traffic, 24 h/day.

**GISIS – Global Integrated Shipping Information System**

- The IMO Secretariat has developed an internet-based Pollution Prevention Equipment Database (PPED) as a module of the GISIS, with the aim of facilitating global access to information on pollution prevention equipment required by MARPOL around the world and promoting the exchange and accuracy of that data.
- The database provides data and information on: ships monitoring, maritime ports, classification societies of ships, naval accidents, maritime safety and security, port reception facilities for all categories of ship-generated waste.

**CECIS - Common Emergency Communication and Information System**

In Romania, the National Contact Point on marine pollution for CECIS, is MRCC from Maritime Coordination Centre of RNA.

#### 4.10.3. Existed and recommended best practices

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##### Management Good practices

Companies should require that all bunkering operations are controlled under procedures that are incorporated in a **Safety Management System**. It is highly recommended the using of a **Bunkering Safety Check-List** between the receiver and the supplier of fuel.

Within the framework provided by the **Safety Management System** (International Safety Guide for Inland Navigation Tank-barges and Terminals) and the stipulation of responsibility carried by the supplier and receiver in case of accidents, the measures of reporting to competent authorities and remediation in accordance to Spills Contingency Plan and other laws in force should be taken.

**International Safety Guide Chapter 25 for Inland Navigation Tank-barges and Terminals** require the documentation and applying of the following:

- Bunkering Procedures
- The Bunkering Operation
- The Bunkering Safety Check-List for Bunker Delivery to Inland Ships

1. Some of the obligatory procedures that must be insured by personnel in charge regarding the safety operation of bunkering are referring to **pre-loading operations, during bunkering, at finally loaded tank and completion of bunkering**, consisting of:

- Carry out a leak test to the pipe line by an air pressure of 5 kg/cm<sup>2</sup> (To be entered the date of last testing in remark column)
- Insuring of technical possibility of careful watching of loading rate while transfer operation
- Insuring that an excessive back pressure is not put on the hose or loading lines
- Insuring that the loading rate could be decreased once the topping-off level was reached as to avoid the risk of the supplier not stopping quickly enough the transfer

While **loading**, it is necessary to be recorded the maximum filling capacity of receiver and the compliancy with all regulations regarding the safety transfer.

It is necessary to have a **pre-bunker exchange of information between responsible persons on Ship and Barge/Facility**.

The following matters must be confirmed with the oil supplier:

- Oil qualities including type of oil, viscosity, density, sulphur content and oil temperature, volume and H<sub>2</sub>S presence
- Pumping rate agreed (The rate to be slow at the beginning of supply in particular).
- Mutual communication means and communication method in an emergency.
- Emergency shutdown procedures.
- Sampling method and the destination of the retained sample.
- Presence / absence of local rules on oil leakage prevention.
- Name of a responsible person and personnel arrangement of the terminal.

Further details could be found on:

[http://www.bunkerworld.com/technical/iso8217\\_dis.htm](http://www.bunkerworld.com/technical/iso8217_dis.htm)

<http://shipsbusiness.com/bunkering-checklist.html>

##### Environmental management

According to Spills Contingency Plan, facilities must be provided to fight against pollution caused by accidental spills.

In Constanta, for instance, such facilities include:

- 2 de-polluting motorboats

- 2 multifunctional ships of 900, respectively 400 t equipped with dispersants, adsorbent products, barrage, skimmer, fire monitor, hoses.

The hydrocarbons leaks are isolated with absorbent belt and recovered from water aquatorium by helping of antipollution ships' pumps.

Among the practices largely used is that of **using dispersants**. Dispersant application thus represents a conscious decision to increase the hydrocarbon load (resulting from a spill) on one component of the ecosystem (e.g., the water column) while reducing the load on another (e.g., coastal wetland). Decisions to use dispersants, therefore, involve trade-offs between decreasing the risk to water surface and shoreline habitats while increasing the potential risk to organisms in the water column and on the seafloor. This trade-off reflects the complex interplay of many variables, including the type of oil spilled, the volume of the spill, sea state and weather, water depth, degree of turbulence (thus mixing and dilution of the oil), and relative abundance and life stages of resident organisms. (Committee on Understanding Oil Spill Dispersants: Efficacy and Effects, National Research Council)

Natural "weathering" makes the oil more difficult to disperse through time; consequently, the window of opportunity for effective dispersant application is early, usually within hours to 1–2 days after a release under most conditions, though there are exceptions.

The decision to apply dispersants is thus time sensitive and complex. Given the potential impacts that dispersed oil may have on water-column and seafloor biota and habitats, thoughtful **analysis is required prior to the spill event so that decision makers understand** the potential impacts with and without dispersant application. Thus, decision making regarding the use of dispersants falls into two broad temporal categories:

(1) Before the event **during spill contingency planning**;

(2) **Shortly after the initial event**, generally within the first 12 to 48 hours.

(Committee on Understanding Oil Spill Dispersants: Efficacy and Effects, National Research Council)

## Environmental performance indicators according to EMAS requirements

### I. Operational Performance Indicators (OPIs)

#### 1. Input indicators

- fuel quality provided according to ISO 8217 specification

As for example, **Fuel quality in samples provided in bunkering in different regions comparing with ISO 8217 specification (Table 10)**

**Table 10**

Region	Al + Si (mg/kg)	Water %V/V	Sulphur % (m/m)	Others
North America Atlantic	36 / 14 - 49	0.20 / 0.05 - 0.45	3.13 / 2.99 - 3.36	
North America Pacific	28 / 16 - 38	0.23 / 0.05 - 0.60	1.31 / 0.95 - 1.80	
North & West Europe	32 / 2 - 73	0.09 / 0.05 - 0.30	1.24 / 0.66 - 3.29	Viscosity
Mediterranean & Bl.Sea	24 / 5 - 58	0.12 / 0.05 - 0.70	2.40 / 0.93 - 3.28	Viscosity Carbon Residue
% samples where the result fell outside of the ISO 8217 specification, but within the 95% Confidence Limit for the test in question				
% samples that were off-specification according to ISO 8217				

According to 8217 Standard, if the sample is not clear and bright, total sediment by hot filtration and water test shall be required. (*ISO 8217 Fuel Standard Fourth Edition*).

As could be seen in Table 10, in the region of North America Pacific, the percent of samples of fuels analysed regarding the water content within fuel felt outside of the ISO 8217 specification, but in the limit of confidence of 95%, it is quite small but higher than in the North and West Europe, North America Atlantic, while in the Mediterranean and Black Sea, the percent of samples felt off-specification according to ISO 8217 was about 0,12.

- bunkering procedures and operational system
- personnel competence
- financial resources

Services supporting the organization's operation:

- Antipollution services
- Collecting and treatment of waste oil
- Ships fuelling
- Tanks cleaning
- Emergency plans implemented

## **2. Physical facilities and equipment indicators**

- Design: friendly-environmental technology design
- Installation: technological performance: number of tanks that fully comply with technical norms of operating; number and type of facilities provided for safety operating
- Operation: level of performance, coordination and control
- Maintenance

## **3. Output indicators**

- level of operability and safety

# **II. Management Performance Indicators (MPIs)**

## **4. System indicators**

- Implementation of policies, and programs
- Number of environmental programmes implemented by operators
- Number of know-how methods/techniques/projects implemented to prevent/repair damages on water, sediments, soil and air quality
- Technological investments in waste oil treatment
- Conformance
- Financial Performance
- Employee involvement

## **5. Functional area indicators**

- Administration and planning
- Purchasing and investments
- Health and safety
- Community relations

# **III. Environmental Condition Indicators (ECIs)**

## **6. Environmental media indicators**

- Water and sediments
- Sea floor integrity
- Concentration of contaminants (PCBs, HAPs, TBT)
- Contaminants (PCBs, HAPs) in fish and other sea-foods
- Integrity of marine food webs
- Biological diversity etc
- VOC emissions in air

## **7. Bio- and anthroposphere indicators**





- Flora: functionality within ecosystem, ecological and economical value
- Fauna: functionality within ecosystem, ecological and economical value
- Humans: aquaculture, fishing, sailing
- Aesthetics, heritage and culture: local tourism

**[http://www.nap.edu/openbook.php?record\\_id=11283&page=355](http://www.nap.edu/openbook.php?record_id=11283&page=355)**

**[http://www.nap.edu/openbook.php?record\\_id=10388&page=20](http://www.nap.edu/openbook.php?record_id=10388&page=20)**

**[http://www.maritimeknowhow.com/English/KnowHow/Technical\\_Operations/bunkering.htm](http://www.maritimeknowhow.com/English/KnowHow/Technical_Operations/bunkering.htm)**

## 4.11. Cargo handling, transportation and storage

### 4.11.1. Legislative background

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In **Albania**, no good practices detected but **“Steering Committee of DPA Decision No. 7, dt. 25.03.2005 Regulation on the Port Operations”** mentions:

- Loading and discharging of commodities;
- Cargo handling equipment;
- Leasing and renting;
- Transfer of commodities within the port from/to the ships,
- Trucks, railway;
- Transfer of commodities from/to port storage and yards;
- Working hours;
- Receiving and submitting of import commodities;
- Special regulations for the direct handling of cold storage commodities;
- Receiving and submitting of export commodities; Verification, description and commodity weight;
- Obligations.

In **Bulgaria**, no good practices detected, but **Regulation No. 9** on the requirements for exploitation suitability of the ports state in Art.12/cargo handling and storage must meet environmental protection requirements (*State Gazette No. 65/9.08.2005, amend. SG 103 /7.12.2007* and according to the Law on Ratification of the MARPOL 73/78 Convention (*prom. SG. 94/13 Oct 2004, amend. SG. 12/4 Feb 2005*) the State Agency “Sea Administration” review the implementation of the requirements of MARPOL

In **Italy**, no good practices detected, but **Legislative Decree of November 17, 2008** rule monitoring of oil-tankers with the aim of a better safety and efficiency of traffic, a better response of authorities in case of accident or dangerous situations. In Decree’s Annex I is given information to be communicated to the Authority, like identification of ship, destination port, timing, total number of persons on board, technical polluting or dangerous goods names and all safety regulated International information about charges. Annex II contains all prescriptions for equipment on board; Annex IV establishes that if, after an accident or in dangerous situations the Authority believes that is necessary to take away or delate a serious danger for coasts, ship safety and of its crew or passengers, the Authority can divert route, order to stop risk, send experts on board, or order the captain to go in a “safe place”.

**Legislative Decree of November 6, 2007, n. 203** establishes requirements for ships in Italian ports that transport not ordered dangerous and gaseous goods

In **Greece**, no good practices detected but **Law. 3622/2007** for the reinforcement of the security of the ships, of the port facilities and ports and other arrangements **defines the competences, the design of the actions in national level as well as their coordination** in order to ensure the application of the 725/2004 (L129/6 of the 29.4.2004) and the European Directive 2005/65/ec of the European Parliament and of the Council of 26 October 2005 on enhancing port security. **The Presidential Decree 66/2004 (FEK 56/A/25.2.2004)** establishes harmonised requirements and procedures for the safe loading and unloading of bulk carriers complying with the 2001/96/EC Directive as it was amended by the Directive 2002/84/EC.

In **Montenegro**: no good practices detected, only **Law on Ports (Official Gazette of Montenegro 51/08, 22.08.2008)** regulates port legal status, management, concessions,

order, surveillance etc.

In **Romania**: no good practices detected, only **Order no. 320 of the Minister of Transport, Construction and Tourism Order of Minister of Public Works, Transport and House no. 727/2003 (Of. M. no. 234/15)** establishes approval requirements and harmonized procedures for loading and unloading safety of bulk carriers

#### 4.11.2. Monitoring procedures

From *the check list of WP5 report*, activities related to cargo handling transportation and storage influence parameter like Water (also port aquatorium), air and sediment. We can therefore refer directly to the indications given in the specific tables referred to these issues (**1, 2, 3, 4, 6, 7, 10, 11**) and their indications on monitoring. In the specific, some measures that can be taken (see the annex in the GMP table) for these issues are:

- Perform purge; monitoring and control of discharged water quality in port aquatorium;
- Strictly control of bunkering, take preventing measures in order to avoid spillage;
- Avoid spreading of chemicals by using "protective" walls, avoid operating on bad weather (wind, rain etc)
- Verify the integrity of pipes, containers; double the measures needed for protection as to avoid accidents;
- Perform periodical cleanings of port aquatorium, install depollution barrages;
- Take over ballast water in specialized tanks;
- Collect separately the wastes, avoid polluting with metallic scraps, paint residues
- Perform a complete treatment (mechanical, chemical, biological) of effluent resulted from discharged waste water

#### 4.11.3. Existed and recommended best practices

***From WP6 Project Work in Greece about cargo handling, transportation and storage results:***

A direct impact on the air comes as a result of the vehicle traffic, which causes emissions of dust, carbon dioxide, oxides of nitrogen and sulphur and other pollutants to the air. Direct air pollution is also caused by the gases released from main and the auxiliary engines of the ships anchored at the quays of the port. In addition, air emissions can affect indirectly the marine area by the convection of pollutants through the precipitations.

**Ship oil waste that should be delivered to the port so as to follow the proper disposal procedure includes the following:**

- **Used Crude oil**
- **Fuel residues**
- **Sludge**
- **Bilge water**

The correspondence between environmental issues, port activities and environmental impacts, as well as their intensity (high 'H', moderate, 'M' and low 'L'), at each port, are shown in Tables 10, 11, and 12 respectively.

Table 10: Assessment of environmental impacts by activities at Igoumenitsa Port

ENVIRONMENTAL ISSUE	GENERATING ACTIVITY	ENVIRONMENTAL IMPACT	INTENSITY
Emission of sedimentation particles	Bulk Cargo Handling	Deterioration of air quality	H
Emission of particles in suspension	Bulk Cargo Handling	Deterioration of air quality	H

ENVIRONMENTAL ISSUE	GENERATING ACTIVITY	ENVIRONMENTAL IMPACT	INTENSITY
Hazardous waste	Maintenance	Potential pollution of water and soil	H
Daytime noise	Loading/Unloading Bulk Cargo onto/from trucks	Local nuisance	L
Night-time noise	Unloading Bulk Cargo	Local nuisance	M
Bulk Cargo transport	Vehicles	Deterioration of air quality and local nuisance	H
Generation of hazardous waste	Changing unloader oil	Pollution of water and soil	H

Table 11: Assessment of environmental impacts by activities at Patras Port.

Operating and maintenance port activities		Assessment of environmental impacts							
		Atmosphere		Marine ecosystem		Groundwater		Soil	
		ST	LT	ST	LT	ST	LT	ST	LT
<b>Ship anchorage</b>									
	Air emissions	M	M	L	L	L	L	L	L
	Warm water disposal (in the sea)	L	L	M	L	L	L	L	L
	Bunkering	H	M	M	L	M	L	M	L
	Water replenishment	L	L	L	L	M	M	L	L
	Maintenance works	H	L	M	L	L	L	L	L
	Toxic anti-fouling paints	L	L	M	M	L	L	L	M
	Oily waste disposal	M	L	H	L	L	L	L	L
	Solid waste disposal	M	L	M	L	L	L	L	L
	Wastewater disposal	L	L	M	L	L	L	L	L
	Passenger service	M	M	M	L	L	L	L	L
<b>Vehicle traffic and parking</b>									
	Air emissions	H	M	L	L	L	L	L	L
	Dust emissions	H	L	L	L	L	L	L	L
	Surface runoff aggravation	L	L	M	M	M	L	L	L
<b>Vehicle and machine maintenance and replenishment</b>									
	Maintenance, repairing, washing	M	L	H	M	M	L	M	L
	Painting, paint removal	H	L	M	L	L	L	L	L
	Fuel replenishment	H	L	M	L	M	L	M	L
<b>Waste management</b>									

Operating and maintenance port activities		Assessment of environmental impacts							
		Atmosphere		Marine ecosystem		Groundwater		Soil	
		ST	LT	ST	LT	ST	LT	ST	LT
	Land area	M	L	L	L	M	L	M	L
	From ships	M	L	M	L	L	L	L	L
<b>Port facility operation and maintenance</b>									
	Buildings	L	L	M	M	M	M	M	M
	Networks, asphalt and concrete surfaces	L	L	M	M	M	M	M	M

**Table 12. Identifying Environmental Aspects**

Vehicle traffic & parking	Air emissions	Deterioration of air quality
	Dust emissions	
	Surface runoff aggravation	Pollution of sea water & soil
	Daytime & night-time noise	Local nuisance
Port activities	Emissions of sedimentation particles from bulk cargo handling	Deterioration of air quality
	Emissions of particles in suspension from bulk cargo handling	

**From WP6 Project work in Greek ports results** (please refer to Appendix of "Igoumenitsa Port EMS records"):

After the analysis, the Igoumenitsa Environmental Management Program for the year 2012, regarding cargo handling transportation and storage is:

**Objective:** Reduction of emission of gases and particulates to atmosphere

**Target #1:** 20% less ships emissions of gases and particles to atmosphere

**Actions:**

1. Request ships to deactivate their main engines within the port area.
2. Request ships to deactivate their auxiliary power producing engines in case they remain within the port area for more than 3 hours.
3. Supply ships with power from the port's electricity network.
4. Impose speed limits to ships moving inside or close to the port area.
5. Request ships to draw away the port area before working their engines at full power.
6. Urge ship owners to use purer fuels at least while the ships stay within the port area.
7. Urge ship owners to maintain ship engines in order to reduce air emissions.

**Operational Controls**

Monitoring of air quality

**Target #2:** 5% less vehicles emissions of gases and particles to atmosphere

**Actions:**

1. Impose speed limits to vehicles moving inside the port land area.
2. Supply port's vehicles and machines with purer fuels.

**Operational Controls**

Monitoring of water quality

**Target #3:** 5% less effluent contaminants discharged into port water area during ships wastewater removal

**Actions**

1. The port must have sufficient and organized processes for receiving ships wastewater that would be immediate and will not delay or complicate ships operation.
2. Equipment used for collecting ships wastewater must be clean and well-maintained.
3. During wastewater collection, tank-trucks must enter the ship in order to collect any occurring leaks and not allow them to end up into the sea.
4. After the collection, wastewater must be driven into the wastewater treatment plant of the Municipality of Patras.

**Operational Controls**

- Regular inspection of equipment and machines used for collecting ships wastewater.
- Recording of wastewater delivered by ships.
- Monitoring of water quality

*From WP6 Project work in Durres ports results ("Records port of Durres"):*

**Environmental Objective #** Prevent and reduce emissions of dusts and entrainment of sediments in runoff from dry bulk storage and handling activities

**Target:** Reduce emissions in order that the parameters related to air pollution

**Actions:**

1. Cover storage and handling facilities where practicable and necessary
2. Install dust suppression mechanisms
3. Utilize water sprays where practical
4. Use vacuum collectors
5. Use slurry transport where feasible
6. Contain piles with perimeter walls
7. Remove materials from the bottom of piles to minimize dust.
8. Provide adequate space for maintenance of equipment
9. Runoff from cleaning area to sanitary sewer or industrial treatment facility
10. Install filtering mechanisms in storm drain system to minimize transport of solids to storm water
11. Consider installing drainage swales, filter burns, drainage inlet protectors such as fabric
12. Install self-contained truck and railcar wash facilities

**Operational Control**

- Ensure all equipment is in proper working order
- Ensure transport vehicles are covered whenever possible
- Ensure vehicle cleaning occurs away from storm drains
- Connect to sanitary sewer or industrial treatment facility if possible
- Minimize idling of vehicles during transport activities
- Inspect vehicles regularly to minimize spills or leaks
- Conduct regular inspection and maintenance program on equipment and vehicles
- Clean up spills immediately
- Retrofit storm drain system to include filtering mechanisms
- Ensure hatches are covered when material handling is not being conducted
- Conduct routine sweeping of docks and handling areas
- Encourage ships to sweep decks and other areas where dust may be suspended
- Avoid loading/unloading during windy conditions, if possible
- Conduct routine sweeping of truck/rail storage areas and roadway surfaces

**Objective:** Prevent release of pollutants from the handling and storage of chemicals as well as from leaking of materials from machines and one part of the waste oil from the washing of the floor of workshop area is discharged in atmospheric sewage system

**Target # 8** Increase effectiveness in reaction on accidental oil spills and treatment

**Target # 9** Increase of prevention release of pollutants of chemicals by 25%

**Actions:**

1. Port has to extend contract with "Pastrimi Detar sh.a" (private company that has all necessary facility)
2. Raise storage area above surrounding ground surface to minimize run-on of storm water
3. Burn storage areas to prevent run-on of storm water and to keep spills and leaks contained
4. Provide secondary containment of materials in use and storage
5. Design storage area to allow easy collection of spills and leaks
6. Provide dead-end sump in loading/unloading docks or areas
7. Protect storage area from accidents from vehicles
8. Restrict access to storage areas through the use of fencing or enclose storage areas
9. Provide adequate ventilation in cases of spills and leaks
10. Provide flame-resistant containers where required
11. Construct site storage and handling facilities away from active traffic areas
12. Pave storage and handling areas to minimize release to soils and groundwater
13. Seal joints and cracks
14. Provide designated separate area for leaking hazardous cargo: covered and ventilated
15. Dead-end sump to contain spills and leaks
16. Burned to prevent spread of spills and leaks
17. Impervious pave to prevent release to the soil and groundwater
18. Have contingency plan available

**Operational Control**

- Ensure only compatible materials are stored together
- Provide flame resistant lockers for small quantities of materials
- Read and understand material safety data sheets (MSDS) for all chemicals
- Keep storage areas away from high traffic areas
- Ensure all containers are marked and labelled properly
- Immediately contain and stop leaks and spills Have spill response materials readily available
- Develop port-wide Spill Response Plan in order to avoid transfer of materials in close proximity to storm drains
- Provide concrete surface where possible minimize use of horizontal drums in cradles
- Provide secondary containment for all active drums and containers
- Contain and properly dispose of waste from secondary containment
- Storage areas should be clearly marked noting materials stored, emergency contacts, and spill cleanup procedures

**Table 13. Summary of the best practices**

Environmental aspect	Actions	Operational control	Performance Indicator
Cargo handling	Assessment of air quality within port area while ships' loading and unloading activities	<ol style="list-style-type: none"> <li>1. Request ships to deactivate their main engines within the port area.</li> <li>2. Request ships to deactivate their auxiliary power producing engines in case they remain within the port area for more than 3 hours.</li> <li>3. Supply ships with power from the port's electricity network.</li> <li>4. Impose speed limits to ships moving inside or close to the port area.</li> <li>5. Request ships to draw away the port area before working their engines at full power.</li> <li>6. Urge ship owners' to use cleaner fuels at least while the ships stay within the port area.</li> <li>7. Urge ship owners to maintain ship engines in order to reduce air emissions.</li> </ol>	Reduction of emission of gases and particulates into ports' atmosphere
	Reduce suspensions of particulate matter while cargo handling on docks and berths	<ol style="list-style-type: none"> <li>1. Cover storage and handling facilities where practicable and necessary</li> <li>2. Install dust suppression mechanisms</li> <li>3. Utilize water sprays where practical</li> <li>4. Use vacuum collectors</li> <li>5. Use slurry transport where feasible</li> <li>6. Contain piles with perimeter walls</li> <li>7. Remove materials from the bottom of piles to minimize dust.</li> <li>8. Provide adequate space for maintenance of equipment</li> <li>9. Runoff from cleaning area to sanitary sewer or industrial treatment facility</li> <li>10. Install filtering mechanisms in storm drain system to minimize transport of solids to storm water</li> <li>11. Consider installing drainage swales, filter burns, drainage inlet protectors such as fabric</li> <li>12. Install self-contained truck and railcar wash facilities</li> </ol>	PM concentration into air in docks and berth areas
	Prevent and reduce dusts airborne and entrainment of sediments in runoff from dry bulk storage and handling activities	<ol style="list-style-type: none"> <li>1. Ensure all equipment is in proper working order</li> <li>2. Ensure transport vehicles are covered whenever possible</li> <li>3. Ensure vehicle cleaning occurs away from storm drains</li> <li>4. Connect to sanitary sewer or industrial treatment facility if possible</li> <li>5. Minimize idling of vehicles during transport activities</li> <li>6. Inspect vehicles regularly to minimize spills or leaks</li> <li>7. Conduct regular inspection and maintenance program on equipment and vehicles</li> </ol>	Concentration of suspended solids and land origin pollutants in collecting systems (run-off effluents)



Environmental aspect	Actions	Operational control	Performance Indicator
		<ul style="list-style-type: none"> <li>8. Clean up spills immediately</li> <li>9. Retrofit storm drain system to include filtering mechanisms</li> <li>10. Ensure hatches are covered when material handling is not being conducted</li> <li>11. Conduct routine sweeping of docks and handling areas</li> <li>12. Encourage ships to sweep decks and other areas where dust may be suspended</li> <li>13. Avoid loading/unloading during windy conditions, if possible</li> <li>14. Conduct routine sweeping of truck/rail storage areas and roadway surfaces</li> </ul>	
	Prevent releasing of pollutants from the handling and storage of chemicals as well as from leaking of materials from machines and one part of the waste oil from the washing of the floor of workshop area is discharged in atmospheric sewage system	<ul style="list-style-type: none"> <li>1. Ensure only compatible materials are stored together</li> <li>2. Provide flame resistant lockers for small quantities of materials</li> <li>3. Read and understand material safety data sheets (MSDS) for all chemicals</li> <li>4. Keep storage areas away from high traffic areas</li> <li>5. Ensure all containers are marked and labelled properly</li> <li>6. Immediately contain and stop leaks and spills Have spill response materials readily available</li> <li>7. Develop port-wide Spill Response Plan in order to avoid transfer of materials in close proximity to storm drains</li> <li>8. Provide concrete surface where possible minimize use of horizontal drums in cradles</li> <li>9. Provide secondary containment for all active drums and containers</li> <li>10. Contain and properly dispose of waste from secondary containment</li> <li>11. Storage areas should be clearly marked noting materials stored, emergency contacts, and spill cleanup procedures</li> </ul>	

## 4.12. Biodiversity

### 4.12.1. Legislative background

All countries within Ecoport8 project implemented The **Birds** Directive 2009/147/EC on the conservation of wild birds and **Habitats** Directive 92/43/EEC on the conservation of natural habitats and of wild fauna in national legislation.

General regulations regarding environmental protection refer also to biodiversity conservation. Special legislation regards cetacean conservation, as in **Albany, Romania and Bulgaria**. Of special importance are regulations which make reference to natural protected areas status – e.g., in **Bulgaria, Italy, Romania**). Plans, programs and projects subject to developing (e.g., “Regulation on the terms and conditions for the assessment of the compatibility of plans, programs, projects, and investment proposals with the conservation of protected areas”- **Bulgaria**) are also regulated by legislative procedures.

Related legislative instruments for ports regulation of their activities are presented bellow. Analysis performed in ports revealed that many ports are not familiarised with biodiversity problematic especially in matters related to special protected areas or habitats preservation.

### 4.12.2. Monitoring procedures

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First managerial step is limiting the pressure by putting in the right limits the agents that harm the environment (as e.g., cargo handling of fertilizers may produce leaks in water leading in this way to **eutrophication** (impact indicator); the parameters that should be measured are total N and P; eutrophication indicators which may show a disequilibrium of algal biomass quantity and/or phytoplankton composition; these parameters could be mathematically integrated in one indicator named TRIX, or could be used other indicators such: chl “a” concentration, phytoplankton composition and biomass).

Ecoport8 partners established the following parameters to be monitored:

- phytoplankton (including chl “a”)
- zooplankton
- macrophytes
- macrozoobenthos
- microbiological parameters

*For details see the **Ecoport8 - WP5 report** - monitoring parameters for biological elements.*

### 4.12.3. Existed and recommended best practices

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Ports are physical units that generally reclaim large spaces for infrastructure and activities to developing. Usually they are confined within cities and have extended impacts on large regions. As for example, road traffic in and outside of ports crossing along the city generates air pollution, noise, jams etc.

Biodiversity is severely affected by land reclamation, frequent dredging operations, chemical and physical pollutants in air, water, sediments and land, noise, habitat fragmentation, light pollution etc.

The final goal of all Ecoport8 ports is the protection of nature insuring a healthy environment within port area by reducing the negative impacts of their activities and maintaining good environmental practices.

Ports have now legal instruments addressing to them. Hereafter are mentioned some of them, which are relatively newly released by European Commission.

**The Water Framework Directive (WFD)** establishes for **heavily modified water bodies**, e.g. for navigation purposes or for the construction of port basins, the objective of reaching good ecological potential. Good status (including good ecological potential for heavily modified water bodies) must be achieved by implementing a programme of measures as part of the river basin management plans. Thus, many aspects that used to be less considered by ports authorities must be covered. Among these are noise effects on fauna, dredging effects, land reclamation, ballast water management, the SPAs' or protected species existence around or inside port area etc.

Under certain strict conditions, the WFD allows new modifications to cause a deterioration of water status, such as port extensions or interventions for improving waterway's infrastructure. These conditions include a justification that no better environmental options exist and that all mitigation measures are taken.

The ports' authorities must also account on the following instruments in their managerial activity to achieving their goals of environmental management certification.

**Maritime Spatial Planning (IMP)**. (Communication adopted by EU in November 2008)

The IMP aims to help public authorities and stakeholders to coordinate their actions and optimizes the use of marine space to benefit economic development and the marine environment.

#### **Integrated Coastal Zone Management**

Integrated spatial planning offers opportunities for anticipating difficulties and adverse environmental impacts and avoiding potential conflicts and delays in port project development. Integrated Coastal Zone Management (ICZM) paves the way for ports for such strategic planning. The EU promotes ICZM on the basis of a European Parliament and Council Recommendation (2002/413/EC).

#### **The Environmental Assessment Directive**

Environmental assessment ensures that the environmental implications of decisions are taken into account before decisions are made. This is typical for ports. Environmental assessment is undertaken for public plans or programmes on the basis of **Directive 2001/42/EC** (known as „Strategic Environmental Assessment“ – SEA Directive) and for individual projects, on the basis of **Directive 85/337/EEC**, as amended (known as 'Environmental Impact Assessment' – EIA Directive). The common principle of both Directives is to ensure that plans, programmes and projects likely to have significant effects on the environment are subject to an environmental assessment, prior to their approval or authorization. Consultation with the public is a key feature of environmental assessment procedures.

For the purpose of the SEA Directive, "plans and programmes", including any modifications to them, must be prepared or adopted by an authority (at national, regional or local level) and be required by legislative, regulatory or administrative provisions.

An SEA is mandatory for plans or programmes which:

- are prepared for, inter alia, transport or land use and which set the framework for future development consent of projects listed in the EIA Directive, or,
- have been determined to require an assessment under the Habitats Directive.

An EIA is mandatory for all projects listed in Annex I of the Directive, as they are considered as having significant effects on the environment (e.g. ports for inland-waterway traffic, which permit the passage of vessels of over 1.350 tones and trading ports, piers for loading and unloading connected to land and outside ports which can take vessels of over 1.350 tones).

For projects listed in Annex II of the Directive, the national authorities have to decide whether an EIA is needed. This is done by the "screening procedure". The projects listed in Annex II are in general those not included in Annex I (e.g. construction of harbours and port installations).

#### **The Environmental Liability Directive**

The Environmental Liability Directive (ELD) establishes a framework based on the "polluter pays" principle, according to which the polluter pays when environmental damage occurs. This

is applicable to ports. The Directive's main objective is to prevent and remedy "environmental damage" which is defined as damage to protected species and habitats, damage to water and damage to soil. The liable party is in principle the "operator", i.e. the one (natural or legal person) who operates or controls the occupational activities. Operators have to take the necessary preventive action in case of immediate threat of environmental damage.

### **BEST PRACTICES**

To accomplish the targets regarding biodiversity conservation, ports must improve their monitoring procedures according to national and international legislation in force. Multidisciplinary approach is required to obtain information about ecosystems' elements and the basic parameters that should be monitored to check constantly the quality of environment factors. These must be put in relation with ports activities or related ones that have negative impacts on environment.

Very important for biodiversity conservation is to take measures in order to avoid:

- habitats disruption
- species disappearance
- ecosystems' function loosing
- economic value decreasing
- humans' health endanger
- landscapes' using

Biodiversity conservation and habitats preservation actions may take several aspects within or surrounding area, helping ports to:

- demonstrate the compliancy with environmental standards
- maintain the confidence level of their activities and to obtain stakeholder support
- maintain their functionality and economic welfare

Ports or their neighbouring located in natural estuarine areas benefit usually of rich biodiversity ecosystems including birds, animals, plants and a variety of habitats. Areas that are not totally separated by ports' influence should undertake special protective measures of conservation. Protective measures should refer to:

- diminishing the habitats destruction by creating SPAs
- create special programmes for conservation of species of interest
- create special trespassing corridors as to avoid habitats fragmentation
- avoid wastewater leakages, litter deposits in protected areas
- avoid dredging or at least minimize its effects on environment (dredged sediments which fall within limits of pollutants concentration could be further used as new-borne natural islands for biodiversity or refugees)
- use ponds system as natural filters and take advantage of natural vegetal biomass for alternative green energy producing

## 4.13. Drinking water

### 4.13.1. Legislative background

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A number of policies on water quality have been identified but not on water consumption.

In general, the main EU legislative and Standardization documents on energy efficiency are:

- European directive n. 105 of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequent repeal of Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC and 86/280 / EEC, and amending Directive 2000/60/EC of the European Parliament and Council of 23 October 2000 establishing a framework for Community action in the field of water policy (amend. 2009) – Water Framework Directive;
- European Directive 2006/7/EC concerning the management of the quality of bathing water and the repeal of Directive 76/160/EEC;

The legislative situation regarding each ECOPORT8 member state is as follows:

#### **Albania**

- Law No. 8102, dt. 28.03.1996 amended with Law No.9352, dt 03.03.2005 "For the regulatory framework for the sector of water supply and disposal of polluted waters".
- DCM No 145 dt 26.2 1998 „On the management of the drinking water quality in the water supply systems"
- DCM No. 236, dt 10.05.1993 "On the administration and water supply for domestic and non-domestic users" amended with DCM No. 96, dt 21.02.2007.

#### **Bulgaria**

- WATER ACT (*prom. SG. 67/27 Jul. 1999, last amend. SG. 95/1Dec 2009*);
- Regulation No 5 on water monitoring (*prom. SG. 44/5 June 2007*);

#### **Greece**

- Ministerial Decision 8600/416/E103/2009 for the: Integration of the Directive 2006/7/EC concerning the management of bathing water quality and repealing Directive 76/160/EEC;
- Directive 2000/60 via Presidential Decree 51/2007 (FEK 54/A/8-3-2007); and Law 3199/2003 (FEK 280/A/9-12-2003)

#### **Italy:**

- Legislative Decree n. 152 of 03/04/2006, Environmental standards;
- Environment Ministerial Decree n. 131 of 16 June 2008;
- Environment Ministerial Decree n. 56 of 14 April 2009;
- Legislative Decree n.116/2008 - Implementation of Directive 2006/7/EC;

#### **Montenegro:**

- Law on Waters (Official Gazette of Montenegro 27/07, 17.5.2007);
- Decree on Classification and Categorization of Superficial and Underground Waters (Official Gazette of Montenegro 02/07, 29.10.2007);
- Rulebook on Quality and Sanitary-Technical Conditions for waste water release into recipient and public sewer system, Mode and Procedure of waste water quality testing, Minimum number of testing trials and content of waste water quality report (Official Gazette of Montenegro 45/08, 31.07.2008).

#### 4.13.2. Monitoring procedures

Water consumption in port terminals can also be a substantial overhead cost for terminal operators. Representative water consumption requirements, derived from characteristic ports' activities (Peris-Mora et al, 2005; Darbra et al, 2004; 2009) are given in Table 14.

**Table 14.** Water consumption derived from typical ports' activities

Activity	Issue
Cleaning and maintaining green areas	Water consumption
Watering carbon heaps when handling bulk solids	
Cleaning and maintaining crafts in marinas	

A detailed and continuous data acquisition of water consumption is the first step that needs to be taken for the successful implementation of any environmental management system. Such types of information can be obtained, under the scope of environmental monitoring and assessment schemes, by utilizing localized meters at the output points (for water consumption). Typically, measurement systems with automatic data readout placed over the various network levels (multilevel) are utilised. These systems collect interval-based consumption data for electricity, natural gas, water, thermal energy and other utilities such as propane, purchased steam and environmental measurements.

#### 4.13.3. Recommended best practices

Early detection of possible water leaks, a high level of recycling and advanced, easy to install, automated water reducing mechanisms are the key aspects for sustainable development of water resources.

More specific **measures** (Table 15) proposed include the ones mentioned bellow and the more practical issues

1. Utilization of recycling waste program reduce the amount of waste going to landfill (i.e. by mulching of extended areas in parks and reserves to reduce evaporation and improve water retention)
2. Water efficiency upgrades
3. Water harvesting system (toilet flushing, landscape irrigation, wash down areas)
4. Water retaining substances in plantings to retain and reduce demand for water
5. Monitor water usage leaks.

It was found out that only a small number of ECOPORT8 member countries incorporate a water regulation scheme on port activities. It is usually performed by the urban services of portable water services.

Hence the range of best practices, from ECOPORT8 countries, on water regulation is minimum. However a range of best practices have been applied successfully by port authorities of other countries.

#### Examples of good practices in Ecoport8 ports

##### Albania

A drinking water consumption monitoring system is performed by Local Water Supply Network UKD in Durres. In addition, water quality analyses are performed in a campaign way by the Public Health Institute contracted by DPA Environmental Directory.

##### Greece

A Building Management System (regulation of infrastructure energy consumption) has been introduced and operates in the port of Igoumenitsa. Under the scope of this system water consumption is monitored according to the particular uses identified in Table 2.

### Montenegro

Drinking water consumption monitoring system is performed by the Port Service of Bar.

### Good practices examples from other European Ports

Early detection of possible water leaks, a high level of recycling and advanced, easy to install, automated water reducing mechanisms are key aspects for sustainable development of water resources. More specific measures proposed include:

- Utilization of recycling waste program to reduce the amount of waste going to landfill (i.e. by mulching of extended areas in parks and reserves to reduce evaporation and improve water retention) 32% reduction in water consumption
- Water efficiency upgrades, monitoring of water usage leaks.
- Water harvesting system (toilet flushing, landscape irrigation, wash down areas) (significant reduction in water consumption)
- Water retaining substances in plantings to retain and reduce demand for water

#### Port of Dover (United Kingdom)

- Promoting a culture of environmental awareness to improve environmental performance by all port staff, users and suppliers by communicating the environmental policy to all through implementation of regular publicity campaigning programmes on a variety of relevant issues.
- Minimisation of landfill waste through reusing or recycling,
- Investing in technology and infrastructure improvements

#### Port of Alicante (Spain)

- Rationing the consumption of resources used in port activities
- Implementing a strict recycling waste program (i.e. mulching extended areas in parks and reserves to reduce evaporation and improve water retention),
- Water efficiency upgrades
- water consumption was reduced by 32 %

**Table 15. Suggested best practices** for an efficient management of water consumption

Actions	Suggested best practices
Reduce the consumption of potable water used internally.	Install water efficient fixtures and fittings (AAA rating system or above) such as toilets, urinals, showerheads, taps, hoses and basins. Infrared or waterless urinals could also be considered.
	Reduce potable water demand through the efficient use/avoidance of evaporative or water cooling tower systems. Alternatively recycled water (treated rainwater) could be used for the cooling tower make up.
	Install water sub-meters for all major water uses in the building, such as cooling towers,

Actions	Suggested best practices
Manage and monitor water usage and any leaks.	irrigation and wash down and hot water services plus separate tenancies. Monitor main and sub-meters to detect leaks.
Reduce the quantity of potable water used for landscape irrigation.	Use native (local) plants for landscaping to reduce irrigation water demand.
	Source irrigation water from on-site rainwater collection or recycled site water (such as grey-water).
	Provide and maintain a water efficient irrigation system comprising subsoil drip systems and automatic timers with rainwater or soil moisture sensor override systems.
Treat water on-site and reuse the treated water to reduce demand on the local potable water supply and the demand on the local infrastructure.	Provide a rainwater harvesting system (rainwater tank) and use rainwater to reduce consumption of potable water

## References

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## 5. SIGNIFICANT ENVIRONMENTAL ASPECTS & OBJECTIVES MEASURED BY PERFORMANCE INDICATORS IDENTIFIED IN ECOPORT8 PORTS (outputs of WP6.2. "Building capacity")

An EMS process implementation in the ports requires the identification of all environmental aspects (Environmental aspect - element of an organization's activities, operations or services that can interact with the environment) and related impacts upon which the activities carried out can be expected to have an influence.

Those aspects which are considered most significant must then be selected in compliance with the *Environmental Aspects Identification Procedure*.

Within the WP6.2. "Building capacity", each trainee in collaboration with ports authorities has analyzed the significant **environmental aspects (SEAs)** in ports participating in the Ecoport8 project. Further, SEAs were used to establish environmental objectives and targets. This was accomplished with the ports authorities support taking into consideration their objectives and targets. According to the EMS scheme (ISO 14000), these must be caught in an Environmental Management Program - a program that is linked directly to objectives and targets by providing a description of how the goals will be translated into concrete actions so that environmental objectives and targets will be achieved.

For each of the documented objective were identified the correspondent targets and performance indicators to measure the level of accomplishment.

Trainees representing each port has analysed one or more SEAs and in accordance the actions and operational control needed to reach the objectives and targets (details in WP 6.2. results). Hereafter (**Table 9**) are synthesized some of the most important objectives of the ports engaged to solve the problems related to the impacting activities which affect most the SEAs identified.

**Table 9. Summary of environmental issues related to objectives and performs indicators identified in Ecoport8 ports**

PORT	SIGNIFICANT ENVIRONMENTAL ASPECT	GENERAL ENVIRONMENTAL OBJECTIVE	PERFORMANCE MEASUREMENT INDICATOR
PORT OF BAR (MONTE-NEGRO)	Effluent from sewage system into the port aquatorium	Prevent and reduce emission of wastewater	Quality of marine water in Port aquatorium
	Discharges of faecal sewer		

	into the sea water		
	Emission of residual steam into the air	<b>Prevent and reduce emission of residual steam into the air by burning of oil in petroleum transformer</b>	Emissions of pollutants into the atmospheric air
	Emissions into the air from oil terminals	<b>Prevent and reduce emission into the air from oil terminals</b>	
	Dust releases into the air	<b>Prevent and reduce emissions of dusts and entrainment of it in runoff from dry bulk storage and handling activities</b>	
	Non-hazardous (solid) waste disposal	<b>Reduce and prevent discharge of contaminants associated with solid waste handling</b>	Quality of land in disposed areas  Quantity of collected and separated waste by types
	Outflow from washing of workshops areas and garages into water  Oil leaks into underground waters from the washing of the floor of workshop area	<b>Prevent or reduce the discharge of pollutants from vehicle and equipment washing</b>	Quality of land in port  Quality of marine water in Port aquatorium
	Spills of oil and oil derivate and alkalis Outflow of oils, detergents and lubricants into water	<b>Prevent release of pollutants from the handling and storage of chemicals as well as from leaking of materials from machines and one part of the waste of the floor of workshop area is discharged in atmospheric sewage system</b>	Quality of marine water in Port aquatorium  Quality of land in port
	Vehicle and equipment maintenance activities, maintenance of switches, lighting, horizontal handling equipment, electrical equipment and installations on site and in workshops, mechanized loading of horizontal and vertical transport, manipulation of liquid bulk cargo	<b>Prevent and reduce discharge of pollutants from vehicle and equipment maintenance activities, maintenance of switches, lighting, horizontal handling equipment, electrical equipment and installations on site and in workshops, mechanized loading of horizontal and vertical transport, manipulation of liquid bulk cargo</b>	Quality of land in port  Quality of marine water in Port aquatorium

<b>PORT OF CONS TANTA (ROMANIA)</b>	Water quality in the port aquatorium	<b>Improvement of the discharged water from the waste water treatment plant</b>	Concentration of the pollutants in the water of the port
	Air emissions	<b>Reduction of gases and particles emissions in to atmosphere</b>	Concentrations of CO, SO <sub>2</sub> , NO <sub>2</sub> , and measurement of the particles size
	Natural resources uses	<b>Reduction of the consumption of energy</b>	Checking the monthly consumption of energy in relation to work performed for each port facility
<b>PORT OF DURRES (ALBANY)</b>	Effluent from atmospheric water sewage system into the port aquarium	<b>Prevent and reduce emission of wastewater</b>	Dumping reduction/waste spill
	Emission of steam into the air	<b>Prevent and reduce emission of steam into the air by burning of oil in the proper equipment</b>	
		<b>Prevent and Emissions reduce emissions into the air from oil terminals</b>	
		<b>Prevent and reduce emissions of dusts and entrainment of sediments in runoff from dry bulk storage and handling activities</b>	
		<b>Reduce and prevent discharge of contaminants associated with solid waste handling</b>	
		<b>Prevent or reduce the discharge of pollutants from vehicle and equipment washing</b>	
		<b>Prevent and reduce discharge of pollutants from vehicle and equipment maintenance activities, maintenance of switches, lighting, horizontal handling equipment, electrical equipment and installations on site and in workshops, mechanized loading of horizontal and vertical transport, manipulation of liquid bulk cargo</b>	
<b>IGOLIUMENIT</b>	Air Emissions	<b>Reduction of emission of</b>	

<b>SA (GREECE)</b>		<b>gases and particulates to atmosphere</b>	SO <sub>2</sub> , Pb, NO <sub>2</sub> , O <sub>3</sub> .
	Electricity consumption of the buildings, paper use	<b>Reduction of natural resources usage</b>	Recycle increase
	Bunkering, Maintenance works, Oil waste disposal, Surface runoff, Repairing/Washing, Painting & Paint removal, Fuel replenishment, Ship wastes	<b>Reduction of effluent contaminants discharged into port water area.</b>	Temperature, DO, pH, Turbidity, Heavy metal concentration
<b>PATRAS (GREECE)</b>	Air Emissions	<b>Reduction of emission of gases and particulates to atmosphere.</b>	Concentration of CO, SO <sub>2</sub> , Pb, NO <sub>2</sub> , O <sub>3</sub> .
	Land area wastes, Ship wastes	<b>Reduction of wastes sent to landfill</b>	Weight of waste sent to landfill
	Bunkering, Maintenance works, Oil waste disposal, Surface runoff, Repairing/Washing, Painting & Paint removal, Fuel replenishment, Ship wastes	<b>Reduction of effluent contaminants discharged into port water area.</b>	Temperature, DO, pH, Turbidity, Heavy metal concentration

## 6. RESULTS OF QUESTIONNAIRES ADDRESSED TO PORT AUTHORITIES AND OPERATORS

The questionnaire wanted to reveal the level of preparedness of ports to implement an EMS from the point of view of their managerial organization, legislative framework, responsibilities, capacity to identify the key environmental aspects, monitoring and management practices, internal communication, control and audit scheme and other aspects related to provisions of ISO 14001 and EMAS. The questionnaire has addressed both to port authorities and ports' operators in order to highlight their implication in EMS implementation and standing in ports studied.

As the final goal of WP6 is not to establish and implement an EMS in Partner Ports, but to produce ECOGUIDELINES, the above mentioned EMAS requirement of ISO 14001 and EMAS was used only as an input to questions in the following pages, and not for a "gap analyses" or a documental audit of the Organizations that are supposed to fill in the questionnaire.

In facts, other major inputs are the results of WP 4 and WP5, as well as Legislation and Regulation framework.

The ports participating to the questionnaire were:

- **Port of Constantza** (*Romanian Naval Authority (RNA) & NC "Maritime Ports Administration" SA Constantza*)- ROMANIA
- **Port of Bar** – MONTENEGRO
- **Port of Bari** – ITALY
- **Port of Varna** - BULGARY
- **Port of Durres** - ALBANY

Questionnaire was conceived to be filled in by Ports, and it's divided in **3 parts**:

1. Ports general questions
2. Operators general questions
3. Operators specific questions

**Part 1** is focused on Port Management items, particularly oriented to those Organizations (i.e.: Port Authority) who play the role and have responsibility of programs, plans, regulation, coordination, control, in the whole Port.

**Part 2 and 3** are focused on Organizations operating in the Port, OPERATORS and SUBCONTRACTORS:

- I. shipyards
- II. Sewage operators/subcontractors
- III. Solid waste operators
- IV. Shipping operators - Solid (chemical products, ores, coals, ferrous and nonferrous metals)
- V. Shipping operators - Liquid cargo handling (petroleum, chemical, food)
- VI. Bunkerage operators
- VII. Cargo handling operators
- VIII. Dredging operators

According to ISO 14001 and EMAS (most relevant Environmental Management Systems - "EMS" - Standards), requirements of an EMS are related to:

### STRATEGY - POLICY-PLANNING part of the EMS

- 4.2 Environmental Policy
- 4.3.1 Environmental Aspects
- 4.3.2 Legal and Other Requirements
- 4.3.3 Objectives, Targets and Programs

#### **OPERATING parts of the EMS**

- 4.4.1 Resources, Roles, Responsibility and Authority
- 4.4.2 Competence, Training and Awareness
- 4.4.3 Communication
- 4.4.4. Documentation
- 4.4.5. Control of Documents
- 4.4.6. Operational Control
- 4.4.7 Emergency Preparedness and Response

#### **MONITORING - MEASUREMENTS - CHECKING parts of the EMS**

- 4.5.1. Monitoring and Measurement
- 4.5.2. Evaluation of legal Compliance
- 4.5.3. Nonconformity, Corrective Action and Preventive Action
- 4.5.4. Control of Records
- 4.5.5. Internal Audit

#### **STRATEGY - POLICY-PLANNING review, final phase, and back loop to 4.2**

- 4.6. Management Review

## **QUESTIONNAIRES SUMMARY**

**1** Referring to WP4 standard analysis and regulatory framework, indicate your **priorities** in your policies, planning and monitoring, among following environmental items

<b>PORTS</b>	<b>PORTS GENERAL Q</b>
<b>Romanian Naval Authority (RNA)</b>	<i>Not mentioned</i>
<b>NC "Maritime Ports Administration" SA Constantza</b>	1. Water quality of port aquatorium 2. Releases to water and waste water treatment 3. Air quality including asbestos 4. Waste including electrical and electronically waste 5. Noise 6. Drinking water 7. Energy efficiency
<b>Port of Bar</b>	1. Water quality of port aquatorium 2. Releases to water and waste water treatment 3. Noise 4. Cargo handling, transportation & storage 5. Port development including IPPC, EIA and SEA, and including Urban Planning
<b>Port of Bari</b>	<i>Not mentioned</i>
<b>Port of Varna</b>	<i>Not mentioned</i>
<b>Port of Durres</b>	1. Water quality of port aquatorium 2. Releases to water and waste water treatment 3. Cargo handling, transportation & storage 4. Air quality (including asbestos) 5. Noise

PORTS	PORTS GENERAL Q
	6. Energy efficiency 7. Soil contamination (including underground tanks)
<b>Comments</b>	Except the Port of Bar, NC MPA Constantza and Durres the others questioned ports didn't mention the key environmental aspects considered priorities for their environmental management. However, considering the implication in analysis of these aspects in Ecoport8 project, we consider that each port will take into account the conclusions to which they came with the occasion of this study. It worth noting that this is one of the baselines in conceiving an EMS. As can be seen, the accent in Port of Bar is put on aspects related to water quality, port development procedures, noise and cargo handling.

**2 Please indicate whether you have or not a public environmental **policy** set**

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<b>Yes.</b> There is a public environmental policy
<b>NC "Maritime Ports Administration" SA Constantza</b>	<b>YES.</b> "The policy in the field of quality, environment, health and labour security", developed by the Company and <b>applied only</b> to the activities carried out by the Company.
<b>Port of Bar</b>	<b>Yes</b>
<b>Port of Bari</b>	Currently, there is <b>not</b> an environmental policy on the port, but will start procedures to make it operational in a short time
<b>Port of Varna</b>	<b>YES.</b>
<b>Port of Durres</b>	<b>YES.</b>
<b>Comments</b>	All, but Bari Port declared that already have a public environmental policy (for details see Chp. 2).

**3 Please indicate who is the authority in charge to **implement** the environmental policy/rules in your port and to **control** their respect by Operators**

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<b>Romanian Naval Authority (RNA)</b> is one of the authorities in charge to implement the environmental policy/rules in Constanta port. To control their receptiveness by <u>shipping operators</u> is in charge of <u>Romanian Naval Authority</u> . <ul style="list-style-type: none"> <li>To control their receptiveness by <u>port operators</u> is in charge of Constanta Maritime Port Administration and local Romanian Environmental Agency.</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>There is not an "environmental policy" of Constantza Port, the Company (NC "Maritime Ports Administration" SA) role not being that of environmental authority in the port area. The environmental legislation in the port is implemented by the Environmental Agency and controlled by the Environmental Guard, each port operator having the competence to establishing by its own environmental policy in accordance with the requirements of ISO 14001, taking into account the type of its activity.</li> </ul>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>Port Authority of Montenegro/Port of Bar</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>The Port Authority is a governmental public authority of the port that will be responsible for implementing of a future environmental policy to be adopted soon and exercise at the same time a monitoring for compliance with environmental issues by the operators</li> </ul>
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>The port operators are in charge to implement the environmental policy/Rules;</li> </ul>

PORTS	PORTS GENERAL Q
	<i>Executive Agency Maritime Administration is one of the agencies responsible for the control.</i>
<b>Port of Durres</b>	<i>Environmental Directorate authorized by Durres Port Authority</i>
<b>Comments</b>	<i>The responsibility of implementation of environmental policy and rules in questioned ports falls mostly in obligation of port authorities, which give them a decisional freedom regarding the approach of environmental aspects influenced by ports. However, the national legislative framework, the economical driving forces and social context are strong interconnected with ports' decisions and actions. Therefore, the policy adopted must reflect measurable environmental targets and objectives, as the commitments of improving the environment to be reliable.</i>

**4 Please specify what the goals/objectives of your policy are; indicate your targets of sustainable environmental development as part of international transport corridors, and describe the managerial actions that you planned to achieve these targets.**

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<p><i>One of the main objectives of RNA to sustain the environmental policy is to implement and apply the provisions of the international maritime conventions issued by International Maritime Organisation (IMO) and also of the European Directives on this domain.</i></p> <p><b>The main tasks of the Romanian Naval Authority for the safety and environmental protection:</b></p> <ul style="list-style-type: none"> <li><i>• Inspection, control and surveillance of navigation in the Romanian maritime waters and inland waterways;</i></li> <li><i>• Fulfilment of the obligations assumed from the international agreements and conventions to which Romania is part of;</i></li> <li><i>• Represents the Romanian Government within the international organizations in the field of naval transport;</i></li> <li><i>• Implementation of European Union rules, regulations and international conventions into Romanian legislation;</i></li> <li><i>• Development, endorsement and submission of drafts laws and mandatory norms to the Ministry of Transports and Infrastructure for approval;</i></li> <li><i>• Port State Control and Flag State Control activity;</i></li> <li><i>• Coordination of prevention and response pollution activities in the Romanian navigable waters and of the actions to be taken in case of navigation accidents and casualties;</i></li> <li><i>• Protection of navigable waters against pollution by vessels;</i></li> <li><i>• Sanctioning of the contraventions and investigation of pollution and navigation accidents and other naval casualties;</i></li> <li><i>• Technical surveillance and certification of maritime and inland waterway ships, offshore drilling units or other naval equipments, flying the Romanian flag;</i></li> <li><i>• Supervising the compliance of the Romanian naval transports with the provisions of the ISM Code and ISPS Code.</i></li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li><i>• To take all control measures to reduce the number of accidents that can lead to pollution</i></li> <li><i>• To cooperate with all authorities to continuously reduce the environmental risk</i></li> <li><i>• Increase their staff aware and working on behalf of the company, to develop good communication for active participation in the objectives and environmental management programs</i></li> <li><i>• Continuous communication with all port operators to increase environmental</i></li> </ul>



PORTS	PORTS GENERAL Q
	<p>responsibility of every person that works inside the Port of Constanta</p> <ul style="list-style-type: none"> <li>• Special attention and unconditional support for the operators that are manipulating with dangerous cargos, hazardous substances and any other dangerous goods.</li> <li>• Continuous improvement in environmental performance, environmental quality, in particular by adopting environmental measures.</li> </ul> <p>The General Manager of the Port of Constanta is committed to provide resources to maintain and continuously improve the effectiveness of Integrated Environmental Management System.</p> <p>All employees are responsible to actively assume Strategy for environment protection and the authority and responsibility for maintaining and improving environmental system are assigned to the Head of Environmental Protection Office for the Port of Constanta.</p>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>• <b>Main goals/objectives</b> of the policy are: improving the market position of the Port, increasing quality of services, increasing utilization of existing capacities, developing new capacities in accordance with principles of sustainable development, continuous improving of safety and security system, continuous improving of environmental management system.</li> <li>• <b>Key targets</b> of sustainable environmental development are: optimization of the environmental protections system at the Dry Bulk Cargo Terminal, optimization of the port waste (solid and liquid) management system, etc.</li> <li>• <b>Planned managerial activities:</b> installing separator for treatment of waste waters at the dry bulks storing area, installing system for measuring air quality at the Dry Bulk Cargo Terminal, developing reception and treatment capacities for liquid waste, etc.</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>• <b>The objective/targets</b> identified for the start of an environmental policy of the port regarding the start of a procedure aimed to the environmental awareness of the port authority employees and organizations operating in the port area, in order to prepare an environmental "awareness" useful to ensure the foundations for a future implementation of an EMS under the EMAS regulations and so, the planning of infrastructure projects oriented to ensure a greater environmental sustainability in port areas in line with the Italian and European legislation</li> </ul>
<b>Port of Varna</b>	<p>The <b>basic and permanent obligations</b> in the environmental improvement policy of the Port of <b>Varna</b> are:</p> <ul style="list-style-type: none"> <li>• Improvement of the existing and implementation of new port operational technologies to meet the contemporary ecological requirements;</li> <li>• Acquisition of modern environment-friendly, specialized port</li> </ul>
<b>Durres Port</b>	<ul style="list-style-type: none"> <li>• Risk Reduction, Prevention and Resource Management</li> <li>• To minimize releases to the air, land or water through use of cleaner technologies and the safer use of chemicals</li> <li>• To minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste</li> <li>• To manage scarce resources such as water, energy, land and forests in an environmentally sensitive manner</li> <li>• To communicate our commitment to our employees, vendors and customers</li> </ul>
<b>Comments</b>	Ports questioned identified objectives and key targets for environmental improvement after analysis of gaps recorded, opportunities and requirements imposed by a sustainable development.

5 Please indicate in what way the environmental issues **interfere** with your economic interests

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<ul style="list-style-type: none"> <li>• Naval transport in Romania represents an important economical resource, contributing to the increasing of the internal product in respect to the</li> </ul>

PORTS	PORTS GENERAL Q
	<i>environmental sustainability</i>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>Not every time economic interests are in accordance with environmental issues, but always - from our point of view - environmental aspects prevails, that means environment protection is on the first place. According to environment law, every project or investment proposed by our customers is accompanied by a mandatory permit released by the local environment authority and, after commissioning of the project, an environment license must be obtained and his provisions fulfilled.</li> </ul>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>Actions from the field of environmental protection are in line with key identified economic interests.</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>The environmental issues more than interfere with the economic interest of the port, they are difficult to implement due to the high costs of implementing of an EMS.</li> </ul>
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>The environmental issues are related with expenses.</li> </ul>
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>The objective of bringing the port services and infrastructure nearer to the international practices, for equal standards between states and Europe impose also the compliancy with standards in environmental protection by guaranteeing a high level security and environment protection. One of the main economical goals is to change the port from a "service port" into a "land of lord port" by increasing the commercial independence of the port.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>All ports identified a link with economical issues, but no one has set clear cost-benefits instruments. However, long terms investments in environmental protection it is seen as the main path to attain also economical development</li> </ul>

**6 Please indicate how the port is perceived by local stakeholders related to environmental impact/how do you interact with them**

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<ul style="list-style-type: none"> <li>Naval transports contribute to the free circulation of goods and persons</li> <li>Compliancy with legislation concerning environment and especially the marine ecosystem represent an obligation and a responsibility of all port operators</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>"The Company activities as port administration have no impact on environment "</li> </ul>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>There is a regular communication between the port and local stakeholders related to port environmental issues.</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>Concerning an authorization process on the rehabilitation of a port area oriented to preshipment of passengers and car/trucks parking in order to ensure and mitigate the effects due to the high freight and passenger traffic, it has been established an Observatory with the main stakeholders in order to manage, in the best way, the environmental impact that the infrastructure should have produced</li> </ul>
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>Not mentioned</li> </ul>
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>Concerning the public health and environmental protection a series of monitoring programs (air, water) and actions has been taken (e.g., moving the old terminal oil out of the Port of Durres at Porto Romano, 6 km north of Durres)</li> </ul>
<b>Comments</b>	Communication and relation with stakeholders it is a key element in EMS implementation. Ports interviewed have already promoted through their policy different programs for public awareness, consultation. More stress must be put on public health assessment in relation with ports activities and finding best solutions to further improve communication and transparency.

**7 Please indicate how the **environmental legislation** and regulations are identified and periodically updated in the Port**

PORTS	PORTS GENERAL Q
<b>Romanian Naval Authority (RNA)</b>	<ul style="list-style-type: none"> <li>RNA is the single Romanian naval body having overall responsibility for <b>implementation of naval legislation</b> including the legislation connected to environmental aspects of Romanian navigable waters.</li> <li>RNA has been legally appointed as the <b>responsible authority</b> for the implementation of International IMO Conventions to which Romania is a part as: <u>MARPOL 1973/1978</u>, <u>OPRC/1990</u>, <u>BUNKERS/2001</u>, <u>CLC/1992</u>-(Civil Liability Convention), <u>SOLAS/1974</u> and <u>Bucharest Convention/1992</u> (Convention on the protection of the Black Sea against pollution), and European Union rules and regulations into Romanian legislation and to perform also the management and mission of co-ordination for prevention and oil pollution response activities, and also to monitor the vessel's traffic within the area under Romania responsibility, through <b>Maritime Co-ordination Center</b>.</li> <li>RNA is designate also to fulfill the the obligations stipulated by the UE Directives like, <u>Directive 2002/59/EC</u> (VTMIS), <u>Directive 2000/59/EC</u> (Ship waste management and port reception facilities), <u>Directive 1999/32/EC</u> (Reduction of the sulphur content in the liquid fuels, as amended by Directive 2005/33/EC on the sulphur content of marine fuels), <u>Directive 2005/35/EC</u> on ship-source pollution and on the introduction of penalties for infringements, etc. Therefore, <u>VTMIS</u>, <u>RoRIS</u>, <u>AIS</u>, <u>SafeSafeNet</u>, <u>CleanSeaNet</u>, <u>LRIT</u>, <u>GISIS</u>, <u>SCOMAR</u>, <u>CECIS</u> and other systems and services, concerning the safety of navigation, environment, passengers, ships and cargoes within the maritime waters and inland waterways, were initiated during the last years.</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>The identification and updating of legislation within the company it is achieved by the Environmental Office. Within the port, each operator it is obliged by the competent environmental authorities to accomplish this task.</li> </ul>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>These activities are a part of the regular obligations of the chief engineers for environmental protection (from the Development and Engineering Department) and the Administration Department.</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>The environmental legislation that affects the main port activities, both invasive and less invasive, it is implemented by the port authority and port operators in full compliance with the periodic updates that it undergoes.</li> </ul>
<b>Port of Varna</b>	-
<b>Port Durres</b>	<ul style="list-style-type: none"> <li>Durres Port Authority and the Department of Protection of Environment</li> </ul>
<b>Comments</b>	<p>Compliance with legislation which regulates port activities represents one of the main concerns and is found in obligations imposed by the ports' status of public authority. Each port authority has assigned these responsibilities to special departments, which must permanently inform the port about these aspects.</p> <p>Defining, implementing and updating the legislative framework are extremely important steps of EMS and constitute a premise for better implementations of plans and programs destined to sustainable development. RNA has already implemented very important international legislation, which brought it in vanguard of environmental protection. Port of Bar, Durres and Port of Bari have defined clear responsibilities and are fully prepared for complying with legislation in force in their country. European countries still must harmonize the national legislation with European Directives and more of that must clarify the regime of ports within the general legislative framework.</p>

**8 Please make a list of all **Organizations** (public and private) who take part to the Management of the Port: describe the main **roles, responsibilities, and authorities** of each Organization.**

PORTS	OPERATIONS
<b>Romanian Naval Authority (RNA)</b>	competence of CN APM Constanta
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>• CN Maritime Ports Administration SA Constanta - APM SA Constanta</li> <li>• Romanian Naval Authority –RNA</li> <li>• Costumer Regional Direction Constanta</li> <li>• Navigable Water Channels Administration</li> <li>• National Environmental Guard - County Commissariat Constanta</li> <li>• Inspectorate of Costumer Phyto-sanitary Quarantine Constanta Port</li> <li>• The Guard Coast</li> <li>• National Veterinary Authority and food safety</li> <li>• Regional Section of Transports Police Constanta</li> </ul>
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>• Montenegrin Port Authority – regulatory functions; overall management of the port infrastructure.</li> <li>• Port of Bar (at the area defined by the concession act) – operational management of the port infrastructure, management of the port superstructure, management of handling and storing operations with dry bulks, liquid bulks, ro-ro cargoes and passenger traffic, environmental protection management.</li> <li>• Container and general cargo terminal (at the area defined by the concession act) - operational management of the port infrastructure, management of the port superstructure, management of handling and storing operations with caontainers and general cargoes, environmental protection management.</li> </ul>
<b>Port of Bari</b>	<p>In the port of Bari there are organizations (private and public) that manage administrative and operational activities as follow:</p> <ul style="list-style-type: none"> <li>• Capitaneria del Porto – Coast Guard (public institution with operational role and control of security in the port activities)</li> <li>• Polizzia di Frontiera Marittima ed aerea (public institution with operational role and control of security in the port activities)</li> <li>• Guardia di Finanza (public institution with operational role and control of security in the port activities)</li> <li>• Arma dei Carabinieri – Nucleo sommozzatori (public institution with operational role and control of security in the port activities)</li> <li>• Vigili del Fuoco (public institution with operational role and control of emergency in the port activities)</li> <li>• Cantier Navale RAMAR (private organization for the management of dry bulk storage and distribution)</li> <li>• Silos Granari della Sicilia (private organization for the management of dry bulk storage and distribution)</li> <li>• Intermodal Transport e Gestione contenitori S.r.l. (private organization for cargo handling)</li> <li>• I.P.M. S.p.a. Impresa portuale Metropolitana (private organization for cargo handling)</li> <li>• ISTOP SPAMAT S.r.l. (private organization for cargo handling)</li> <li>• A.T.I.: <ul style="list-style-type: none"> <li>➢ Serport S.a.s.</li> <li>➢ Sermar S.a.s.</li> <li>➢ Mare progetti e future S.r.l.</li> <li>➢ La Pulisan S.r.l.</li> </ul> </li> </ul>

PORTS	OPERATIONS
	(Association of private companies for the management of liquid/solid waste in the port area)
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>• Not mentioned</li> </ul>
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>• Fire protection and rescue police</li> <li>• Port security force</li> <li>• Directorate of Environment &amp; Monitoring Laboratory</li> <li>• Private Contactors are dealing with port territory cleaning, with maintenance of port facilities &amp; cargo handling (loading unloading)</li> <li>• Two Cleaning Service companies</li> </ul>
<b>Comments</b>	All ports have public and private organizations/institutions involved in management of different activities with responsibilities in carrying security/emergency and operational activities. There is a need for setting an integrated management system for fully coordination of assigned roles and responsibilities of each of them. This will contribute to a better implementation of EMS in accordance with policy engaged towards sustainable economic, ecologic and social development.

**9 How is environmental department **organized**? Otherwise, please describe the department who has the similar attributes in the environmental issues.**

PORTS	OPERATIONS
<b>Romanian Naval Authority (RNA)</b>	<p>RNA has specialized and dedicated departments in charge with safety and environmental aspects of navigation, like:</p> <ul style="list-style-type: none"> <li>- <u>Maritime Co-ordination Centre</u>, which consists of 2 departments, <u>SAR &amp; Pollution Department</u> (MRCC) and <u>VTS Department</u>, performing activities regarding prevention and response to marine pollution, search and rescue, as well as the surveillance and management of the vessel's traffic, 24 h/day, 365 days.</li> <li>• MRCC Constantza has been designate as a National Operational Contact Point (NOCP), according to the National Contingency Plan for Oil and HNS pollutions, being also the Coordinator of the Division for Marine Operations during marine response pollution activities.</li> <li>- <u>Maritime safety and security directorate</u> consists of: <ul style="list-style-type: none"> <li>- ISM / ISPS Department</li> <li>- Ship's Classification Department</li> <li>- Port State Control / Flag State Control Department</li> </ul> </li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	The Environmental Office functions within The Port Exploiting Direction
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>• Activities having the scope of the environmental protection are part of the responsibilities of the Development Division (two chief engineers for environmental protection).</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>• Currently, it is not present an environmental office in the Port Authority and so the competence about the environmental issues is performed by the Office of Infrastructure, technological innovation and strategic planning.</li> </ul>
<b>Port of Varna</b>	<p>Ministry of transport and Communication – which coordinate and control the following the harbor structures:</p> <ul style="list-style-type: none"> <li>• Bulgarian Ports Infrastructure Company</li> <li>• <b>Executive Agency "Maritime Administration"</b></li> <li>• Port Operators (State or Concessionaire)</li> </ul> <p>This structures are subordinated to Environmental Institutions (Ministry of</p>



PORTS	OPERATIONS
	<i>Environment and Water, Water Area Directorate, Regional Inspectorate of Environment and Water)</i>
<b>Port of Durres</b>	<i>Under Durres Port Authority operates the Department of Protection of Environment, which coordinates the work of The Environment Directorate</i>
<b>Comments</b>	<i>Ports questioned, except Bari Port and Bulgarian Port, have environmental departments of their own or institutions with clear responsibilities in environmental management. Others are coordinated by hierarchic superior institutions as in Bulgarian Ports. An EMS implementation will require to have strictly documented procedures for every environmental aspect and activity and therefore it is recommended to create a special Environmental Department under port administration.</i>

**10 Is it a Program for the improvement of environmental Competence/Training/Awareness established and implemented? Who manages this program?**

PORTS	OPERATIONS
<b>Romanian Naval Authority (RNA)</b>	<p><i>Romanian Naval Authority as the specialized technical body subordinated to the Ministry of Transport and Infrastructure through which exerts its function as a state authority in the field of safety of navigation and environmental protection of the national navigable waters :</i></p> <ul style="list-style-type: none"> <li><i>- Supervises the compliance of the Romanian naval transports with the provisions of the ISM Code and ISPS Code;</i></li> <li><i>- Conducts audits on shipping companies and ships in respect of certification in accordance with ISO 9000 – 14000, ISM Code and ISPS Code and verifies the compliance of shipping companies and ships with the requirements of the ISM Code and ISPS Code;</i></li> <li><i>• Issues the DOC (Document of Compliance) for the shipping companies and Safety Management Certificate for the ships in accordance of the ISM Code provisions as well as the Security Certificate in accordance with the ISPS Code provisions;</i></li> <li><i>• Provides technical survey and certification of maritime and inland water ships, offshore drilling units flying Romanian flag and of naval equipments as per RNA regulations;</i></li> <li><i>• Provides technical survey and certification of ships and offshore drilling units flying the Romanian flag and containers, and issues by means of the authority given by the Romanian Government the documents and certificates required in order to certify the compliance with the provisions of the international conventions to which Romania is a party or intends to apply;</i></li> <li><i>• Performs the flag state control (FSC) of the ships hoisting Romanian flag;</i></li> <li><i>• Performs the port state control (PSC) of the ships hoisting foreign flags in the national navigation waters and Romanian ports;</i></li> <li><i>• Coordination of prevention and response pollution activities in the Romanian navigable waters and of the actions to be taken in case of navigation accidents and casualties;</i></li> <li><i>• Protection of navigable waters against pollution by vessels;</i></li> <li><i>• Sanctioning of the contraventions and investigation of pollution and navigation accidents and other naval casualties</i></li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li><i>• YES, the annual professional training in environmental protection organized by The Human Resource Service</i></li> </ul>

PORTS	OPERATIONS
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li><b>NO.</b> The Program is not established.</li> </ul>
<b>Port of Bari</b>	<ul style="list-style-type: none"> <li>It has been started a phase of study for the implementation of an environmental training course oriented to Port Authorities employees and port operators in order to start an EMS under the EMAS regulation. The program is performed by the Office of Infrastructure, Technological Innovation and Strategic Planning.</li> </ul>
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li><b>The staff specially trained</b> for ship garbage treatment serves also other companies besides the Port of Varna PLC</li> <li>In order to carry out its activities in compliance with the law, the company has obtained Permission #03 – DO –006 – 03 (26.04.02) issued by the relevant authorities – the RIEW in Varna in compliance with the requirements of art. 12 and art. 37 of AROFHIWE. The permitted activities are as follows: <ul style="list-style-type: none"> <li><u>1. Harmful wastes</u> (mixed garbage) from ships under code 20.03.01, as follows: <ul style="list-style-type: none"> <li>C – collection;</li> <li>T – transportation;</li> <li>D15 – temporary storage until treated;</li> <li>D10 – overland burning (incineration).</li> </ul> </li> <li><u>2. The activities regulated under codes of 00</u> in compliance with Order #RD – 323/98 by the MoEW are specific for each port within the corporative structure. Collection, transportation and temporary storage are valid for all ports, but incineration – only for the Port of Varna-West.</li> </ul> </li> </ul>
<b>Port of Durres</b>	Not mentioned
<b>Comments</b>	All questioned ports already implemented or make efforts in this direction to training the operators for acting responsible and to increase the professional level of employees. This is a very necessary action towards the implementation of EMS by collective and unified efforts.

**11 Please indicate internal communication actions undertaken to involve Port Operators in environmental performance improvement**

PORTS	OPERATIONS
<b>Romanian Naval Authority (RNA)</b>	Competence of CN APM Constanta
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>The infringements reports from environmental laws or accidental pollutions on the port land area or aquatorium are made public</li> <li>The port website offer on request any information regarding the environmental issues</li> </ul>
<b>Port of Bar</b>	Port Operators are involved in the improvement of environmental performances through their defined obligations in the concessions acts.
<b>Port of Bari</b>	Currently, it is not yet started an internal communication activity through the port authority employees and port operators because it has not been started the implementation procedure of an EMS
<b>Port of Varna</b>	Not mentioned.
<b>Port of Durres</b>	Durres Port Authority and The Department of Protection of Environment have strenght their efforts towards increasing the awareness and responsibility of employees and tenants for the environmental protection by taking a series of measures of control and monitoring
<b>Comments</b>	Most ports have set a communication policy with operators, mainly imposed through their contractual obligations with port authorities. As the communication is a key element for EMS implementation, ports must establish special communication procedures for all ports operators, as a part of their overall policy.

12. Please make a list of all Organizations (public and private) who take part of **Emergencies** Preparedness and Response: describe the main tasks, responsibilities, and authorities of each Organization.

PORTS	OPERATIONS
<b>Romanian Naval Authority (RNA)</b>	<p>Response for emergencies situation in case of a major pollution, the authorities involved are as follows:</p> <p><b><u>Division for maritime operations</u></b></p> <ul style="list-style-type: none"> <li>Romanian Naval Authority – <b>Co-ordinator of the operations</b></li> <li>Romanian SAR Agency (ARSVOM); - involved</li> <li>National Company for Naval Radio-communications; - involved</li> <li>County Inspectorate for Border Police - involved</li> <li>Navy Headquarters; - involved</li> <li>Universitary Hospital Port Constanta; - involved</li> <li>Department for Public Health of County Constanta; - involved</li> <li>Dobrogea-Littoral Waters Directorate- involved</li> <li>Danube Delta Biosphere Resort Administration ; - involved</li> <li>National Institute for Marine Research and Development; - involved</li> <li>Agencies for Environmental Protection Constanta and Tulcea; - involved</li> <li>Environmental Guard Constanta and Tulcea; - involved</li> <li>other companies, including shipyards ; - involved on the request</li> <li>NGO, volunteers. – involved on the request</li> </ul> <p><b><u>Division for land operations</u></b></p> <ul style="list-style-type: none"> <li>Constanta County Inspectorate for Emergency Situations- <b>Co-ordinator of the operations</b></li> <li>Dobrogea Littoral - Waters Directorate- <b>Co-ordinator of the operations</b></li> <li>Romanian Naval Authority – harbour area; - <b>involved</b></li> <li>Inspectorates for Environmental Protection Constanta and Tulcea; - <b>involved</b></li> <li>Environmental Guard Constanta and Tulcea ; - <b>involved</b></li> <li>Depollution companies; - <b>involved on the request</b></li> <li>County Inspectorate for Border Police- <b>involved</b></li> <li>Department for Public Health of County Constanta; - <b>involved</b></li> <li>Prefecture, municipalities; - <b>involved</b></li> <li>National Institute of Meteorology and Hydrology; - <b>involved</b></li> <li>National Institute for Marine Research and Development; - <b>involved</b></li> <li>NGO's; <b>involved on the request</b></li> <li>Other companies; <b>involved on the request</b></li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	See the list above
<b>Port of Bar</b>	<ul style="list-style-type: none"> <li>Montenegrin Maritime Safety Department – body in charge for emergency preparedness and response at the state and regional level.</li> <li>Port operators – bodies in charge for actions at the local level.</li> </ul>
<b>Port of Bari</b>	<p>The Organizations (Private and Public) involved in environmental emergencies are as follow:</p> <ul style="list-style-type: none"> <li>Capitaneria del Porto – Coast Guard (public institution with operational role and control of security in the port activities)</li> <li>A.S.L. (local health authority for the control and management of hygiene and public health)</li> <li>A.R.P.A. (Environmental Protection Agency of Apulia Region)</li> </ul>



PORTS	OPERATIONS
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>• Fire Safety and Rescue Directorate General</li> <li>• Emergency aid Department</li> <li>• Ministry of Interior Regional Directorate</li> <li>• Maritime Rescue Coordination Center</li> <li>• Marine Antipollution Enterprise JSCo</li> </ul>
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>• Civil Emergency Department</li> <li>• Department of Environment of APD</li> <li>• Port Captain General and the Harbor Master of Durres</li> <li>• Water Depolluting companies</li> <li>• Port Security Directorate</li> <li>• Unit MKZSH</li> <li>• Cleaning Service companies</li> </ul>
<b>Comments</b>	All ports have very well organized managerial scheme of institutions involved in activities of emergencies preparedness and response but very important is their coordination and operability. Therefore, investments, modernization, continuous checking of procedures by simulations and training must be implemented through specially designed programs

**13. Please indicate who is responsible for regulatory framework compliance control in the port**

PORTS	MONITORING - MEASUREMENTS - CHECKING
<b>Romanian Naval Authority (RNA)</b>	<p>For the <u>protection of navigable waters against pollution by vessels</u>, Romanian Naval Authority is the responsible body for:</p> <ul style="list-style-type: none"> <li>• Prevention pollution control concerning the provisions of the international conventions to which Romania is a part, EU Directives transposed and Romanian legislation in the domain-protection of the environment, performed by Harbour Master's officers (Harbour Master's Offices are parts of the Romanian Naval Authority's body)</li> <li>• Performing the flag state control (FSC) of the ships hoisting Romanian flag;</li> <li>• Performing the port state control (PSC) of the ships hoisting foreign flags in the national navigation waters and Romanian ports;</li> <li>• Sanctioning of the contraventions and investigation of pollution and navigation accidents and other naval casualties</li> </ul> <p>For the <u>protection of navigable waters against pollution by port operators</u>, the responsible bodies are:</p> <ul style="list-style-type: none"> <li>• Ports Administration Companies</li> <li>• Local Environmental Protection State Agencies</li> <li>• Environmental Guard Constanta and Tulcea</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	The Company is responsible to implement legislation in this field regarding activities carried by it in port area
<b>Port of Bar</b>	Montenegrin Port Authority.
<b>Port of Bari</b>	A.R.P.A. (Environmental Protection Agency of Apulia Region)
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>• The responsible for regulatory framework compliance control is EAMA</li> </ul>
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>• Durres Port Authority</li> <li>• Department of Protection of Environment and Environment Directorate</li> <li>• Port Security Directorate</li> </ul>
<b>Comments</b>	Legislative compliancy related to monitoring of environmental parameters is checked in all ports by different institutions pertaining to port or external control institutions (local or national agencies of environment). On purpose of EMS implementation,

PORTS	<b>MONITORING - MEASUREMENTS - CHECKING</b>
	monitoring compliancy in ports with legislative framework must be done within a <b>Monitoring Program</b> set by port authorities. In the present, some ports have neither an integrated monitoring program nor set limits for different environmental parameters because the legislative framework regarding this aspects is not well defined in case of the ports

**14. Make a list/short description of environmental **Monitoring and Measurement** implemented in the Port**

PORTS	<b>MONITORING - MEASUREMENTS - CHECKING</b>
<b>Romanian Naval Authority (RNA)</b>	<p>Romanian Naval Authority is designate to fulfill the obligation stipulated by the <u>Directive 2002/59/EC (VTMIS Directive)</u> and <u>Directive 2005/44/EC (RIS Directive)</u>. Therefore, services and systems, concerning the safety of navigation and environment were implemented, like:</p> <ul style="list-style-type: none"> <li>Vessels Traffic Monitoring and Information System (<b>VTMIS</b>), Romanian River Information System (<b>RoRIS</b>), Automatic Information System (<b>AIS</b>), Long Range Information Tracking System (<b>LRIT</b>), SafeSafeNet System (<b>SSN</b>), CleanSeaNet Service (<b>CSN</b>) - satellite surveillance and monitoring of pollutions on the sea</li> <li>Global Integrated Shipping Information System (<b>GISIS</b>), Romanian Integrated Monitoring and Surveillance System on the Black Sea (<b>SCOMAR</b>), Common Emergency Communication and Information System (<b>CECIS</b>).</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	<ul style="list-style-type: none"> <li>Quality of potable water delivered to and of the wastewater collected from operators</li> <li>Quality of domestic wastewaters discarded in port aquatorium after prior treatment in wastewater treatment plant</li> <li>Quality of environmental aspects of dismantled garbage deposit area (underground water, leakage, air emissions, soil compacing)</li> <li>Noise</li> </ul>
<b>Port of Bar</b>	Water and air quality monitoring and measurement.
<b>Port of Bari</b>	Currently, in the Port of Bari has been implemented an <b>Air Monitoring</b> oriented to the concentration measurement of Particulate Matter ( <b>PMx</b> ) as required by the Ecoport8 project. Furthermore, in a short time it will be started an <b>environmental monitoring plan</b> oriented to air/noise quality in the completion of a port infrastructure for car and truck parking.
<b>Port of Varna</b>	The EAMA conducts periodical checks
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li><b>Water quality</b> in 5 monitoring points (1.Sea Yard, 2. Fishing bridge area, 3. Next to the can tier yard of new Terminal at the ferry square, 4. Unloading area unpacked goods, 5. At the entrance of the aquatorium channel); Parameters: pH, DO, heavy metals, conductivity, salinity, TSS, BOD<sub>5</sub>, microbiological)</li> <li><b>Air</b> in 5 monitoring points (1.Quay.6 -Unloading area of unpacked goods, 2. Quay 7- 8 - Loading area of unpacked goods, 3. Quay 9- Ferry square beside the new terminal, 4. Ferry square, 5. Quay 10-11 /Sea Yard); Parameters: SO<sub>2</sub>, NOx, LGP, CO<sub>2</sub>)</li> <li><b>Noise</b> (locations of monitoring as to air)</li> </ul>
<b>Comments</b>	Monitoring of some environmental aspects within ports in accordance with a defined monitoring plan was recently introduced in some ports - Bari, Bar, Durres (in ongoing Ecoport8 project). This is one of the most important steps in further implementation of an EMS. Monitoring Program must be integrated in the management system of the ports and should demonstrate the measures taken for continuous improvement of environmental performance.

15. Is an **audit** system established and implemented in the Port?

Who conducts the audit? Which audit criteria/standard is adopted?

PORTS	MONITORING - MEASUREMENTS - CHECKING
<b>Romanian Naval Authority (RNA)</b>	Romanian Naval Authority has its own internal audit system and also any time can be audited by the international recognised institutions like, International Maritime Organisation (IMO), European Maritime Safety Agency (EMSA), Germanischer Lloyd Romania-Constanta. <u>Audit criteria:</u> <ul style="list-style-type: none"> <li>Conformity with the provisions of the international convention (IMO) to which Romania is a part;</li> <li>Conformity with the provisions of the European Directives on the domain.</li> </ul>
<b>NC "Maritime Ports Administration" SA Constantza</b>	The audit is performed within the Company according to the procedures elaborated by SMIQMS
<b>Port of Bar</b>	No.
<b>Port of Bari</b>	Currently, it is not implemented an audit system to the environmental issues because it is not yet operative an EMS.
<b>Port of Varna</b>	Yes. The adopted standards vary for the different ports.
<b>Port of Durres</b>	<ul style="list-style-type: none"> <li>Yearly and monthly - Environmental Management Plan</li> <li>Monitoring of contracts with the private operators,</li> <li>Environmental Monitoring according to Environmental Impact Assessment procedures of implemented projects</li> </ul>
<b>Comments</b>	Only certified ports (e.g., Constanta Port) have an audit established through EMS. The criteria of audit are meant to define the compliancy with environmental provisions set by international legislations that are in force. The others have different systems of internal control that are not related to a certified EMS. Anyway, an internal audit for the monitoring and measurement programs could be implemented by any ports whether or not is looking for the implementation of a certified EMS

## Questionnaire Part 2:

### Questionnaire for Port Operators and Subcontractors (general)

1. Referring to WP4 standard analysis and regulatory framework, indicate **priorities** in your company activities and operational control, among following environmental items:

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	Not mentioned
<b>Port of Bar</b>	1. Water quality of port aquatorium 2. Releases to water and waste water treatment 3. Noise 4. Cargo handling, transportation & storage 5. Port development including IPPC, EIA and SEA, and including Urban Planning
<b>Port of Bari</b>	1. Waste (including electrical and electronically) 2. Noise 3. Odours 4. Air quality (including asbestos) 5. Energy efficiency 6. Soil contamination (including underground tanks)

PORTS		Port Operators and Subcontractors
		7. Water quality for port aquatorium
	<b>2. Silos Granari dela Sicilia</b>	1. Air quality (including asbestos) 2. Noise 3. Energy efficiency 4. Waste (including electrical and electronically) 5. Water quality for port aquatorium 6. Odours 7. Soil contamination (including underground tanks)
	<b>3. Sermar S.a.s.</b>	1. Water quality for port aquatorium 2. Odours 3. Soil contamination (including underground tanks) 4. Energy efficiency 5. Noise 6. Air quality (including asbestos) 7. Waste (including electrical and electronically)
	<b>Port of Varna</b>	1. Water Quality Of Port Aquatorium 2. Releases To Water And Waste Water Treatment 3. Air Quality Including Asbestos ( <b>RIEW</b> Investigation – No problems registered) 4. Waste including electrical and electronic waste 5. Dredging 6. Noise ( <b>RIEW</b> Investigation – No Problems Registered) 7. Odours 8. Light Pollution 9. Energy Efficiency 10. Rehabilitation Of Polluted Areas 11. Soil Contamination Including Underground Tanks 12. Bunkering 13. Cargo Handling, Transportation & Storage ( <b>RIEW</b> Investigation – No Problems Registered) 14. Biodiversity 15. Port Development including IPPC, EIA and SEA, and including Urban Planning 16. DRINKING WATER ( <b>RIEW</b> investigation – no problems registered)
	<b>Port of Durres</b>	-
	<b>Comments</b>	Responding operators from ports Bari (3 operators) and Bar have prioritised their environmental aspects according to their impacting activities. Furthermore, these activities must be documented, establishing targets, objectives, action plans and operational control within continuous improvement programs engaged through policy set by ports authorities.

## 2. Please indicate whether you have or not an environmental policy

PORTS		Port Operators and Subcontractors
	<b>Romanian Naval Authority (RNA)</b>	<p>The authorities in charge to implement the national environmental policy/rules in Romanian ports and national navigable waters, are: Romanian Naval Authority (RNA) and Maritime and Danube River Port.</p> <ul style="list-style-type: none"> <li>• <u>Romanian Naval Authority Administrations</u> is in charge to control if legal provisions are respected by shipping operators-owners.</li> <li>• Controlling the compliance with legal provisions by port operators is in charge of <u>Maritime and Danube River Port Administrations and local Romanian Environmental Agencies.</u></li> </ul>

PORTS		Port Operators and Subcontractors
<b>Port of Bar</b>		<i>Yes, as a part of the overall business policy</i>
<b>Port of Bari</b>	<b>1. Istop SPAMAT S.r.l.)</b>	<b>Yes</b>
	<b>2. Silos Granari dela Sicilia</b>	<b>Yes</b>
	<b>3. Sermar S.a.s.</b>	<b>YES</b>
<b>Port of Varna</b>		<b>Not mentioned</b>
<b>Port of Durres</b>		<b>-</b>
<b>Comments</b>		<i>RNA and questioned operators from Bar Port confirmed that have an environmental policy. In Bar Port this is subordinated to the overall environmental policy of the port. The EMS implemented by different operators helps at improving and maintaining the environmental performance and enhances the implementation of EMS in entire organization (port).</i>

**3. Has your Company implemented environmental management systems and / or environmental improvement actions and **programs**? Please specify what are the goals/objectives of your policy and programs**

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		<i>This is in charge of port administrations and port operators and it is implemented.</i>
<b>Port of Bar</b>		<i>Company has defined environmental improvement actions and programs. Objectives are related to the optimization of the environmental protections system at the Dry Bulk Cargo Terminal, optimization of the port waste (solid and liquid) management system, etc.</i>
<b>Port of Bari</b>	<b>1. Istop SPAMAT S.r.l.)</b>	<b>YES. International Standard ISO 14001:2004 "Environmental Management System"</b>
	<b>2. Silos Granari dela Sicilia</b>	<b>NO.</b> <i>But, it is present a control system:</i> <ul style="list-style-type: none"> <li>Periodic check are made regularly through survey for emissions and noise</li> <li>Periodic internal audit are made through group actions about quality, safety and environmental topics</li> </ul>
	<b>3. Sermar S.a.s.</b>	<b>YES.</b> <i>Environmental Improvement Programme (oriented to waste recovery)</i>
<b>Port of Varna</b>		<b>-</b>
<b>Port of Durres</b>		<b>-</b>
<b>Comments</b>		<i>The questioned operators from Bari Port (Istop SPAMAT and Sermar) have implemented EMS, while Granari della Sicilia operator has a system of control of quality checked through periodic internal audit. Ports Authorities must pursue closing contracts with operators that can guarantee the accomplishment of environmental targets and objectives established by port policy.</i>

**4. Please indicate in what way the environmental issues interfere with your **economic interests****

PORTS	Port Operators and Subcontractors
<b>Romanian</b>	<i>Port administrations and port operators</i>

PORTS		Port Operators and Subcontractors
<b>Naval Authority (RNA)</b>		
<b>Port of Bar</b>		<i>Actions directed to the improvements of the environmental protection are in line with defined key economic interests.</i>
<b>Port of Bari</b>	<b>1. Istop SPAMAT S.r.l.)</b>	<b>NO.</b>
	<b>2. Silos Granari dela Sicilia</b>	<b>YES.</b> <ul style="list-style-type: none"> <li>• Management costs for surveys, advices and assessment environmental</li> <li>• Benefits through the replacement of machinery and engines with higher performance solutions in terms of energy</li> </ul>
	<b>3. Sermar S.a.s.</b>	<b>YES.</b> <i>S.I.S.T.R.I. Regulation (about registration, black box, computer, employee for communication to S.I.S.T.R.I. Register)</i>
<b>Port of Varna</b>		<i>Not mentioned</i>
<b>Port of Durres</b>		-
<b>Comments</b>		<i>The operators questioned (from Bar Port and Bari Port: Silos Granari and Sermar S.a.s.) have identified economical resources designated to improvement of environmental management. These are costs for maintaining the management but also to attain the economical efficiency through reducing the impacts on environment (e.g., replacement of machinery and engines with higher performance solutions in terms of energy in Bari Port). Towards establishing an EMS, a very detailed costs-benefits analysis in terms of ecologic and economic sustainability must be performed as to plan all resources (human, economic and technological), which must be foreseen in the EMS.</i>

5. Please indicate how **environmental legislation** and regulations are identified and periodically updated in Your Company and how environmental legal compliance is controlled (internal or external authorities' control?)

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		<i>Environmental legislation and regulation are identified and periodically updated in according with:</i> <ul style="list-style-type: none"> <li>- the provisions of the international conventions (IMO) to which Romania is a part;</li> <li>- the provisions of the European Union Directives on the domain;</li> <li>- updating the national legislation to be in accordance with the international (IMO) conventions to which Romania is a part and with the EU Directives on the domain.</li> </ul> <i>Environmental legal compliance is controlled by internal or external audits.</i>
<b>Port of Bar</b>		<i>Identification of the environmental legislation is one of the obligations of Chief Engineers for environmental protection. Control is done by the state inspectors for environmental protection (external evaluation).</i>
<b>Port of Bari</b>	<b>1. Istop SPAMAT S.r.l.)</b>	<b>YES.</b> <i>Legislative Decree 152/06 – “Environmental Standards”</i> <b>YES.</b> <i>The legislative framework is periodically updated</i>
	<b>2. Silos Granari dela Sicilia</b>	<b>YES.</b> <i>D.Lgs. 152/06 - “Environmental Standards”</i> <i>Air quality, noise and waste legislation</i>
	<b>3. Sermar S.a.s.</b>	<b>YES.</b> <i>D.Lgs. 182/03 – Implementation of Directive 2000/59 on “Port Reception Facilities for ship generated waste and cargo residues”</i>



PORTS	Port Operators and Subcontractors
	<p>The legislation is periodically <b>updated</b>.</p> <p>It is present <b>an external control system: Environmental Register</b></p>
<b>Durres Port</b>	-
<b>Comments</b>	<p>All interrogated ports' operators are working in respect to specific and general legislative framework, which set the "environmental standards". Keeping the evidence of compliancy with legislative framework falls in responsibility of special departments/employees of ports. This aspect it is very important and demonstrates the interest of ports to improve their performance even through adopting the latest best practices, recommendations and operational legislation. These offer the prerequisites for implementing their actions, plans and programme towards certification an EMS.</p>

**6. Is an "Environment Office" identified in your Company?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	<p>All, Romanian Naval Authority and Maritime and Danube River Port Administrations have very well definite in them organisational structures, environment offices in charge with all the environmental aspects connected to ships, national navigable waters and port operators activity.</p>
<b>Port of Bar</b>	<b>NO.</b>
<b>Port of Bari</b>	<p>1. Istop SPAMAT S.r.l.) <b>YES.</b></p>
	<p>2. Silos Granari dela Sicilia <b>YES.</b></p>
	<p>3. Sermar S.a.s. <b>NO.</b></p>
<b>Durres Port</b>	-
<b>Comments</b>	<p>The certified operators (within RNA responsibility, Istop SPAMAT S.r.l., Silos Granari della Sicilia) have an "environmental office" of their own</p>

**7. Is a Program for the improvement of environmental Competence/Training/Awareness established and implemented? Does it fit with environmental aspects of your activity?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	<p>Romanian Naval Authority as the specialized technical body subordinated to the Ministry of Transport and Infrastructure through which exerts its function as a state authority in the field of safety of navigation and environmental protection of the national navigable waters :</p> <ul style="list-style-type: none"> <li>- Supervises the compliance of the Romanian naval transports with the provisions of the ISM Code and ISPS Code;</li> <li>- Conducts audits on shipping companies and ships in respect of certification in accordance with ISO 9000 – 14000, ISM Code and ISPS Code and verifies the compliance of shipping companies and ships with the requirements of the ISM Code and ISPS Code;</li> <li>• Issues the DOC (<b>Document of Compliance</b>) for the shipping companies and <b>Safety Management Certificate</b> for the ships in accordance of the ISM Code provisions as well as the Security Certificate in accordance with the ISPS Code</li> </ul>

PORTS		Port Operators and Subcontractors
		<p>provisions;</p> <ul style="list-style-type: none"> <li>Provides technical survey and certification of maritime and inland water ships, offshore drilling units flying Romanian flag and of naval equipments as per RNA regulations;</li> <li>Provides technical survey and certification of ships and offshore drilling units flying the Romanian flag and containers, and issues by means of the authority given by the Romanian Government the documents and certificates required in order to certify the compliance with the provisions of the international conventions to which Romania is a party or intends to apply ;</li> <li>Performs the flag state control (FSC) of the ships hoisting Romanian flag;</li> <li>Performs the port state control (PSC) of the ships hoisting foreign flags in the national navigation waters and Romanian ports;</li> <li>Coordination of prevention and response pollution activities in the Romanian navigable waters and of the actions to be taken in case of navigation accidents and casualties;</li> <li>Protection of navigable waters against pollution by vessels;</li> <li>Sanctioning of the contraventions and investigation of pollution and navigation accidents and other naval casualties</li> </ul>
<b>Port of Bar</b>		No, as a regular activity
<b>Port of Bari</b>	<b>1.Istop SPAMAT S.r.l.)</b>	<b>YES.</b> Annual training programs to staff by the head of the management system – existence of environmental manual at company
	<b>2.Silos Granari dela Sicilia</b>	<b>NO.</b>
	<b>3. Sermar S.a.s.</b>	<b>YES.</b> <b>YES.</b> It fits with environmental aspects of the company activity
<b>Port of Durres</b>		-
<b>Comments</b>		The certificated operators in Bari Ports have periodical training and awareness programs for employees. RNA is involved due to its attributes in operational control in programs of training and audit of shipping companies in accordance with ISM and ISPS Codes. Being official responsible for coordination of prevention and response pollution activities in the Romanian navigable waters and of the actions to be taken in case of navigation accidents and casualties, performs regular trainings and simulations activities.

**8. Please indicate **communication** and coordination actions for environmental performance improvement, Your Company has been involved in.**

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		Romanian Naval Authority is in permanent connection with the International Maritime Organisation (IMO) and with European Maritime Safety Agency (EMSA) for the coordination actions for environmental performance improvement, participating also to all conferences, seminars and trainings organised.
<b>Port of Bar</b>		Communication with the national bodies in charge. Participation in international projects
<b>Port of Bari</b>	<b>1.Istop SPAMAT S.r.l.)</b>	<b>YES.</b> Awareness/training on indicators of performance under the environmental management system – as required by Environmental Manual



PORTS		Port Operators and Subcontractors
	2.Silos Granari dela Sicilia	NO.
	3. Sermar S.a.s.	Not mentioned
Port of Varna		-
Port of Durres		-
<b>Comments</b>		<p>Communication Plans are well defined in RNA management system and is oriented towards external communication with international maritime organizations (IMO, EMSA) for coordination of actions for environmental performance improvement, participating also to all conferences, seminars and trainings organised. The internal communications is done by permanent updating of shipping operators with relevant information.</p> <p>In Bari port, certified operators organize as required by Environmental Manual, the training and awareness actions.</p> <p>This element is extremely important for EMS implementation by awareness of each employee about its role in EMS, but also promoting at international level the environmental performance of the ports/operators.</p>

**9. Has your Company any **Emergencies Preparedness and Response PROCEDURES**? Is a periodic test program (simulations?) implemented for these procedures? Are procedures reviewed and improved after accidents?**

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		<p>Romanian Naval Authority has Emergencies, Preparedness and Response procedures for pollution of the national navigable waters, inspections and control procedures for prevention of pollution from ships.</p> <p>Periodically, Romanian Naval Authority is involved in participating to the local, national and international-regional exercises and test program simulations.</p> <p>The working operational procedures are reviewed and improved after accidents or after modification of the legislation.</p>
<b>Port of Bar</b>		Yes, there is a general QMS procedure which covers, among other things, and response activities. Procedure were reviewed and improved several times.
<b>Port of Bari</b>	1.Istop SPAMAT S.r.l.)	<p><b>YES.</b> In these procedures are described potential emergencies with instructions for action – as required by Environmental Manual at company</p> <p><b>YES.</b> Simulations are made annually and registered on appropriate forms</p> <p><b>NO.</b> No accidents.</p>
	2.Silos Granari dela Sicilia	<b>NO.</b>
	3. Sermar S.a.s.	<p><b>NO.</b> <b>YES.</b> The procedures are reviewed and improved. Pollution of sea water due to result of a ship demolition in the Port of Bari</p>
<b>Port of Varna</b>		

PORTS	Port Operators and Subcontractors
Port of Durres	
Comments	<p>Among respondent operators, only Istop SPAMAT S.r.l. from Bari Port, specialized on cargo handling, has QMS procedures regularly reviewed and improved. Sermar S.a.s. specialized on solid and liquid waste management has procedures for fighting against water pollution.</p> <p>One of the key elements of the EMS is the Emergency and Preparedness Response Plan implemented by ports and operators. Therefore, all ports must pursue to EPR being well regulated through procedures and be sure that resources and responsibilities are established. Operational Controls must be built for each environmental, health or safety regulatory programs, which require emergency plans.</p>

10. Make a list/short description of environmental **Monitoring and Measurement** implemented by your Company.

PORTS	Port Operators and Subcontractors
Romanian Naval Authority (RNA)	<p>Romanian Naval Authority is legally appointed with the responsibility for the implementation of European Union rules, regulations and IMO international conventions to which Romania is a part, into Romanian legislation and to perform the management and mission of co-ordination for prevention and oil pollution response activities.</p> <p>Therefore RNA fulfills the obligations stipulated by the UE Directives like:</p> <ul style="list-style-type: none"> <li>- <u>Directive 2002/59/EC</u> (VTMIS) - Vessel's traffic monitoring and information system, <u>Directive 2000/59/EC</u> (Ship waste management and port reception facilities), <u>Directive 1999/32/EC</u> (Reduction of the sulphur content in the liquid fuels, as amended by <u>Directive 2005/33/EC</u> on the sulphur content of marine fuels), <u>Directive 2005/35/EC</u> on ship-source pollution and on the introduction of penalties for infringements, etc., and the obligations stipulated by the International IMO Conventions to which Romania is a part like:</li> <li>- <u>MARPOL 1973/1978</u>, <u>OPRC/1990</u>, <u>BUNKERS/2001</u>, <u>CLC/1992</u>-(Civil Liability Convention), <u>SOLAS/1974</u> and <u>Bucharest Convention/1992</u> (Convention on the protection of the Black Sea against pollution)</li> </ul>
Port of Bar	Equipment for water quality measurement is installed; Installation of the air quality station is foreseen as well as purchasing of noise measurement equipment (as ECOPORT 8 activities);
Port of Bari	1. Istop SPAMAT S.r.l.) -
	2. Silos Granari dela Sicilia -
	3. Sermar S.a.s. -
Port of Varna	-
Port of Durres	
Comments	<p>RNA, in accordance with its attributes and tasks, has specialized monitoring systems (video surveillance) and operational control of ships calling at Constanta port.</p> <p>In Port of Bar, Bourgas and Bari, already operate automatic stations of monitoring of different environmental aspects and related sensible parameters (water and air quality).</p> <p>This is one of the major acquisitions within the Ecoport8 project and will make huge</p>

PORTS	<b>Port Operators and Subcontractors</b>
	<i>changes of capacity to manage the key environmental aspects identified, to establish real targets, objectives and actions and also to better plan the future investments. All these elements are steps forward to EMS implementation in the ports</i>

**11. Is an **audit** system established and implemented in your Company?**

PORTS	<b>Port Operators and Subcontractors</b>
<b>Romanian Naval Authority (RNA)</b>	<p>Romanian Naval Authority is legally appointed with the responsibility for the implementation of European Union rules, regulations and IMO international conventions to which Romania is a part, into Romanian legislation and to perform the management and mission of co-ordination for prevention and oil pollution response activities.</p> <p>Therefore RNA fulfills the obligations stipulated by the UE Directives like:</p> <ul style="list-style-type: none"> <li>• <u>Directive 2002/59/EC</u> (VTMIS) - Vessel's traffic monitoring and information system, <u>Directive 2000/59/EC</u> (Ship waste management and port reception facilities), <u>Directive 1999/32/EC</u> (Reduction of the sulphur content in the liquid fuels, as amended by <u>Directive 2005/33/EC</u> on the sulphur content of marine fuels), <u>Directive 2005/35/EC</u> on ship-source pollution and on the introduction of penalties for infringements, etc., and the obligations stipulated by the International IMO Conventions to which Romania is a part like:</li> <li>• <u>MARPOL 1973/1978</u>, <u>OPRC/1990</u>, <u>BUNKERS/2001</u>, <u>CLC/1992</u>-(Civil Liability Convention), <u>SOLAS/1974</u> and <u>Bucharest Convention/1992</u> (Convention on the protection of the Black Sea against pollution)</li> </ul>
<b>Port of Bar</b>	No
<b>Port of Bari</b>	<b>1. I stop SPAMAT S.r.l.)</b> Not mentioned
	<b>2. Silos Granari dela Sicilia</b> Not mentioned
	<b>3. Sermar S.a.s.</b> -
<b>Bourgas Port</b>	-
<b>Durres Port</b>	
<b>Comments</b>	<i>The audit system is established in certified companies. Interrogated Operators didn't give a specific answer on this issue. An audit is one of the key elements in EMS and it is very useful to ensure that EMS was properly implemented and maintained. Procedures for internal audit must be kept by the companies.</i>

**1. Questionnaire Part 3 :**

**Questionnaire for Port Operators and Subcontractors (specific)**

This part of the questionnaire is focused on **specific environmental aspects** in Port Operators and Subcontractors activities.

## I. Shipyards – if it is the case

### 1. Please describe the activities that generate environmental impact

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		Shipyards activity, in general, sandblast activity, etc
<b>Port of Bar</b>		- not mentioned
<b>Port of Bari</b>	<b>1. Istop SPAMAT S.r.l.)</b>	- specialized on cargo handling
	<b>2. Silos Granari dela Sicilia</b>	- private organization for the management of dry bulk storage and distribution
	<b>3. Sermar S.a.s.</b>	- private organization for the management of solid/liquid waste
<b>Comments</b>		NO operator involved in shipyard activities has answered to the questionnaire

### 2. Please describe the monitoring and control system of polluting activities

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		- not mentioned
<b>Port of Bar</b>		- not mentioned
<b>Port of Bari</b>		-
<b>Port of Durres</b>		-
<b>Comments</b>		-

### 3. What technological improvements are foreseen in order to produce efficient results upon reducing the impact on environmental aspects (water, air, soil)

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		- not mentioned
<b>Port of Bar</b>		- not mentioned
<b>Port of Bari</b>		-
<b>Port of Durres</b>		-
<b>Comments</b>		-

## II. Sewage operators/subcontractors

### 4. Which are the main difficulties met in wastewater management in your port?

PORTS		Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>		- not mentioned
<b>Port of Bar</b>		- not mentioned
<b>Port of Bari</b>		-
<b>Port of Bourgas</b>		-
<b>Port of Durres</b>		-
<b>Comments</b>		-

**5. How is the quality of water that enters in the sewage system and finally in marine water controlled?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	APM Constanta and The Environmental Guard competence
<b>Port of Bar</b>	- not mentioned
<b>Port of Bari</b>	-
<b>Port of Bourgas</b>	-
<b>Port of Durres</b>	-
<b>Comments</b>	-

### III. Solid waste operators

**6. Describe the location for port reception facilities**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	CN APMC Constanta competence
<b>Port of Bar</b>	Near the Dry Bulk Cargo Terminal
<b>Port of Bari (Seramar S.a.s.)</b>	<ul style="list-style-type: none"> <li>Mobile structures in the port area (truck for <b>solid and liquid waste</b> collection, ship for solid and liquid waste collection on sea water)</li> </ul>
<b>Port of Bourgas</b>	<ul style="list-style-type: none"> <li>By a mobile waste treatment plant for bilge water it is possible to accept hard ship generated waste.</li> </ul>
<b>Port of Durres</b>	
<b>Comments</b>	<p>Fix port facilities for solid waste are at disposal by questioned operators offer proper location in the vicinity of activities carried out by them. The location must be established by taking into account the Port Reception Facilities Plan and the existence of ways to removing the wastes without to cause running out activities. Also, must be paid attention to environmental aspects that might be affected by neighbouring with these facilities.</p> <p>Mobile structures must have obligate procedures for emergency situations in case of pollution and procedures for safety operation. Must be at proper capacity and periodically checked. EMS requires the creating of documented procedures for operational control.</p>

**7. Is the port communication system regarding its available facilities developed and recorded in Global Integrated Shipping Information System (GISIS, <http://gisis.imo.org/Public/>)**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	<ul style="list-style-type: none"> <li>Romanian Naval Authority is responsible to insert in GISIS database the information on PRF (Port Reception Facilities). This module of GISIS is updated now and in any time any change of PRF equipment or system come up, RNA will insert it in the data base.</li> <li>Romanian Naval Authority is collecting all the information from the port administrators.</li> </ul>
<b>Port of Bar</b>	<b>NO.</b>
<b>Port of Bari</b>	<b>NO.</b>
<b>Port of Bourgas</b>	<ul style="list-style-type: none"> <li>Port of Bourgas <b>does not have</b> such a certificate</li> </ul>
<b>Port Durres</b>	-
<b>Comments</b>	Except RNA from Constanta Port, as port authority, no operator has a Global Integrated Shipping Information System

**8. Is the collecting and sorting system of different kind of waste from ships well regulated activity?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	<ul style="list-style-type: none"> <li>Yes, collecting and sorting system of different kind of waste <u>on board the ships</u> is very well regulated by national legislation in according with MARPOL 73/78 Convention.</li> <li>After the waste is taken from the ships, it is the responsibility of port administration and authorised operators.</li> </ul>
<b>Port of Bar Sermar S.a.s.</b>	<ul style="list-style-type: none"> <li>YES</li> </ul>
<b>Port of Bari</b>	-
<b>Port of Varna</b>	<ul style="list-style-type: none"> <li>The Port of Varna is in charge with the treatment of the bilge waters. Other institutions are in charge with the solid waste.</li> <li>In compliance with Art. 19 of ARofHIWE, the following are done in the Port of Varna: <ul style="list-style-type: none"> <li>A specialized complex – an incinerator for burning of ship garbage is built on the territory of Port of Varna – West. It includes a building (warehouse, sorting compartment, machine hall, office, wardrobe room, and sanitary unit), open-air storage area, incinerator, warehouse for fuel and lubricators.</li> <li>A collection area was built on the territory of Port of Varna-East, consisting of: close warehouse (temporary depot), open-air storage area for garbage containers and an office.</li> <li>At Port of Balchik a specially marked and locked garbage container plays the role of a warehouse.</li> </ul> </li> <li>The staff is specially trained. They also serve other companies besides the Port of Varna PLC, which have contracts for ship garbage treatment.</li> </ul>
<b>Port of Durres</b>	-
<b>Comments</b>	In accordance with legislation implemented in ports there are facilities for selective collecting of waste but are needed more programs for separate treating and reusing of waste. Also, must be imposed rules, procedures for deposit of waste in safe conditions, according to best practices recommended in specific Directives.

**9. Which is the average percent of waste (per month or per year) that is reused or recycled?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	CN APMC responsibility
<b>Port of Bar</b>	This is at the very low level as for the Port area
<b>Port of Bari</b>	2%/year
<b>Port of Varna</b>	1400 tones per 2011
<b>Port of Durres</b>	400 tonnes per month
<b>Comments</b>	Management of waste in questioned ports included measures for reducing the quantity of waste by recycling a part of it and keeping documenting evidence of quantity of waste operated

**10. Which is the efficiency of fees uses for modernization/technology upgrade/renewing of port facilities which make the object of Port Reception Facilities regulated by IMO (1999)?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	CN APMC responsibility



PORTS	Port Operators and Subcontractors
<i>Port of Bar</i>	- not mentioned
<i>Port of Bari</i>	<b>YES.</b> Temporary storage of waste collected for recycling
<i>Port of Varna</i>	-
<i>Port of Durres</i>	-
<b>Comments</b>	No relevant information from questioned port operators. This aspect must be very well regulated in order to plan the further investments for improvement of environmental performance. In Port of Bari, incomes of waste operator's are invested in temporary storing of waste recovered for recycling purpose

**11. Which are the environmental benefits obtained after the implementation of the Management Plan of Port Facilities Reception?**

PORTS	Port Operators and Subcontractors
<i>Romanian Naval Authority (RNA)</i>	<ul style="list-style-type: none"> <li>Financial benefits</li> <li>Environment protection and secure of ports and national navigable waters (clean waters-clean ports)</li> <li>Sea and Danube River life and human secure and protection</li> <li>Enhancing of touristy and economic activity, etc.</li> </ul>
<i>Port of Bar</i>	- not mentioned
<i>Port of Bari Sermar S.a.s.</i>	<ul style="list-style-type: none"> <li>Improving the temporary storage of waste (liquid and solid) in order to reduce transportation costs to landfill</li> </ul>
<i>Port of Varna</i>	- not mentioned
<i>Port of Durres</i>	-
<b>Comments</b>	Questioned operators didn't give relevant answers with exception of Port of Bari, which mentioned only the improvement of economic savings made with temporary storage of waste

**IV. Shipping operators**

**12. Please describe how your company insures the security of shipping operations within the port area (taking into considerations also the implementation of Safety Management System)**

PORTS	Port Operators and Subcontractors
<i>Romanian Naval Authority (RNA)</i>	CN APMC responsibility
<i>Port of Bar</i>	- not mentioned
<i>Port of Bari</i>	<b>1.Istop SPAMAT S.r.l.)</b> <ul style="list-style-type: none"> <li>The activities are managed on the basis of the company procedures that provide both the management of the quality system and safety procedures with respect to Legislative Decree 81/08 and in accordance with the provisions of the Port Authority. The company has implemented a safety management system</li> </ul>
	<b>2.Silos Granari dela Sicilia</b> <ul style="list-style-type: none"> <li>Compliance with the street signage in the port area</li> <li>Compliance with the port area regulations</li> <li>Periodic monitoring of the plants</li> </ul>
<i>Port of Varna</i>	As per emergency plan for Marine Emergency and Rescue Squadron
<i>Durres Port</i>	
<b>Comments</b>	Ports and operators respondent have safety procedures implemented or safety rules applied to their operations performed in port area. However, the little number of respondent operators not permits us to have a clear conclusion about this aspect. As a recommendation, all ports operators, especially those which present risks for the

PORTS	<b>Port Operators and Subcontractors</b>
	<i>environment must introduce procedures for risks assessment and Safety Management System in their activities.</i>

**13. In case of accidents (spills, collides), which are the measures of environmental remediation in case that damages were produced?**

PORTS	<b>Port Operators and Subcontractors</b>
<b>Romanian Naval Authority (RNA)</b>	<i>In case of accidents spills, collides, etc. the environmental remediation is done with the expenses in the charge and account of the polluters or those which are responsible for the damages produced.</i>
<b>Port of Bar</b>	<i>Not mentioned</i>
<b>Port of Bari</b>	<b>1.Istop SPAMAT S.r.l.)</b> <i>The measures are required by the EMS – as required by the Environmental Manual at company</i>
	<b>2.Silos Granari dela Sicilia</b> <i>In case of cereals handling, is sufficient to recover the spilled goods and cleaning the area affected by the discharge</i>
<b>Port of Varna</b>	<i>As per emergency plan for Marine Emergency and Rescue Squadron</i>
<b>Durres Port</b>	
<b>Comments</b>	<i>Certified operator of cargo handling Istop SPAMAT from Bari Port manage the accidents according with procedures established through Environmental Manual</i>

**V. Bunkerage operators**

**14. What is the procedure under which your company operates – short description**

PORTS	<b>Port Operators and Subcontractors</b>
<b>Romanian Naval Authority (RNA)</b>	<i>Not mentioned</i>
<b>Port of Bar</b>	<i>Not mentioned</i>
<b>Port of Bari</b>	-
<b>Port of Varna</b>	-
<b>Durres Port</b>	-
<b>Comments</b>	<i>NO operator involved in bunkering activities has answered to the questionnaire</i>

**15. What are the possibilities of response (technological, legal) in case of accidents of your company?**

PORTS	<b>Port Operators and Subcontractors</b>
<b>Romanian Naval Authority (RNA)</b>	<i>Not mentioned</i>
<b>Port of Bar</b>	<i>Not mentioned</i>
<b>Port of Bari</b>	-
<b>Port of Varna</b>	<i>Not mentioned</i>
<b>Port of Durres</b>	-
<b>Comments</b>	-

**VI. Cargo handling operators**

**16. Does your port comply with IMO regulations (e.g.BLU and IMDG code)?**

PORTS	<b>Port Operators and Subcontractors</b>
<b>Romanian Naval Authority (RNA)</b>	<b>YES</b>
<b>Port of Bar</b>	<b>YES</b>
<b>Port of Bari</b>	<b>YES</b>



PORTS	Port Operators and Subcontractors
(Istop SPAMAT S.r.l.)	
Port of Varna	YES
Port of Durres	-
<b>Comments</b>	Cargo handling is well regulated according with IMO regulations in Ecoport8 ports, which make safer the conditions of operating and implicit protect the environment

**17. Please describe the measures against negative effects of accidents (discarding in water, soil, air) that may affect the environmental aspects**

PORTS	Port Operators and Subcontractors
Romanian Naval Authority (RNA)	CN APMC responsibility
Port of Bar	Continuous improvements of the cargo handling and storing technologies
Port of Bari	1.Istop SPAMAT S.r.l.) Since cargo handling with crane, it is very remote the possibility of pollution of air, water and soil. In any case, it is expected the safety of the site and subsequent intervention of the competent authorities and specialized companies
	2.Silos Granari dela Sicilia Since dust emissions from cereals (vegetable dust), in case of malfunction of equipments for dust reducing (mainly marked by the continuous monitoring system), the company operates with the stop of equipment in order to reset fault.
<b>Comments</b>	Cargo operators from Bari Port have implemented safety measures in case of pollution and furthermore the technology used permits a reduced impact on environmental aspects. Anyway, plans for intervention in case of pollution as well documented procedures, responsibilities and resources for reducing the damages are established. Dust emissions from grain silos operating are monitored and measures for preventing the damages are settled.

## VII. Dredging operators

**18. Please describe the legal framework under which you perform the dredging activity**

PORTS	Port Operators and Subcontractors
Romanian Naval Authority (RNA)	<ul style="list-style-type: none"> <li>• <b>MTI Order 287/2003, as amended</b> regarding the authorization of the companies dealing with naval transport activities</li> <li>• <b>Law 108/2010</b> on ports and navigable channels administration, as well as naval transports activities in ports and navigable channels</li> <li>• <b>MTI Order 287/2003, as amended</b>, establishes the criteria for authorization of specialized companies performing <b>extraction dredging</b> operations: <ul style="list-style-type: none"> <li>◦ to present a list of specialized vessels, proving that the following requirements are fulfilled : safe shipping, environmental protection measures, work and health conditions;</li> <li>◦ to prove that the company is the owner of the vessels or the existence of a leasing or hire contract for minimum 1 year, registered to the national competent authority;</li> <li>◦ to present a list of employees with qualification in this field;</li> <li>◦ to prove that they are accepted by the port administration;</li> <li>◦ optional: insurance for vessels and employees.</li> </ul> </li> <li>• According to the <b>Law 108/2010</b>: <ul style="list-style-type: none"> <li>◦ is regulated any dredging activity;</li> <li>◦ the port administrations are not allowed to perform extraction dredging activities in the ports belonging to public property.</li> </ul> </li> </ul>
Port of Bar	-
Port of Durres	The Environmental Impact Assessment of Dredging project in port of Durres, is carried out by a German company and now a tendering procedure is going on.

PORTS	Port Operators and Subcontractors
<b>Port of Bari</b>	-
<b>Comments</b>	<p>NO operator involved in the dredging activities has answered to the questionnaire. However, ARN Constanta provided a list with the most relevant legislation for this domain and also the conditions in which the dredging operators are authorized for this activity in the port basin.</p> <p>New requirements coming from the implementation of Water Directive and related directives as well as recommendations given by the Best Practices Guidelines manuals published by international organizations (e.g., EPA, CEDA, OSPAR etc) are useful instruments for plan the dredging activities in an environmental and economical sustainable way. EIA and ERA must become instruments for assessing the potential impacts but also to estimate the risks and to take the right management decisions. Demonstrating the compliancy with best practices in the field fundament the environmental performance certification.</p>

**19. Which are the solutions that you found out for dredged sediments' disposal?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	Not mentioned
<b>Port of Bar</b>	Not mentioned
<b>Port of Bari</b>	-
<b>Port of Varna</b>	-
<b>Port of Durres</b>	

**20. What solutions would match best in your port from environmental and economical point of view?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	Not mentioned
<b>Port of Bar</b>	Not mentioned
<b>Port of Bari</b>	-
<b>Port of Varna</b>	-
<b>Port of Durres</b>	-
<b>Comments</b>	

**21. Have your port implemented the recommendations of IMO regarding dredged sediments control before disposal?**

PORTS	Port Operators and Subcontractors
<b>Romanian Naval Authority (RNA)</b>	Not mentioned
<b>Port of Bar</b>	Not mentioned
<b>Port of Bari</b>	-

## CONCLUSIONS

WP 6.1 has incorporated the results of WP4 and WP5 and has analyzed some benchmark in the international framework.

The results of WP 6.1 , which will be used for the construction of the Final Common Protocol, are themselves a final output of the project.

In fact, for every environmental aspect, the present Report allows to have a a wide sampling of good practices, of operational and management guidelines.

One aspect certainly interesting, to be taken into account in drawing up the Final Common Protocol, is a clear need to entrust to a subject coordinator the coherent definition of a set of actions, objectives and programs appropriately chosen (and this Report presents a broad review).

It highlights the need to reclassify the programs and good practices in the context of policies relating to legal compliance and regulatory world maritime traffic: as demonstrated in WP4 and in this WP 6.1 , the complexity (but also the lack of homogeneity and fragmentation) of legislation and international regulations, must induce to a big effort and commitment of coordination of activities and operators in Ports.

This last aspect is very evident in the analysis of the questionnaires (prepared by GeoEcoMar and revised by external reviewer Stefano Battellini), addressed both to port authorities and to operators. The main results of the analysis of questionnaires (even if it would have been better adhesion and compilation) are summarized in the following points.

- Most ports authorities have answered to the general questions about the issues that constitute the main elements of an EMS, while only 3 operators from Bari Port have offered their contribution to the inputs of this questionnaire.
- Due to the small participation of operators, this questionnaire can't bring very relevant information about the contribution of them to the overall environmental management of the ports
- Answers given by the port authorities as main actors show that are preoccupied of environment and many of them make efforts towards implementation of an EMS
- The key environmental issues prioritized by each respondent port authority are common in most of the ports (water quality in port aquatorium, releases to water, air quality, noise, energy efficiency)
- The organizational schemes built at the level of ports' organizations could be operational from the point of view of coordination, implementation and control of an environmental management. However, some ports are still in the process of organization of specialized departments inside port area (e.g., Bari).
- The responsibilities for different managerial environmental aspects are shared among different ports compartments' and authorities and therefore the coordination between

them should be a priority of the ports' management (CONSTANTZA: CN Maritime Ports Administration SA Constanta - APM SA Constanta, Navigable Water Channels Administration, The Guard Coast etc; BAR: operational management of the port infrastructure, management of the port superstructure, management of handling and storing operations with dry bulks, liquid bulks, Ro-Ro cargoes and passenger traffic, environmental protection management; BARI: Capitaneria del Porto – Coast Guard, Polizzia di Frontiera Marittima ed aerea, Guardia di Finanza, Vigili del Fuoco, private organization for the management of dry bulk storage and distribution; DURRES: Fire protection and rescue police, Port Security Force, Directorate of Environment & Monitoring Laboratory)

- Targets and objectives stipulated in the environmental policy declarations of ports are all directed to achieve the economical and ecological performance but some of them are very dependent of the financial investments in technology and ports infrastructure on medium or long time.
- Internal communication and training programs of employees about the environmental policy still lack specialized and regular programmes in most of the ports. Some exceptions were recorded in Port of Constantza, Varna Port, Bari Port, but are much addressed to small segments of professional categories.
- Monitoring programmes were defined in Port of Bari (air monitoring), Port of Durres (air, water, noise monitoring), Port of Bar (meteorological and air, water monitoring), Port of Constanta (effluents and potable water monitoring), in relation with pollution generating activities. The points of monitoring were set in the potential impacted areas by the identified sources. Must be clear defined the standards to which the measures are referring and how the limits of set parameters to be imposed to each polluter. In case of port aquatorium for e.g., must be clear defined the status of water as to know the domain of application of the standards.
- In case of port operators neither general questions nor the specific ones were able to offer an image of their contribution to the EMS implementation
- On the base of the 3 Italian operators respondent, specialized one on cargo handling of cereals (EMS certified), one on the solid and liquid waste (EMS certified) and the other, a grain silos operator, can be said that their independent certification constitute a guarantee for ports' authorities that environmental measures to control and fight against pollution coming from their activities are taken and that the targets of environmental performance will be reached.



- One important aspect of EMS implementation is changing of ports' vision about the economical development and environmental sustainability. Therefore, must be enlarged the financial sources of investments in environment paying much more attention to projects which promote innovation in technology, awareness of employees, or stakeholders' support.

## **Annex1. Elements in developing an EMS**

An EMS naturally leverages and builds upon existing good practices and the practical knowledge base of employees throughout the organization.

A common approach based on ISO 14000 in defining EMS within one organization comprised **17** elements. A “Plan-Check-Act-Do” is subordinated in operational management of each element.

1. Define scope of EMS and assign EMS responsibilities;
2. Create environmental policy statement;
3. Identify relevant legal and other requirements;
4. Identify environmental aspects and significant environmental aspects;
5. Establish objectives, targets, and action plans;
6. Resources, Roles, Responsibility and Authority
7. Develop operational controls;
8. Develop emergency preparedness and response program;
9. Set up a training program for competence and awareness;
10. Create a communications strategy;
11. Set up documentation for the EMS;
12. Measurement and Monitoring
13. Evolution of compliance
14. Nonconformity, Corrective action, Preventive action
15. Control of Records
16. Internal Audit
17. Management Review

### **Element 1: Define Scope of EMS and Assign Responsibilities**

The EMS must provide a mechanism for environmental management throughout all functional areas of port facility. The EMS is designed to cover environmental aspects that a facility can control and directly manage as well as those aspects that it does not control or directly manage.

### **Element 2: Create Environmental Policy Statement**

Most of the Ecoport8 ports have developed environmental policy statements to guide their EMS efforts.

#### **Minimum Port Commitments in EMS Policy Statement**

- Compliance with legal requirements & voluntary commitments
- Pollution prevention
- Continuous improvement in environmental performance
- Transparency and permanent consultation with community about the port’s environmental performance

### **Element 3: Identify Relevant Legal and Other Requirements**

Checking the compliance with legal national and international requirements within the Ecoport 8 ports was one of the main targets of the project. Standing at the base of the environmental policy, ports are required to develop procedures to identify, access, analyze,

and communicate applicable legal and other requirements and ensure that these requirements are factored into the organization's management efforts. Other legal requirements might include industry or trade group codes of practices, or neighbourhood or community association requirements. Up-to-date information should be permanently obtained.

An overview of the legal compliancy of ports with main national and European requirements is presented in the Chapter 5 "**Environmental Key issues in Ecoport 8 Ports**".

#### Element 4: **Identify Environmental Aspects & Significant Environmental Aspects**

This is based on:

- Identifying the environmental aspects (e.g. losses during bunkering, losses during maintenance, disposal of waters in the sea, oil spilling, garbage from passengers and crew, dust emissions, fuel consumption, etc) based on port activities and pollution level assessment;
- Identifying the effects on human and environmental (from low to high)
- Assess the risks on: workers, community and environment exposure, noise, safety (from low to high)
- Asses the overall level of risk

#### Element 5: **Establish Objectives, Targets, and Action Plans**

Once the SEAs are identified, must be set environmental objectives and targets. Objectives and targets help the port continuously improve its environmental performance. An environmental **objective** is an overall environmental goal arising from port's environmental policy statement. Environmental **targets** are detailed performance requirements that are based on an environmental objective and are quantified whenever practicable. While all SEAs need operational controls, not all need objectives and targets. In setting objectives and targets, the port should consider its environmental policy commitments to prevent non-compliance, prevent pollution at its source, minimize cross-media pollutant transfers, and continuously improve its environmental performance.

WP4 report made a detailed description of plans (investments) of ports towards environmental improvement. As an exercise of training activity performed under WP 6.2., all trainees have identified in the studied ports the main objectives, targets and action plans to which ports commit to implement according to their environmental policy. Some of the objectives and targets are included in the following material as examples of good practices in the field and actions to follow to improving the operational environmental management in all ports.

#### Element 6: **Resources, Roles, Responsibility and Authority**

EMS Resources, Roles, Responsibility and Authority include: training, human resources, specialty services, financial resources, and technical and informational services. The EMS Representative has primary responsibility for establishing, operating and maintaining the EMS. The structure and responsibilities of the EMS will be developed in accordance with the Structure and Responsibility procedure.

In the process of EMS preparation, Ecoport8 ports' authorities have involved in a series of investments funded by national and European projects and programmes pursuing to attaining state of the art environmental technology (e.g., Bar, Constanta, Bourgas, Durrës).

#### Element 7: **Develop Operational Controls**



Operational controls are documented procedures, work instructions, BMPs, posted placards, and action plans that ensure that operations and activities (such as wastewater discharge monitoring, waste management, and environmental performance improvement) are carried out effectively. At least one operational control should be in place for each SEA identified to ensure compliance with legal requirements and company policies or to achieve improvement objectives.

In all Ecoport8 ports have been identified operational control procedures for waste management, cargo loading and unloading operations, and bunkering.

#### **Element 8: Develop emergency preparedness and response program**

An effective emergency preparedness and response program (EP&R) should include provisions for:

- assessing the potential for accidents and emergencies;
- preventing incidents and their associated environmental impacts;
- responding to incidents through emergency plans and procedures;
- testing of emergency plans and procedures periodically;
- mitigating impacts associated with accidents and emergencies

Operational Controls must be built for each environmental, health or safety regulatory programs, which require emergency plans and/or procedures

#### **Element 9: Set Up a Training Program for Competence and Awareness**

Each person and function within a port can play a role in environmental management. Employees, tenants, and managers should be aware of the environmental policy, the SEAs and related procedures that apply to their work, key EMS roles and responsibilities, and the importance of meeting EMS requirements. Employees also should understand what might happen if they don't meet EMS requirements, such as spills, releases, and fines or other penalties.

#### **Element 10: Create a Communications Strategy**

An EMS should define the process for proactive, two-way, internal and external communication.

Internal communication should provide information about environmental requirements and voluntary commitments to all employees, on-site service providers, and contractors whose work could affect your ability to meet those requirements and commitments.

External communication should provide information on your environmental programs and accomplishments to other stakeholders and include a way to provide feedback. Stakeholders include anyone who has a stake in ports facility's environmental performance.

#### **Element 11: Set Up Documentation for the EMS**

Documentation is a requirement of an EMS, but it should not be the main emphasis. EMS documentation is different than EMS records. **EMS documentation** describes what must be done and how to be done, while **EMS records** demonstrate that it is done what the documentation stipulates.

Some sort of EMS Manual, either electronic or hard copy, can be the EMS documentation and should:

- Describe the core elements of your EMS and how the elements interact
- Provide direction to related documentation.

#### **Element 12: Measurement and Monitoring**



Monitoring and measurement will permit a better control by allowing ports authorities to measure environmental performance, analyze what is going wrong, and assess compliance with legal requirements, by:

- Monitoring operations and activities that can have significant environmental impacts and/or compliance consequences;
- Tracking performance (including the progress in achieving ports' goals);
- Measures and reports on continuous improvement in environmental performance via the EMS;
- Calibrates and maintains monitoring equipment;
- Perform periodically internal audits to evaluates compliance with applicable laws and regulations

#### Element 13: **Evolution of compliance**

This is part of monitoring programme and is dedicated to improving of programs, targets and objectives established through environmental management. It is a step by step activity included in all procedures, operations and decision-making process.

#### Element 14. **Nonconformity, Corrective action, Preventive action**

Nonconformity must be evidenced through documented procedure in order to plan the preventive actions or corrective actions by filling in PAN (*Preventive Actions Notice*: PAN) or CAN (*Corrective Action Notice*).

*Preventive Action* - is generally a proactive process intended to prevent potential problems before they occur or become more severe

*Corrective Action* - is generally a reactive process used to address problems after they have occurred

#### Element 15. **Control of Records**

This procedure establishes a process for the review, distribution and implementation of documents that describe and control the EMS. The procedure applies to the following documents (and any changes to them) that must be controlled: the EMS manual, facility wide environmental procedures, process-specific or activity-specific procedures and work instructions and forms, checklists and drawings used for EMS purposes.

#### Element 16. **Internal Audit**

The EMS audits are coordinated by the EMS Representative and conducted on an annual basis. The results are provided to management in accordance with the Management Review procedure. Audits are performed according to a schedule that is based on the environmental importance of an activity and the results of previous audits. All auditors are trained and audit records are kept with the EMS Representative.

#### Element 17. **Management Review**

Management reviews are critical to continual improvement and ensure the EMS will continue to meet the port's needs over time. A management review answers the question, "Is the system working?" (i.e., is it suitable, adequate, and effective, given the port's needs?).

Your port's top management should review and evaluate your EMS at defined intervals, such as quarterly. While the scope of the review should be comprehensive, not all elements need to be

reviewed at once. Review of the policy, goals, and procedures should be carried out by the level of management that defines them. The management review should include:

- Results from assessment, including internal audits, and status of preventive and corrective actions;
- Progress in meeting objectives and targets;
- The continuing suitability of the EMS in relation to changing conditions and information; and
- Concerns of relevant interested parties;
- Follow-up actions from previous management reviews; and
- Recommendations for improvement.

Management involvement ensures that the EMS is integrated not only in the port's day-to-day operations but also into its strategic planning process.