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REGIONAL MARINE POLLUTION EMERGENCY
RESPONSE CENTRE FOR THE MEDITERRANEAN SEA
(REMPEC)

EURO-MED PARTNERSHIP

EU - UE

MAP

PROJECT MED.B7.4100.97.0415.8

PORT RECEPTION FACILITIES FOR COLLECTING SHIP-GENERATED GARBAGE, BILGE WATERS AND OILY WASTES

ACTIVITY A

COLLECTION AND TREATMENT OF SOLID AND LIQUID WASTES

FINAL REPORT

October 2003

epe ENVIRONMENTAL PROTECTION ENGINEERING S.A.

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The present document and related study have been produced with the financial assistance of the European Community.

The views expressed herein are those of REMPEC and can therefore in no way be taken to reflect the official opinion of the European Community (EC).

PROJECT MED.B7.4100.97.0415.8

PORT RECEPTION FACILITIES FOR COLLECTING SHIP-GENERATED GARBAGE, BILGE WATERS AND OILY WASTES

ACTIVITY A

COLLECTION AND TREATMENT OF SOLID AND LIQUID WASTES

Within the framework of Euro-Mediterranean Partnership, the European Community (EC) and the International Maritime Organisation (IMO) on behalf of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), have signed in December 2001 a Grant Agreement for the implementation of the operation entitled: Port reception facilities for collecting ship-generated garbage, bilge water and oily wastes (Project MED.B7.4100.97.0415.8). The implementation of the three-year Project started on 1st January 2002.

The Project addresses ten Mediterranean beneficiary countries, Contracting Parties to the 1976 Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution (Algeria, Cyprus, Egypt, Israel, Lebanon, Malta, Morocco, Syria, Tunisia and Turkey) and aims at facilitating the implementation of Annex I and Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).

Activity A (Collection and treatment of solid and liquid wastes) as well as Activity C (Collection and treatment of oily ballast waters from tankers) of the Project were executed by the Environmental Protection Engineering S.A., Greece, contracted by and under the responsibility of REMPEC.

The present report contains the findings of Activity A, while the findings of Activity C are the subject of a separate report.

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- EXECUTIVE SUMMARY

The Activity A of the project "Port Reception Facilities for Collecting Ship-Generated garbage, bilge water and oily wastes" – MED.B.7.4100.97.0415.8, is concerned with the identification of required capacities for collection and treatment of relevant types of solid and liquid wastes, taking into consideration the type and capacity of existing installations and specific nature of traffic in each country and port concerned, as well as specific requirements resulting from such differences.

Annex I of MARPOL 73/78 contains certain regulations and interpretations related to procedures for the retention onboard, treatment, discharge at sea and disposal of oily mixtures generated in the machinery spaces of all ships and the cargo areas of oil tankers. Annex V, similarly, contains regulations dealing with the storage, disposal and management in general of garbage produced onboard ships.

All the beneficiary countries of the project are signatory parties of the International Convention MARPOL 73/78 and its optional Annex V dealing with the prevention of marine pollution from ship-generated garbage, apart from Israel and Malta which are currently in preparatory work to ratify this Annex.

Status of Annexes I and V of MARPOL 73/78 in the area of the project
(July 2003)

Country	Annex I	Annex V
Algeria	4	4
Cyprus	4	4
Egypt	4	4
Israel	4	-
Lebanon	4	4
Malta	4	-
Morocco	4	4
Syria	4	4
Tunisia	4	4
Turkey	4	4

Four questionnaires were produced and provided to the respective Port Authorities and Terminal Operators before the missions to each port and terminal, to enable the collection of essential information from those that are responsible for the provision, control and the operation of port reception facilities.

These questionnaires were as follows:

1. *Review of the national legislative framework related to the provision of port reception facilities for ship-generated waste (QES.1)*

It was addressed to both REMPEC Governmental - Operational Focal Points and the Maritime - Ports Administration Contact Points to provide information as per their area of responsibility.

2. Questionnaire for dedicated Oil Terminals (QES.2)

This questionnaire was addressed to the Administration / Operators of oil terminals operating within the jurisdictional area of the ports involved in the project.

3. Questionnaire for Ports (QES.3)

This was addressed to the Authority of each one of the ports, from which information was requested to a number of issues related to the maritime traffic, the type and the general infrastructure of the port and the existing reception facilities for dirty ballast and ship-generated waste in general.

4. Voluntary Questionnaire for Masters of ships calling at the port (QES.4)

This was addressed to the Masters of ships that used to call at the ports during the project, seeking their voluntary participation to provide a few but significant data on the waste types and amounts their ships normally produce, handle and wish to deliver at port.

The methodology used for calculating the volumes of dirty ballast and other relevant oily wastestreams from tankers involved the following tasks:

1. Calculation of the volumes of wastestreams by means of a series of formulas, that were developed taking into account:

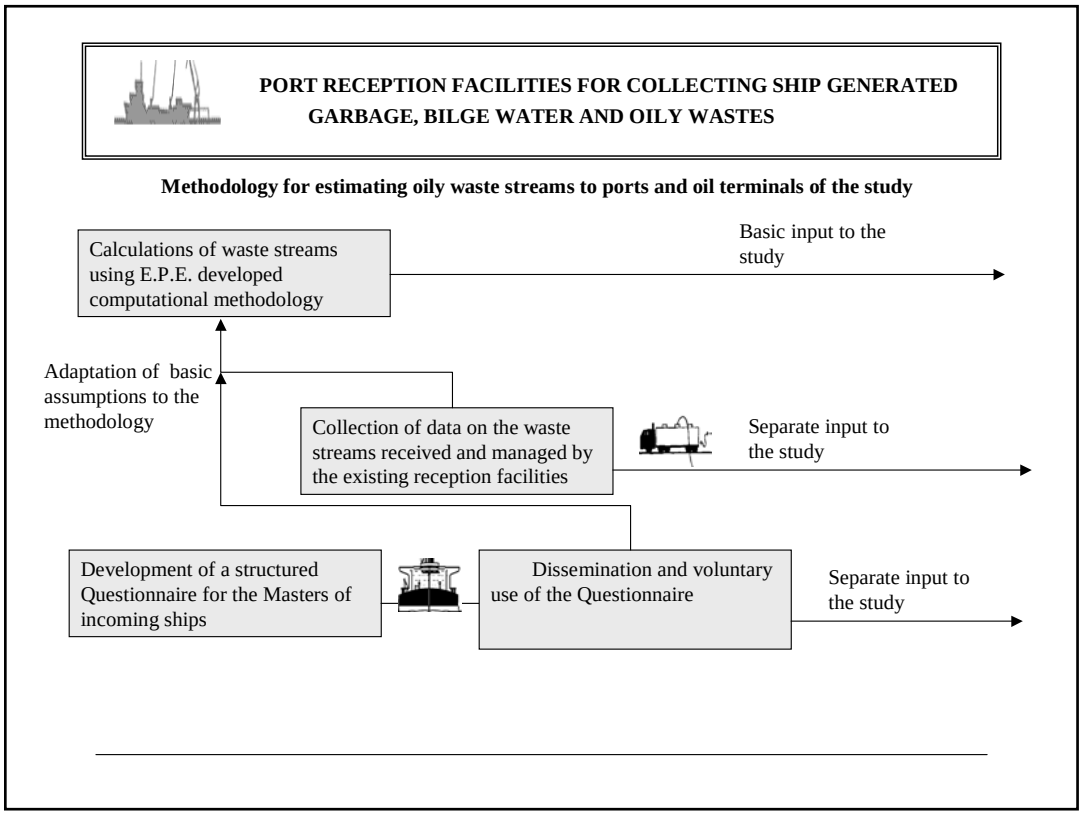
1a The Guidelines developed by the International Maritime Organization to determine the adequacy of reception facilities for oily wastes from ships, based on the permissible discharge criteria at sea, oil retention onboard requirements and practices, as well as assumptions on waste production onboard ships.

1b Data on terminals specific traffic, collected from the responsible port authorities and/or other maritime-related sources, the berthing infrastructure in relation with the permissible and average sizes of ships,

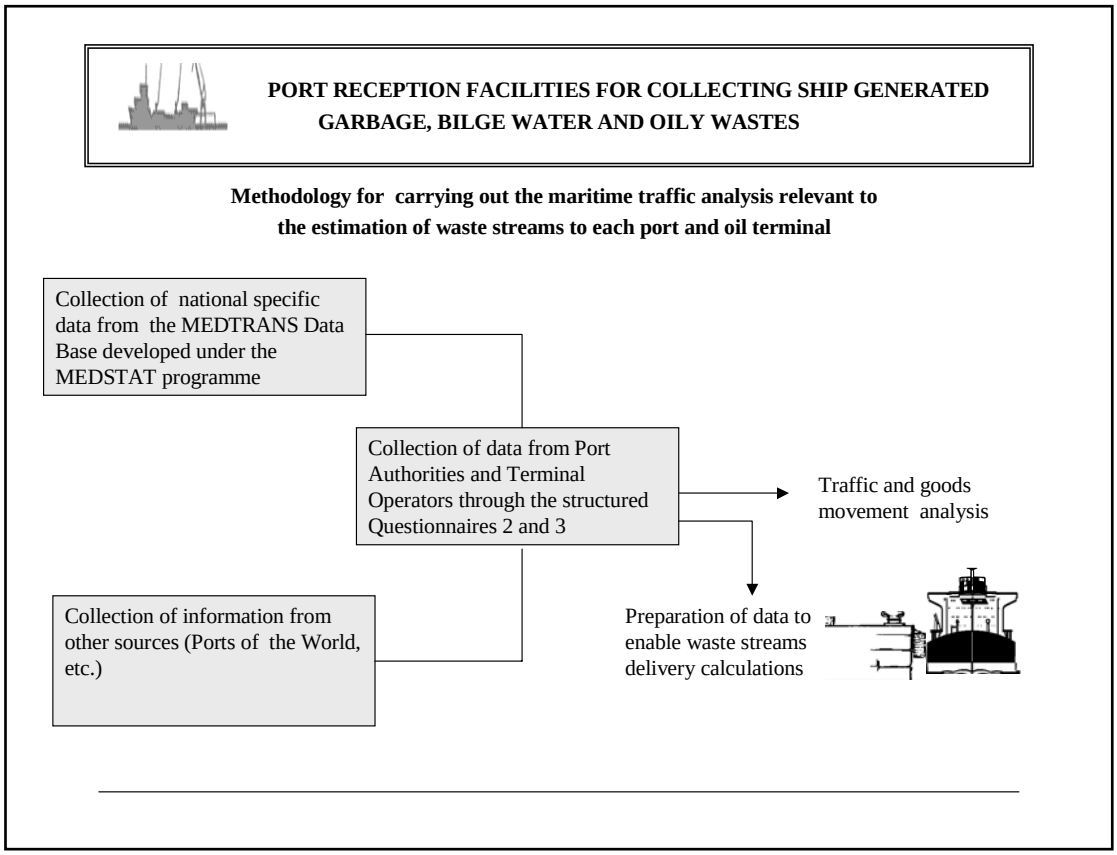
the volume of oil as cargo handled on average, any operational requirements imposed to tankers, etc.

2. Collection of data maintained and provided by the operators of the existing reception facilities with the aim to compare the results taken from the first step and also to adapt better the formulas to the local conditions.

The methodology is presented schematically below:



The methodology used for the analysis of maritime traffic consisted of the collection of data through the completed questionnaires 2 and 3 (developed for oil terminals and ports respectively), from other sources as well as from the MEDTRANS data base developed and maintained under the MEDSTAT program. Schematically, this methodology is shown below:



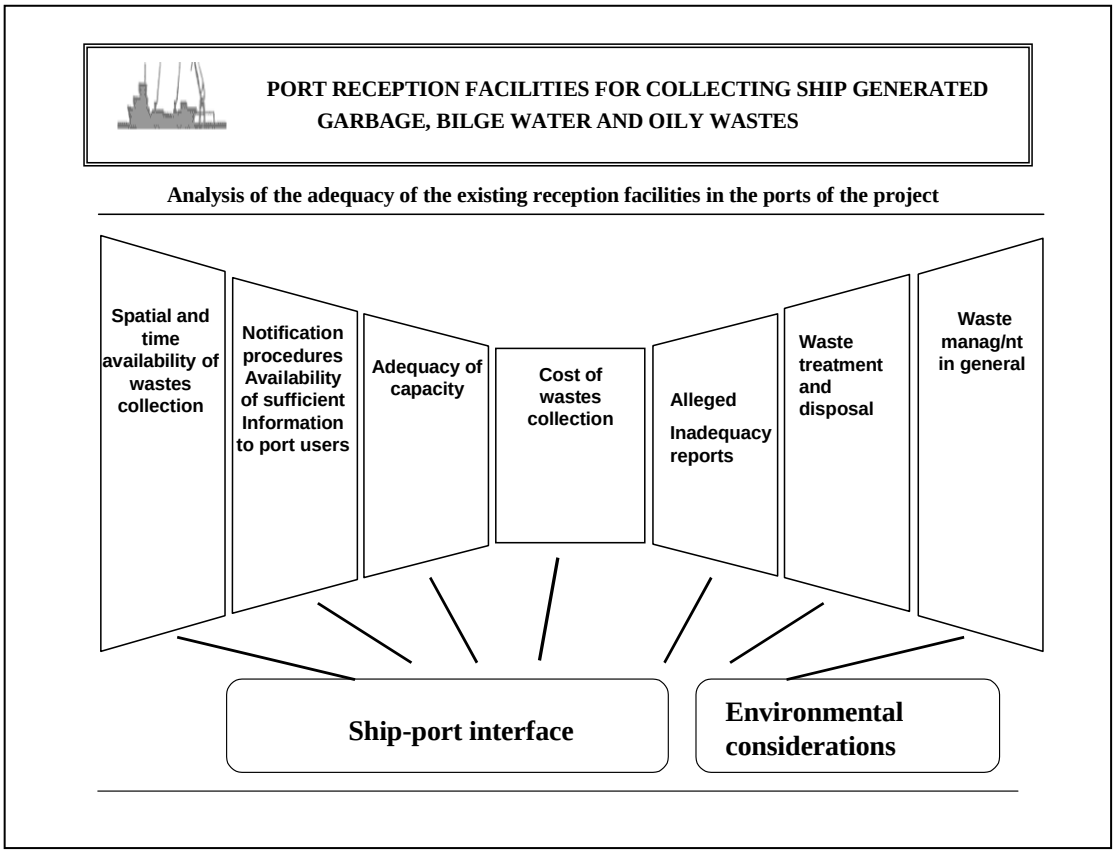
Two major sets of criteria were identified as more suitable and at the same time critical to assess the adequacy of the existing reception facilities, one dealing with the ship-port interface and a second dealing with the protection of the environment from secondary wastes or potential pollution produced during waste collection, treatment and disposal processes.

The first set provides a series of criteria emphasizing on the operational needs of ships normally calling at the ports and terminal of the project. There is no doubt that a port to become successful and adequate in providing reception facilities for ship-generated waste, should have regard to the operational needs of its users supplying all the appropriate means to collect and further manage the different types and volumes of wastes from ships normally engaged in operation at its terminals or wider area such as designated anchorages, etc. In parallel, the operation and the management of the existing facilities should not provide any disincentives for incoming ships to use them.

The second set of criteria concentrates on environmental and technical considerations regarding the way that waste collected is managed and finally disposed of, including procedures enabling the wastes traceability, procedures for complying with national or other standards related with the discharge of effluent water, etc.

Whenever, during the missions or during the information collection process, details of the local or wider waste management strategy and relevant requirements were known, it was almost always feasible to result in safe conclusions on that.

The criteria used to assess the adequacy of the existing reception facilities are schematically presented in the following diagram:



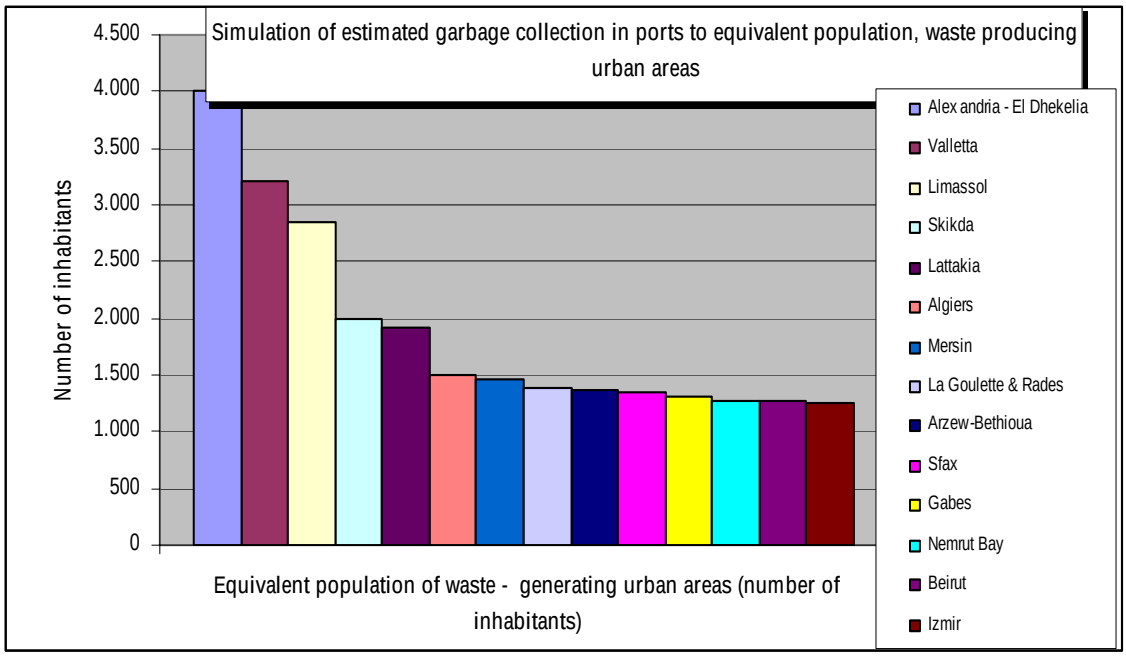
From the estimation of the waste streams (basically, of the average annual volume, the reduced daily volume and the maximum volume per arrival) as well as the assessment of the needs of each port separately, it was concluded that at least ten of them, need to establish a port – based reception and pre-treatment facility.

A conceptual flow process diagram was produced for every proposed facility, while in certain cases a separate collection pattern with regional treatment was considered.

During the missions in the ports of the project, it was realized that most of the existing oily wastes treatment facilities employ mild processing techniques to produce either replacement fuel oil for cement kilns, large boilers, or more severe processing techniques to produce marine, fuel oils following blending with standard fuels.

The operation of the recommended, new reception and pre-treatment facilities should ensure that oil recovered from the treatment process, is disposed of in the proximity of the port area minimizing the need of distant road or sea transport and that are re-used in a way that does not pose risks to the environment or to human health.

It should be noted that a few major ports involved in the project, in terms of the volume of waste streams that are called to manage, can be seen as waste generating, urban areas with equivalent population of more than 2.000 inhabitants.



It was recommended that mechanically assisted, garbage transfer facilities, to be established on a pilot basis, at least in ports where garbage delivery exceeds the rate of 2.000 capita - waste producing urban areas (ports of Alexandria, Valetta, Limassol and Skikda).

Ship – port notification systems and procedures, established to facilitate the collection of wastes from the available facilities, should enable the formal exchange of information on the existence of hazardous wastes or substances and the subsequent need for disposal at the port.

The production of a standard, national plan that could be developed and implemented across the ports of the country would contribute to the consolidation and formulation of numerous elements, such as the dynamic assessment of the need for port reception facilities, the development of procedures for the reception, collection, pre-treatment and final disposal of

ship-generated wastes and cargo residues, the description of the charging system, the development of procedures for recordkeeping the actual use of the facilities, e.t.c.

Assessment of the environmental effects of ongoing or forthcoming waste management activities in the ports of the project, such as the establishment and operation of reception and treatment facilities, garbage transfer stations, etc., is recommended as a formal procedure.

The effectiveness of port reception facilities has been demonstrated that can be improved by requiring or encouraging ships to notify their need to use reception facilities. In parallel, a dynamic tool is provided to the respective port authorities and reception facilities' operators to systematically verify the adequacy of the capacity of the available facilities and the efficiency of the whole collection service. It is recommended also that the port authorities and the dedicated terminal operators in the area of the project, require or encourage the Masters of ships to notify their needs by making use of a standard, notification document.

GENERAL

1. General

1.1 Subject and scope of the Activity A of the project

The Activity A of the project "Port Reception Facilities for Collecting Ship-Generated garbage, bilge water and oily wastes" – MED.B.7.4100.97.0415.8, is concerned with the identification of required capacities for collection and treatment of relevant types of solid and liquid wastes, taking into consideration the type and capacity of existing installations and specific nature of traffic in each country and port concerned, as well as specific requirements resulting from such differences.

The Project addresses ten Mediterranean beneficiary countries, Contracting Parties to the 1976 Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution (Algeria, Cyprus, Egypt, Israel, Lebanon, Malta, Morocco, Syria, Tunisia and Turkey) and aims at facilitating the implementation of Annex I and Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).

The ports that were visited and studied by country in the framework of the Activity A and C *(Collection and treatment of dirty ballast from tankers)* of the project are listed in the following table. It should be noted that a number from them due to their exclusive oil - related activities, are discussed in the Final Report of the Activity C.

- **Algeria**
  Algiers, Annaba, Arzew, Bejaia, Bethioua, Ghazaouet, Jizel, Mostagenem, Oran, Skidka, Tenes
- **Cyprus**
  Dhekelia, Larnaka, Limassol, Moni, Vassiliko
- **Egypt**
  Alexandria, Damieta, El Dekhelia, Port Said, Sidi Kerir
- **Israel**
  Ashdod, Ashqelon, Hadera, Haifa
- **Lebanon**
  Beirut, Jounieh, Saida, Selaata, Tripoli, Zahrani Terminal
- **Malta**
  Marsaxlokk, Valletta
- **Morocco**
  Nador, Tangiers
- **Syria**
  Banias, Lattakia, Tartous
- **Tunisia**
  Bizerte & Menzel Bourguiba, Gabes, La Goulette & Rades, La Skhira, Sfax, Sousse, Zarzis
- **Turkey**
  Aliaga, Antalya, Bodrum, Ceyhan, Dikili, Iskenderun, Izmir, Kusadasi, Marmaris, Mersin, Nemrut Bay

1.2 Definitions

Annex I of MARPOL 73/78 contains certain regulations and interpretations related to procedures for the retention onboard, treatment, discharge at sea and disposal of oily mixtures generated in the machinery spaces of all ships and the cargo areas of oil tankers.

Annex V, similarly, contains regulations dealing with the storage, disposal and management in general of garbage produced onboard ships. The terms used for the purpose of this Report as well as their definitions which are presented below have been extracted by the following sources:

- MARPOL 73/78 Annex I Regulations and unified interpretations.
- MARPOL 73/78 Annex V Regulations.
- IMO Guidelines for the implementation of Annex V of MARPOL 73/78. These Guidelines provide information and guidance to assist vessel personnel in complying with the requirements set forth in Annex V and also port and terminal operators in assessing the need for and providing adequate reception facilities for garbage generated onboard different types of ships.
- IMO Guidelines for systems for handling oily wastes in machinery spaces of ships. These guidelines provide guidance in achieving an efficient and effective system for the management of oily bilge-water and oil residues for new buildings and, where applicable and reasonable, for existing ships.

The terms used and the definitions are as follows:

Oil is defined as petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products other than petrochemicals.

Oily wastes means oil residues (sludge) and oily bilge-water.

Oil residues (sludge) means:

- separated sludge, which means sludge resulting from purification of fuel and lubricating oil;
- drain and leakage oil, which means oil resulting from drainages and leakages in machinery spaces; and
- exhausted oils, which means exhausted lubricating oil, hydraulic or other hydrocarbon-based liquid which are not suitable for use due to deterioration and contamination.

Oily bilge water means an oil – water mixture containing potentially sea and fresh water, fuel oil, cooling water, leakage and lubricating oil, accumulated either in designated holding tank/s or bilge wells.

Mediterranean Sea area means the Mediterranean Sea including also the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41^0 N parallel and bounded to the west by the straits of Gibraltar at the meridian of 5^0 36' W.

Sludge tanks means:

- tanks for separated sludge;
- drain and leakage oil tanks; and
- exhausted oil tanks.

Bilge-water holding tanks mean tanks for oily bilge-water.

Oil sludge incinerators are systems serving for incineration of oil sludge generated on board seagoing ships. Sludge incinerators should be main and auxiliary steam boilers with appropriate oil sludge processing systems, incinerators with appropriate oil sludge processing systems designed for sludge incineration, etc. .

Harmful Substance means any substance which, if introduced into the sea, is liable to create hazards to human health, harm living resources and marine life, damage amenities or interfere with other legitimate uses of sea. Harmful substances for which MARPOL 73/78 has set discharge limits are oil and oily mixtures (Annex I), noxious liquid substances in bulk (Annex II), sewage (Annex IV), garbage (Annex V) and air emissions (Annex VI).

Discharge, in relation to harmful substances or effluents containing such substances, means any release, from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying which is limited for the purpose of this Report to the discharge of oily bilge water and garbage. Discharge does not include dumping, within the meaning of the London Dumping Convention.

Food wastes are any spoiled or unspoiled victual substances, such as fruits, vegetables, poultry, meat products, food scraps, food particles, and all other materials contaminated by such wastes, generated aboard ship, principally in the galley and dining areas.

Plastic means a solid material which contains as an essential ingredient one or more synthetic organic high polymers and which is formed during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic. Plastics are used for a variety of marine purposes including, but not limited to, packaging (vapor-proof barriers, bottles, containers, liners) ship construction (fiberglass and laminated structures, siding, piping, insulation, flooring, carpets, fabrics, paints and finishes, adhesives, electrical and electronic components), disposable eating utensils and cups, bags, sheeting, floats, fishing nets, strapping bands, rope and line.

Domestic wastes means all types of food wastes and wastes generated in the living spaces on board the ship.

Cargo-associated wastes means all materials which have become wastes as a result of use on board a ship for cargo stowage and handling. Cargo-associated waste includes but is not limited to dunnage, pallets, lining and packing materials, plywood, paper, cardboard, wire, and steel strapping.

Maintenance wastes means materials collected by the engine department and the deck department while maintaining and operating the vessel, such as soot, machinery deposits, scraped paint, deck sweeping, wiping wastes, rags, etc.

Operational wastes means all cargo-associated wastes and maintenance wastes, and cargo residues as defined below.

Cargo residues are defined as the remnants of any cargo material on board that cannot be placed in proper cargo holds (loading excess and spillage) or which remains in cargo holds and elsewhere after unloading procedures are completed (unloading residual and spillage).

Oily rags are rags which have been saturated with oil while contaminated rags are those which have been saturated with a substance defined as a harmful substance including oil.

Ash and clinkers from shipboard incinerators and boilers are operational other garbage in the meaning of Annex V respective regulations.

REGULATIONS & RULES

2. Regulations and Rules

2.1 Oily Mixtures

2.1.1. Criteria for discharging oily mixtures from the machinery spaces at sea

In accordance with Regulation 10 of MARPOL 73/78 Annex I (Methods for the prevention of oil pollution from ships while operating in Special Areas), any discharge into the Mediterranean sea of oil or oily mixtures from any oil tanker and any ships of 400 tons gross tonnage and above other than oil tankers is prohibited.

The abovementioned prohibition does not apply to the discharge of processed bilge water from machinery spaces, provided that all the following conditions are met:

(a) the bilge water does not originate from cargo pump room bilges of an oil tanker,

(b) the bilge water is not mixed with oil cargo residues,

(c) the ship is proceeding en route,

(d) the oil content of the effluent without dilution does not exceed 15 parts per million; and

(e) the ship has in operation equipment as required by Regulation 16 of Annex I. For ships of 10.000 tons gross and above this equipment includes an oil filtering equipment with arrangements for an alarm and for automatically stopping any discharge of oily mixtures when the oil content in the effluent exceeds 15 parts per million. Any ship of 400 gross tons and above but less than 10.000 gross tons should be fitted with an oil filtering equipment. In parallel, any such ship which carries large quantities of oil fuel should similarly be fitted with an approved oil filtering equipment with alarm and automatic stopping arrangements.

For ships of less than 400 tons gross, their Flag State Authority should ensure, that as far as practicable, they shall be equipped so to retain on board oil or oily mixtures to discharge them in accordance with the abovementioned requirements. Ships engaged exclusively on voyages within Special Areas can be relieved from installing and operating oil filtering equipment provided that all the following conditions are met:

- The ship is fitted with a holding tank having a volume adequate, to the satisfaction of its Flag State Authority, for the total retention on board of the oily bilge water,

- All oily bilge water is retained onboard for subsequent discharge to reception facilities,

- The Flag State Authority has determined that adequate reception facilities are available to receive such oily bilge water in a sufficient number of ports and terminals the ship calls at,

- Appropriate endorsements have been made to those ships' IOPP Certificate and also the quantity, time and port of the discharge are recorded in the Oil Record Book.

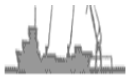
The oil residues which cannot be discharged into the sea in compliance with the abovementioned conditions shall be retained on board to be finally disposed of to available port reception facilities. The requirements that oil tankers and other ships should comply with, are presented schematically in the next tables:

OIL TANKERS OF ALL SIZES AND OTHER SHIPS OF 400 GRT AND ABOVE **Control of discharge of oil from machinery spaces**	
Within Special Areas	Any discharge is prohibited, except when, 1. the ship is proceeding en route, and 2. the oil content of the effluent without dilution doesn't exceed 15 ppm, 3. the ship has in operation oil filtering equipment with automatic stopping device 4. bilge water is not mixed with oil cargo residues or cargo pump room bilges (on oil tankers)

SHIPS BELOW 400 GRT OTHER THAN OIL TANKERS **Control of discharge of oil from machinery spaces**	
Within Special Areas	Any discharge is prohibited, except when all the following conditions are satisfied as far as practicable and reasonable: 1. the ship is proceeding en route, and 2. the oil content of the effluent without dilution doesn't exceed 15 ppm, 3. the ship has in operation suitable equipment as required by Regulation 16 of Annex I of MARPOL 73/78

The following table summarizes the requirements related with the installation and operation of appropriate shipboard equipment to process and dispose of oily mixtures produced in the machinery spaces of ships during their normal operation. It has proved that the reliable operation of the integral oily water

separating and filtering equipment is critical for the proper discharge of oily water mixtures at sea and the minimization of those mixtures that are likely to be delivered on the existing port reception facilities.



PORT RECEPTION FACILITIES FOR COLLECTING SHIP GENERATED GARBAGE, BILGE WATER AND OILY WASTES

Summary of shipboard equipment for processing and disposing of oily water mixtures from machinery spaces

Size of ships	Applicable Annex I Regulations	Equipment installation and performance standards	Equipment requirements
Ships of more than 10.000 grt and ships between 400 and 10.000 grt carrying large quantities of oil fuel	Regulation 16 (1, 2, 5)	MEPC.60 (33) Resolution	• 15 ppm oil water filtering equipment • Bilge alarm and automatic stopping device • Oil content meter
Ships between 400 and 10.000 grt	Regulation 16 (1, 4)	MEPC.60 (33) Resolution	• 15 ppm oil water filtering equipment and oil content meter

2.1.2 Annex I – MARPOL 73/78 Regulations dealing with the provision of Reception Facilities in ports and terminals

The following tables summarize the relevant requirements for the provision of Reception Facilities both for dirty ballast, tank washings from oil tankers as well as for other oily residues and oil mixtures from all ships.

Regulations of Annex I of MARPOL 73/78	**Summary of the requirements**
Regulation 10 Methods for the prevention of oil pollution from ships while operating in Special Areas	*All oil loading terminals and repair ports within a Special Area should be provided with facilities adequate for the reception and treatment of all the dirty ballast and tank washings from oil tankers.* Such facilities shall have adequate capacity to meet the needs of the ships using them without causing undue delay.
	All ports within a Special Area shall be provided with adequate reception facilities for other residues and oily mixtures from ships. Such facilities shall have adequate capacity to meet the needs of the ships using them without causing undue delay.
Regulation 12 Reception Facilities	Reception facilities adequate to meet the needs of the ships using them without causing undue delay should be provided in: - *All ports and terminals in which crude oil is loaded into oil tankers where such tankers have immediately prior to arrival completed a ballast voyage of not more than 72 hours or not more than 1,200 nautical miles* Crude oil loading terminals shall have efficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with the provisions of Regulation 9(1)(a) of Annex I from all oil tankers on voyages as described above. - *All ports and terminals in which oil other than crude oil in bulk is loaded at an average quantity of more than 1,000 metric tons per day* Such loading ports and terminals shall have efficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with the provisions of Regulation 9(1)(a) of Annex I from oil tankers which load oil other than crude oil in bulk. - *All ports having ship repair yards or tank cleaning facilities* These ports shall have sufficient reception facilities to receive all residues and oily mixtures which remain on board for disposal from ships prior to entering such yards or facilities.

Regulations of Annex I of MARPOL 73/78	**Summary of the requirements**
Regulation 12 Reception Facilities	In addition reception facilities should be provided in: - *All ports and terminals which handle ships provided with the tank(s) required by Regulation 17 of Annex I.* All facilities provided to the abovementioned ports and terminals shall be sufficient to receive all residues retained according to Regulation 17 from all ships that may reasonably be expected to call at such ports and terminals. - *All ports in respect of bilge waters and other residues, which cannot be discharged in accordance with Regulation 9 of Annex I.* All facilities provided to these ports and terminals shall be sufficient to receive oily bilge waters and other residues which cannot be discharged in accordance with Regulation 9. - *All loading ports for bulk cargoes in respect of oil residues from combination carriers which cannot be discharged in accordance with Regulation 9.*

Ports involved in the project have in principle to provide reception facilities for either oily bilge water and oil residues as long as due to the effect of MARPOL Annex I Regulations which apply to designated Special Areas, the discharge of non – processed oily bilge water and oil residues is prohibited. Ports handling ocean tonnage should be able to accept larger quantities of oily bilge water while proportionately smaller facilities should be provided at ports serving coastal vessels.

Ships equipped with oily-water separating equipment are not expected to require substantial reception facilities if such effluents are allowed to be discharged also in port areas. There is also a need for facilities to receive dirty ballast water from bunker fuel tanks. Although MARPOL 73/78 prohibits "new" ships over certain tonnages from ballasting bunker fuel tanks, except under abnormal conditions, existing ships have to ballast their bunker tanks to maintain stability for safety reasons.

IMO recommends that some 50 to 60 per cent of ships may sometimes be faced to this requirement and facilities for these residues will be needed at the great majority of ports. However, it was not possible during the project through the input provided by the voluntary response of ships that happened to call to the ports involved, to identify cases where oil contaminated ballast water was requested to be delivered from ships other than oil tankers.

2.1.3 Oily mixtures and residues produced in the machinery spaces of ships and current management practices implemented onboard

From the normal operation of ships, different oil liquid and semi-liquid wastes are produced in their machinery spaces which can be broadly distinguished to:

- Oil residues from the purification of fuel and lubricating oil
- Oily leakage from machinery spaces
- Exhausted or contaminated oils
- Oily bilge water

Certainly, there are also other almost solid residues such as oily rags, solid deposits from the oil water separating and filtering equipment, residues from scavenging parts, dirty grease including this one originated from other shipboard spaces, etc. which can be dealt with in the framework of Annex V of MARPOL 73/78 (as special garbage items).

Oil residues that originate during storage and treatment of fuel oil and lubricating oil are produced basically:

- in fuel oil storage tanks
- during purification of fuel oil in settling tanks, separators, filters and the daily supply tanks
- in the lubricating oil separating systems

The volume of sludge produced in the engine room of ships, varies depending on the quality of fuel oil and the compatibility of different grades used on board. The use of low grade fuels is invariably resulting to increasing volumes of residues during the purification process. Fuel oil refers to residual fuel oil that remains usually from the atmospheric distillation process. The majority of marine diesel engines uses Intermediate Fuel Oils for propulsion purposes, produced by blending of the residual fuel oils with marine distillate fuels to obtain the required viscosity (the most commonly used fuel oils from ships are the IFO 180 and IFO 380 with viscosities of 180 and 380 centistokes at 50^0C). The ISO 8217 standard distinguishes 13 grades of residual marine fuel oils which practically all of them (apart the first two RM A 10 and RM B 10) require onboard purification in ordinary purifiers/clarifiers or other specially designed separators.

Almost all ships use Marine Diesel Oil, a light distillate without residual fuel oil as fuel in generators and auxiliary equipment in port areas, while specialized types of ships such as high speed ferries can use marine distillates such as Marine Gas Oil. Several efforts are currently made to reduce either the volume of sludge such as new generations of heavy fuel oil purifiers which have been developed to reduce the volume of sludge and to cope with the

increasing density of fuel oils, or in the shipbuilding and designing phase to reduce fuel consumption (such as the optimization of hull form through the incorporation of computational fluid dynamics calculations in hull designing or the use of aluminium which is about half the weight of steel for equal strength in highspeed craft, superstructures in ferries and cruise ships, etc.).

A diesel propelled ship using residual fuel oil may accumulate sludge from the onboard fuel oil processing at a rate normally not exceeding 1 per cent of the fuel consumption. In broad terms, a 10,000 BHP ship at sea under power may accumulate oil sludge at a rate of about 0,25 metric tons per day. Ships are required to be provided with sludge holding tanks of sufficient capacity in conformance with Regulation 17 of Annex I of MARPOL 73/78. These tanks are identified in the Supplement to the International Oil Pollution Certificate. Piping to and from sludge tanks do not have direct connection overboard, other than the standard discharge connection to enable delivery to port reception facilities.

Ocean-going diesel propelled ships with sludge holding tanks of between 5 and 10 metric tons should provide for 15 to 25 days of steaming without having to empty the sludge tanks.
Research on the sludge production onboard ships has demonstrated that sludge generation represent 1. 0 – 2.0 % of the daily fuel oil consumption and also represent 0.5 % of the daily Marine Distillate Oil consumption, as presented in the following table:

Quantity of oil residues (sludge) generated during normal operation of ships	
Residues at HFO operated engines	1.0 – 2.0 % of the daily consumption
Residues at MDO operated engines, generators and auxiliary systems	0.5 % of the daily consumption

As it will be explained later in this Report, for simplicity reasons, a sludge production factor equal to 2% of the daily fuel consumption was used in estimating oil residues from both fuel oil and marine diesel oil use.

Tanks for separated sludge are commonly equipped with tank heating systems. The heating system is designed to enable heating of the oil sludge up to 60^{o}C. The suction line from the sludge tank to the pump should be provided with heating tracing. It is also a common practice that the sludge tank is preferred to be located below the heavy fuel oil purifier. In addition to the provision of sludge tanks, another means for the disposal of oil residues could be the approved oil sludge incinerators. Such a system consists of an oil burner, an oil sludge processing system including a tank for

mixing oil residues with fuel oil, an oil sludge preheating system, a filter and a homogenization system as well as tank/s for separated sludge.

The other component of sludge is represented by:

- drain and leakage oil, which means oil resulting from drainages and leakages in machinery spaces; and

- exhausted oils, which means exhausted lubricating oil, hydraulic or other hydrocarbon-based liquid which are not suitable for use of machinery due to deterioration and contamination.

Exhausted oils are identical to used lubricating oils or waste oils which have gone through their intended use cycle and must be disposed of or treated for re-use. Lubricating oils are complex mixtures of hydrocarbons containing linear and branched paraffins, cyclic alkanes and aromatic hydrocarbons. Used lubricating oils are present in the general oily wastes stream without however, constituting its main component. The collection of separated, exhausted oils in ports where depots or facilities engaged in re-refining processes of waste oils, operate in the proximity of the port area, could contribute to their re-use (as it happens in the case of Bizerte port and the SOTOLUB industrial plant in Tunisia).

Separate tanks of appropriate size are recommended to be installed onboard ships. If an exhausted oil tank is installed, in addition to the requirements of Regulation 17 of MARPOL 73/78, Annex I, it should be of sufficient capacity to receive lubricating oil or other oils and hydrocarbon-based liquids from engine-room systems being exhausted due to deterioration, contamination or due to maintenance activities. The oil being discharged from the 15ppm equipment may also be discharged to this tank. For main and auxiliary engines, which require a compete change of the lubrication oil at sea, the capacity of the tank should be determined as 1,5m^3 for each 1,000 kW engine rating.

Oily bilge water is a mixture of fuel oil, sea water, fresh water, cooling water, leakage oil and lubricating oil. In practice, bilge water may contain cleaning agents such as boiler additives or additives for cooling water to prevent corrosion, detergents, drainage from handbasins situated in the engine room.

The quantity of oily bilge water that can be accumulated in the bilge wells or the dedicated holding tanks of a ship depends on:

- The type, age and maintenance condition of main and auxiliary engines

- The cleaning and repair intervals

- The technical operations performed in the machinery spaces

- The motivation, awareness and qualification of ships personnel

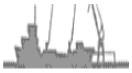
Research on this field has shown that the quantity of oily bilge water in the range of 1 – 10 cubic meters on medium and large vessels per day and 0.1 –

3 cubic meters on ships engaged in near coastal voyages. A bilge-water holding tank is arranged to receive the daily generation of bilge-water before this water is discharged through the 15 ppm overboard.

A bilge-water holding tank enable ships to operate safely during ports visits, during operation in special areas and coastal waters and during periods of maintenance of the oily water filtering equipment. It has also proved that a bilge-water holding tank also provides additional safeguards in the purification of oily bilge-water when quick-separating detergents are used for cleaning purposes. Bilge-water holding tanks, if fitted, usually have a capacity that provides the ship with the flexibility of operation in ports, coastal waters and special areas, without the need to discharge oil bilge water overboard. Since the average main engines power rating of ships calling normally at the ports of the project was not intended to be reflected in the questionnaires used, a correlation between the gross tonnage of diesel engine ships and the potentially estimated volume of oily bilge water that could be accumulated on a daily basis for water and oil cooling/lubricating shafts was used *(Hellenic Ministry of Merchant Marine, Marine Environment Protection Directorate, 1990).*

Gross Tonnage (grt)	**Estimated daily volume of oily bilge water (lts/day)**		
	Water based cooling/lubricating engine shaft	Oil based lubricating engine shaft	Volume used in the calculations for tonnage scales
< 400	100	50	75
400 – 3.000	100 – 500	50 – 250	375
3.000 – 5.000	500 – 1.500	250 – 750	1.125
5.000 – 7.000	1.500 – 2.500	750 – 1.250	1.875
7.000 – 10.000	2.500 – 4.000	1.250 – 2.000	3.000
> 10.000	>4.000	> 2.000	5.000

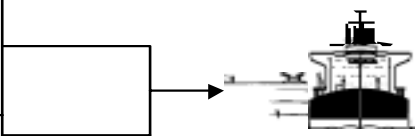
In the following diagram, the basic management options for both oily bilge water and oil residues are schematically presented:



PORT RECEPTION FACILITIES FOR COLLECTING SHIP GENERATED GARBAGE, BILGE WATER AND OILY WASTES

Oily wastes produced in the machinery spaces of ships and basic management options

Type of ship-generated oily wastes	Basic oily waste management options
Oily bilge water	Discharge at sea in accordance with the provisions of Regulation 10 (methods for prevention of pollution within Special Areas) Temporary retention onboard and disposal to port reception facilities
Oily residues (sludge)	Temporary retention onboard and disposal to port reception facilities Incineration onboard



2.1.4 Calculation basis for oily wastes streams volumes

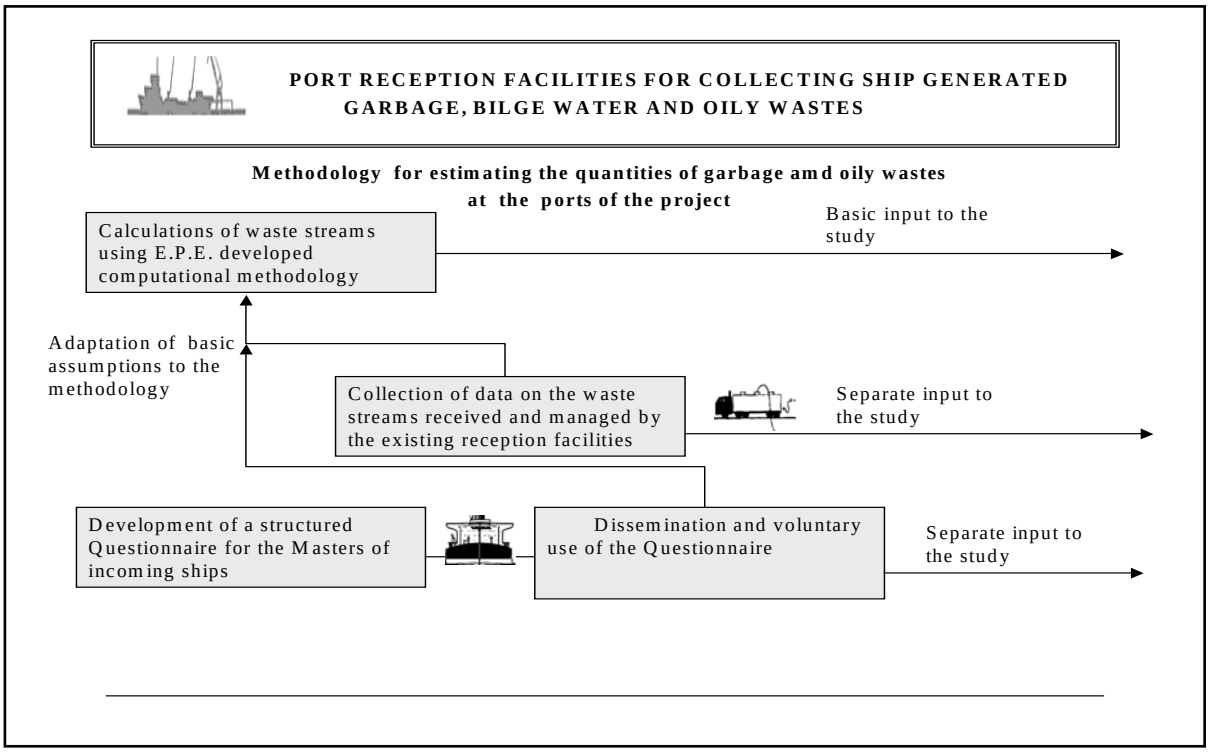
In estimating the quantities that are likely to be collected at ports, the following basic assumptions and criteria were used:

- The ships calling at the ports of the project take all necessary steps to ensure that residues on arrival are reduced as far as possible, in compliance with the relevant provisions of Annex I of MARPOL 73/78 related with the retention of oil onboard and discharge requirements,

- The waste production factors for oily bilge water and oil residues used in the calculations are those provided before, adapted appropriately according to the feedback offered by the voluntary response of the Masters of ships that happened to call at the ports during the project. Apart any necessary adaptations, data received either from the waste handling contractors, port authorities, terminal operators and the Masters of ships are provided as a separate input, as shown in the following diagram.

- The average duration of ships' transit and stay at a port area which is an important variable in estimating the volume of oily wastes to be collected, was extracted from the completed questionnaires.

The methodology used is schematically shown below:



The formulas as well as the basic assumptions used in estimating the production of oil residues and oily bilge water are as follows:

$$Q_t = Q_{sl} + Q_m \quad (m^3/day)$$

$$Q_{sl} = \frac{N_1 * P_{sl} * T}{365}$$

$$Q_m = \frac{N_2 * P_m * T}{365}$$

where:

Q_t = Volume of oily wastes from the machinery spaces of ships to be received (m^3/day)

Q_{sl} = Volume of oil residues (sludge) to be received (m^3/day)

Q_m = Volume of oily bilge water to be received (m^3/day)

N_1 = Number of ships calling at the port annually

N_2 = Number of ships without oily bilge water separating and filtering equipment (with only bilge holding tanks) calling at the port on an annual basis

P_{sl} = Oil residues daily production (0.02 x fuel oil daily consumption per day *(gr/HP * hr)* of voyage (m^3/day)

P_m = Oily bilge water production per sailing day from N_2 ships calling at the port (m^3/day)

T = Average duration of voyage before calling at the port and stay at the port area (days)

For the needs of the project, the daily oil residues production was estimated as a function of the residual fuel consumption using 0.02 as coefficient factor. There is no doubt that marine diesel engines are the predominant type of power unit in the maritime industry for propulsion and auxiliary power generation. In 1991, diesel engine ships accounted for about 98% of the world merchant fleet while the remaining 2% used steam plants (Lloyd's Register 1993). As fuel consumption is related with the engine horse power (considering for simplicity reasons that the consumption remains the same for both cruising underway and maneuvering), the engine horsepower of ships calling at the ports of the project was correlated to their deadweight tonnage

by using the equation *HP = Dwt * Dwt Coef + b* (where *Dwt Coef* corresponds to a coefficient factor for different types of ships and b an intercept, both calculated from regressions made by E.P.A. (2000).

In accordance with the requested information by the Port Authorities and Terminal Operators on the ports traffic, the major types of ships were given an estimated horsepower from which the daily production of oil residues was calculated.

Type of ship	***Dwt coefficient***	***b***
Bulk carrier	0.0985	6726
Tanker	0.183	6579
General cargo ship	0.288	3046
Container ship	0.800	-749.4
Passenger ship	6.810	- 4877

The abovementioned approach was considered to be more realistic since a number or dedicated terminals (such as the Freeport Terminal in Malta, the Damietta Container Terminal, etc.) normally accommodate uniform ships' sizes with high main engine outputs and consequently potentially higher fuel oil consumption rates. This is particularly true for the large container ships (more than 2.500 TEU) with engines output to be up to 60.000 BHP or similarly for large displacement cargo ships.

2.2 Garbage

2.2.1 Criteria for discharging garbage from ships into the Mediterranean Sea

Regulation 5 of Annex V of MARPOL 73/78 provides requirements for the disposal of garbage within Special Areas.

In accordance with the provisions of this Regulation, disposal into the sea of the following items is prohibited:

- all plastics, including but not limited to synthetics ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products which may contain toxic or heavy metal residues; and

- all other garbage, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials;

Disposal into the sea of food wastes shall be made as far as practicable from land, but in any case not less than 12 nautical miles from the nearest land which is the baseline from which the territorial sea under the jurisdiction of each coastal state is measured.

The garbage disposal requirements from ships within and outside Special Areas are presented in the following table:

Type of garbage	Garbage Disposal from Ships	
	Outside Special Areas	**Within Special Areas**
Plastics, including synthetic ropes, fishing nets and plastic garbage bags.	Disposal Prohibited	Disposal Prohibited
Floating dunnage, lining and packing materials.	> 25 miles offshore	Disposal Prohibited
Paper, rags, glass, metal, bottles, crockery and similar refuse.	> 12 miles	Disposal Prohibited
All other garbage including paper, rags, glass, etc. comminuted or ground.	> 3 miles	Disposal Prohibited
Food waste not comminuted or ground.	>12 miles	>12 miles
* Food waste comminuted or ground.	> 3 miles	> 12 miles
Mixed refuse types.	**	**

* Comminuted or ground garbage must be able to pass through a screen with mesh size no larger than 25mm.

****** When garbage is mixed with other harmful substances having different disposal or discharge requirements, the more stringent disposal requirements shall apply.

The abovementioned requirements do not apply to:

(a) the disposal of garbage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or

(b) the escape of garbage resulting from damage to a ship or its equipment provided all reasonable precautions have been taken before and after the occurrence of the damage, for the purpose of preventing or minimizing the escape; or

(c) the accidental loss of synthetic fishing nets, provided that all reasonable precautions have been taken to prevent such loss.

2.2.2 Annex V – MARPOL 73/78 Regulations dealing with the provision of Reception Facilities in ports

Regulations 5 and 7 provide requirements with respect to the establishment and operation of port facilities for receiving garbage from ships.

Regulations of Annex V of MARPOL 73/78	Summary of the requirements
Regulation 5 ***Disposal for garbage within Special Areas***	The Government of each Party to the Convention, the coastline of which borders a special area, undertakes to ensure that as soon as possible in all ports within a special area adequate reception facilities are provided in accordance with the Regulation 7, taking into account the special needs of ships operating in these areas.
Regulation 7 ***Reception Facilities***	The Government of each Party to the Convention undertakes to ensure the provision of facilities at ports and terminals for the reception of garbage, without causing undue delay to ships, and according to the needs of the ships using them.

2.2.3 Ship – generated garbage and current management practices implemented onboard

Ship-generated garbage can be divided into the following categories:

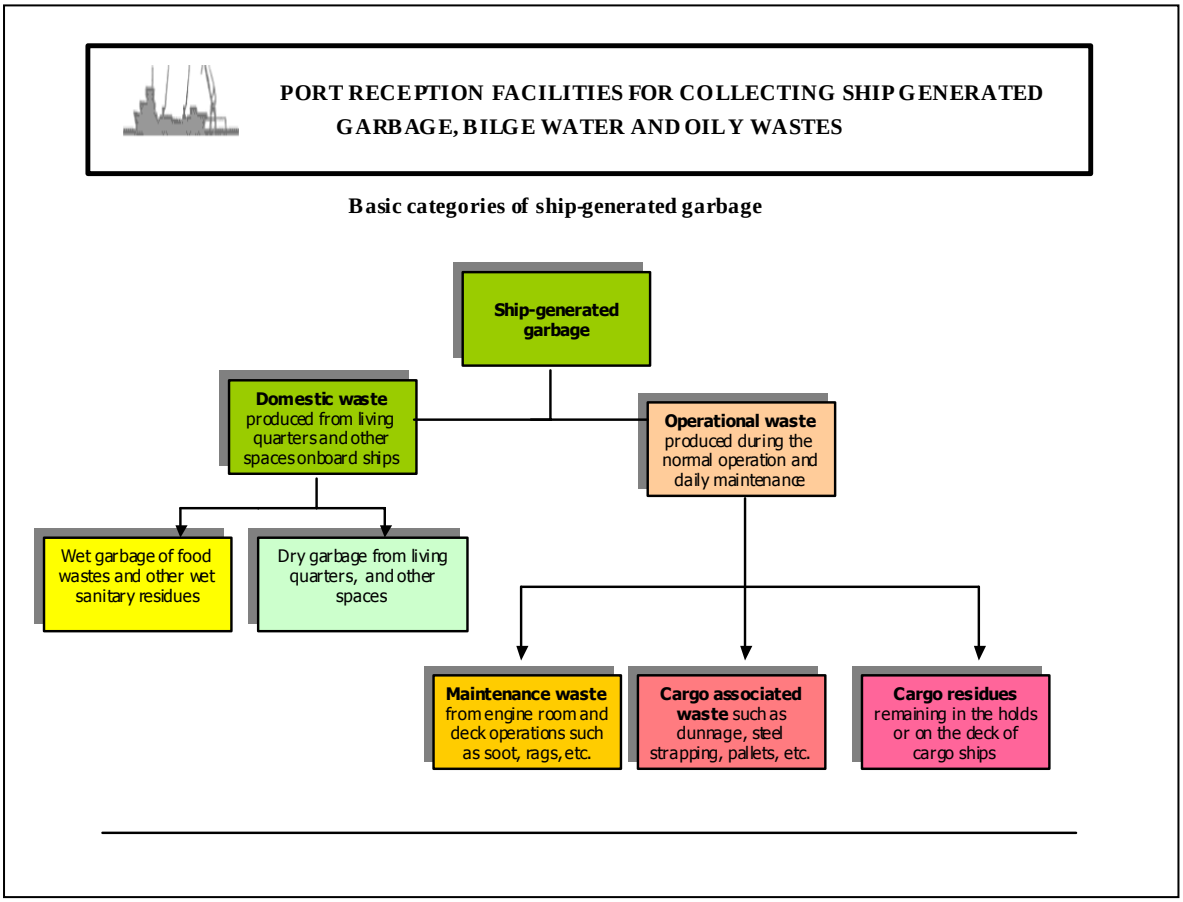
Domestic wastes including wet and dry garbage, represent all types of food waste and wastes generated in the living quarters of a ship such as paper products, textiles, glass, rags, bottles, plastics, etc.

Domestic wastes consists of food wastes generated in the galley and dining rooms and of all materials contaminated by such waste and disposed of as solid materials and also of refuse produced in living spaces of crew and passengers including paper products, textiles, glass, rags, bottles, plastic items, etc. Garbage of this type can also originate from medical spaces including expired medicines, lining and packing material, sweepings, etc.

Operational wastes that consists of *cargo-associated wastes* originated from cargo stowage and handling works in general and *maintenance wastes* collected by the engine department and the deck department while maintaining and operating the vessel. In this category, also small quantities of solid cargo residues are included.

Usually about 1.5 – 2.5 kgs of domestic waste is generated on a daily basis per person on a commercial, cargo ship and about twice as much on a passenger ship. On average, 75% per weight and 10% per volume of domestic waste is food waste and the remaining 25% per weight and 90% per volume is refuse as delineated before.

The aforementioned categories are presented schematically below:



In respect of the cargo-associated waste, there is no doubt that both the increase of the containerisation of maritime transport and also the need for more efficient and clean loading unloading operations have reduced the quantities of this type of waste. Waste due to break bulk cargo operations remains the largest source of shipboard solid waste in both volume and weight.

Such waste consists of dunnage, pallets, paper and cardboard material, wire and steel strapping, etc.

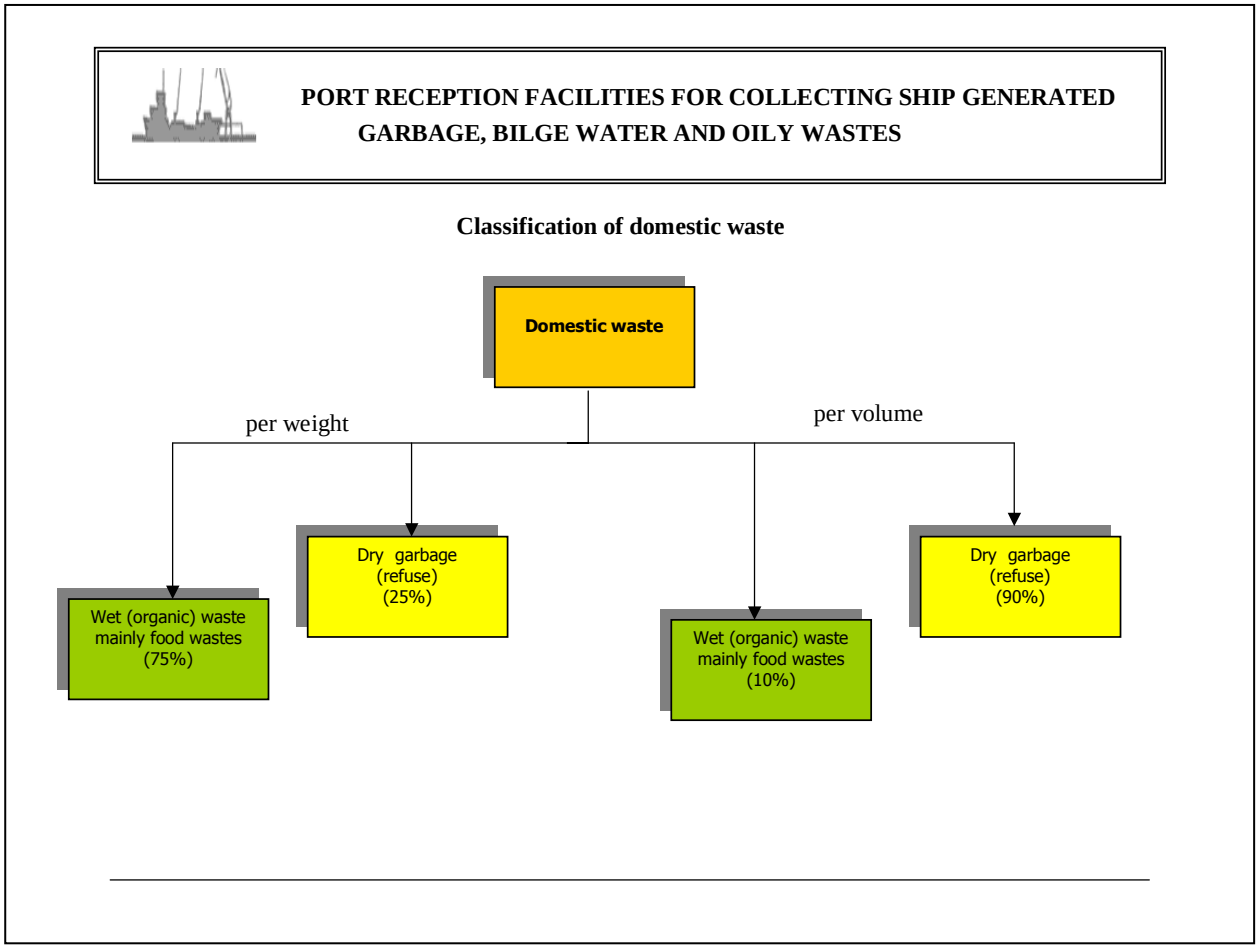
A variety of works carried out onboard ships normally, such as cleaning of boilers, tanks, decks and platforms result in the production of maintenance wastes, the quantity of which that can be accumulated on a large sea-going ship could exceed 20 kgs daily.

Other than routine maintenance, carried out in port including major and overhaul work would be additional to the abovementioned figure.

The table below provides some average figures of wastes generated by the engine and deck department while operating and maintaining a vessel, provided by the IMO respective Guidelines mentioned in the beginning of this Report.

Maintenance waste per day on a medium sized ship	
Kind/origin of waste	**Quantity (kgs/day)**
Soot and machinery deposits	4
Paint scraping waste	3
Wiping wastes and rags	3
Sweepings	1

The composition of domestic waste is schematically presented in the following diagram.



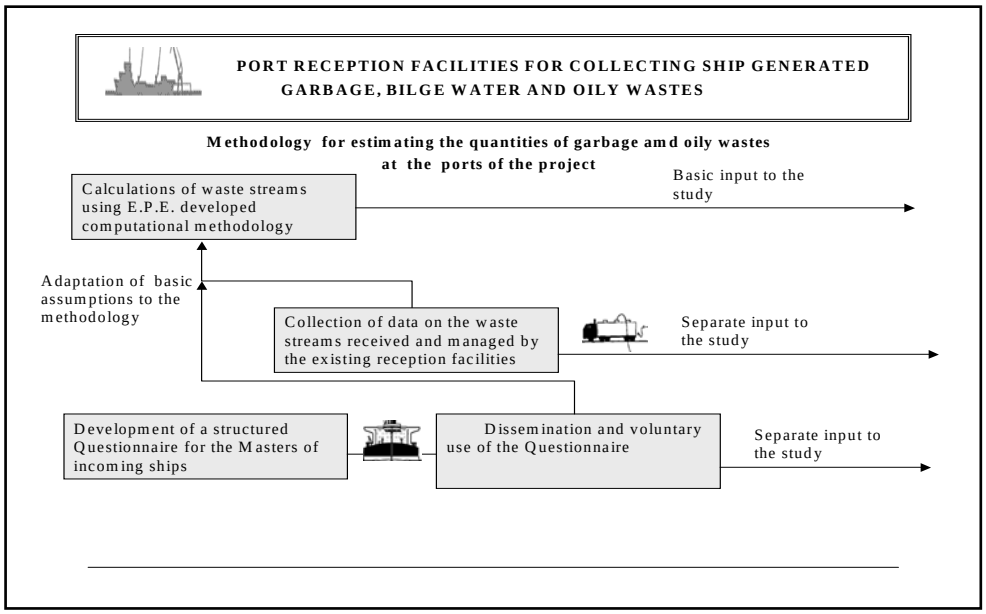
The following table provides an arbitrary estimate of cargo associated waste per kind of cargo handled in a port.

Quantities of cargo- associated waste	
Kind of cargoes	**Cargo generation factor(tons of waste per quantity of cargo)**
Break bulk cargoes	1 : 123
Dry bulk cargoes	1 : 10.000
Containerized cargoes	1: 25.000

2.2.4 Calculation basis for garbage streams volumes

The calculation of the volumes of garbage that are likely to be collected at a port reception facility was based on the following assumptions and criteria:

- Ships calling at the ports of the project take steps to ensure that garbage is collected in a manner consistent with the requirements of Annex V of MARPOL 73/78 and predominantly that illegal discharges do not occur at sea while engaged in voyages within the Mediterranean sea or other navigable areas.
- Garbage production factors used in the formulas which are presented below are those described before, adapted appropriately according to the feedback offered by the voluntary response of the Masters of ships that happened to call the ports of the project. Apart any necessary adaptation, data received either from the waste handling contractors, port authorities, terminal operators and the Masters of the ships are provided as a separate input, as shown in the following diagram.



- The average duration of ships' transit and stay at the port area was extracted from the completed questionnaires.

The volumes of domestic, maintenance and cargo – associated waste are calculated from the following formula:

$$G = G_D + G_M + G_C \text{ (kg/week)}$$

or

$$G = G_D + G_M + G_C / \rho \quad (m^3/\text{week})$$

(where ρ=250 kg/ m^3 the average density of shipboard garbage)

where:

G = the quantity of garbage received in peak seven day period (kg/week)

$\mathbf{G_D}$ = the quantity of domestic solid waste received in a peak seven day period (kg/week)

$\mathbf{G_M}$ = the quantity of maintenance solid wastes received in a peak seven day period (kg/week)

$\mathbf{G_C}$ = the quantity of cargo associated waste received in a peak seven day period (kg/week)

Quantity of domestic waste

$$G_D = G_B + G_P + G_H$$

$$G_B = N_B * T_B * Q_B * P_B$$

where

$\mathbf{G_B}$ = quantity of domestic garbage received in peak seven day period from sea-going cargo ships (kg/week)

$\mathbf{N_B}$ = number of cargo ships calling at the port in the same period

$\mathbf{T_B}$ = average duration of voyage and stay at the port of sea going cargo ships (days)

$\mathbf{Q_B}$ = average daily domestic garbage generation rate on sea-going cargo ships (2.0 kg/person and day)

$\mathbf{P_B}$ = average number of persons onboard a typical sea-going cargo ship (persons/vessel)

$$G_P = N_P * T_P * Q_P * P_P$$

where

N_P = number of passenger ships calling at the port in the same period

G_P = quantity of domestic garbage received in peak seven day period from passenger ships (kg/week)

T_P = average duration of voyage and stay at the port this kind of ships (days)

Q_P = average daily domestic garbage generation rate on passenger ships (3.0 kg / person and day)

P_P = average number of persons onboard a typical passenger ship (persons/vessel)

$$G_H = N_H * T_H * Q_H * P_H$$

where

N_H = number of harbour craft engaged in the port operation

G_H = quantity of domestic garbage received in peak seven day period from harbour craft (kg/week)

T_H = average duration of voyage and stay at the port of harbour craft (7 days)

Q_H = average daily domestic garbage generation rate on harbour chart (1.0 kg/person and day)

P_H = average number of persons onboard a typical harbour craft (persons/vessel)

Quantity of maintenance waste

$$G_M = N * T * M$$

N = number of vessels in port during a peak seven-day period (vessels/week);

T = average duration of ships' transit and stay at the port area (days);

M = average quantity of maintenance solid wastes generated daily from a typical vessel (11 kg/vessel-day)

Quantity of cargo – associated waste

$$\mathbf{G_C = C_B + C_D + C_C}$$

where:

$\mathbf{C_B} = W_B * 1/123$ = quantity of break bulk cargo solid wastes received in a peak seven-day period (kg/week);

$\mathbf{W_B}$ = quantity of break bulk cargo received in a peak seven-day period (kg/week);

1 / 123 = break bulk cargo waste generation factor;

$\mathbf{C_D} = W_D * 1/10{,}000$ = quantity of dry bulk cargo solid wastes received in a peak seven-day period (kg/week);

$\mathbf{W_D}$ = quantity of dry bulk cargo received in a peak seven-day period (kg/week);

1/10,000 = dry bulk cargo waste generation factor;

$\mathbf{C_C} = W_C$ 1/25,000 = quantity of container cargo solid wastes received in a peak seven-day period (kg/week);

$\mathbf{W_C}$ = quantity of container cargo received in a peak seven-day period (kg/week);

1/25,000 = container cargo waste generation factor.

2.2.5 Projection of wastes production and collection

The quantity of wastes generated during the normal operation of ships is influenced by a variety of circumstances and factors which are either related directly to the cargoes' carriage process (representing the material input from which wastes are produced or to the daily operation of ships in combination with any waste prevention efforts dictated by their management including planned maintenance, use of new environmentally sound marine technologies, etc.

It's really difficult to develop and apply a projection scheme for ship-generated wastes production as it has been conceived and used in the case of land-based waste streams such as municipal waste or specific industrial wastes for which close links between the economic or production activity and wastes generation has been demonstrated.

It is a fact that reliable and comprehensive information on waste produced by ships is even today not sufficient making the analysis and forecast of future developments on waste generation more difficult.

The use of waste generation factors for both oily wastes and garbage from ships in estimating the potential volume produced from the last port of call or from the last port where wastes were delivered in conjunction with the actual number of ships calling at a port led to the argument to correlate the future volumes of waste streams with the anticipated growth or decline of traffic at each port (as estimated from the last three years period data).

The projection of volumes of wastes that could be collected at each port was based on the following assumption which excludes the effect of a number of factors (waste prevention measures, port state control procedures, charging systems, etc) :

$W_t = f(W_{bs}, T_i)$ = average annual change of traffic (%) X W_{bs}

where
(*f*) underlines the simple linear function of waste production onboard ships with the port traffic development, so that a 5 % increase of the number of ships calling at a port annually increases proportionally 5% the wastes produced that could be delivered to the port reception facilities, and

(W_t) is the estimated volume of the two major waste streams, oily wastes and garbage in the near future *t* (Ti means 2004 and 2005 years).

(W_{bs}) is the baseline estimate of both oily wastes and garbage streams which is also considered as identical for 2003 due to the uncertainty of the port traffic progress in relation with the last three years period.

It should be noted that the abovementioned approach is subject to considerable margins of error due to the quality of data used and the exclusion of factors outlined before.

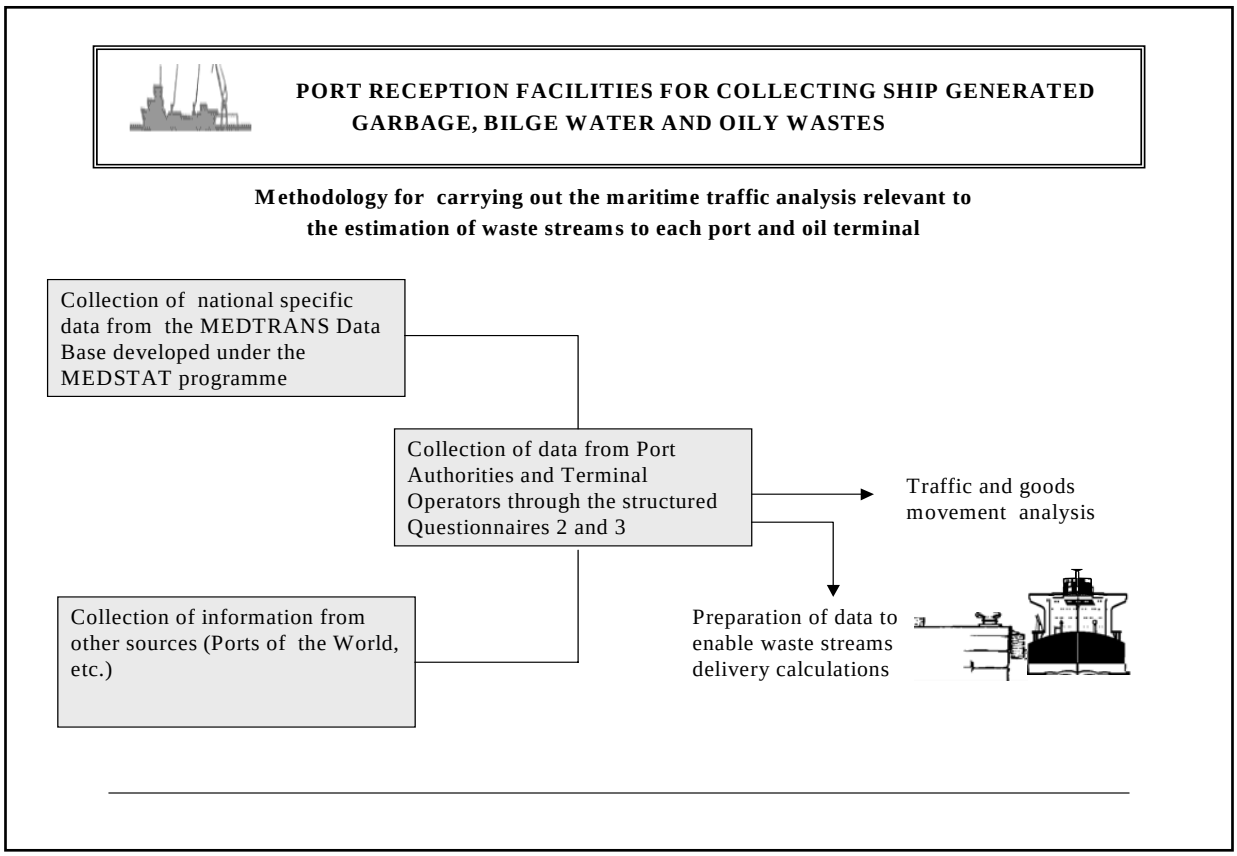
METHODOLOGY

3. Methodology

3.1 Maritime traffic data and analysis

The collection and analysis of information regarding the maritime traffic and the carriage of cargo or passengers at each port, was essential for the preparation of the variables used in the formulas to estimate the potential for delivery volumes of ship-generated waste.

The methodology used for the collection and analysis of these data consisted of the collection of data through the completed questionnaires 2 and 3 (developed for oil terminals and ports respectively), from other sources as well as from the MEDTRANS data base developed and maintained under the MEDSTAT program. Schematically, this methodology is shown below:



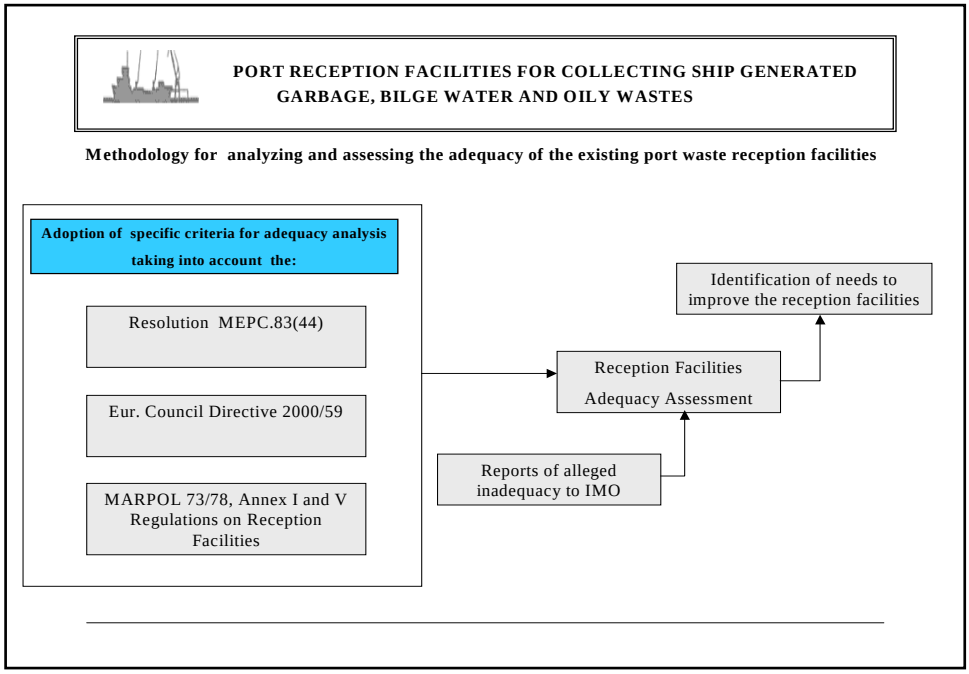
With respect to the MEDTRANS database, it should be noted that MEDSTAT is the regional statistical co-operation programme between the European Union and the 12 Mediterranean Partners, including the 10 countries of the project and also the Palestininian Territories and Jordan. The need for reliable, harmonized and up-to-date statistics to monitor the development of a free trade area between the European Union and these countries resulted in the inauguration of the MEDSTAT programme.

MED-TRANS project (MED TRANS 1 and MED TRANS Bridge) carried out between 1997 and 2002, was aimed at establishing a comprehensive and

harmonized data base on the freight and the traffic of passengers in order to monitor the development of an efficient trans-Mediterranean multi modal transport system. Key objective of the programme has been the maintenance and continuous updating of the MED-Trans Database which contains statistics on the transportation of goods and passengers by all modes of transportation including shipping. The fact that statistical information produced by Eurostat and projects like MED-TRANS provide reliable and comparable data for all the countries of the project weighted to use this source of information. As expected by the collection of data, maritime transport constitutes an important mode of carriage of goods for all the countries of the project. The predominant part of the external trade of these countries is carried out by sea and in terms of volume, it is equally significant in the exchange of goods between the European Union and them.

3.2 Methodology for analyzing and assessing the adequacy of existing reception facilities

Criteria for assessing the adequacy of the capacity and the whole operation of the existing port waste reception facilities were adopted for audit purposes, taking into account the IMO relevant Guidelines provided with the Resolution MEPC.83(44), the requirements of the European Council Directive 2000/59/EC, and the provisions of those MARPOL 73/78 Regulations of Annex I and V that deal with the establishment and operation of port reception facilities within Special Areas. As explained later, the Sample Assessment Procedure annexed in the abovementioned Resolution was adapted for use during the port surveys and data collection phases, taking also into account the preceding preparatory work. Recent documentation on the reports of alleged inadequacy provided to IMO by Flag States was requested by the Organization in reviewing and capturing information regarding the ports of the project to enable the further assessment of the adequacy of the existing reception facilities. The methodology used is presented schematically below:



Resolution MEPC.83(44), provides Guidelines for ensuring the Adequacy of Port Waste Reception Facilities, with the aim:

- to assist Member States in planning and providing adequate port waste reception facilities and,

- to encourage them to develop environmentally appropriate methods of disposing ship – generated waste ashore.

These Guidelines which complement the IMO Comprehensive Manual on Port Reception Facilities, provide information relating to the on-going management of existing facilities but also for the planning and establishment of new facilities. The Guidelines have incorporated an Assessment Form as an Appendix (Sample Assessment Procedure for Ports - Management/Strategy for waste reception facilities at ports, marinas, and boats harbours), the use of which is encouraged by the responsible State Authorities, independent bodies or assessors. The procedure provides an example of a detailed audit that might be conducted by a consultant, offering a systematic check list of questions designed to obtain information with respect to existing port waste reception facilities, the level of waste collection service provided to port users, the level of environmentally sound waste handling, valorization and final disposal practices and methods, etc.

It was deemed as advisable to use in a properly adapted way for the scope of the project, the abovementioned assessment procedure, as an integral element of both the collection of data process as well as of the site surveys at the areas of the ports and oil terminals of the project.

Since, the operation of fixed ship-generated waste reception facilities or more flexible collection and management schemes in the port area is not isolated from the rest of the port infrastructure and the services provided by the ports authorities and operators, many of the Sample Assessment items were incorporated among other things within the two port - specific questionnaires No. 2 (Questionnaire for Oil Terminals involved in the Project) and No. 3 (Questionnaire for Ports involved in the Project) which represent the basic means for collecting input for most of the needs of the project.

- **Criteria for assessing the adequacy of the existing reception facilities**

Two major sets of criteria were identified as more suitable and at the same time critical to assess the adequacy of the existing reception facilities, one dealing with the ship-port interface and a second dealing with the protection of the environment from the secondary wastes or potential pollution produced by the waste collection, treatment and disposal processes.

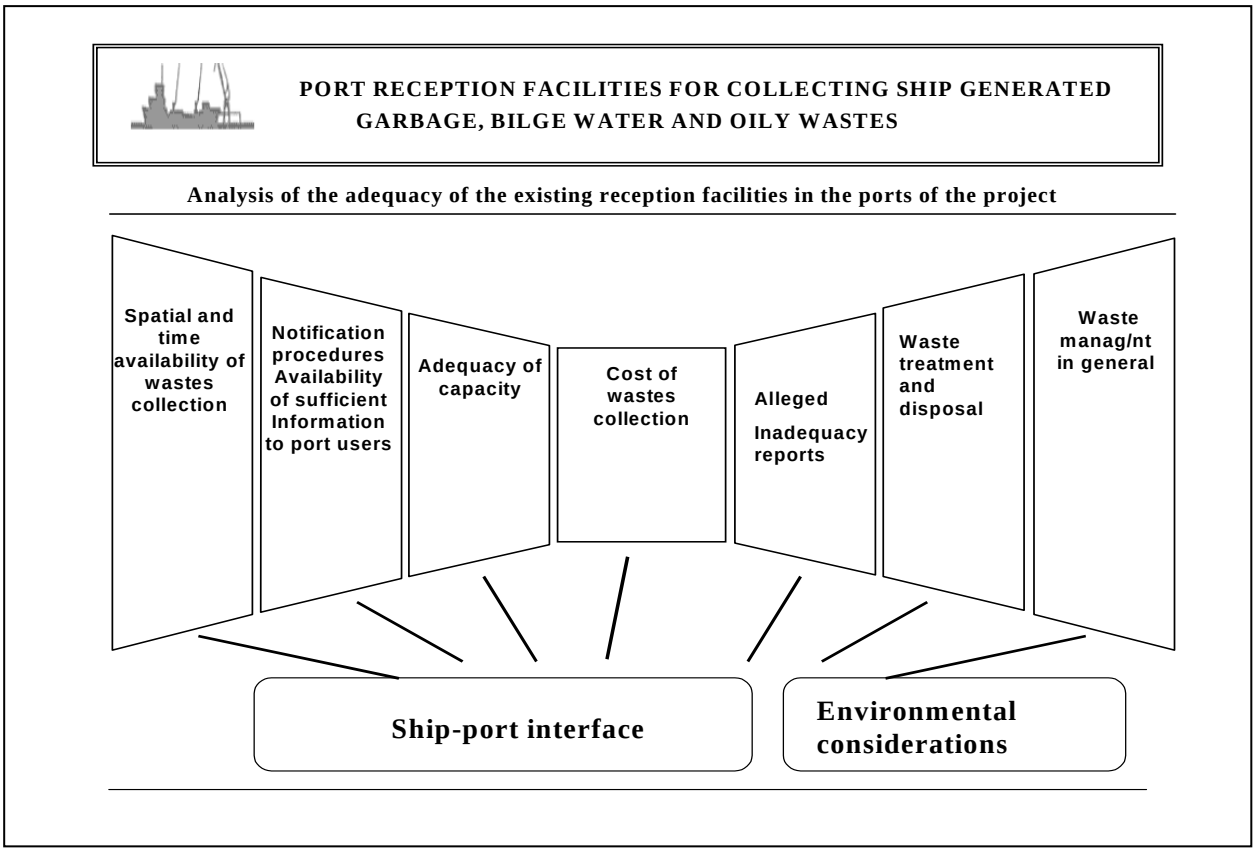
The first set provides a series of criteria emphasizing on the operational needs of ships normally calling at the ports and terminal of the project. There is no doubt that a port to become successful and adequate in providing reception facilities for ship-generated waste, should have regard to the

operational needs of its users supplying all the appropriate means to collect and further manage the different types and volumes of wastes from ships normally engaged in operation at its terminals or wider area such as designated anchorages, etc. In parallel, the operation and the management of the existing facilities should not provide any disincentives for incoming ships to use them.

The second set of criteria concentrates on environmental and technical considerations regarding the way that waste collected is managed and finally disposed of, including procedures enabling the wastes traceability, procedures for complying with national or other standards related with the discharge of effluent water, etc.

The second series of criteria used to enable the assessment of the adequacy of the existing reception facilities, supplements the first one related with the provision of sufficient services to shipping, by attempting to identify whether or not the waste management after the collection in the port or the terminal area is environmentally sound. Whenever, during the missions in the beneficiary countries or during the information collection process, details of the local or wider waste management strategy and relevant requirements were known, it was almost always feasible to result in safe conclusions on that.

The criteria used to assess the adequacy of the existing reception facilities are schematically presented in the following diagram:



- **Spatial and time availability of wastes collection**

This criterion can apply to both dock side port areas as well as to jetties, SPMs or other type of berthing or mooring systems provided in a port or an oil terminal, simply determining the availability of reception facilities in terms of the nominal berthing sites and the immediacy of wastes collection upon the request of a ship to deliver its wastes or residues. .

A dirty or clean ballast reception line provided, ideally, at each one of the buoys of a terminal where deballasting can normally take place in parallel to the loading of crude oil or oil products represents an example of adequate availability of reception facilities.

In commercial and multipurpose ports this availability can be achieved when almost every nominal berthing place can operate as a site where reception of oily wastes or garbage can take place by either navigable or land-based mobile means. It's important for ships that wish to deliver wastes to an existing reception facility, that the collection process does not entail any undue delays forcing the ships to change berthing site or in general to spend time beyond the time of their port operation since it is unlikely that a ship would enter a port solely to deliver wastes.

- **Notification procedures – Availability of sufficient information**

Those that provide collection of ship-generated wastes in the ports areas, require, in principle, advance notification of the intention to use the existing facilities, in particular, when a number of qualified and licensed, privately operating, waste contractors provide some or all of the port's waste collection services. Providing advance notification of the type and quantity of wastes onboard for delivery to a reception facility should minimize the risk of undue delay to ships. The importance of prior notification has been already acknowledged in the relevant legislation of the European Communities, resulting in the development and use of a uniform system by the Masters of ships bound for a port located in the Eur. Community.

Prior notification in the form of a standard message (incorporated as Annex II of the 2000/59/EC Directive) should be provided to the port authority or other entity designated to receive this information. It was witnessed during the missions in the ports of the project, that several port authorities have adopted some kind of notification both to provide and receive information from ships with respect to the potential receipt of wastes from them. In any case, it is considered as essential for the Masters of ships that call to a port, to receive information well in advance on the availability or reception facilities, any perhaps operational or waste transfer requirements, fees incurred, etc.

- **Adequacy of collection capacity**

The initial reception capacity which represents the volume of liquid or solid waste that can be received from a ship without causing undue delay, is of predominant importance for ships wishing to deliver their wastes at a port. While the type and characteristics of ship-generated waste determine in principle which treatment method should be applied, the type and volume of wastes expected to receive at a port determine the capacity of the reception facility. Since, the inflow of ship-generated waste is not constant, the abovementioned capacity, in particular for fixed reception facilities reflects the volume of holding tanks or buffering and equalization tanks in which massive oily wastes such as dirty ballast or tank washings are collected before treatment. The holding capacity of these tanks is determined by the average or peak inflows and also the capacity of the subsequent treatment process.

In respect of ship-generated garbage, the collection capacity invariably should match the volumes requested to be delivered and also the segregated kinds of solid wastes as a result of the daily garbage management practices onboard ships or of the port requirements for hygiene or sorting and recycling purposes. In the same criterion, it is also taken into consideration the interface between the ship and the reception facility to permit a timely delivery of wastes.

- **Cost of waste collection service**

One of the demanding financial aspects of the establishment and operation of reception facilities for collecting ship-generated waste, is the ships' charging system and in general the operational cost. Two principles dominate the basis on which a charging system is built and operates, the selection and use of which requires due consideration of several, mainly local factors.

The first one is the "polluter pays" principle which implies that those produce the wastes should pay for their reception, treatment and disposal and the second one is the "shared costs" that implies that all costs are covered by governmental financing and other contributions which clearly does not represent a cost recovery scheme. In line with "the polluter pays" principle, the new European Community legislation on port reception facilities, requires the establishment of a fair, transparent and reasonable cost recovery system through which fees collected from ships would be able to cover the cost of the port reception facilities including the treatment and disposal of wastes.

To ensure that the cost recovery systems do not provide any incentives for ships to discharge illegally their waste at sea polluting the marine and coastal environment, three basic rules are adopted to apply to all ocean going ships calling at a port in the area of a Member State jurisdiction, which are as follows:

Fees for ship-generated waste *(in accordance with Article 8 of the 2000/59/EC Directive)*
4 All ships calling at a port of a Member State shall contribute significantly to the costs of reception facilities including the treatment and the disposal of waste received, irrespective of the actual use of the facilities. Arrangements to this effect, may include incorporation of the fee in the port dues or a separate standard waste fee. The fees, may be differentiated with respect to factors such as the category, type, size of the incoming ships, etc. 4 The part of the costs which is not covered by the abovementioned fee, if any, shall be covered on the basis of the types and quantities of ship-generated waste actually delivered by the ships. 4 Fees may be reduced if the ship's environmental management, design, equipment and operation are such that the Master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

In the adequacy assessment procedure, it was not intended to assess or comment on the current charging system at the ports of the project, since numerous, local factors (economic, social, administrative, etc.) should be taken into account to determine whether or not fees collected by ships are reasonable and effective for the level and adequacy of the service provided. However, in every case where completed questionnaires from ships were collected with the assistance of Port Authorities and analyzed, the judgement of their Masters with respect to the sensibility of the fees was only taken into account to provide an input to the assessment.

- **Reports of alleged inadequacy of reception facilities**

The International Maritime Organization has established a reporting system for alleged inadequacies and observed lack of adequate reception facilities under the provisions of MARPOL 73/78. All Parties to MARPOL 73/78, apart from their obligations to communicate to the International Maritime Organization a list of the existing reception facilities in their ports and territories able to collect wastes from ships as defined in the Annexes I and II (in accordance with the Article 11(1)(d) of the Convention), are also recommended to notify the Organization for subsequent transmission to the Parties concerned, of all cases where facilities are alleged to be inadequate.

The format currently used by Flag States for reporting alleged inadequacies of port reception facilities is provided in the MEPC/Circ.349 that revised the previous MEPC/Circ.318. In practice, Flag States are encouraged to distribute the abovementioned format to ships, recommending to Masters to use it to

report to their Administration, and preferably to the Authorities of the Port State. Flag States are required to notify IMO of any case where facilities were alleged to be inadequate.

In accordance with the above-mentioned procedure, information on reports concerning inadequacy of reception facilities in the area of the project, was requested and collected by IMO, for the period of the last three years. Since 1999 and up to February 2003, there were not any reports on alleged inadequacies for oily wastes regarding the ports involved in the project. In the same period, reports concerning inadequacy of reception facilities for garbage were submitted in two countries of the project, but for only one of the ports included in the project. In the appropriate column of the assessment format used for the purposes of these activities (Activity A & C) of the project, it's indicated the existence or not of any reports of alleged inadequacy for the ports concerned.

- **Serious operational restrictions**

Under this criterion, an effort was made to identify and assess serious operational restrictions (other than those related with the initial reception capacity of the facilities) that could influence the waste collection service provided to ships that normally call at a port. The disposal of oil residues containing for instance lead compounds which can be found in some refined oil products or concentrations of tank cleaning chemicals, entails an advanced treatment which is not always available at the existing reception facilities.

- **Port – based waste treatment**

The collection predominantly, and any subsequent waste management activity in a port area should be carried out in such a way as to prevent pollution of the environment and enhance its protection from secondary pollutants produced during the waste storage and pre-treatment phases that can take place in the port area before the transportation and final disposal of wastes.

The operation of a port facility for collecting oily wastes or garbage from ships should ensure that, in particular, the pre-treatment, or even disposal should be carried out in accordance with any applicable local, national or regional requirements. For the new, two Mediterranean Member States of the European Union, Cyprus and Malta, the coherent European Community legislative framework dealing with the disposal of waste oils, the management of hazardous waste and non-hazardous waste, provides already those requirements, standards and recommended options that the treatment, recovery or disposal of ship-generated waste and cargo residues should meet.

As expected, oily wastes reception in most of the ports and oil terminals of the project, was combined with storage, primary separation and treatment aimed to remove oil from water to produce a water effluent that could be

discharged at sea provided that any applicable discharge standards are met. At the same time, the second objective of the port passed treatment was the recovery of oil for recycling or re-use. Appropriate technologies or sequences of water effluent treatment steps, can, invariably, ensure the preferable compliance with local or national regulations since discharge of oily wastes into surface waters or in general uncontrolled discharge is prohibited in every country of the project.

While, reception facilities for ship-generated garbage act as a link between the incoming ships to a port and the final disposal sites of the nearby area, oily wastes collection at on-shore facilities and in navigable means such as barges, is combined with storage and primary treatment. Only in exceptional cases, within the port area, fixed facilities of other means were provided for the treatment and disposal of garbage (for instance the incineration plant in Damietta port).

What was really assessed to indicate the adequacy of the treatment of oily wastes in a port, was the efficiency of the method and the infrastructure used in relation to the identity of the type of oily wastes collected and processed.

It is widely known that oil derived liquid wastes such clean or dirty ballast, washings from tanks where crude oil or oil products carried, oily bilge water, sludge mainly produced from fuel and lubricating oils purification, used lubricants, etc. make particularly demanding the collection and treatment process since the above mentioned types of oily wastes may include numerous chemical compounds and may have different physical and chemical properties.

Generally speaking, only free oil in oily water mixtures can be removed through simple buoyancy separation techniques while it has been demonstrated that mechanically (produced by mechanical shear forces during mixing or pumping) or chemically emulsified oil (produced due to chemical bonding from the use of surfactants or cleaning agents) needs further treatment.

It was witnessed during the missions that some fixed port based facilities for collecting and treating oily wastes were faced with operational problems due to the incompatibility of the applicable treatment method and the nature of the treated mixtures (treatment of sludge from purification processes in Izmir port) or the discharge of all kinds of oily liquid waste might affect the nominal, treatment capability of a facility designed to treat specific kinds of residues (e.g. La Skhira terminal treatment plant).

- **Waste final disposal and valorisation**

Since, disposal of wastes collected from ships is an integral component of the entire waste management system applied in a port or a wider area, the identification and assessment of the existing uses of recovered oil and separated garbage able to be recycled, along with their final disposal, were

the objectives set upon the incorporation of this criterion to the assessment process.

Recovered oil can be used with or without blending with regular fuel oils (provided that its quality meets specific criteria related with the intended use) as supplementary fuel for either the land-based industry or shipping. Certainly, this perspective depends on the local industrial needs including also the operational needs of the combined reception-treatment facilities themselves (e.g. feeding of boiler houses at the waste oils treatment plant of Malta Drydocks Tank Cleaning Facility).

The co-existence of treatment facilities with bunkering stations in the port areas, makes possible the blending of recovered oil with standard types of marine fuels and therefore the supply of a recovered oil based fuel oil, provided that it's accepted from an environmental point of view (absence of hazardous substances the combustion of which could result in harmful air emissions, etc.) and also from a operational safety point of view (e.g. production of potentially corrosive mixtures and sub-products during the combustion process that could cause significant failure at the ships engines and fuel distribution systems). It's worth mentioning that a trend is appearing, initiated by national standardization bodies (e.g. ASTM) to provide standard compositional specifications for recycled oils that are intended to be used as fuel oils.

The fact that modern ships are provided with tanks for retaining used lubricating oils segregated from other oily wastes holding tanks, enables the separate collection and regeneration of used lubricating oils that have gone through their intended use cycle, in areas where local or central infrastructure exists for waste oils re-refining to produce mineral based oils with similar characteristics as the original base oils (e.g. SOTULUB treatment facility in La Bizerta, Tunisia).

It's also worth mentioning for Malta and Cyprus, that the 75/439/EEC Council Directive, as amended, on the Disposal of Waste Oils provides a harmonized system for the disposal of waste oils giving priority to processing waste oils by regeneration, combustion and final disposal respectively. Additionally, other requirements are provided with respect to the authorization of those disposing waste oils, the operation of treatment plants, etc. A look at the waste oils management in the European Union countries, demonstrates that 75% of the waste oils generated are collected (including waste oils collected in ports from marine sources), with 50% (of the generated volume) to be used in combustion with energy recovery and the 25% in regeneration processes *(European Topic Centre on Waste and Material Flows, E.E.A., 2002).*

Disposal of oily semi-solid sludge produced either as a secondary waste from treatment processes or, as heavy scale and sludge from tank cleaning activities collected in port areas (in particular in ship repairing zones and tank cleaning facilities) was another issue to which the assessment concentrated, attempting to verify the compliance of disposal options with the existing legal requirements.

In respect of garbage collected from ships, it was endeavored to identify and assess the disposal route in relation with the available locally recycling options and controlled land-filling facilities since the disposal of garbage is strongly associated with the municipal domestic collection, transportation and disposal systems. The option that dominates the final disposal of the non-hazardous ship-generated garbage in the ports of the project is land-filling in the nearby area around the port.

- **Waste management in general**

Under this last criterion, a number of issues that compose an environmentally sound waste management were attempted to be identified and assessed jointly or on a separate basis, including at least:

Permit requirements for those that collect, transport, treat and dispose of ship-generated waste collected in ports,

Procedures for performing surveys of the waste collection providers that operate in the port area,

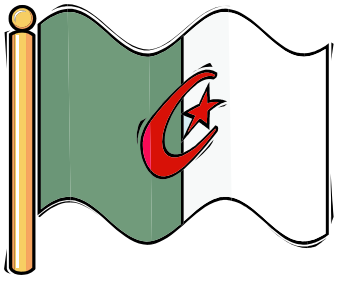
Procedures for recordkeeping requests from ships to deliver wastes at the port, quantities and types of wastes received and handled,

Procedures for enabling the traceability of wastes collected from the area of their reception to their final disposal site.

The Directive 2000/59/EC places emphasis on the continuous improvement of the adequacy of facilities by up-to-date waste reception and handling plans in consultation with all relevant parties in particular the port users. In addition, it is recommended that the procedures carried out for the reception, collection, storage, treatment and disposal should conform in all respects to an environmental management scheme suitable for the progressive reduction of the environmental impact of waste handling activities.

ANALYSIS OF RESULTS

ALGERIA



ALGERIA

- **Introduction**

Maritime transport constitutes a significant part of the economy and external trade of the country, contributing about 21% in the entire, carriage of goods in the Mediterranean Sea area, carried out by the ten countries of this project. European Union accounts for about 60% of the maritime transport flow for the country, Americas for the 27%, and Africa for about 4.5%. Less than 2% of the cargo was from and to Near and Middle East, Asia and Australia.

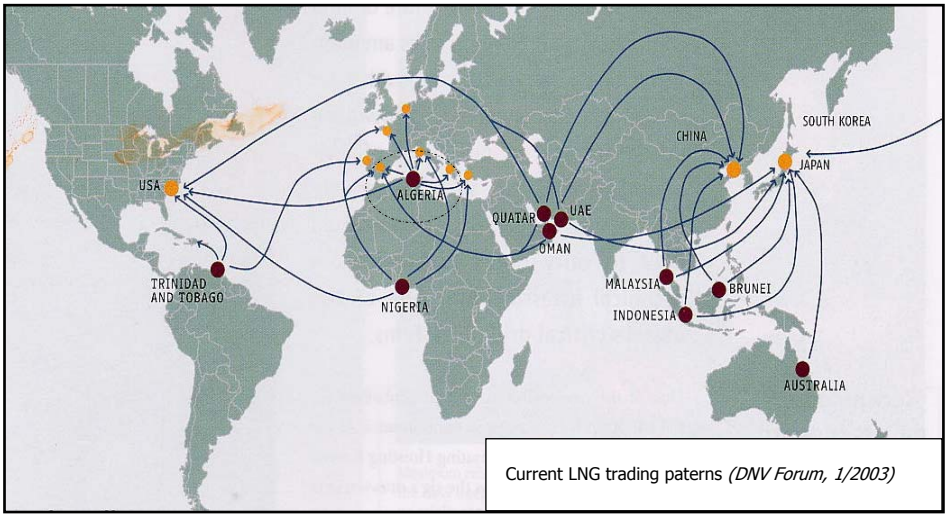
Bethioua has been handling the largest volume of cargo from all the other Mediterranean ports of the project, reaching about 36.4 million tons in 2000. Crude oil and petroleum products represent an important component of the volume of the cargo handled in the Algerian ports. In addition, the volume of cargo loaded to ships from the ports and terminals of the country was 4.4 times greater than the volume of goods unloaded from ships. The ports of Bethioua, Skikda and Arzew handled more than 73 million tons of commodities in 2000, contributing to the 82% of liquid bulk cargoes total handling. Between, 1998 and 2000, a 30% increase of container and Ro-Ro cargo units handling was also noted.

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	91.432	94.474	100.301	+4.74

Quantities of goods loaded and unloaded in the main ports of the country *(in thousands tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro and other cargoes
Quantity of goods	100.301	18.529	81.772	82.410	10.085	7.805

Energy related cargoes such as crude oil, liquified natural gas and refined petroleum products represent a major component of the caroges handled, exported and imported in the ports and dedicated oil terminals of the country.

The export of energy related cargoes such as LNG from Algeria has been gradually moving from its regional character to a world scale one, as illustrated in the diagram below, extended not only in the adjacent Mediterranean countries and Europe but far, beyond.



Current LNG trading paterns *(DNV Forum, 1/2003)*

The ports and terminals of the country which were involved in the project, are these of Annaba, Skikda, Bejaia, Algiers, Arzew, Oran, Jizel, Bethioua, Mostaganem, Ghazaouzet, and Tenes, as shown in the following table:

Ports involved in the project	**Port**		**Oil Terminal**				
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Crude oil		Oil Products		Fuel oil power plant & other facility
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal	
Skikda	4		4	4	4	4	
Oran	4				4	4	
Arzew & Bethioua	4		4	4	4	4	
Tenes	4						
Jijel	4						
Bejaia	4		4			4	

Mostaganem	4						
Annaba	4				4	4	
Ghazaouzet	4						
Algiers	4		4	4	4	4	

Algeria is a Singatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of ship-generated marine pollution from oil and garbage respectively.

The current legislative framework dealing with waste management is provided by the following instruments:

- The Law on Environment Protection No. 83-03.
- Management, control and waste prevention are regulated by Law No. 01-19 (December 2001), the application Decrees of which are currently under development.
- Law. No. 01 – 19, instituted a National Management Plan for Special Waste, the development of which is currently carried out.
- In 1998, the country ratified the Basel Convention, through the Presidential Decree No. 98 – 158 (May 1998).

The competent Authorities and Institutions that are charged with the planning and implementation of the waste management strategy, the provision of technical guidance on pollution prevention, clean production, etc. are the following:

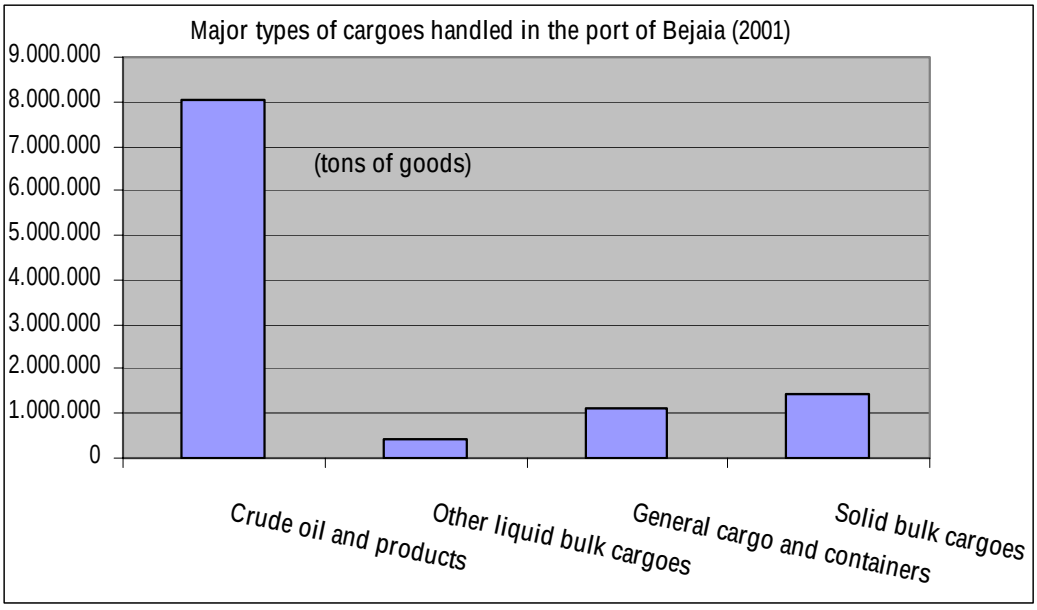
- The Ministry of Land Use Planning and the Environment (MATE) which is the main institution in charge of waste management in Algeria.
- The Waste Agency, created by the Ministerial Decree No. 02-175 (May, 2002).
- The National Center of Cleaner Production, created by Ministerial Decree No. 02 – 262 (August 2002).
- The Ministry of Industry which collaborates with MATE to support the safe and environmentally sound industrial waste management. The country through the cooperation of its responsible Authorities and Institutions is currently working on the feasibility and technical study for the establishment of a central, hazardous waste treatment and disposal facility.

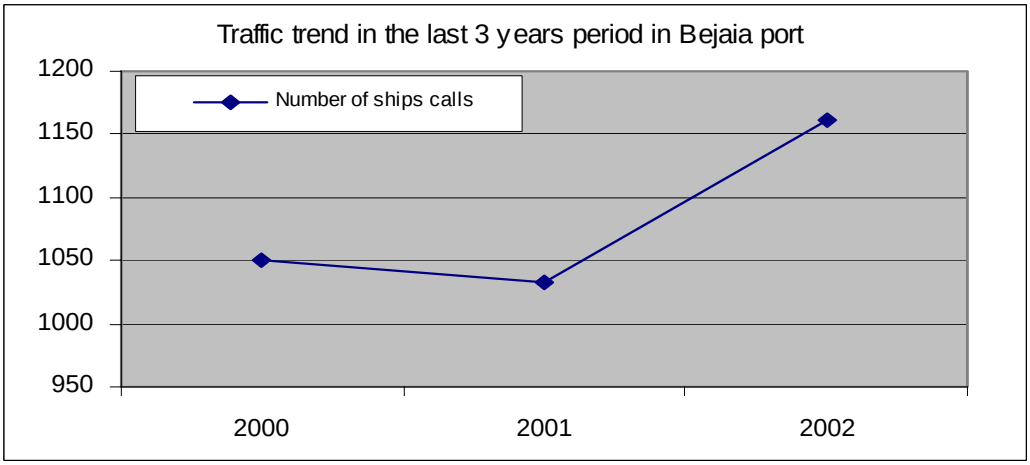
A. General Information

- **Port** Bejaia
- **Port Authority** Enterprise Publique Economique S.P.A.

B. Type and operation of the port

The total traffic of the port in 2001 reached 10.9 million tons presenting an increase of 2 % in relation to the previous year. Handling of general goods accounts for 26% of the total amounting to 2.8 million tons, while exported crude oil mostly destined to European and U.S. markets marked an increase of 1% amounting to 7.8 million tons, transported by 121 crude oil tankers. Cargo handled in 2001 and traffic in the last three years are illustrated below:





C1. Existing receptions facilities for dirty ballast and other oily mixtures

According to the data maintained by the Authority of the port and SONATRACH Regional Office, oil tankers calling to receive crude oil are exlusively SBT tankers, thus eliminating the need to discharge oil contaminated ballast during loading operations in the port. However the terminal provides a 2.500 cub. meters capacity, fixed, reception and treatment facility able to dewater oil contaminated ballast and tank washings at a 200 cub. meters per hour rate resulting in an oil level less than 1% prior its discharge. Mechanical skimmimg of oil separated from water is achieved at a 80 cub. meters rate. Collection of dirty ballast and other cargo or ballast tanks mixtures is free of charge. From the estimated volumes of dirty ballast and other oily wastes, it is obvious that the capacity of the facility covers more than sufficiently the needs of tankers approaching the terminal to receive crude oil.

Terminal: SONATRACH, Bejaia
Country: Algeria

2 Estimates of ship-generated oily wastes and residues from oil tanker operations

Oily wastes	Dirty ballast	Tank washings -	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	147.9	0.6	0.5
Average annual volume (m^3/year)	-	54,000	240.0	192.0
Maximum volume to be received per ship/arrival (m^3)	-	900.0	15.0	18.5

C2. Existing receptions facilities for oily wastes and garbage

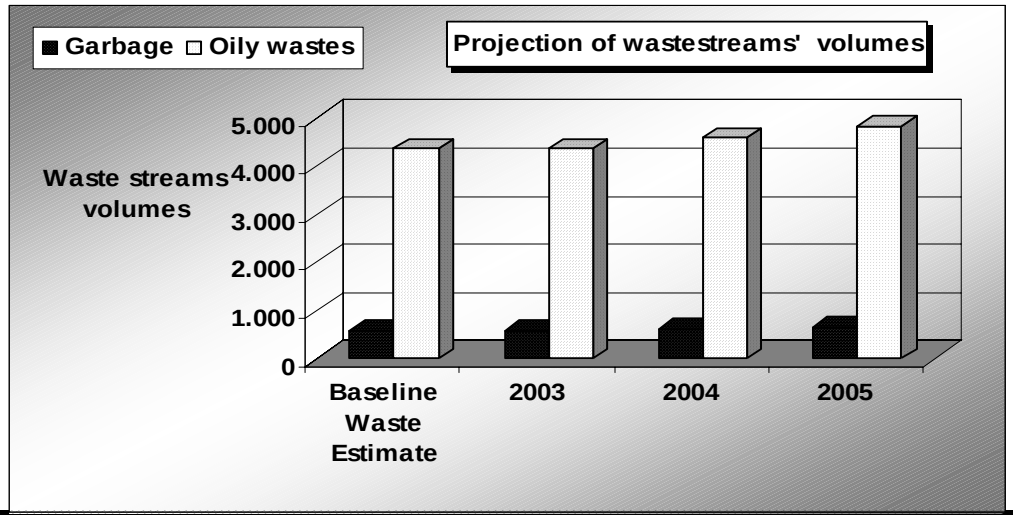
The Direction Dom. Development (D.D.D.) provides the garbage collection service at the port, upon prior request, allocating 15 prepositioned receptacles of 55 cub. meters capacity and 3 trucks of 11 cub. meters capacity. A separate from the port dues fee equal to 600 DA per cub. meter collected applies. Systematic efforts to record the use of these facilities demonstrate that almost 30% of ships request to deliver garbage, on average less than 3 cub. meters per ship.

Garbage collected is either landfilled locally in a designated area or depending on its quality can be incinerated or composted at suitable facilities. There are no fixed reception and treatment facilities for oily wastes, however, through NAFTAL and D.D.D. resources, collection of oily water mixtures can be carried out via four, in total, road tankers, able to collect limited volumes.

D. Estimation of waste streams' volumes

Port : Bejaia
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	8.7	3.1	Average weekly volume (m^3/week)	8.0	2.9	0.2	11.1
Average annual volume (m^3/year)	-	-	3,200.0	1,162.0	Reduced Annual volume (m^3/year)	417.6	153.1	12.2	582.9
Maximum volume per ship/arrival (m^3)	-	-	15.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



A. General Information

- **Port Complex** Arzew & Bethioua
- **Port Authority** Enterprise Portuaire d' Arzew

B. Type and operation of the terminal

The port complex of Arzew and Bethioua account for 60% of Algeria's total hydrocarbon exports, while in the last few years due to the strong interest aimed at enhancing the productivity of the port, significant projects have begun including the upgrade of Arzew's crude oil loading capacity in particular.

The port of Arzew provides three berths for tankers inside of the jetty able to accommodate ships of 13.0 – 14.9 and 17.0 meters maximum draught respectively.

Further, three berths on the jetty are provided for tankers of 50.000 tdw, 90.000 tdw and 250.000 tdw respectively. The loading of crude oil is also carried out at a sea terminal (lat $35^0$50'8" N, long 0^0 15'35" W) operated by SONATRACH's petroleum product distribution subsidiary, Naftal, capable of accommodating tankers of up to 250.000 tdw equipped with three pipelines dedicated for loading and one for deballasting purposes. The berthing capacity of the port for handling liquid petroleum and other products is summarized below:

Berths	Allowable Draught (m)	Length of berths (m)	Type of cargo normally handled
P1, P2, P3	13.0 – 14.9 & 17.0	220, 260, 230	Crude oil and fuel oil
S1, S2, S3	9.20 – 9.90 – 9.90	150, 210, 220	Gas oil, fuel oil, LNG, etc.
C1 and C2 Meth. berths	9.10 – 9.20	500 (250, 250)	LNG, etc.
Offshore oil terminal	> 21		Loading of crude oil

The commercial port area provides three berths for handling general cargoes and loading fertilizers and salt in bulk, a berth for cement carriers while a quay for fishing vessels extends west from the root of Mole 3.

The port of Bethioua provides at a total of 4.520 meters long quays a number of dedicated, specialized berths capable of accommodating ships up to 250.000 tdw.,
where handling of LPG, LNG and other liquid products is carried out. This berthing infrastructure of the port is summarized below:

Berths	Allowable Draught (m)	Length of berths (m)	Type of cargo normally handled
M1	12.50	480	Crude oil for ships up to 90.000 tdw
M2 – M3	12.50	460 - 460	LNG berths for ships up to 200.000 tdw,
M4 – M5	12.50	860 (430, 430)	LNG Berths forships up to 125.000 t.dw
B1, B2, B3	22.00	400, 440, 460	Crude condensate for ships of 100.000, 150.000 and 250.000 tdw
D1 & M6	10.0 – 12.70	960 (480, 480)	LPG berths for ships up to 55.000 tdw.

Year	Total number of ship calls	Crude oil & oil products throughput *(met. Tonnes)*	Bulk liquid products other than oil throughput *(met. Tonnes)*	Solid bulk and general non- containerized cargo throughput *(met. Tonnes)*
2002	1.651	24.082.030	36.777.853	234.256
2001	1.563	23.723.738	35.899.819	176.259
2000	1.543	23.899.346	35.823.710	261.024

C. Existing receptions facilities for oily mixtures and garbage

SD 2 and SD 3 reception installations for exclusively dirty ballast from crude oil tankers are provided by SONATRACH – RTO, following a 24 hours in advance, request from the incoming tankers. Both, fixed facilities are capable to receive at 3.000 cub. meters of dirty ballast per hour providing a total, nominal storage capacity of 25.700 cub. meters. Apart the above mentioned facilities, there are no other facilities available for dirty ballast, tank washings and other oily mixtures from tankers. Clean ballast meeting the respective

specifications of Annex I of MARPOL 73/78, can be discharged at sea from oil tankers berthed at the other petroleum port sites.

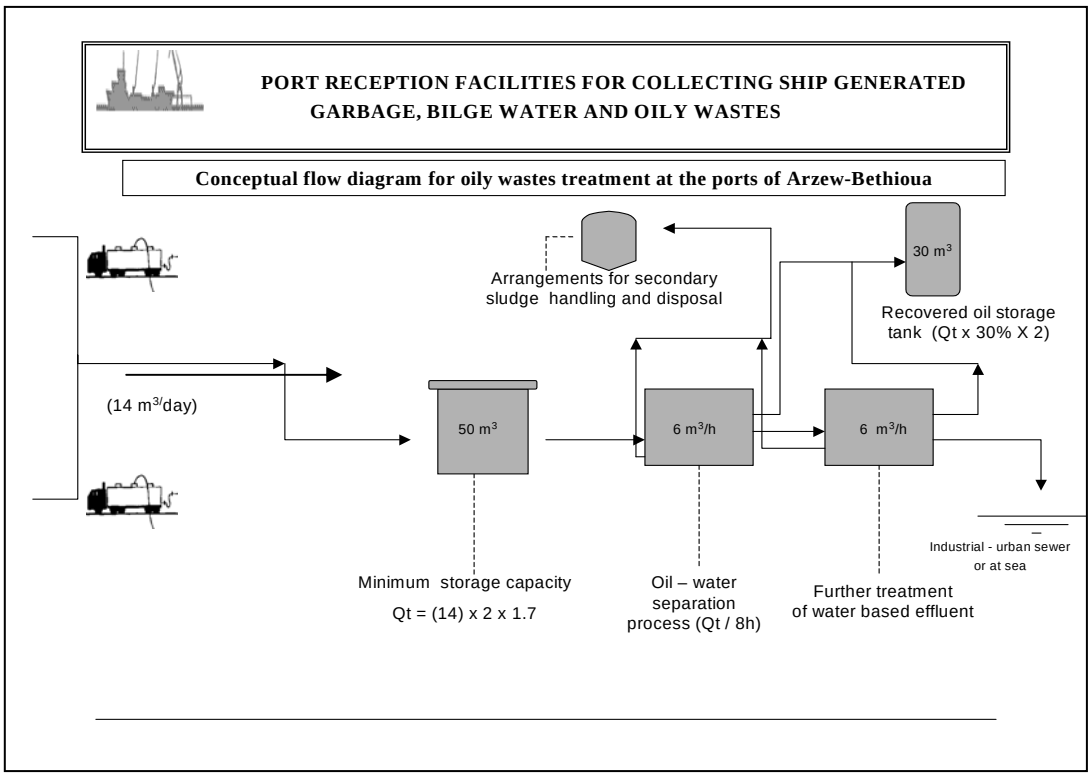
The estimated, below, reduced daily volume of sludge and oily bilge water (more than 13 cub. meters) that could be delivered from ships, leads to the conclusion that a reception facility followed by pre-treatment should be established and operate at the ports either of Arzew or Bethioua. The objective of the treatment technology will be to remove oil from water to produce a water based effluent that could be discharged at sea provided that the local, discharge standards and requirements are met while another vital objective would be the recovery of oil for re-use or recycling.

Port :	**Arzew & Bethioua**
Country:	**Algeria**

2 Estimates of ship-generated oily wastes and residues that could be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	-	9.0	4.5
Average annual volume (m^3/year)	-	-	3285,8	1,649
Maximum volume per ship/arrival (m^3)	-	-	15.0	7.5

In determining the capacity of the reception and collection system, the estimated reduced daily volume should be taken into consideration in relation to the requirement for no undue delay for ships. Although a more detailed study is always advised to identify the proper collection scheme for the port, it can be recommended that the provision of at least three, dedicated road tankers (the specifications of which should meet the national and local requirements for land – based transport of waste oils) of 20 cub. meters capacity each, is considered as a sufficient solution for collection purposes from each nominal berth of the ports. A rough, conceptual collection and treatment flow diagram is presented below:



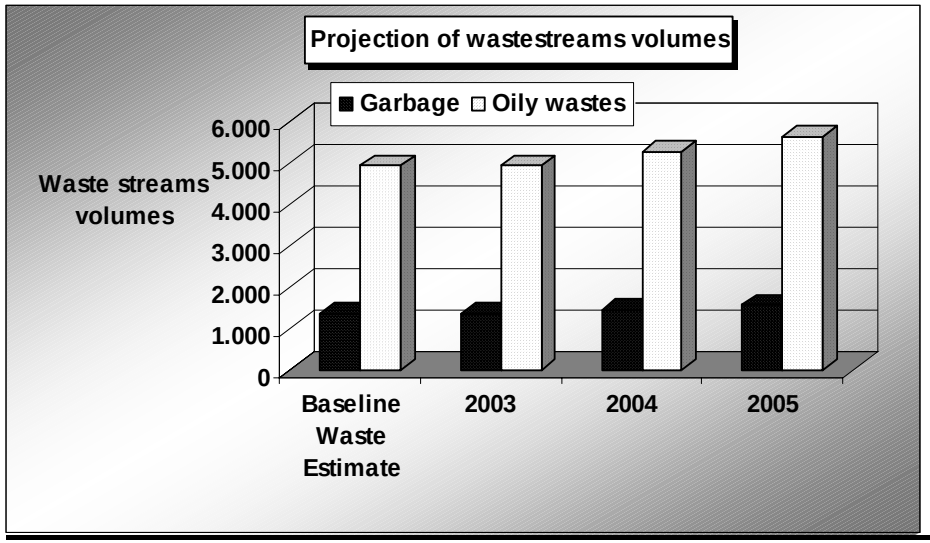
The Port Authority arranges the provision of garbage collection providing a considerable number of receptacles (32) of 96 cub. meters total capacity and a truck for empyting and transporting purposes. Garbage collected is disposed of at a designated, public landfill situated 6 kms far from the port area. Garbage collected is domestic like, non hazardous thus, not requiring special handling and precautions.

The reasonable cost of US $ 32 per cubic meter of garbage, the contolled deposit of garbage in relation to the proximity of the final disposal area and the adequate reception and emptying capacity ensure that the whole service is consistent to the needs of ships.

D. Estimation of waste streams' volumes

Port : Arzew & Bethioua
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	9.0	4.5	Reduced weekly volume (m^3/week)	18.2	5.5	2.3	26.0
Average annual volume (m^3/year)	-	-	3285,8	1,649	Reduced Annual volume (m^3/year)	950.0	290.5	122.2	1,362.7
Maximum volume per ship/arrival (m^3)	-	-	15.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



A. General Information

- **Port** Ghazaouet
- **Port Authority** Enterprise Portuaire de Ghazaouet

B. Type and operation of the port

The port of Ghazaouet is located at 35^0 6′ N, 1^0 52′ W, engaged basically in the handling for both import and export purposes of general cargo, grains, minerals, and chemical liquid substances in bulk. In a total of 1496 meters long quays, it provides 17 berths to accommodate ships up to 25.000 tdw and 185 meters LOA. Its berthing, nominated capacity is summarized below:

Berths	Allowable Draught (m)	Length of berths (m)	Type of ships and cargo normally handled
1 – 3	7.0	300	Up to 140 meters LOA and 9.000 tdw ships
4 - 5	7.5	151	Passenger ships up to 8.000 tdw
8 – 10	7.5	336	Ro-Ro ships and cruise ships up to 120 meters LOA
11 – 13	7.8	300	Bulk carriers up to 185 meters LOA for handling cereals and other cargoes in bulk
14	10.5	120	Chemical tankers engaged in handling of acids and other liquid products
15 - 17	10.5	289	Bulk carriers up to 25.000 tdw for loading and discharging minerals and cereals

In the last three years period, an increase of about 37% has been experienced in the traffic at the port, as presented below in association with the contribution of the major types of cargo in the port operation:

Year	Total number of ships	Containerized cargo (TEU)	Bulk liquid products other than oil (*met. tonnes)*	Solid bulk and other general cargo *(met. tonnes)*
2002	274	1.641	80.764	470.523
2001	167	1.785	54.014	358.863
2000	150	171	54.383	364.773

C. Existing receptions facilities for oily wastes and garbage

From the data maintained by the port authority, with respect to the volumes of garbage collected, an average 6% of the total number of incoming ships deliver basically domestic garbage items (2 cub. meters per ship/arrival). About 35 cub. meters annually are landed at the port which are finally disposed of at a designated landfill situated 5 kms west from the port.

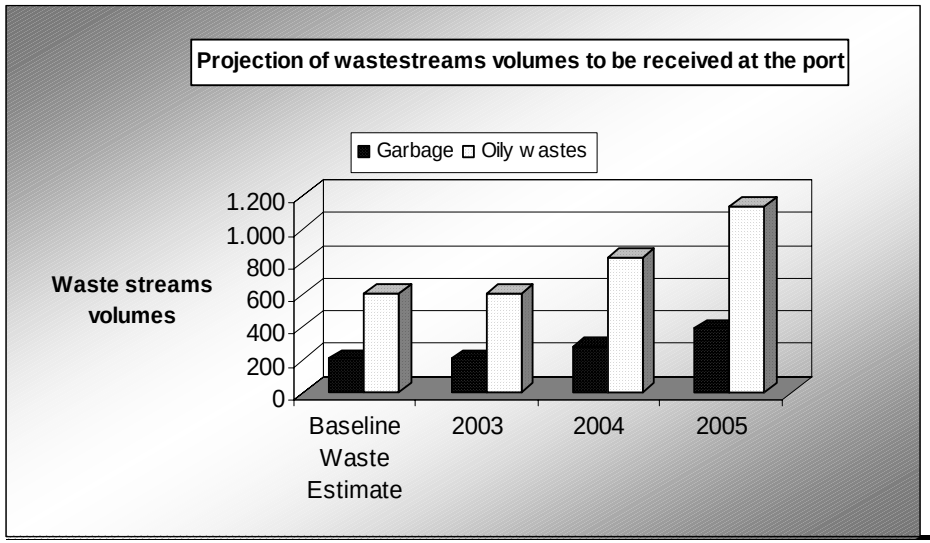
The port provides 6 receptacles of 2 cub. meters storage capacity to ships wishing to deliver domestic and other non hazardous wastes. A charge of $ US 96 per ship/arrival for collecting a maximum 2 cub. meters volume of garbage in the above mentioned receptacles.

In the absence of any oily wastes reception facilities, it is recommended that at least, either through the involvement of the Authority of the port or the engagement of a private contractor, a road tanker for collecting mixed oily wastes along with the installation of a small, portable tank for receiving separated waste oils could match the limited needs of the port. What needs to be ensured, is that an appropriate depot for temporary storing these mixtures in the proximity of the area should exist or a designated treatment and disposal facility.

D. Estimation of waste streams' volumes

Port : Ghazaouet
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.9	0.7	Average weekly volume (m^3/week)	3.0	0.9	-	3.9
Average annual volume (m^3/year)	-	-	328.8	274.0	Reduced Annual volume (m^3/year)	156.0	48.2	-	207.2
Maximum volume per ship/arrival (m^3)	-	-	18.5	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



A. General Information

- **Port** Annaba
- **Port Authority** Enterprise Portuaire de Annaba

B. Type and operation of the port

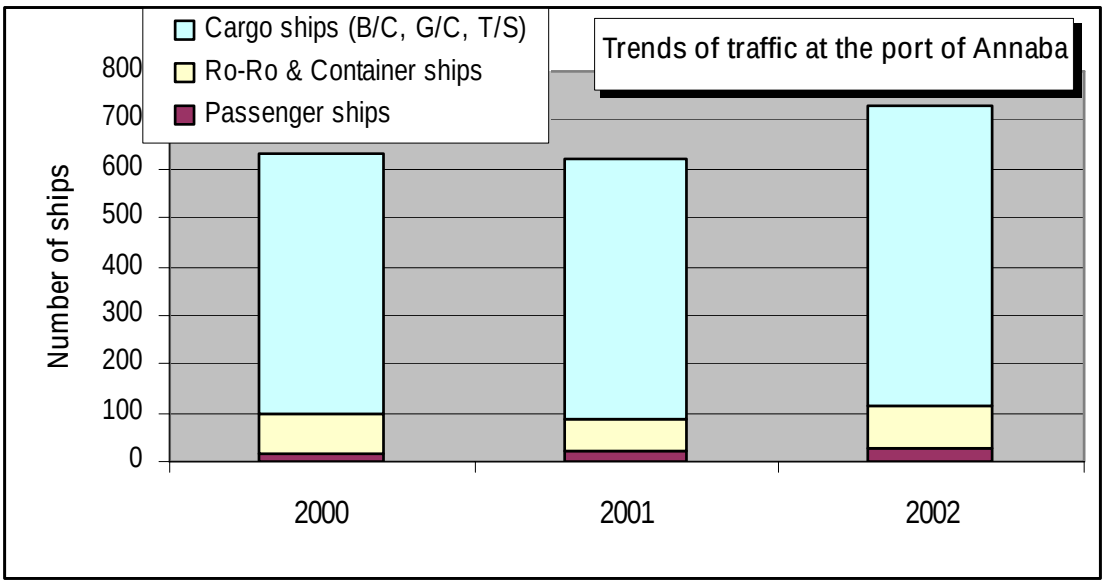
The port of Annaba which is located at 36^0 54' N, 7^0 45' W plays an important role for the locally active, industrial sector as its premier base for importing and exporting basically, metallurgical products, phosphates, ammonia, edible oils and other general cargoes. The port consists of three basins of 94 ha total surface providing 22 nominal berths at its 3.685 meters long quays, as illustrated below:

Berths	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
				LOA (m)	DWT (t.dw)
1 - 2	8 - 10	240	Container ships	130	8.000
3 - 4	7- 9.80	350	Ro-Ro and car ferries	160	10.000
5	5.00	100	Service craft	130	500
6	6.20	160	Cargo ships engaged in general cargoes handling	140	25.000
7 - 12	9.80	900	Cargo ships engaged in cereals, vegetable oils handling, etc.	180	25.000
13 - 18	9.75 – 12.5	1360	Coal carriers, iron and steel products, etc.	250	70.000
19 - 22	7.0 – 9.0	575	Ships engaged in handling ammonia, phosphates, cereals, etc.	160	22.000
26	12.80	575	Ships engaged in handling gas oil and other oil products (coaster, cabotage tankers)		10.000

Oil products are handled at quay 26 operated by Naftal. The average annual traffic at the port and the share of major types of cargo in the port operation is provide below:

Year	Total number of ships	Containerized cargo (TEU)	Bulk liquid products other than oil (*met. tonnes)*	Solid bulk and other general cargo *(met. tonnes)*	Oil products *(met. tonnes)*
2002	729	3.756	105.986	2.559.008	95.120
2001	619	2.791	144.399	1.870.102	83.275
2000	631	2827	131.376	1.826.262	94.947

The trends of maritime traffic at the port in relation with the major types of ships and the associated kind of cargo carried is schematically shown below:



C. Existing receptions facilities for oily wastes and garbage

A privately operated company has been assigned to provide garbage collection. Garbage is directly received on trucks, costing $ US 16 per cubic meter collected. Disposal is carried out at a public landfill, 22 kms far from the port area. On average, less than 10 per cent of the ships that call to the port request to deliver basically, domestic garbage, at volumes which do not exceed 6 cub. meters per ship.

In the absence of any oily wastes reception facilities, it is recommended that at least, either through the involvement of the Authority of the port or the engagement of a private contractor, a road tanker for collecting mixed oily wastes along with the installation of a small, portable tank for receiving separated waste oils could match the limited needs of the port. What needs to be ensured, is that an appropriate depot for temporary storing these

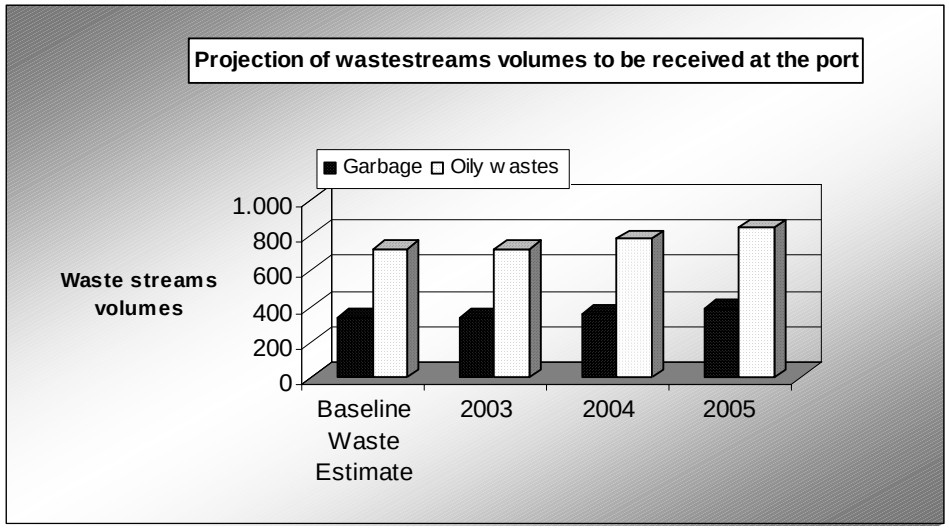
mixtures in the proximity of the area should exist or a designated treatment and disposal facility.

The estimations made, on the basis of proper garbage management onboard the ships, demonstrate that volumes that could be received at the port are similar to those actually recorded. It's worthmentioning that in 2002, 64 ships delivered 384 cub. meters garbage while the baseline estimate was 336.4 cub. meters respectively.

D. Estimation of waste streams' volumes

Port : Annaba
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	1.0	0.9	Reeduced weekly volume (m^3/week)	5.3	1.1	-	6.4
Average annual volume (m^3/year)	-	-	395.4	329.8	Average Annual volume (m^3/year)	278.5	57.9	-	336.4
Maximum volume per ship/arrival (m^3)	-	-	13.5	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.0



A. General Information

- **Port** Mostaganem
- **Port Authority** Enterprise Portuaire de Mostaganem

B. Type and operation of the port

The port of Mostaganem is located at 35^0 56 N, 00^0 04' E, the marine area of which consists of two basins of 30 ha total surface, providing 10 nominal berths able to accommodate ships up to 183 meters LOA, basically engaged in the carriage of 1.2 million tons of general cargoes, cereals, bitumens, etc., annually.

Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that normally call	Maximum size of ships LOA (m)
1st Basin Nord Est, Maghreb & Mole de l' Indepeb. (Y, 0 – 5)	7 – 7.62	1.011	General cargo ships and Ro – Ro cargo ships	108
2nd Basin Ramp Ro- Ro & SO Quay	6.0 – 8.20	492	Ro – Ro and cargo ships	183

Year	General cargo ships		
	Number of ships calling at the port	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	319	05	06
2001	240		
2000	213		

Year	Ro – Ro and Container ships		
	Number of ships calling at the port	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(hours)*
2002	94	1	36
2001	58		
2000	76		

On average 340 ships call annually at the port, while during the last 10 years period, the traffic at the port has been remaining relatively constant (329 ships in 1995, 340 ships in 1997 and 403 ships in 2002).

C. Existing receptions facilities for oily wastes and garbage

Garbage collection is provided upon prior notice from the interested ships, preferably, during working hours by means of a 3 cub. meters capacity truck. Collected garbage is transported for final landfilling in a designated area operated by the Administration of the local community (A.P.C.). Less than 10% of the incoming ships to the port delivered garbage, on average 3 cub. meters per ship and arrival. There is not any other port based storage or treatment facility and the maximum volume collected annually is about 100 cub. meters.

There are not any facilities available for collecting oily wastes from ships.

Four cargo ships responded, during the short time of the project, upon the request of the port authority to provide input with regard to their needs to deliver oily wastes at the port. Having spent a varied interval, en route, it was demonstrated that all of them were provided with sufficient storage capacity to retain either oily wastes or garbage onboard. However, two at least of them could have delivered a volume of oily wastes varying from 3.40 to 4.0 cub. meters sludge and oily bilge water as well. Similarly, garbage to be received fluctuated from 0.07 to 0.5 cub. meters per ship.

In the absence of any oily wastes reception facilities, it is recommended that at least, either through the involvement of the Authority of the port or the engagement of a private contractor, a road tanker for collecting mixed oily wastes along with the installation of a small, portable tank for receiving separated waste oils could match the limited needs of the port. What needs to be ensured, is that an appropriate depot for temporary storing these mixtures in the proximity of the area should exist or a designated treatment and disposal facility.

D. Estimation of waste streams quantities

Port : Mostaganem
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	1.3	1.4	Reduced weekly volume (m^3/week)	4.7	1.7	0.3	6.7
Average annual volume (m^3/year)	-	-	510.0	511.5	Average annual volume (m^3/year)	245.5	91.0	16.0	352.5
Maximum volume per ship/arrival (m^3)	-	-	18.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5

No considerable changes are expected in the near future with respect to the anticipated volumes of ship-generated wastes for delivery
in the port facilities.

A. General Information

Port Oran

Port Authority Enterprise Portuaire d' Oran

B. Type and operation of the port

The port of Oran is located at 35^0 43' N, 00^0 39' W, being accessed through the 150 meters wide and 24 meters deep, eastern channel. It is protected by two breakwaters and consists of seven basins with a total marine surface area of 122 ha and 3.5 kms long quays. Thirty three, nominal berths are provided to accommodate ships up to 270 meters long.

Year	Total number of ships	Containerized cargo (TEU)	Bulk liquid products other than oil (*met. tonnes)*	Solid bulk and other general cargo *(met. tonnes)*	Oil products *(met. tonnes)*
2002	1.331	34.706	48.847	2.137.693	83.012
2001	1.150	24.786	60.768	1.657. 752	63.327
2000	1.110	20.640	39.275	1.864.661	72.000

Year	**Passenger and Cruise ships**		
	Number of ships calling at the port	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	241	24	1.5
2001	246		
2000	264		

Year	**Bulk carriers and General cargo ships**		
	Number of ships calling at the port	Average duration of ships stay at the port *(hours)*	Average size (tdw)
2002	575	12	7.000
2001	476		
2000	481		

Year	**Container ships**		
	Number of ships calling at the port	Average duration of ships stay at the port *(days)*	Average size (tdw)
2002	515	1.5	5.600
2001	428		
2000	365		

C. Existing receptions facilities for garbage

The Port Authority arranges and provides collection services for domestic like garbage, upon request from any interested ship following a 24 hours prior notice. A separate from the standing port dues fee is charged, equal to 1.500 dinars per truck voyage.

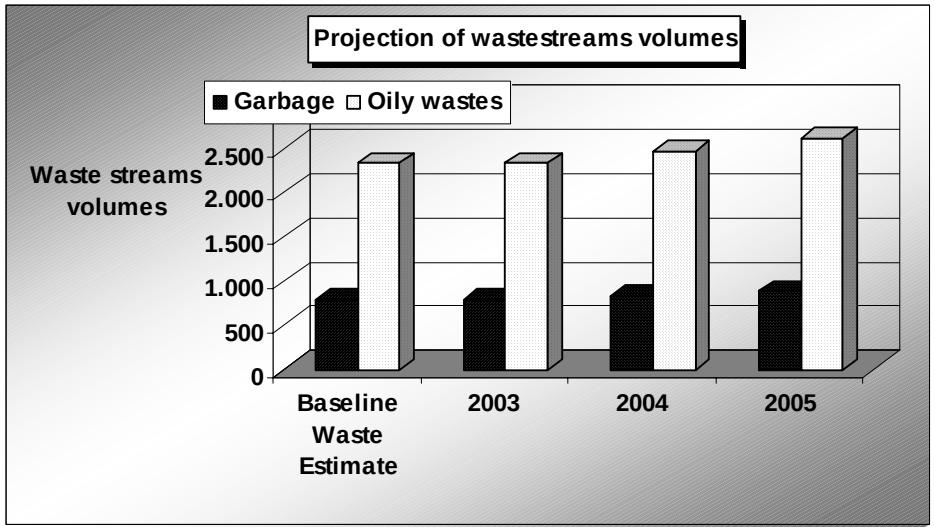
A sufficient number of 10 receptacles of 3 cub. meters capacity, is allocated alongside the ships while 1 truck of 3 cub. meters capacity, is employed in emptying and removing garbage either from the receptacles or directly from the ships. On average, 4.100 tons of garbage are collected annually which are disposed of at the nearby (25 kms far from the port area) designated, public operated landfill.

In the absence of any oily wastes reception facilities, it is recommended that at least, either through the involvement of the Authority of the port or the engagement of a private contractor, a road tanker for collecting mixed oily wastes along with the installation of a small, portable tank for receiving separated waste oils could match the limited needs of the port. What needs to be ensured, is that an appropriate depot for temporary storing these mixtures in the proximity of the area should exist or a designated treatment and disposal facility.

D. Estimation of waste streams' volumes and Recommendations

Port : Oran
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	3.9	2.4	Reduced weekly volume (m^3/week)	9.9	3.0	2.1	15.0
Average annual volume (m^3/year)	-	-	1,440.0	886.0	Average annual volume (m^3/year)	518.4	158.4	109.2	786.0
Maximum volume per ship/arrival (m^3)	-	-	15.0	12.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



A. General Information

Port Tenes

Port Authority Enterprise Portuaire de Tenes

B. Type and operation of the port

The port of Tenes is located 250 kms far from Algiers at 35^0 31' N, 01^0 19' E and basically provides two jetties the north and southwest with total length of quays 420 meters and four nominal berths of 6 – 7 meters safe draught.

In 2002, 77 ships called at the port (average size of 4.000 tdw.) engaged in the handling of 316.349 tons of general cargo.

C. Existing receptions facilities for oily wastes and garbage

Due to the limited traffic of the port, there are no facilities available for collecting oily wastes from ships. Collection, transfer and final disposal to the regional NAFTAL installations is provided only for the limited volumes of oily water mixtures and waste oils produced in the ports' small craft and fishing vessels.

Similarly, limited quantities of domestic garbage can be collected, upon request, in the port arranged by the Authority of the port and through the involvement of the local community's resources.

As illustrated below, the estimated volumes of both, two distinguished wastestreams are very limited, eliminating the need of the port to provide a systematic collection service based on fixed reception and treatment facilities.

D. Estimation of waste streams' volumes

Port : Tenes
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.1	0.1	Reduced weekly volume (m^3/week)	0.1	0.1	-	0.2
Average annual volume (m^3/year)	-	-	42.0	57.7	Average annual volume (m^3/year)	7.3	5.4	-	12.7
Maximum volume per ship/arrival (m^3)	-	-	10.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5

A. General Information

Port Jizel (Djen Djen)

Port Authority Enterprise Portuaire de Jijel

B. Type and operation of the port

The port of Jijel is located 577 kms far from Algiers at 36^0 50' N, 5^0 47' E, providing more than 1.000 meters quayage for accommodating ships up to 40.000 t.dw., with 10. 5 – 18 meters draught. Steel products and general cargoes are basically handled amounting to 1.7 million tons while on average 136 ships call at the port.

C. Existing receptions facilities for oily wastes and garbage

Due to the limited and almost constant traffic of the port, there are no facilities available for collecting oily wastes from ships. A pumping station in the port area is currently used by the small craft and the fishing vessels to discharge used and other waste oils produced in the machinery areas, at 200 lts capacity, barrels for subsequent transfer to the regional NAFTAL operated installations. In respect of garbage, limited quantities of domestic garbage can be collected, upon request, in the port arranged by the Authority of the port and through the involvement of the local community's resources.

As verified below, the estimated volumes of oily wastes and garbage are very limited, eliminating the need of the port Authority to provide a systematic collection service based on fixed reception and treatment facilities.

D. Estimation of waste streams' volumes

Port : Jijel
Country: Algeria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.3	0.2	Reduced weekly volume (m^3/week)	0.9	0.3	-	1.2
Average annual volume (m^3/year)	-	-	126.0	102.0	Average annual volume (m^3/year)	48.9	17.9	-	66.8
Maximum volume per ship/arrival (m^3)	-	-	10.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5

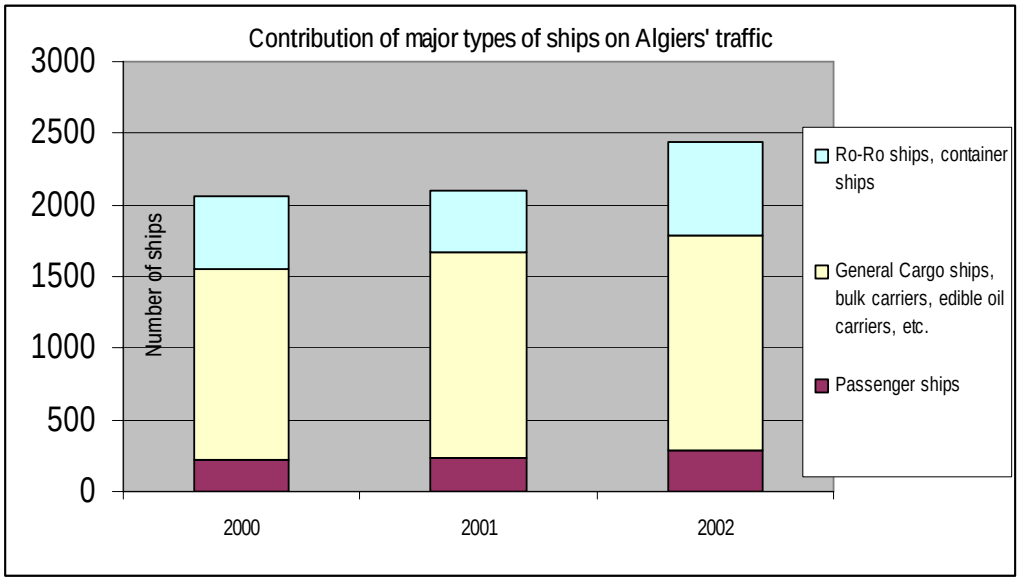
A. General Information

- **Port** Algiers
- **Port Authority** Enterprise Portuaire d' Algier

B. Type and operation of the port

The port is located at 36^0 47' N, 03^0 04' E, being accessed through the North approach Channel which is 176 meters wide and 22 meters deep, and the South approach Channel which is 240 meters wide and 16 meters deep. The port is basically engaged in the handling of oil products, building material, timber and other general cargoes. It consists of three basins, the berthing capacity of which is summarized below:

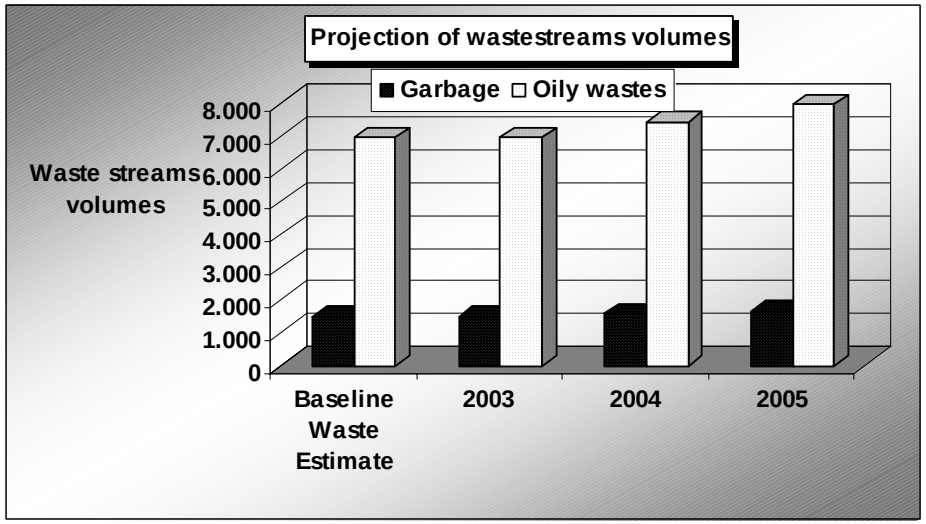
Berths	Actual Depth (m)	Berth overall length (m)	Type of ships, normally accommodated
Vieux port basin Berths 1 – 4	3.7 – 5.9	8.488	Fishing vessels and craft supporting the port operation
Agha basin Berths 5 – 8a	6.5 – 9.6		General cargo ships, Ro – Ro ships, edible oils carriers
Mustapha basin Berths 8b – 10	8.0 – 10.0		Petroleum carirers, bulk carriers, general cargo ships, Ro – Ro ships, etc.



C. Estimation of waste streams' volumes

Port : Algiers
Country: Algeria

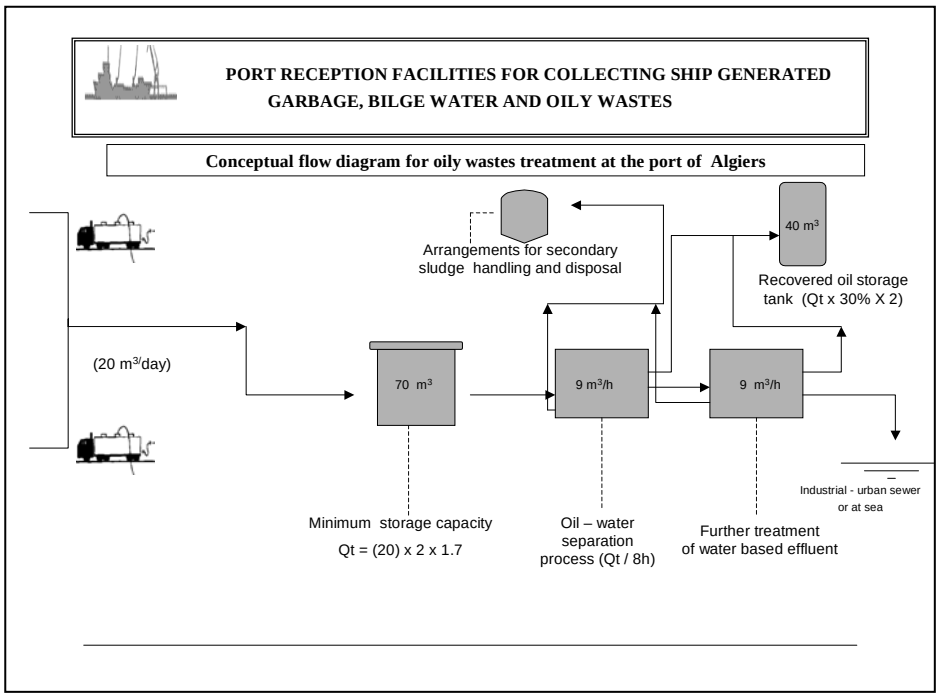
2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	10.6	8.3	Reduced weekly volume (m^3/week)	16.8	8.2	3.1	28.1
Average annual volume (m^3/year)	-	-	3,888	3,042	Average annual volume (m^3/year)	876.2	428.3	163.2	1467,7
Maximum volume per ship/arrival (m^3)	-	-	18.0	15.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



C. Existing receptions facilities & Recommendations

The Port Authority arranges the provision of garbage collection at the port through the involvement of authorized contractors who collect garbage, upon reguest, and at a separate cost, from the standing port dues. The means provided for the collection of garbage are 20 containers of 120 cub. meters, total holding capacity. Garbage collected is disposed of at a designated, public landfill situated 12 kms far from the port area. Garbage collected is domestic like, non hazardous not requiring special handling and precautions. The safe deposit of garbage in relation to the proximity of the final disposal area and the adequate reception and emptying capacity ensure that the whole service is consistent to the needs of ships.

The establishment of a land – based collection and treatment facility for oily wastes in the port of Algiers, the generic flow process of which is shown below, is recommended for the following two reasons:



1. The estimated, volume of about 7.000 cub. meters of oily wastes that can be delivered annually along with the daily, batch volume of about 20 cub. meters exceed the threshold that normally determines the feasibility of setting up a port - based, collection and treatment system that could be cost effective and technically sound. The collection means should incorporate, at least, two separate means either road tankers or a barge or a combination of them.

2. The existence of the facility either as a pierside application or in the proximity of the port area would ensure that oily water mixtures are treated effectively to a certain level, so that oil recovered from the process can, in turn, be easily disposed of at the nearby NAFTEC refinery.

A. General Information

- **Port** Skikda
- **Port Authority** Enterprise Portuaire de Skikda

B. Type and operation of the port

One of the major oil terminals in Algeria used for the export of hydrocarbons is the SONATRACH operated terminal in the port of Skikda. In parallel, the oil refinery at Skikda which became fully operational in 1981, is the country's largest being capable of processing more than 15 million tons of crude oil annually. On average, 3.5 million tons of crude oil are exported annually from the terminal while more than 200.000 tons of refined procucts including fuel oil, naptha, gas oil etc. are discharged from its installations.

Year	Total number of ships	Containerized cargo (TEU)	Crude oil and refined products (*met. tonnes)*	Solid bulk and other general cargo *(met. tonnes)*
2002	1.737	49.187	24.854.470	1.414.296
2001	1.579	32.941	22.507.612	1.265.479
2000	1.488	25.453	23.211.017	1.339.464

On average, 540 oil tankers, almost all of them S.B.T. or D.C.B.T. tankers call at the terminal annually, the average and maximum allowable size of which is 80.000 and 125.000 t.dw respectively, as presented below:

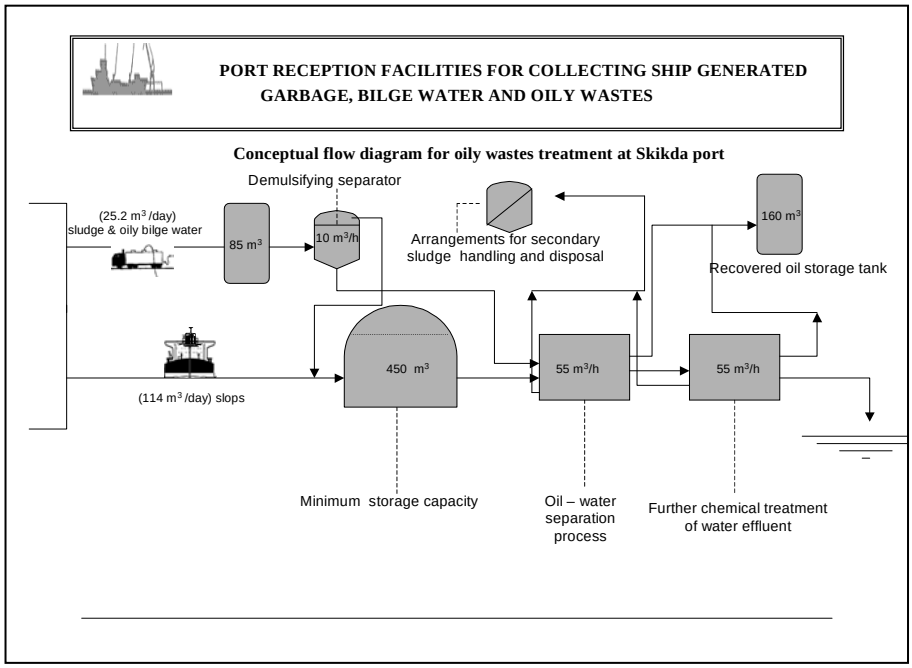
Year	Number of tankers	Average size (t.dw) of tankers	Maximum size (t.dw) of tankers
2002	529	80.000	125.000
2001	551	60.000	99.000
2000	539	60.000	99.000

C. Existing receptions facilities & Recommendations

The estimated, reduced daily volume of about 140 cub. meters of various, oily wastes including also those of tank washings produced from cargo receiving oil tankers, requires the establishment of a reception facility able to deal with about 50.000 cub. meters annually. In determining the capacity of the reception and collection system, the estimated, daily volume should be taken into consideration in relation to the requirement for no undue delay for ships. To further design the reception system, parameters such as tank washings flow rate, quality of tank washings, effluent treatment objectives, etc.

Slops from tanker operations, are considered to be rich in oil, mixtures compared to those of oily bilge water and sludge making preferable a different treatment while the use of a initial, holding and equalization tank could enhance a single treatment process. It was considered that a fixed, receiving system for occasionally dirty ballast and for slops should be established at all crude oil and refined products loading berths or alternatively navigable means able to receive the above, estimated maximum volume per tanker (2.400 cub. meters) to be provided.

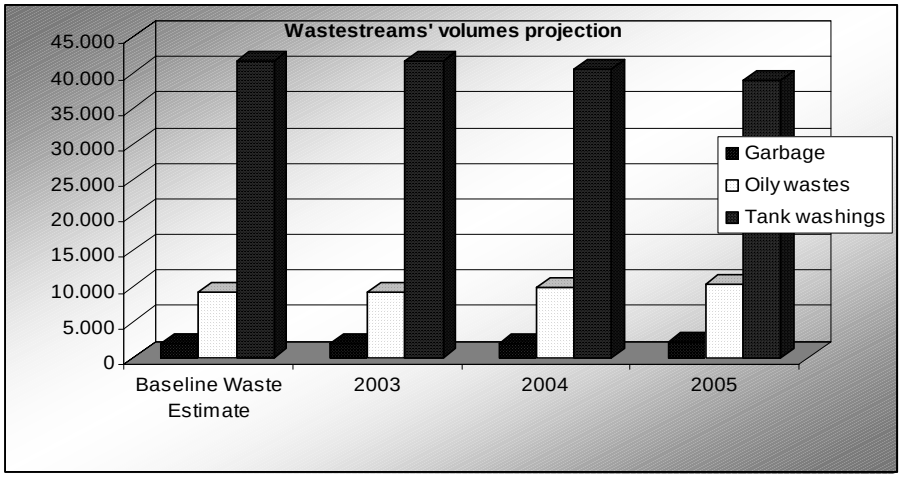
Although a more detailed study is always advised to identify the proper collection scheme for the port and its petroleum berths, it can be recommended that the provision of at least three, (15 cub. meters capacity) dedicated road tankers (the specifications of which should meet the national and local requirements for land – based transport of waste oils) to collect oily wastes from the machinery spaces of ships and one or two barges of 750 – 1000 t.dw could provide a satisfactory collection pattern. Oily wastes collected are to be directed to a port-based storage and treatment facilty, as shown below:



D. Estimation of waste streams' volumes

Port : Skikda
Country: Algeria

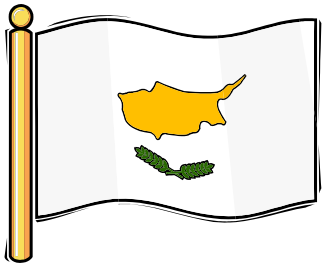
2 Estimates of ship-generated oily wastes and residues that could be received at the port					/ Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	113.9	13.4	11.8	Reduced weekly volume (m^3/week)	26.8	9.1	<1.0	36.9
Average annual volume (m^3/year)	-	41,600	4,898	4,342	Average annual volume (m^3/year)	1389,6	473.2	52.0	1914,8
Maximum volume per ship/arrival (m^3)	-	2,400	20.0	22.0	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				2.0



Terminal	**Type of Facility**			**Oily wastes received from the facility**												**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximun receiving rate (m^3/hour)	
SONATRACH Oil terminal Port of Skikda	4			15.000	2.400	15.000	2.400									

Reception facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
SONATRACH Region Transport Est. Mr. Lagraf Aissa Tel: + 213 3875 7311 Fax: + 213 3874 5240	A fixed deballasting facility able to receive 15.000 cub. meters is provided for the reception and further treatment of basically dirty ballast and tank washings	Separation of oil and water phases is achieved in two stages involving an initial treatment in an API separator followed by a decanting basin at a 250 cub. meters per hour maximum rate.	Up to 5.000 tons a charge equal to 100.000 Alg.dinars applies For volumes greater than 5.000 tons, 150.000 Alg. dinars	Oil recovered from the whole separation and treatment process is directed back to the distillation process

CYPRUS



CYPRUS

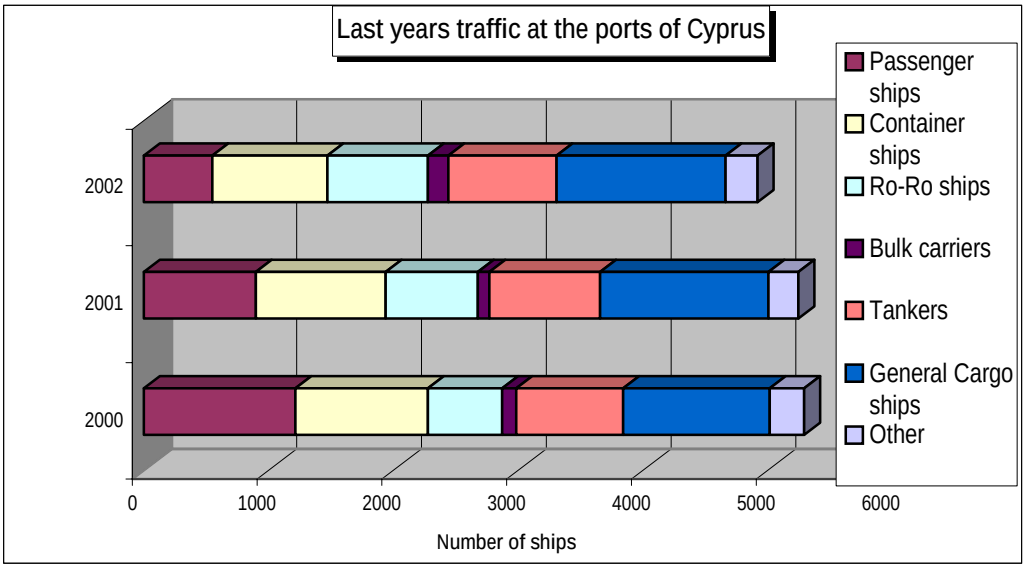
Maritime traffic in Cyprus is served by a port system that comprises the multi-purpose ports of Limassol and Larnaca, the industrial port of Vassiliko and the three 3 dedicated oil terminals of Larnaca, Dhekelia and Moni. Limassol and Larnaca ports are the island's main sea gateways handling two-thirds of the total volume of goods, supplementing basically one another in terms of traffic and facilities. The latter is also a fact for the existing facilities provided for the collection and treatment of ship-generated waste at all country's ports and terminals.

Total maritime transport of goods
(in thousands of tons)

Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	6.443	7.037	7.281	+ 6.30

Quantities of goods loaded and unloaded in the main ports of the country
(in thousands of tons)

	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro & other cargoes
Quantity of goods	7.281	5.475	1.805	3.095	1.845	474



The ports and terminals of the country are presented below, from which these of Larnaka, Vassiliko and Limassol are discussed here:

Ports involved in the project	**Port**		**Oil Terminal**				
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Crude oil		Oil Products		Fuel Oil fired power plant
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal	
Larnaka	4		4		4	4	
Vassiliko	4						4
Limassol	4						
Moni							4
Dhekelia							4

Cyprus, as a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of marine pollution from oil and garbage respectively from ships, has adopted specific regulations dealing exclusively with the provision of reception facilities at its ports. Regulations 282/1993 provide basically a set of requirements dealing with the establishment, licensing and operation of either floating or land-based reception facilities for ship-generated oily wastes. More specifically, they provide:

- Structural and operational specifications for reception facilities including the oil – water separation system, oil content meters used for monitoring the discharge of separated water, the associated piping system, interface detectors, fire-fighting means, etc.

- Criteria for discharging treated water at sea, requirements for the safe and environmental sound disposal of solid residues produced from the treatment process, etc.

- Criteria and procedures for the licensing of reception facilities, surveys and recordkeeping requirements, etc.

It should be noted that Cyprus is engaged in transposing and applying a number of E.U. Directives related with waste management, the assessment of environmental impacts, water quality, etc. Legislation is currently being drafted for the transposition of the 2000/59/EC Directive on port reception facilities, a copy of which was provided to the Consultant during the mission in the country. Upon the completion of the transposition process and the finalization of any necessary institutional, administrative and other changes, it is obvious that the alignment of the country's existing legislation dealing with the port based reception facilities to the abovementioned E.U. Directive will be achieved.

It was considered as appropriate to summarize below, the major, existing E.U. Directives that influence the operations of port and land-based facilities which collect, treat, transport and dispose of ship-generated oily wastes and garbage:

E.U. relevant Legislation	**Basic requirements**
Council Directive 2000/59/EC dealing with the port based reception facilities for ship-generated wastes	The Directive is aimed at drastically preventing the intentional discharges of ship-generated wastes at sea by enhancing the availability of the reception facilities in the ports and terminals that operate in the Euro. Union area, and specifically by requiring from every port: - to develop a proper waste reception and handling plan - to establish adequate facilities for collecting wastes produced from the normal operation of ships and cargo-associated waste - to ensure that costs related with the operation of the facilities including those for treatment and disposal purposes, are covered through the collection of a fee from all ships
Council Directive 74/442/EEC on wastes as amended	The aim of the Directive is to establish a coherent framework for the management of wastes, providing requirements and strategies for their prevention, recycling, recovery, and the final disposal. It's strongly related with the operations of reception facilities for both oily wastes and garbage since it provides requirements for the integrated management of wastes produced from any source.
Council Directive 75/439/EEC on waste oils	The aim of the Directive is to ensure the safe and environmentally sound collection, management and disposal of waste oils, providing priorities to the way they will be treated, requirements for the licensing of waste oils treatment plants and operational criteria with respect to air and water emissions, etc.

Council Directive 91/689/EEC on hazardous wastes	The aim of the Directive is to provide requirements for the identification, labelling, temporary storage, classification, transportation, and in general the management of hazardous wastes. It should be noted that within the ship-generated waste stream, items displaying certain characteristics and properties are likely to be hazardous, the collection and further management of which, should be in accordance with the requirements of this Directive.
Council Directive 1999/31/EC on landfill of wastes	This Directive provides requirements and guidance: - to prevent or reduce the negative effects to the environment and the potential risks to human health from the landfilling of waste, - to promote a strategy for each Member State for the implementation of the reduction of biodegradable wastes going to landfills, - to set criteria for the establishment and operation of landfills for hazardous wastes, etc.

All the ports in Cyprus are provided with reception facilities for oily wastes and garbage.

The collection of garbage is governed by the Cyprus Ports Authority and of oily waste is carried out by privately owned companies that have obtained a permission by the Minister of Communication and Works. There are two, licensed companies for the collection of oily residues (VGN Ltd. and ECOFUEL Cyprus Ltd.) and one central treatment facility based in Vassiliko (ECOFUEL Cyprus Ltd.).

A. General Information

Port	Limassol
Port Authority	CYPRUS PORTS AUTHORITY (C.P.A.)

B. Type and operation of the port

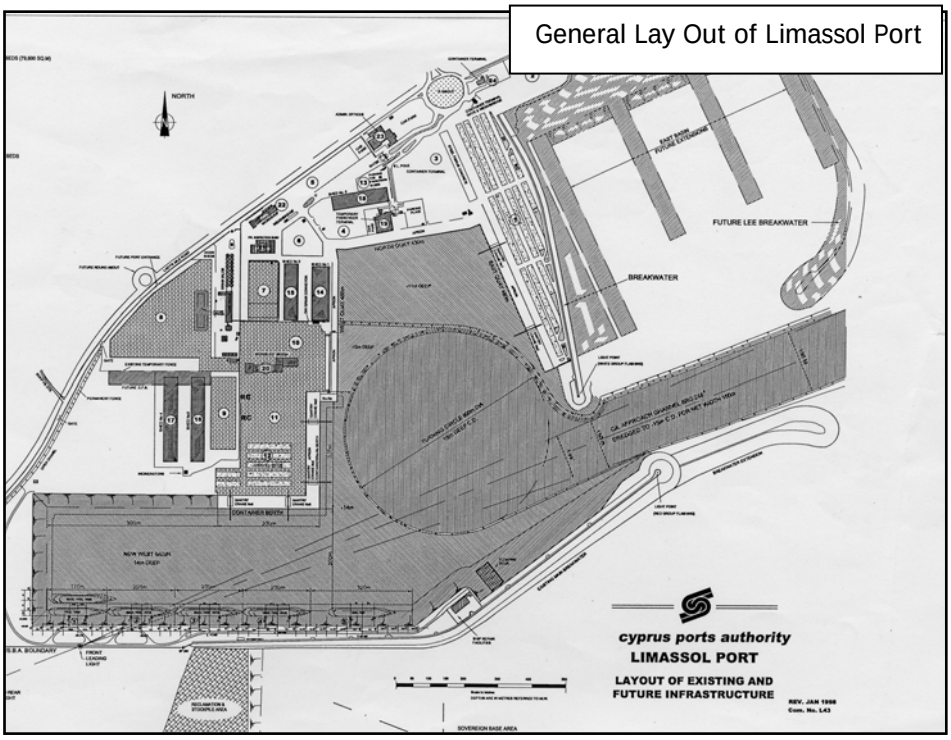
The port of Limassol is the largest port of Cyprus situated at the outskirts of the city of Limassol. As a multipurpose port which combines containers and general cargo handling with passenger ships' operations, it presents a constant growth in terms of the number of incoming ships as well as of the tonnage of cargo handled. Data with respect to the maritime traffic and the annual cargo throughput is presented in the following table:

Year	Total number of ship calls	Containerised cargo throughput *(TEUs)*	Oil products throughput *(met. Tonnes)*	Bulk liquid products other than oil throughput *(met.Tonnes)*	Solid bulk and general non-containerised cargo throughput *(met. Tonnes)*
2002	3.373	229.767	151.012	10.320	1.239.892
2001	3.366	235.100	97.650	14.026	1.261.324
2000	3.037	257.020	81.147	13.976	1.211.443

Handling of containers takes mainly place at the east and new west quays, 1.100 meters long provided with all necessary land-based facilities and stacking areas. North and west areas are normally engaged in general cargo operations including passenger and cruise ships accommodation. The berthing capacity in relation to the type and size of ships normally engaged in the operation of the port, is presented below:

A/ A	**Berths**	**Actual Depth (m)**	**Berth overall length (m)**	**Type of ships that can be accommodated**	**Maximum size of ships accommodated**	
					LOA (m)	DWT (t.dw)
1	Container Ro-Ro berths East Q New West Q	 11,0 14,0	 480 620	Container & Ro-Ro ships	300	50.000
2	Multipurpose & Bulk berths North Q West Q South Q	 11-13 14,0	 430 450 300	General cargo, Container, Passenger and Cruise ships	280	50.000

General Lay Out of Limassol Port



Year	Cruise ships and passenger ships				
	Number of ships calling at the port	Average Size of ships *(grt)*	Average number of persons onboard	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	508	12.791	422	8	1
2001	861	12.819	390		
2000	1138	12.735	435		

Year	Bulk carriers and general cargo ships				
	Number of ships calling at the port	Average Size of ships *(grt)*	Average number of crew onboard	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(days)*
2002	1695	5141	14	2	3
2001	1752	4317			
2000	1538	4364			

Year	**Container ships and Ro-Ro carriers**				
	Number of ships calling at the port	Average Size of ships *(grt)*	Average number of crew onboard	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	1590	13650	18	8	2
2001	1506	12983			
2000	1388	12550			

About 100 ships on a monthly basis anchor within an suitable area north east of the port. The time spent at anchor depends on the voyage planning and it varies from one to 30 days. The building and operation of a new passenger terminal, the expansion of the port's open stacking area and the extension of the southern berth length from 300 to 800 meters comprise the main, future development plans.

C1. Existing Reception Facilities for oily wastes

The licensed and authorized facilities of VGN Ltd. and ECOFUEL Cyprus Ltd. provide the oily wastes collection at the port (details are cited in the section dealing with the Vassiliko port).

In 2002, 600 ships delivered oily wastes including 1.000 tons of dirty ballast, 1000 tons of tank washings, 7.000 tons of oily bilge water and 3.000 tons of sludge.

C2. Existing Reception Facilities for garbage

The Port Authority provides garbage collection services for ships berthed and at anchor. No notice in advance is required from ships to arrange the collection process and there are not any separation/containment requirements. Charges are compulsory for each day in the port or the anchorage at about $ U.S. 16.0 per day. A garbage reception boat of 15 cub. meters capacity and a number of receptacles of 20 cub. meters aggregate capacity are used to enable the physical scheme of the service. Garbage collected is landfilled at a designated, disposal area outside the city of Limassol.

The following table presents the existing reception facilities for garbage at the port of Limassol.

Port	**Garbage collection capacity provided in the port** *(m^3 per allocated means)*				**Description of port- based treatment of garbage collected from ships**	**Operational restrictions on the use of the facilities**
Limassol	**Trucks** (used as reception and transportation means)	**Navigable means** (such as barges used as reception and transportation means	**Receptacles provided at the quayside**	**Other reception means**		
		1 reception boat (15 m^3 capacity)	11 (20 m^3 total capacity)			
Name, Address and other contact details of Operator	**Requirements for ships to deliver garbage**		**Method of final disposal**	**Charging system**	**Other remarks**	
Cyprus Ports Authority (C.P.A.)			Controlled landfilling	Charges are compulsory for each day in the port or the anchorage at about $ U.S. 16.0 per day.		

D. Estimation of waste stream quantities to be received at the port

A number of 48 ships which called at the port of Limassol during the period of the project, responded to the request of the Cyprus Ports Authority to complete the Questionnaire that was produced especially to provide an input from the Masters of ships with regard to their needs to use the port reception facilities. On average, 50% of them wished to or actually delivered oily wastes or garbage to the port.

	Container ships	Cruise ships	General cargo ships	Ro-Ro Cargo ships	Tankers	Total
Number of ships responded	38	1	1	6	2	48
Number of ships that would deliver or delivered oily wastes	20		1	3	2	26 (54%)
Number of ships that would deliver or delivered garbage	13		1	6	2	22 (45.8%)

According to the information provided in the questionnaires, only two ships were not equipped with oily water separating and filtering equipment and 9 ships were equipped with shipboard incinerators.

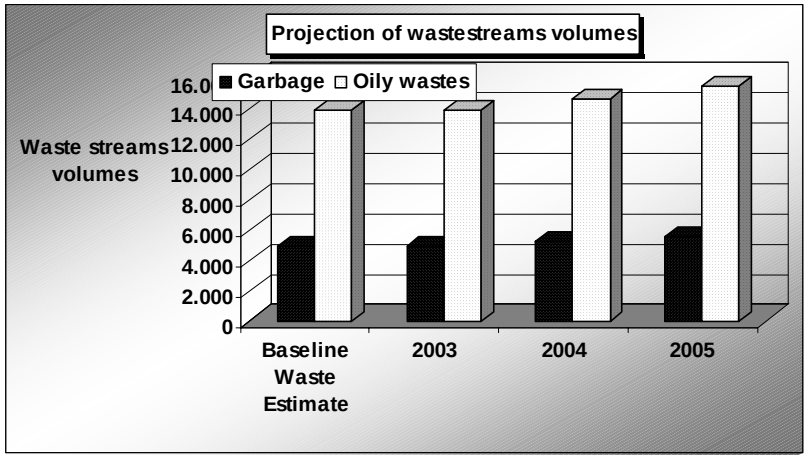
The volume of garbage to be delivered varied between 0.3 and 4 m^3 (on average 1.17 m^3 per ship excluding cruise ships), consisting of segregated plastic, other domestic garbage (rubbish) and mixed garbage including food wastes. Garbage retained onboard the cruise ship, for discharge to reception facilities (not necessarily to Limassol port) amounted 29 m^3 consisting of 7 m^3 of plastics, 8 m^3 of food waste, 10 m^3 of garbage such as paper products, rags, crockery, etc. (5 m^3 of which were ground) and 4 m^3 of other lining and packaging material.

Oily wastes retained for discharge to the reception facilities consisted of oily residues (sludge), oily bilge water and other waste oils such dirty lub oils, etc. Volumes varied between 3.9 and 47.5 m^3. The average volume of sludge for delivery was 17.5 m^3 apparently demonstrating the relatively higher fuel consumption and engine operation loads of container ships as well as their larger sludge tanks storage capacities.

While, oily bilge water can be discharged through properly operating oil water separating and filtering equipment at sea, in accordance with MARPOL 73/78, Annex I Regulations, it was demonstrated that it can be also retained onboard either within the dedicated holding tanks of other bilge wells and finally delivered at the port reception facilities. On average, 7.4 m^3 of oily bilge water were to be delivered or delivered at the port.

Port: Limassol
Country: Cyprus

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	Current volume of ship –generated garbage to be received	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	18.2	19.8	Reduced weekly volume (m^3/week)	89.3	4.0	2.3	93.3
Average annual volume (m^3/year)	-	-	6,643	7,227	Average annual volume (m^3/year)	4,643	208.0	119.6	4,970
Maximum volume per ship/arrival (m^3)	-	-	25.0	39.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0



A. General Information

Port	Larnaka
Port Authority	CYPRUS PORTS AUTHORITY (C.P.A.)

B. Type and operation of the port

The port of Larnaka is the nearest port to Nicosia, the capital city of Cyprus, and constitutes an important for the country port, for the transportation and export of agricultural products and other cargoes produced in the neighbouring mainland. A specialized oil terminal zone including the oil tankers berth of the Cyprus Petroleum Refinery Ltd. operates in the proximity of the area of the port serving, the country's energy trade, power production and refined petroleum products distribution.

Part of the Government plans to increase the growth and the development of the port, is the allocation of a 450 meters turning circle, the establishment and the operation of a new passenger and cruise ships' terminal. Data with respect to the maritime traffic and the annual cargo throughput are presented in the following table:

Year	Total number of ship calls	Containerised cargo throughput *(TEUs)*	Solid bulk and general non-containerised cargo throughput *(met. Tonnes)*
2002	607	482	413,070
2001	579	1,440	441,000
2000	693	2,070	439,000

The berthing capacity of the port is presented below:

A/A	**Name of Berth**	**Designed/ Actual Depth (m)**	**Berth overall length (m)**	**Type of ships that can be accommodated**	**Maximum size of ships accommodated** LOA (m)
1	North quay	10	326	All types of ships except tanker ships	220
2	South quay	12	340	All types of ships except tanker ships	270
3	Steel fl. pontoons	6	200	Small crafts and fishing boats	70

Information related with the traffic in the last three years' period per type of ships, the berthing duration, etc., is presented below:

Year	**Cruise ships and passenger ships**				
	Number of ships calling at the port	Average Size of ships *(t.dw)*	Average number of persons onboard	Average duration of ships stay at the port *(days or hours)*	Average duration of voyage from last port of call *(hours)*
2002	38	10,000 to 14,000	500	12	8
2001	32		300		
2000	74		350		

Year	**Bulk carriers and general cargo ships**			
	Number of ships calling at the port	Average Size of ships *(t.dw)*	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(days)*
2002	150	10,000	2	3
2001	137			
2000	235			

Year	**Ro-Ro carriers**			
	Number of ships calling at the port	Average Size of ships *(t.dw)*	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(hours)*
2002	128	50,000	5	15
2001	159			
2000	147			

A number of 25 craft supporting towage, ships supplying and other services are engaged in the routine operation of the port. The anchorage area basically used by oil tankers and other ships (45 ships monthly) spending on average 24 hours at anchor, is located north east of the port entrance.

C1. Existing Reception Facilities for oily wastes

The two, licensed companies for the collection of oily residues (VGN Ltd. and ECOFUEL Cyprus Ltd.) and the central treatment facility based in Vassiliko (operated by ECOFUEL Cyprus Ltd.) are engaged in receiving and further managing oily wastes from ships calling at the port of Larnaka (presented at the Vassiliko port related section).

C2. Existing Reception Facilities for garbage

The Port Authority provides garbage collection services for ships berthed and at anchor. The means provided for the collection of garbage are a 5 cub. meters barge, 11 containers of 120 cub. meters total capacity and two trucks of 25 cub. meters total capacity employed for both direct collection and transport purposes. Garbage collected is disposed of at a designated, public landfill situated 15 kms far from the port area (Klavdia). Since garbage delivery is compulsory, almost all ships that call to the port discharge garbage at the available facilities. Cargo associated waste left on quays can be collected following agreement with ships' representatives.

The cost of garbage collection varies in terms of the type of ships, as follows:

- Passenger ships : 85.5 euro per day,
- Container ships : 25.7 euro per day,
- Ro-Ro ships : 34.2 euro per day,
- Bulk carriers : 22.8 euro per day,
- Convent. Ships : 28.5 euro per day,
- Ships awaiting orders : 17.1 euro per day,
- Laid up ships, craft, etc : 11.40 euro per day

The following table presents the existing reception facilities for garbage at the port of Larnaka.

Port Larnaka	**Garbage collection capacity provided in the port** *(m^3 per allocated means)*				**Description of port- based treatment of garbage collected from ships**	**Operational restrictions on the use of the facilities**
	Trucks (used as reception and transportation means)	**Navigable means** (such as barges used as reception and transportation means	**Receptacles provided at the quayside**	**Other reception means**	There are no garbage treatment facilities operating in the port area	
	2 (25 m^3 total capacity)	1 reception boat (5 m^3 capacity)	11 (120 m^3 total capacity)			
Name, Address and other contact details of Operator	**Requirements for ships to deliver garbage**		**Method of final disposal**	**Charging system**	**Other remarks**	
Cyprus Ports Authority (C.P.A.)	Garbage collection is compulsory		Controlled landfilling at a designated disposal area 15 kms far from the port	Charges are compulsory for each day in the port (euro per day) Passenger ships :85.5 Container ships 25.7 Ro-Ro ships 34.2 Bulk carriers 22.8 Convent. Ships 28.5 Ships awaiting orders 17.1 Laid up ships, craft, etc.:11.40	Cargo associated waste can be also collected following an agreement with ships' representatives	

D. Estimation of wastestreams' volumes

Port: **Larnaka**
Country: **Cyprus**

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	2.5	1.2	Reduced weekly volume (m^3/week)	7.2	1.5	-	8.7
Average annual volume (m^3/year)	-	-	939.0	467.2	Average annual volume (m^3/year)	375.6	82.6	-	458.2
Maximum volume per ship/arrival (m^3)	-	-	15.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0

No significant changes are expected in the future to the above estimated figures of wastestreams

A. General Information

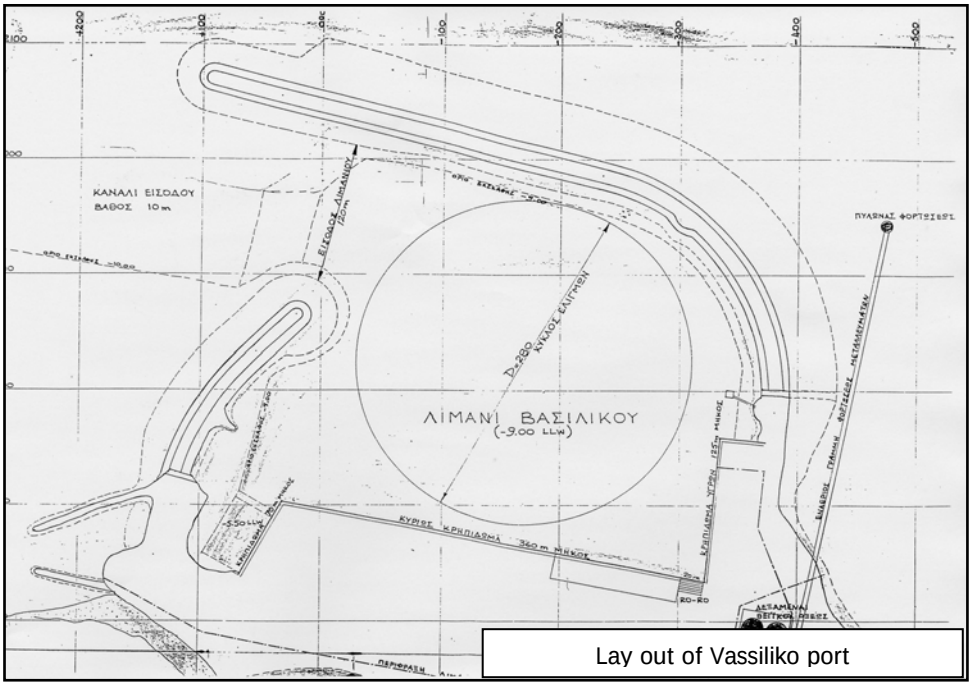
Port Vassiliko

Port Authority CYPRUS PORTS AUTHORITY (C.P.A.)

Cement Terminal Operator Vassiliko Cement Works Ltd

B. Type and operation of the port

The sea borne traffic of the industrial port of Vassiliko (apart the E.A.C. operated oil terminal in the area) is dominated by the operation of the Vassiliko Cement Works Ltd at the port installations of which, 190 ships are accommodated per year. A general lay out of the port and information on its berthing capacity and traffic, are shown below:



Lay out of Vassiliko port

A/A	Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships	
					LOA (m)	DWT (t.dw)
1	Main Quay	9.0	360	All types of ships	185	45,000
2	West Quay	9.0	125		140	10,000

Year	**Bulk carriers and general cargo ships**			
	Number of ships calling at the port	Average Size of ships *(t.dw)*	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(days)*
2002	207	8.000	3	1 - 3
2001	182			
2000	181			

There are also about 15 fishing boats accommodated at the port, while 20 ships per month stay at anchor outside the port area spending on average a day, before entering the terminal.

C1. Existing Reception Facilities for oily wastes

Oily waste collection is available at all berths and on 24 hour basis at the port of Vassiliko, provided by the locally established, ECOFUEL Cyprus Ltd. The fixed waste treatment plant with its own berth and associated piping is located in the Vasilikos port area. The total storage capacity of the plant is 2.000 m^3. The company owns and operates 5 road tankers (each with 10 m^3/hour capacity) properly equipped with gear pumps and flexible hoses for collecting oily wastes. Collection of oily wastes is also enabled through VGN Ltd. which operates 2 barges of 600 m^3 total capacity.

C2. Existing Reception Facilities for garbage

Garbage collection services for ships berthed at the port of Vassiliko are provided by the Port Authority. No notice in advance is required from ships to arrange the collection process and there are not any separation/containment requirements. 10 CYP per day is charged that corresponds to garbage collection.

Four containers of 12 cub. meters capacity are placed on the quays to receive garbage from ships.

Port, name and location of Facility	**Type of Facility**			**Oily wastes received from the facility**												**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
ECOFUEL CYPRUS LTD. Waste Treatment Plant Port of Vasilikos	4	4		2.000	100	2.000	100	-	-	*	*	2.000	100	2.000	100	No chemicals contaminated wastes can be received

Name, Address and other contact details of Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
ECOFUEL CYPRUS LTD. Waste Treatment Plant Mr. C. Varavas, Man. Director Address: 54, Nikos Pattichis Str., P.O. Box 51770, 3508 Limassol **Tel: + 357 2533 7637** **+ 357 333332 (Plant)** **Fx: + 357 25 388333** **+ 357 23 333334 (Plant)** e-mail: ecofuel@cytanet.com.cy	The fixed waste treatment plant is located in the Vasilikos port area. The total storage capacity of the plant is 2.000 m^3. The company owns and operates 5 road tankers (each with 10 m^3/hour capacity) properly equipped with gear pumps and flexible hoses for collecting oily wastes from ships alongside Collection of oily wastes is also enabled through VGN Ltd. which operates 2 barges of 600 m^3 total capacity at a pumping rate 100 tons/hour.	Settling, chemical treatment, centrifugation and vacuum evaporation is carried out to separate oil fuel before its further filtration and homogenisation. Nominal throughput rate is 120 tons.hour Effluent water is treated by DAF (5m^3/hour) and biological treatment to reduce oil content below 15 ppm.	During the period of the project, CYP 6 per m^3, expected to be doubled shortly	The facility has been operating since the 1st March 2002. On average it receives 800 – 1.000 m^3 of oily wastes per month. * Sludge originated from these operations can be received and treated as the other oily wastes

Port Vassiliko	**Garbage collection capacity provided in the port** *(m^3 per allocated means)*				**Description of port- based treatment of garbage collected from ships**	**Operational restrictions on the use of the facilities**
	Trucks (used as reception and transportation means)	**Navigable means**	**Receptacles provided at the quayside**	**Other reception means**		
			4 containers (12 m^3 total capacity)			
Reception Facilities Operator	**Requirements for ships to deliver garbage**		**Method of final disposal**	**Charging system**	**Other remarks**	
Cyprus Ports Authority (C.P.A.)			Controlled landfilling	Charges are compulsory for each day in the port at about 10 CYP per day.		

D. Estimation of wastestreams' volumes

Port: Vassiliko
Country: Cyprus

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.5	0.2	Reduced weekly volume (m^3/week)	0.4	0.3	-	0.7
Average annual volume (m^3/year)	-	-	211.0	105.5	Average annual volume (m^3/year)	21.2	16.8	-	38.0
Maximum volume to be received per ship/arrival (m^3)	-	-	15.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				2.0

No significant changes are expected in the future to the above estimated volumes of wastestreams.

E. Assessment of the existing reception facilities - Recommendations

More than 88 % of the estimated volume of oily wastes originates from ships calling at the port of Limassol. The average annual volume of about 15.500 cub. meters of oil residues and oily bilge water, that is likely to be landed basically to the commercial ports of Limassol and Larnaka can be sufficiently absorbed from the currently, available facilities in terms of both the maximum, potential volume per arrival and also of the daily needs of ships. In accordance with the methodology developed for assessing the existing reception facilities, the respective assessment matrix for the joint collection and treatment facilities of ECOFUEL CYPRUS Ltd. & VGN Ltd. is illustrated below:

Facility: Integrated collection and treatment facilities of ECOFUEL -VGN
Country: Cyprus

Criteria for assessing the adequacy of existing reception facilities	Reception Facilities for oily wastes from ships	Yes	No	N/C
Spatial and time availability of wastes collection scheme	*At all terminals involved in the project*	4		
Availability of sufficient information / Notification procedures		4		
Adequacy of capacity		4		
Reasonable cost of waste collection service		4		
Existence of submitted reports of alleged inadequacy			4	
Existence of serious operational restrictions			4	
Environmental sound waste treatment		4		
Acceptable waste final disposal	*Production of replacement fuel oil*	4		
Environmentally sound waste management		4		

Less than Satisfactory	
Satisfactory	
Adequate	4

The capacity of the facilities for collecting garbage from ships at the ports of the country, in conjunction with the systematic, emptying, transportation and disposal scheme matches both the recorded needs of ships by the Port Authority and also the estimated waste streams volumes. Controlled landfilling is the predominant option of final disposal for domestic like garbage from ships. The Ministry of Agriculture, Natural Resources and Environment is the competent authority to work out and provide strategies, programs and practices to manage waste in a sustainable manner and accordance with the applicable E.U. Directives. It should be stressed out that ship-generated garbage collection and its further management is carried out in a way that ensures the protection of the environment of the country which

is of paramount importance due to the small size of the island, the intense land use, and its reliance on the tourism industry.

EGYPT

EGYPT

- Introduction

The strategic, geographical position of Egypt in the eastern Mediterranean and Red Sea in association with their natural link, the Suez Canal, makes the ports' sector and the maritime industry in general a significant asset for the external trade and economy of the country. The targets set by the responsible Maritime Transport Sector of the Ministry of Transport is to enhance the role of ports in Egypt through constant development and modernization to become logistic and distribution centres apart from being important gates for imports and exports, the promotion of the private sector in the ports and maritime related activities, the use of state - of the - art technologies and competent human resources to ensure safety of navigation, protection of the environment, etc.

The contribution of the Mediterranean ports of Egypt to the entire, maritime transport of cargoes in the Mediterranean Sea area from all the countries of the project accounts for about 11 % with at least two ports, those of Alexandria – Dhekelia port complex and Damietta to be among the first, 15 major ports in the basin in terms of the volumes of cargoes handled (28 million tons for Alexandria and Dhekelia and 13 million tons for Damietta, in 2000 respectively).

Total maritime transport of goods
(in thousands tons)

Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	49.048	54.110	54.777	+ 5.29

Quantities of goods loaded and unloaded in the main ports of the country
(in thousands tons)

	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro and other cargoes
Quantity of goods	54.777	41.713	13.064	7.281	22.449	25.047

The ports and terminals of the country involved in the project, are provided below, while these of Port Said, Alexandria and Dhekelia, and Damietta are discussed here for the purposes of the Activity A of the project.

Ports & Terminals involved in the project	Port	Oil Terminal					
		Crude oil		Oil Products		Fuel Oil power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Sidi Kerir			4				
Port Said	4				4		
Alexandria	4			4	4		
Damietta	4			4	4		
Dhekelia	4			4	4		

Egypt is a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of ship-generated marine pollution from oil and garbage respectively. Law 4/94 and its associated Executive Regulations provide the legal instruments through which MARPOL 73/78 has been ratified and implemented. Waste management has been extended also to ports that operate in the country, with basically the Egyptian Environmental Affairs Agency (E.E.A.A.), the Ministry of Transport and in the case of state owned petroleum terminals the Egyptian General Petroleum Cooperation (E.G.P.C.) to be charged with its planning, supervision, and approval of its technical, operational and environmental specifications. At a local level, E.E.A.A. and the related Governorates are the competent authorities for the control and the implementation of the waste management strategy and monitoring of the related activities.

Ports and Lighthouses Authority is in charged of performing inspections and controls with respect to the operational procedures carried onboard the ships calling at the ports of the country, for ship-generated waste management, discharge operations, etc.

A number of pilot projects in Alexandria and other coastal areas are in progress or finalized, aimed among other things, at the establishment of hazardous waste treatment facilities for industrial wastes, landfills for final disposal of hazardous wastes, etc.,

A. General Information

- **Port** Damietta
- **Port Authority** Damietta Port Authority

B. Type and operation of the port

The port of Damietta is located 70 kms west of Port Said near the Suez Canal convoys and 250 kms east of Alexandria in an area with easy access to the main Egyptian industrial and agricultural zones. Exports of agricultural products, fertilizers and imports of grain, general cargo and cement predominantly take place with approximately 1.750 ships calling at the port engaged in the handling of more than 13 million tons of cargo.

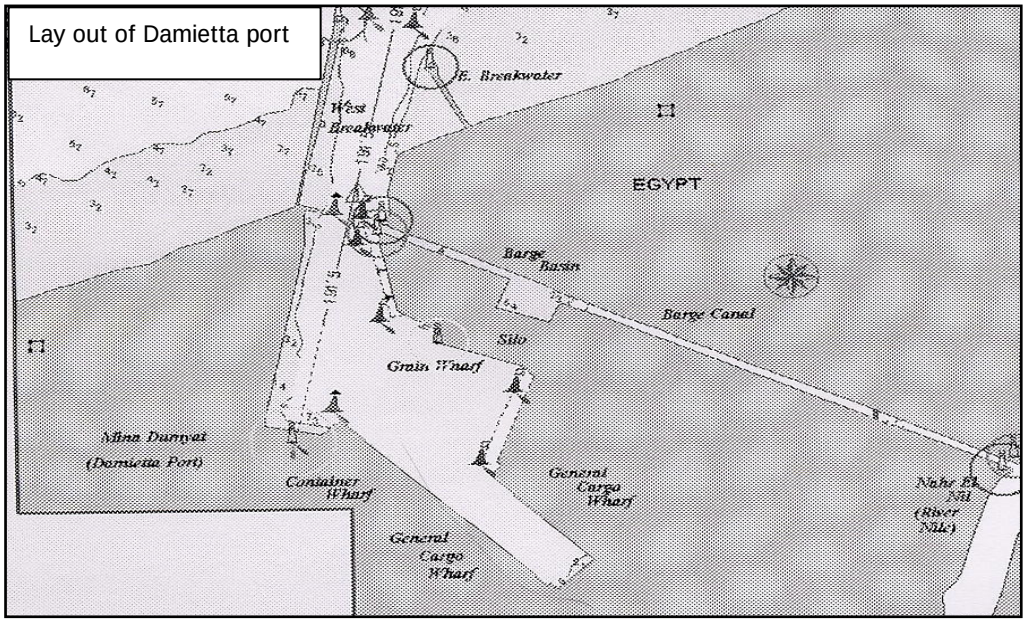
During the mission at the port, it was witnessed the future perspective for further development and growth in consistency with the local and national valuable energy resources. The new Liquified Natural Gas Plant is currently under construction in the port of Damietta verifying that various natural gas projects are progressing rapidly in Egypt, resulting from the redundancy of the national gas reserves. The LNG plant along with the two tanks of 150.000 cub. metres and the 800 m quay to accommodate LNG carriers will be operational at the end of 2004 at the port. The port of Damietta is expected to export 4 billion cub. meters of natural gas annually.

The container terminal operated by the Damietta Container and Cargo Handling Co., is able to accommodate ships of 290 meters long, up to 57.000 t.dw. providing four berths 1.050 meters long. The efforts of the Authority with regard to the container terminal productivity are to increase the capacity from 600.000 containers to 1.2 million annually. Eight berths, 850 meters long, dedicated to general cargo handling including one for Ro-Ro ships are provided along with some 310.000 sq. meters area for storage purposes and all the necessary facilities. Four other berths 1200 meters long accommodate bulk carriers and other general cargo ships enabled by a 100.000 tons grain silo and other quay side storage and handling facilities.

A/A	Berths	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
					LOA (m)	DWT(t.dw)
1	1 - 4	14,5	1050	Container ships	250	56.000
2	5 - 8	12,0	850	General cargo ships	250	65.000
3	9 - 12	12,0		General cargo ships	250	

4	13 – 16	14,5	1200	Bulk carriers and general cargo ships	250	40.000

Another smaller berth is allocated for accommodating craft supporting the operation of the port including the oily water mixtures reception barge and the oil pollution fighting vessels operated by the Authority. An anchoring area is situated 7 n. miles at the north western area of the port entrance where on average 20 ships per month stay at anchor less than a week.



The following table presents the average contribution of each one of the major categories of cargoes handled in the port and the share of each one of the major types of ships at the overall port operation.

	Cargoes in bulk (grains, etc)	General cargoes	Containers
Contribution of major categories of cargoes in overall cargo handling (%)	29.4	27.2	43.4
	Bulk carriers	General cargo ships	Container ships
Share of major categories of ships calling at Damietta port at the average port operation (%)	5.5	35.5	50.0

C1. Existing Reception Facilities for oily wastes

Collection of oily bilge water, sludge and other oily residues is carried out, at the time being, by the O.C.C.P., a private company, through mainly a number of road tankers.

This kind of service will change soon, upon the completion of the installation of a land – based reception and treatment facility, that will be provided and operated by the Damietta Port Authority.

The Port Authority is very well aware of the needs of ships and to this effect, it has developed a suitable notification system for the incoming ships based on a standard document that all ships calling at the port are obliged to use to report their needs for delivering oily wastes or garbage. With this standard document, information is requested from the ships or their agents on the capacity of the waste collection tanks (sludge and bilge oil holding tank, other waste oil tanks, last delivery of wastes at ports, actual retained volumes of waste, etc.). All information requested has been related to the records maintained in the Oil and Garbage Record Book of ships.

The Authority of the port has been constructing a farm of two tanks (400 cubic meters in total) connected with a line crossing the quay, the end of which is fitted with a standard, MARPOL shore connection to enable its connection with the discharge lines of a dedicated waste oil collection barge.

A visit was made at the under construction farm of tanks enabling a look at the containment basin, the associated piping and also at the 70 meters long and 700 cub. meters storage capacity, oil waste collection barge berthed nearby the facility. Upon the completion of the construction of the farms, the Authority will perform waste oil collection from ships by its own barge while storage and separation of oil from water will be achieved in the two tanks.

In 2001, in accordance with the records kept by the Port Authority, 30 ships requested and delivered 150 cubic meters of oily wastes, virtually sludge from fuel and lubricating oil purification processes. Respectively, in 2002, 50 ships delivered 200 cubic meters of oily wastes of the same origin and quality. The percentage of ships wishing to deliver oily wastes is less than 3% appearing to be lower than expected.

C2. Existing Reception Facilities for garbage

Garbage collection from ships, is carried out by local contractors (four at the time being approved by the Port Authority for providing this kind of service). These are mainly called by the agents of ships calling at Damietta port. Wet garbage consisting of food waste is collected separately, from a number of trucks of 10 cub. meters capacity following a proper sorting from ships personnel. Maintenance and other type of waste can be collected by two self-propelled barges of 20 cub. meters capacity.

Non – organic portion of waste is incinerated at a fixed plant operating at the north – western area of the port, some 500 meters far from the bulk cargoes handling berths.

The plant is operated by the Port Authority of Damietta, and the contractors responsible for the reception of garbage from ships, compensate the Authority for disposing the collected dry garbage to the plant. On average, 8 tons of garbage are provided daily for burning.

Upon the visit to the plant and the survey of the area where garbage is collected to feed the burner, the furnace charging system, the fuel supply tank and piping system, the operating control unit and other parts of the plant, the whole scheme was estimated as operational.

The following data on the number of ships which delivered garbage to the reception facilities of the port with the relevant quantities, demonstrate the increase of the provision of the garbage collection service in the last three years period.

On average, annually, 175 ships wish to deliver domestic and normal maintenance waste at the port reception facilities representing approximately 10% of the overall number of ships.

Year	Number of ships that requested and delivered garbage	Quantity or volume of garbage collected from ships (tons)
2002	523	895
2001	320	400
2000	200	280

The following tables present the existing reception facilities at the port of Damietta.

Port, location of facility	**Type of Facility**			**Oily wastes received from the facility**											**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*	
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Port of Damietta	4	4	4	400 (F) 700 (B)	15 50	400 (F) 700 (B)	15 50	-	-	-	-	400 (F) 700 (B)	15 50	400 (F) 700 (B)	15 50	

Reception facility operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
O.C.C.P. is the private contractor that operates the road tankers for collecting oily wastes during the transitional phase before the P.A. of Damietta undertakes the provision of the whole service. Request can be made through the P.A. of Damietta	The Authority of the port has been constructing a farm of two tanks (200 cubic meters each one). During the project the whole facility including the tanks, its containment basin, piping and also the oil waste collection barge was under construction. Upon the completion of the facility, the Authority will perform waste oil collection from ships by its own barge while temporary storage will be achieved in the two tanks.	Enhanced oil – water mixtures separation in the tanks. Oil recovered is disposed of to the near by operating refinery.		

Port Damietta	**Garbage collection capacity provided in the port** *(m^3 per allocated means)*				**Description of port- based treatment of garbage collected from ships**	**Operational restrictions on the use of the facilities**
	Trucks (used as reception and transportation means)	**Navigable means** (such as barges used as reception and transportation means	**Receptacles provided at the quayside**	**Other reception means**	Land based incinerator operates at the north-western area of the port where 8 tons of non organic garbage are burned daily	
	5 –- 8 trucks (10 m^3 capacity each)	2 reception boats (20 m^3 capacity each)				
Reception Facilities Operators	**Requirements for ships to deliver garbage**		**Method of final disposal**	**Charging system**	**Other remarks**	
Private contractors & the Damietta Port Authority	A well designed notification system is in place		Controlled landfilling for organic garbage and incineration for dry, non organic wastes	Charges vary according to the types of ships		

D. Estimation of wastestreams' volumes and recommendations

To quantify the oily wastes and garbage that could be delivered at the port in relation to the actual needs of the ships normally calling, the following assumptions were made:

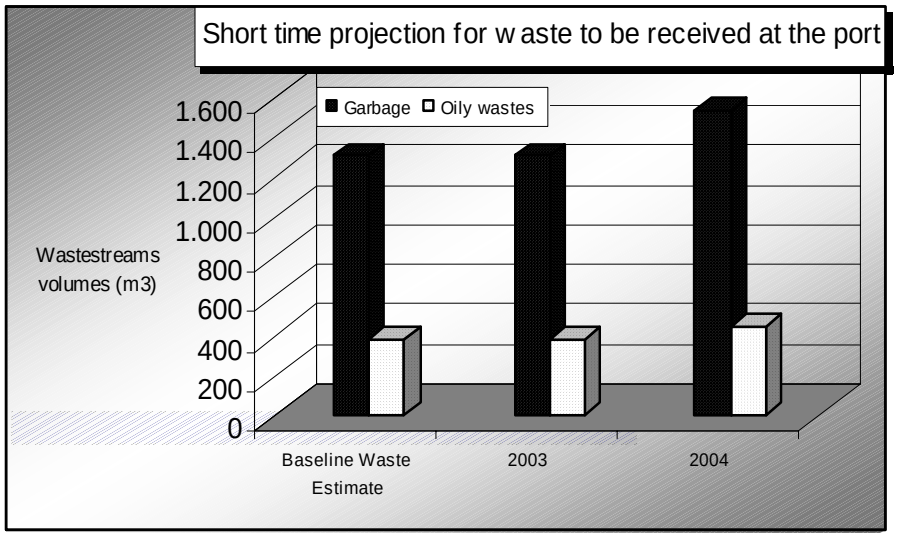
The number of the three basic types of ships used in the estimations was taken as an average per ship type, for the three years period (1996, 1997, 1998) and 2001 for which sufficient statistics existed. Calculations were made using 50% of ships calling at the port (on an annual basis) that would really need to deliver their wastes at the reception facilities of the port. This assumption applied for both oily wastes and garbage streams calculations. The number of ships without properly operating oily water separating and filtering equipment was considered as being the 10% of the above mentioned number.

To estimate the short term variation of wastes delivery at the port, an annual increase of maritime traffic of the port, equal to 7.9% was assumed, considering 2001 as the baseline year.

The facilities provided in the port of Damietta, apparently, are adequate to meet the actual but also the constantly increasing needs of ships, since the available capacity matches the estimated volumes of the two distinguished wastestreams that could be received. The Authority has taken advantage of its technical expertise and of the good understanding of the needs of incoming ships to undertake the management and the performance of the physical operations related with the collection and mainly treatment of oily wastes and garbage. In respect of the incineration at the port area, an effective sorting and identification of those garbage items that are likely to be hazardous and not suitable for burning, would enhance the whole operation ensuring also that flue gases do not exceed the allowable limits or air emissions. In addition, in respect of the pierside, facility for collecting oily wastes from the mobile and navigable reception means that operate in the port, the local effluent water discharge standards should be taken into account in case of the oily water mixtures separation.

Port : Damietta
Country: Egypt

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	6.0	8.2	Reduced weekly volume (m^3/week)	14.6	4.4	-	19.0
Average annual volume (m^3/year)	-	-	2,190	2,993	Average annual volume (m^3/year)	759.2	232.4	-	991,6
Maximum volume to be received per ship/arrival (m^3)	-	-	25.0	18.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0



A. General Information

Port	Port Said
Port Authority	Port Said Port Authority

B. Type and operation of the port

The port of Port Said is situated at the northern entrance to the Suez Canal and west of a 17 kms long bypass channel connecting the Mediterranean Sea and the Suez Canal. It is considered one of the main Egyptian ports due to its location at the crossroad of a strategic world sea trade route between East and Europe via Suez Canal.

An important, large scale project known as Port Said East Port Project has been under development in the wider port area. The first stage of the project consisted of the designing, construction, equipment supply and operation of a new, transhipment container terminal of 22.5 sq. kms area, able to handle third generation container ships with an anticipated capacity of 3 million containers annually (2007 forecast). An entry channel, 16.8 kms long and 18.5 meters deep has been developed to enable the navigation from the Mediterranean Sea to the Suez Canal east bank. In 2002, following the construction of the Container Quay (1.200 meters long and 35 meters wide), the terminal commenced its operation handling about 1 million containers.

Other objectives set out for the project include the establishment of a 81.6 sq. kms free industrial zone hosting petroleum, petrochemicals, fertilizers and steel production as well as tourism areas and other facilities. Works related with these projects are under development. It became obvious during the mission in Port Said that the whole project entails the construction and operation of a new port aiming at the expansion of the Egypt's industrial base and the establishment of export oriented industries in the area. For the period of 2000 – 2002, data on ships calls at the port as well as on the cargo handled are presented in the following table:

Year	Total number of ship calls	Containerised cargo throughput *(million TEUs)*	Solid bulk and general non- containerised cargo throughput *(million met. Tonnes)*
2002	2.300	1.534	1.766
2001	2.400	1.480	920
2000	2.400	1.200	1.200

During the mission the whole port area was visited from the western bank of the port south of the Abbas Basin to the Container Terminal operated by the Port Said Container Handling Co., the multipurpose berth, the cruise berths serving more than 500 cruise ships annually and the petroleum berth north of

the junction canal. The petroleum berth and the associated fuel oil tanks farm, serve as a bunkering station operated by Mobil Oil Egypt Inc., for fuel oil barges engaged in bunkering within the port area or the area of the Suez Canal Authority. There are no oil tankers calls at the port (the by-bass canal is used for south or north bound destinations).

Number of berths	**Depth (mt)**	**Berth overall length (m)**	**Type of ships that can be accommodated**
1 - 3	30 – 35	555	Passenger ships
5	10.67	1020	Cruise ships and passenger ships
3	12.98	360	Container ships
5	8.23	660	General Cargo ships
2	12.8	480	Bulk carriers and other general cargo ships
5	12.99	605	Multipurpose use
10	3.66 – 8.23	1320	Barges, Sailing craft, tugs and other support craft
4	3.66	590	Lighters and bunker barges

Three floating docks of 25.000 tons maximum lifting capacity are operated by the Port Said Shipyard while a significantly smaller dock and slipways up to 750 tons are used for repairing and building small craft by the Canal Naval Con. Co. The respective workshop basin is located on the eastern bank of the port area, where on average, 13 ships per year are accommodated for repairs and other works.

The maritime traffic of the port in the last three years period regarding cruise ships, passenger ships, bulk carriers and general cargo ships is summarized below:

	Cruise ships and passenger ships				
Year	Number of ships calling at the port	Average Size of ships *(grt)*	Average number of persons onboard	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(days)*
2002	243	15.000	150	1	1
2001	376	15.000	150	1	1
2000	538	15.000	150	1	1

Year	**Bulk carriers and general cargo ships**			
	Number of ships calling at the port	Average Size of ships *(grt)*	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(day)*
2002	1633	1.000 – 30.000	2 – 7	1
2001	829			
2000	1068			

A wide, designated area for ships awaiting to accede Port Said either to join the North convoy to transit the Suez Canal or to be supplied with necessary provisions and fuels is provided north of the port, divided into two section for ships with draught more than 42 feet and 39 feet respectively. The northern Area located between latitudes 31^{o} 28.5 N, 31^{o} 27 N and longitudes 31^{o} 20 E and 32 18 E is allocated for vessels with deep drafts, while the southern area, located between latitudes 31^{o} 21.3 N and 31^{o} 22 N and longitudes 32 ^{o} 16.2 E and 32 ^{o} 20.6 E is allocated for all types of ships. On average 90 ships per month stay at anchor for about 24 hours in the above mentioned areas.

About 130 harbour ships including tugs and other support craft are engaged in the operation of the port and the facilitation of the maritime traffic.

C1. Existing Reception Facilities for oily wastes

There are not any fixed or other type of facilities provided in Port Said for the collection of oily wastes from ships. Oily wastes collection is provided, upon request by the privately operated facilities in the Suez Canal through an agreement of the Authority of the Port Said with the Suez Canal Authority. Road tankers or barges for receiving limited quantities can be provided to ships calling at Port Said. A number of four barges with a total capacity of about 200 cub. meters, presently carry out the collection of mainly oily bilge waters, sludge and other oily residues as well as garbage on their open deck. No treatment onboard the existing barges, or at least oil – water separation takes place while an uncertainty existed over the disposal of the collected mixtures.

C_2. Existing Reception Facilities for garbage

Facilities for collecting garbage from ships are provided by private companies which operate small barges of about 10 cu. meters capacity (holds and deck area for garbage reception). Collection is performed at all berths and anchoring areas on a 24 hours basis provided that a short time notice is addressed, in practice by the local agents of ships. A considerable percentage of ships, exceeding 65% of the total number of incoming ships

deliver garbage at the abovementioned facilities. The following table summarizes garbage collection in the last three years.

Year	Number of ships that requested and delivered garbage	Quantity or volume of garbage collected from ships (cub. meters)
2002	1500	18.5
2001	1700	20.4
2000	1600	20

Garbage collected is landfilled in a controllable way at a designated final disposal site which is situated 10 kms far from Port Said port area where, while another option for incinerating non-organic fraction of garbage is provided in the same area. It was made clear that ships crossing the Suez Canal, do not normally wish to deliver their wastes at the Port Said.

Port Port Said	**Garbage collection capacity provided in the port** *(m^3 per allocated means)*				**Description of port- based treatment of garbage collected from ships**	**Operational restrictions on the use of the facilities**
	Trucks (used as reception and transportation means)	**Navigable means** (such as barges used as reception and transportation means	**Receptacles provided at the quayside**	**Other reception means**	No port- based treatment is provided	
		6 barges (10 cub. meters capacity each)				
Reception facilities operator	**Requirements for ships to deliver garbage**		**Method of final disposal**	**Charging system**	**Other remarks**	
Private companies			Controlled landfilling at a designated disposal site 10 kms from the port	Charges vary per cub. meter of collected garbage. No other information.		

D. Estimation of wastestreams' volumes and recommendations

Port: Port Said
Country: Egypt

2 Estimates of ship-generated oily wastes and residues to be received at the port/terminal

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			7.3	2.4
Average annual volume (m^3/year)			2,666	888,8
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

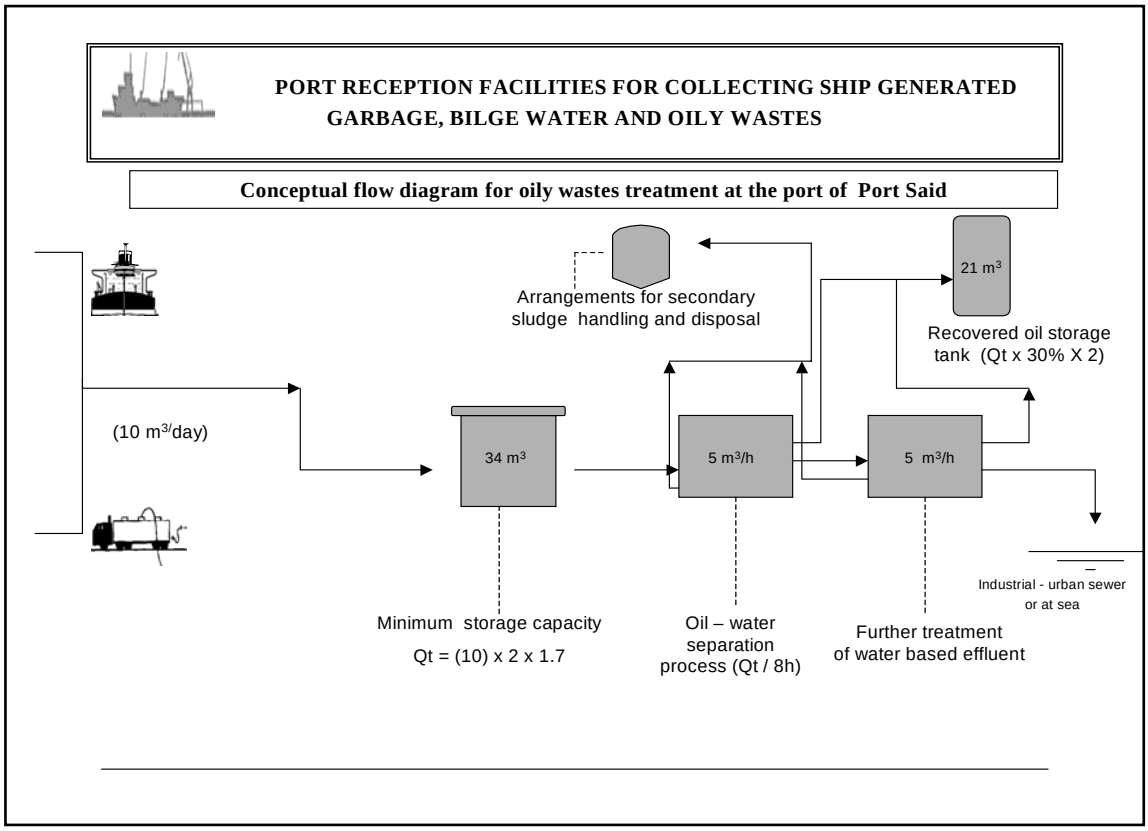
2 Estimates of ship-generated garbage to be received at the port/terminal

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced weekly volume (m^3/week)	13.2	4.0	2.5	19.7
Average annual volume (m^3/year)	691.2	211.2	130.0	1,032.4
Maximum volume to be received per ship/arrival (m^3)				5.0

The traffic in the port has not seen significant changes in the last years (2.300 ships in 2002 and 2.400 ships in 2000 and 2001). Similarly, no drastic changes are expected in the estimated volumes of wastestreams.

Garbage collection is obviously effective in Port Said both in terms of the available reception and systematic emptying capacity but also in terms of the disposal of the volumes of wastes collected.

Although the data regarding the traffic and operation of the East Port Said have not been incorporated in the estimations, it was considered as appropriate that the port should be provided with independent from the adjacent Suez Canal port, facilities for receiving and treating oily water mixtures from ships. It is recommended that these facilities could combine mobile and navigable means for collecting oily wastes to serve ships at anchor and quayside while a fixed treatment facility in the port area would minimize transportation costs and maximize the collection efficiency, as schematically shown below:



A. General Information

Port	Alexandria and Dhekelia port complex
Port Authority	Alexandria Port Authority

B. Type and operation of the Alexandria

The port complex of Alexandria and Dhekelia is the most important port are of the country in terms of the volume of cargoes imported and exported, being also the biggest and most diversified port, occupying a marine area of 8.5 sq. kms and a land based area of about 1 sq. km. where 87 separate berths are allocated on 10.5 kms long quays. The port consists of two major areas or ports, the inner and the outer used for handling general cargo and liquid or solid bulk cargoes respectively.

During the mission, a visit by sea of almost all berths was carried out, sailing from the south eastern harbour close to the Arsenal and Passenger Quay, the container terminal managed by the Alexandria Container Handling Co. with a handling capacity 230.000 containers annually, the Coal Terminal to the General Cargo berths and also the petroleum berths including the dock side jetty managed by the Alexandria Petroleum Company which is the state-owned subsidiary which operates the El Mex and Amerya refineries in the area of Alexandria. The existing berthing capacity of the port is given in brief below:

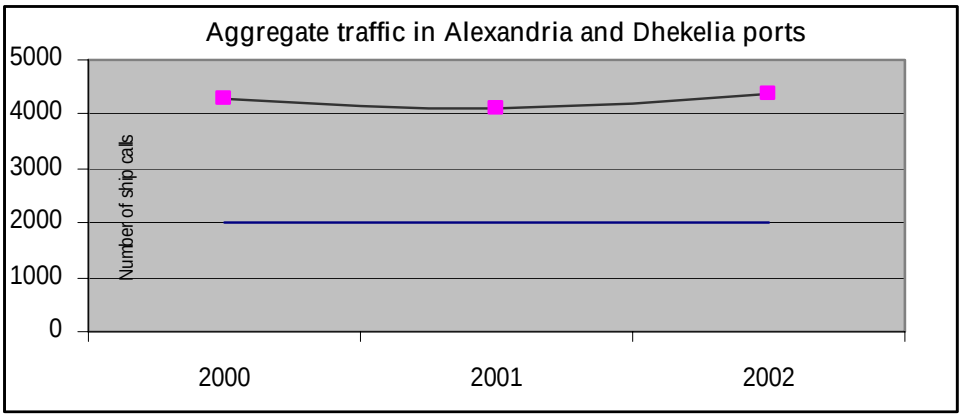
Number of berths	Depth (mt)	Berth overall length (m)	Type of berths
27	4.5 – 10.3	3100	Used gor general cargoes handling
8		1783	Wood products and other general cargoes
6	8.2 – 10.0	1.105	Used for loading and discharge of fertilizers, grain, cement, etc.
3	10 - 11	560	Containers
4	9.4 - 10	638	Passenger and cruise ships
4	9.5	600	Coal carriers
3	5.5 – 11.0	570	Ro-Ro ships, livestock and Molase
3	6 –10.0	430	Naval navy ships mainly

The port of Dhekelia represents a natural extension of the port of Alexandria, possessing an area of 6 sq. kms from which a surface of 3.2 sq. kms constitutes the land-based area and the remaining 2.74 sq. kms the marine area. The port is one of the deepest in Egypt providing up to 20 meters

maximum, permissible draughts able to accommodate ships up to 168.000 t.dw.

The independent management from the Authority of Alexandria Port is promoted, which along with port development projects such as the planning of a passenger ships berth south of the western breakwater etc., will enhance the port productivity and its reliance on its own resources in the future. The berthing capacity of the port is summarized in the following table:

Number of berths	Depth (mt)	Berth overall length (m)	Type of berths
3	13.4 – 13.60	690	Oil handling
2	13.4 – 17.37	640	Minerals
3	12.8 – 13.4	793	Solid bulk cargoes, grain. etc.
3	11.89	244	Container ships
1	10.0	229	Multipurpose berths
3	10.6 – 11.8	731	



C1. Existing Reception Facilities for garbage in Alexandria port

Garbage collection is carried out by 4-5 local contractors who operate special barges and collect about 80 tons of garbage per month. The port suffers from pollution caused by floating debris and to this extent, the Authority operates three specially designed boats to collect them. Disposal of garbage is carried out to a designated area 15 kms west of Alexandria.

C2. Existing Reception Facilities for oily wastes in Alexandria port

Waste oils from the machinery spaces of ships, are collected upon request, by contractors approved by the Port Authority who operate a number of 4 –5 dedicated barges (100 cub. meters capacity each one). Storage of collected bilge oil and other oil – water mixtures is made onboard the 5 years old and 200 met. tons barge "Saboura II" owned and operated by the Alexandria Port Authority. Waste oil stored at the barge is provided for final disposal through its dedicated petroleum pier to the Alexandria Petroleum Company. The capacity of the storage barge is quite small, while it lacks the ability to separate the oily water mixtures.

Reception facilities for collecting dirty ballast and other cargo spaces oily residues are provided for the tankers calling at the oil terminal of the Alex. Petroleum Company.

C3. Existing Reception Facilities for oily wastes and garbage in Dhekelia port

Reception facilities for the machinery spaces of ships and garbage have not been established in the port. Upon request - a prior notice of a few hours before berthing, is required - barges and trucks can be provided by the Port of Alexandria. One hour steaming is required for the barges operated in Alexandria to reach El- Dhekelia, as long as weather and sea state conditions are favourable.

Port : Alexandria & Dhekelia complex
Country: Egypt

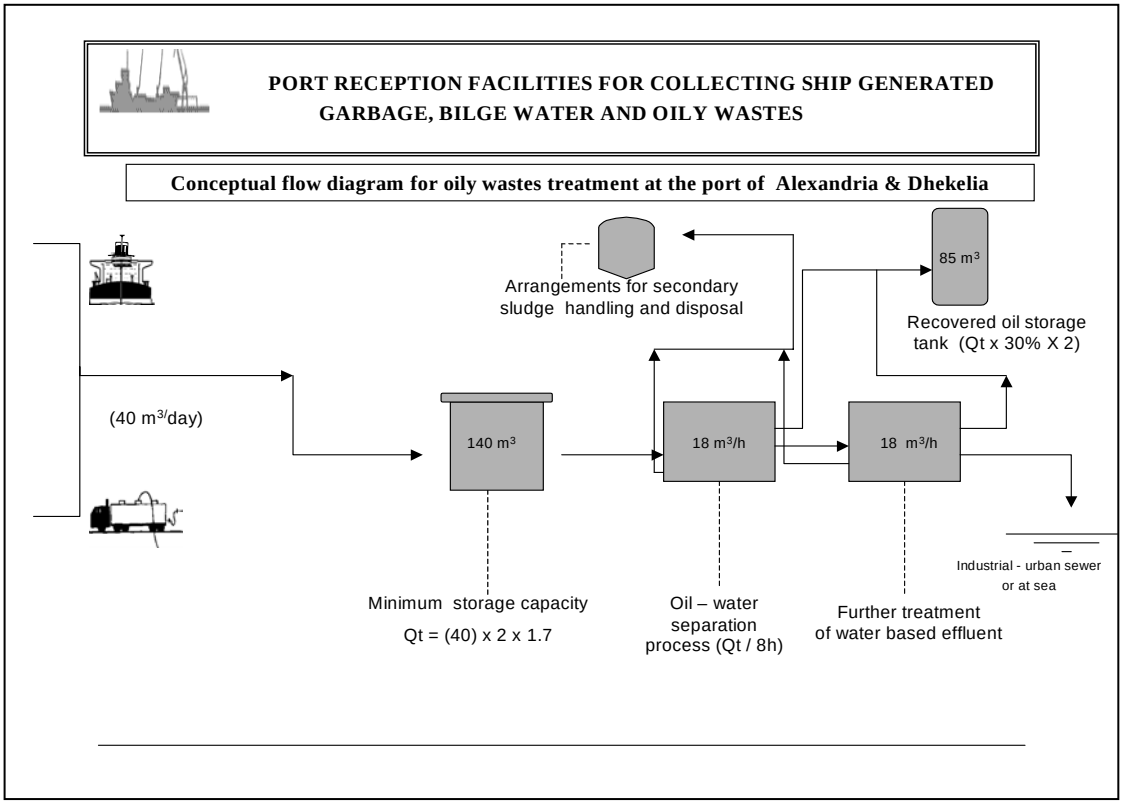
2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	14.7	24.6	Reduced weekly volume (m^3/week)	55.3	15.2	14.5	85.0
Average annual volume (m^3/year)	-	-	5,400	9,000	Average annual volume (m^3/year)	2,880	792.0	754.0	4,426
Maximum volume to be received per ship/arrival (m^3)	-	-	25,0	18,5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0

No significant changes are expected to the above estimated figures in the near future.

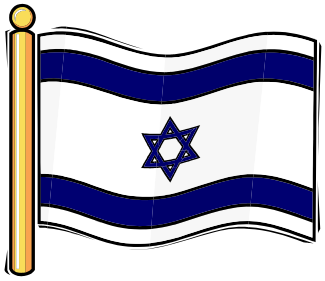
Proper waste collection and management have become a constant target of the authority of Alexandria and Dhekelia ports. The capacity, provided by the private contractors as well as by the Authority is sufficient to meet the recorded volumes that ships normally calling at the ports, deliver to the available facilities. The collection efficiency succeeds to enhance the efforts made towards the key objective to minimize illegal discharges at sea and debris' accumulation and also to sustain the quality of the port basin and area in a satisfactory level despite the huge traffic and the intensity of port operations. It was felt that a port specific study is necessary to encompass and integrate the existing waste management operations, collection, treatment, transfer, recycling, management of potentially hazardous waste, resource recovery functions, to the locally, existing infrastructure and waste management strategy.

With regard to the collection and management of oily wastes, it is considered that the ports of Alexandria and Dhekelia really need a better (than the existing temporary storage barge) facility for collecting, temporary storing and treating oily water mixtures collected from ships. It is obvious that the storage capacity of "Saboura II" is limited, providing a safe margin for less than 3 days in peak periods. A larger capacity or a treatment facility would minimize the current, disposal frequency of oily wastes to the Alexandria Petroleum Company.

Land area restrictions might not make feasible the establishment of a fixed facility in the congested port of Alexandria. A rough, conceptual diagram that could be used either for the purpose totconvert the existing barge to a treatment separator or for the establishment of a land based reception and treatment facility is shown below:



ISRAEL



ISRAEL

- Introduction

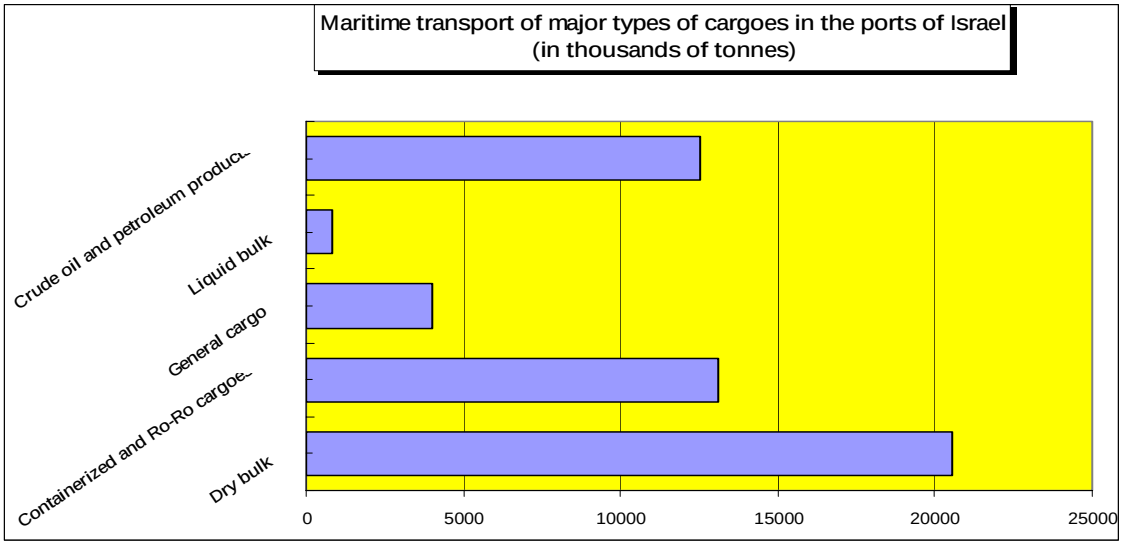
Israel's, 195 kms long coastline consists of tremendously important commercial, cultural and environmental assets. There are basically two major ports in the Mediterranean Sea area, those of Ashdod and Haifa as well as one major oil terminal - Ashqelon - and another secondary oil terminal combined with unloading dock for coal - Hadera - to be considered in this report.

National legislation covers the mandatory Annexes I and II of MARPOL 73/78 while Annex V, has not yet been ratified to be subsequently enforced by the national regulatory agencies. The Law on Prevention of the Marine Pollution (Dumping of Waste), Section E 11, prohibits dumping of waste in Israeli territorial or inland waters. The Cleanliness Law of 1984 also gives the regulatory agencies the possibility to prosecute offenders who dumps any kind of material into the sea. All ports are required to have waste reception facilities in accordance with the Port Regulations and Israel's environmental legislation (Business Permit Law). Inspections on the basic, operational requirements of MARPOL 73/78 such as proper entries to the Oil Record Book, I.O.P.P. Certificate and other technical items related with the installation and operation of oil - bilge separating equipment and filtering system, etc., are being regularly exercised by the responsible Port State Control Officers.

An outline of the maritime transport of cargoes from and to the ports of the country, is provided below:

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	33.819	35.069	36.091	3.3

With respect to the transport of goods in 2000, 16.379 thousands tons were discharged from ships to the ports of the country and respectively 19.712 thousands tons were loaded from the shore based installations to ships. The contribution of the major types of cargoes that are handled in the ports is illustrated below:



The types of the ports in relation with their mode of operation and the respective MARPOL 73/78 Regulations dealing with the provision of Reception Facilities is presented in the following table:

Ports involved in the project	**Port**		**Oil Terminal**					
			Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Ashdod								
Haifa								
Ashqelon								Planned dessali-nation plant
Hadera								

B. Legislative framework regarding ports' operation, prevention of marine pollution and provision of reception facilities

The Shipping and Ports Administration of the Ministry of Transport is the State's responsible Authority for the planning, control and implementation of activities related with the national and foreign flagged merchant shipping, including registration and surveys of ships, licensing of maritime personnel, etc. as well as of those related with the infrastructure of ports that supports navigational safety, ports' operations, etc.

Under the Ports Authority Law (1961), the State of Israel established the Ports Authority as a government corporation to manage Israel's ports guided by the principle that the ports subject to its management must be self-supporting enterprises.

According to the Law, the functions of the Authority are to plan, build, develop, manage, maintain, operate and control the ports of the country including those of Ashdod and Haifa. Hadera is operated by the Ministry of Transport and with the abovementioned ports are discussed here.

Ports Regulations (Loading and unloading of oil) 5736 – 1975 address requirements for tankers and terminals engaged in petroleum related operations dealing also with the disposal of dirty ballast and other oily wastes.

The basic, legal framework for marine pollution prevention consists of a number of laws and regulations, including those of:

- Prevention of Sea-Water Pollution by Oil Ordinance, 1980, which prohibits discharge of oil or oily water into Israel's territorial and inland waters by any shore installation or vessel,

- Regulations for the Prevention of Sea-Water Pollution by Oil, 1983 (Marine Environment Protection Fee) which impose a fee on the owners of vessels and terminals to be collected into the Fund for the Prevention of Sea Water Pollution.

- Prevention of Sea Pollution (Dumping of Waste) Law, 1983 and the respective 1984 Regulations which deal with the dumping of waste at sea.

- Prevention of Sea Pollution from Land-based Sources Law, 1988, and the respective 1990 Regulations which deal with the discharge of land - generated (industrial and municipal) wastes.

- Hazardous Substances Law, 1993 and Disposal of Hazardous Substances, 1990 dealing with the handling of hazardous substances including the disposal of waste originated from hazardous substances.

- Maintenance Cleanilness Law, 1984.

Legal Instrument	Summary of requirements
Ports Regulations (Loading and unloading of oil) 5736 - 1975	Ports Regulations 5736 – 1975, provide provisions with respect to the loading and unloading of oil in the ports and terminals of the country, stipulating also requirements for the delivery of oily ballast and other oily wastes from oil tankers. The quantity of oil contaminated ballast on a tanker and the position of tanks where it is stored as well as of oil free ballast is reported to the Harbour Master or the Person in charge of the terminal as soon as the mooring operations have been completed. The entire quantity of dirty ballast should be pumped out to the terminal installations while segregated ballast or in general ballast free of oil shall not be pumped into the sea except with prior approval. Requirements are also addressed for the collection of oily wastes from the machinery spaces of oil tankers while they are engaged in terminal operations. Specifically, upon the completion of loading/unloading operation, any oily water mixtures and residues should be pumped out either directly to a barge designated for their collection or to land based tank allocated for the same purpose.
Prevention of Sea Water Pollution by Oil Ordinance, 1980 & Marine Environment Protection Fee 1983	These Regulations deal with discharges of oil basically in the territorial and inland waters of the country, matters of surveys of ships aimed at the prevention of oil pollution, the establishment of a Fund for the Prevention of Sea Water Pollution, etc. Under the respective 1983 Regulations, the owner of vessels which are greater than 24 meters long, must pay a fee at a rate of 25% of the lighthouse dues imposed under the abovementioned Ports Regulations, while the owners of tankers calling at the ports of Eliat or Ashkelon must pay a fee at the rate of lighthouse dues.
Prevention of Sea Pollution from Land Based Sources Law, 1988 and respective 1990 Regulations	The Law and the promulgated respective Regulations deal with those wastes that are prohibited to dump or dispose at sea, arrange the procedures for applying and the conditions for the issue of permits and in general provide a framework for an authorization system for point source discharges at sea. The incorporation of materials that are not allowed for dumping or discharge is based on the list of substances specified in the 1976, Protocol for the Protection of the Mediterranean Sea Against Pollution from Land Based Sources.

Hazardous Substances Law, 1993	The Law provides the national framework for dealing with the management of hazardous wastes, identifying the Ministry of the Environment as the responsible authority to control the handling of hazardous substances, to issue licenses, to adopt regulations with respect to the production, use, handling, marketing, transport, import and export of hazardous substances.

It should be noted that the Ports Authority and the terminal operators are responsible to provide reception facilities for ship-generated wastes in general at the ports and terminals of the country. There is no any requirement for drawing up and implementing management plans either for wastes collected from ships or for wastes produced from routine port operations.

Israel is a Contracting Party of the Barcelona Convention. As per 1/2/2003, It has not ratified yet the Hazardous Waste Protocol, the new Emergency Protocol and the amended LBS Protocol. It has also ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

According to the existing national legislation, wastes which can be also produced from ships are considered to be hazardous and are treated as such, include all kinds of residues and waste fuel oils, medical wastes, batteries and pyrotechnics.

It should be noted that since 1990 a government owned Centre for the Treatment of Hazardous Wastes has been operating in the industrial area of Ramat Hovav. Regulations adopted at that time with the aim to ensure the controlled and environmentally sound management of hazardous wastes, require every operator of industrial facility in the country to deliver such wastes at the Centre for further treatment, recovery and final disposal.

The Centre is engaged in collecting, storing, treating, recovering and disposing hazardous wastes produced either from the industry, laboratories, research institutions, hospitals, etc. The Centre has developed specific reception and treatment lines for different waste streams employing physicochemical treatment, controlled landfilling and incineration processes.

The following discussion for each one of the ports of Ashdod, Haifa and Hadera consists of a general information on port operation and maritime traffic, a presentation of the existing facilities, the estimations of wastestreams that are likely to be landed from the incoming ships while the assessment of their adequacy along with other recommendations and findings is presented in the end.

A. General Information

- Port Ashdod

- Port Authority Israel Ports & Railways Authority

B. Type and operation of the port

The port is located at $31^0$49' N, 34^0 38' E about 40 kms south of Tel Aviv close to the industrial and production centres of the country. It's an artificial harbour consisting of a main breakwater 2000 meters long and a lee one 900 meters long enclosing a water basin about one sq. kilometre with finger piers extending from the shore in W direction. A Free Port Zone is provided with facilities available covering an area of 37 acres.

Handling of container ships is carried out at piers 7 (481 meters long with 12.0 meters maximum depth) and 9 (435 meters long with 13.8 meters maximum depth) where coal unloading also can take place. Modern equipment and sufficient storage areas enable the operation of the container terminal contributing to the increase of the productivity of the port.

Passenger and cruise ships are normally accommodated at pier 4 (207 meters long with 12.5 – 13.0 meters depth). From 200 cruise liners calls in 1985, the number declined to 160 in 2000 and 76 in 2001 respectively.

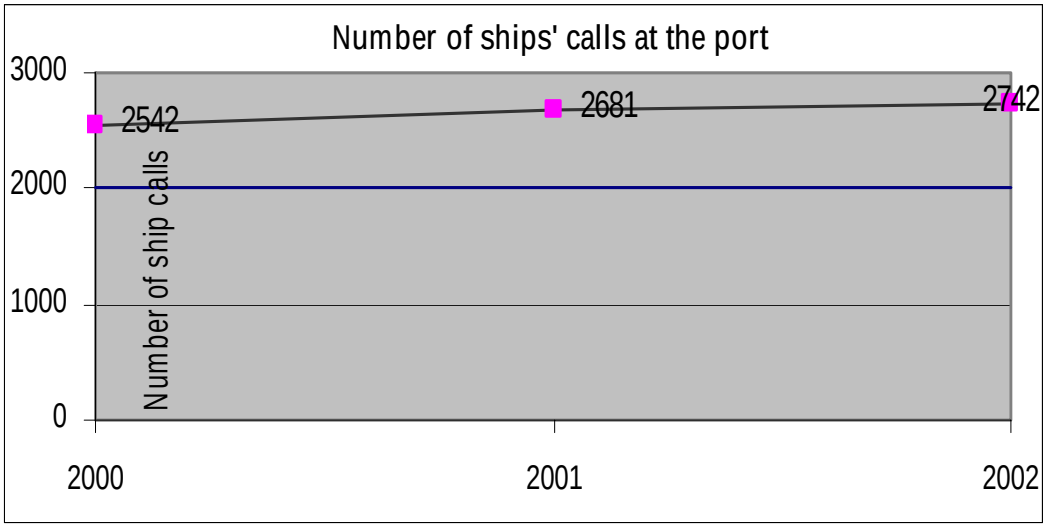
Six piers varying in length from 770 to 205 meters able to accommodate ships up to 60.000 grt., are allocated for the handling of general cargo, agricultural products, timber, metals, etc.

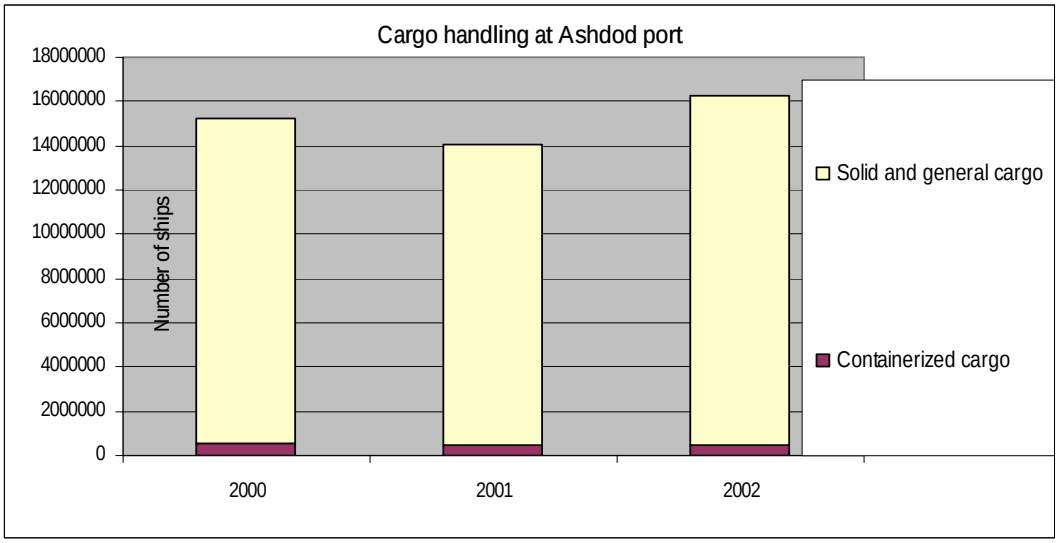
The berthing infrastructure of the port is summarized in the table below:

Quays	Main purpose	Length (m)	Depth (m)
1	General cargo and liquids & Ro – Ro ships accommodation	770	5.0 – 10.5
2	General cargo	150	5.0
3	General and Bulk cargo	620	5.0 – 11.5
4	Passenger ships and general cargo	207	12.5 – 13.0
5	General cargo, Bulk cargo and Ro-Ro ships' accommodation	477	7.0 – 13.8

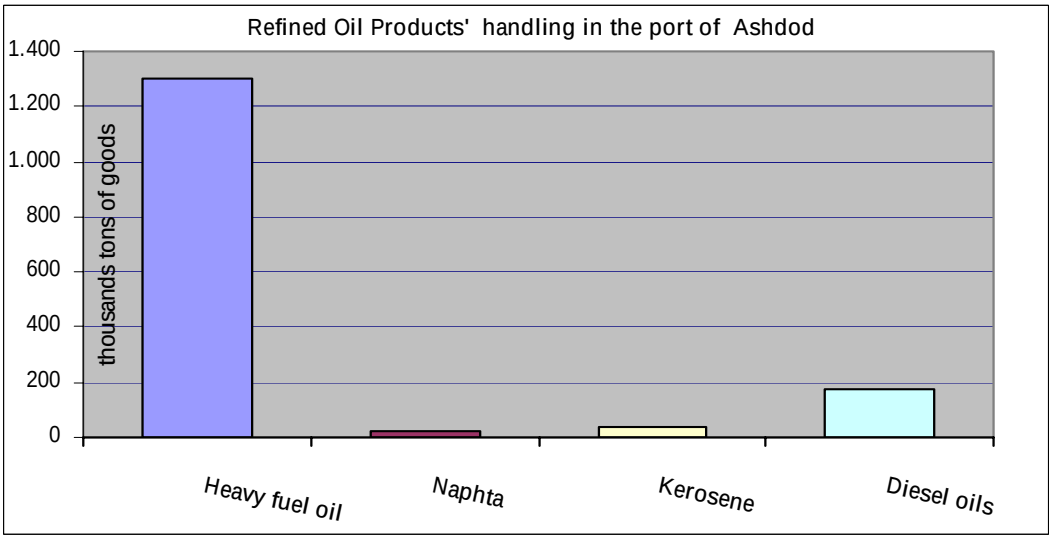
6	Ro – Ro ships	150	7.0
7	Container and Ro-Ro ships	481	10.0 – 12.0
8		105	13.0
9	Coal and containers	435	13.8
30	Security	150	9.5
11	Phosphates and Potash	250	12.0 –14.0
12	Phosphates and Potash	150	14.0
20	Liquids Bulk	150	7.0

Year	***Maritime traffic details***			
	Number of ships calls	Containerised cargo throughput (TEUs)	Solid bulk cargo & general cargo throughput (metr. tons)	Number of passengers
2002	2.742	536.000	14.722.000	-
2001	2.681	512.000	13.575.000	76.000
2000	2.542	479.000	15.758.000	160.000





With respect to oil handling operations in the port, a number of 300 oil tankers call annually engaged in discharging of about 1.5 million tons of refined products, the break down of which is illustrated below:



C1. Existing receptions facilities for garbage

Facilities for collecting garbage from ships are provided at the port through the involvement of authorized private contractors. Garbage collection service is provided on a 24 hour basis at all berthing areas of the port while a prior notice is required from incoming ships for proper arrangement. Local agents normally undertake to notify to the contractors, the needs of the ships to deliver garbage.

There are not any requirements with respect to the separation and containment of garbage onboard prior to its delivery at the facilities. The collection of garbage is carried out by container vehicles with an average holding capacity of 20 cub. meters. There are not any means for compacting or mechanically sorting out garbage collected in the port.

Controlled landfilling is the option for final disposal. The landfill site, located about 90 kms south of the port area, is operated by a private contractor. The landfilling operations are being inspected and frequently checked by the local authority and the Ministry of the Environment, as well.

Under the 1983 Marine Environment Protection Fee Regulations, ships with a LOA greater than 24 meters, should pay a fee at a rate of 25% of the lighthouse dues imposed under the Ports Regulations. Garbage collection charge has been incorporated into the respective standing port dues.

There is not any formal procedure for record keeping either the number of ships that wish to deliver garbage or the quantities received for transport and final disposal.

C2. Existing receptions facilities for oily wastes

Facilities, operated by private contractors are available in the port for collecting oily wastes produced in the machinery spaces of the incoming ships but also for any potential tank washings from tankers. Road tankers of an average 15 cub. meters holding capacity are provided for receiving oily wastes enabling a 5 cub. meters per hour pumping capacity.

Prior notice, basically through ships' agents is mandatory for arranging the collection service.

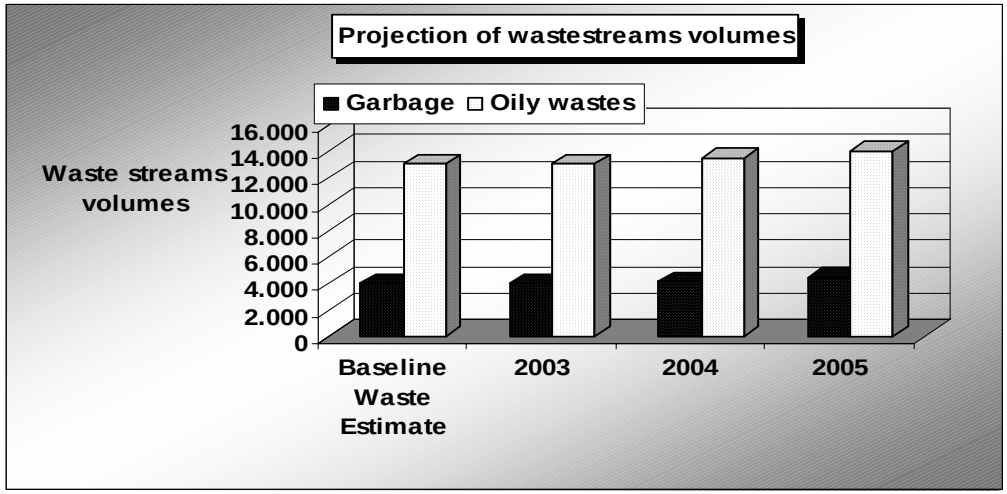
The collection and treatment facility is located 20 km north of the port area, owned and operated by the private company Lipodan S.A. which serves a wide area of service and all kinds of waste oils including those produced from land based sources.

On average, 250-300 tons/month of basically sludge and oily bilge water are collected annually in the port to be treated subsequently at the facility. While, charges for the reception of oil contaminated ballast are incorporated in the port dues, reception of the abovementioned wastes is charged separately by the contractors at 40 $ US per ton.

D. Estimations of wastestreams' volumes

Port : Ashdod
Country: Israel

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily Wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	17.4	18.1	Reduced weekly volume (m^3/week)	58.8	17.9	-	76.7
Average annual volume (m^3/year)	-	-	6,372.0	6,637.5	Average annual volume (m^3/year)	3,059.7	934.5	-	3,994.2
Maximum volume to be received per ship/arrival (m^3)	-	-	15.0	25.0	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				4.5



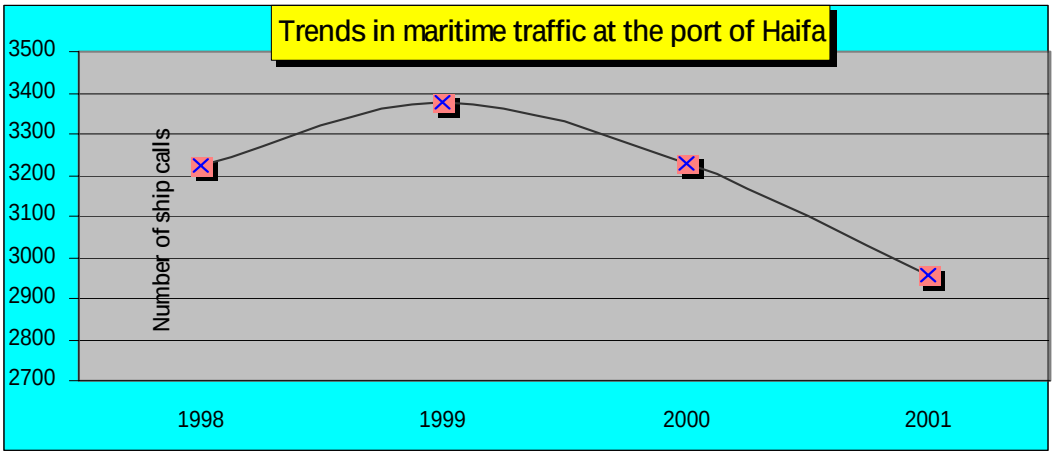
A. General Information

- **Port** Haifa
- **Port Authority** Israel Ports & Railways Authority, Port of Haifa

B. Type and operation of the port

The port of Haifa is located at 32^0 49' N, 35^0 0' E within the Haifa Bay which provides a good anchorage protected from all winds to the incoming ships. The port includes a modern passenger terminal consisting of a variety of a number of land-based facilities able to cope with the increasing growth of passenger traffic, dedicated terminals engaged in handling and storing chemicals such as ammonia, methanol, etc, a grain silo with a nominal capacity of 100.000 tons as well as a container terminal which operates at both the East and West Quays.

On average more than 3.200 ships call at the port annually with the container and general cargo ships to dominate in respect of their contribution to the entire traffic and the volume of cargo handled in the port. Haifa is ranked among the top 15 ports of the Mediterranean in terms of the gross weight handled which amounted 18.534 thousands tons in 2000. The trends of traffic at the port in the 1998 – 2001 period is presented below:

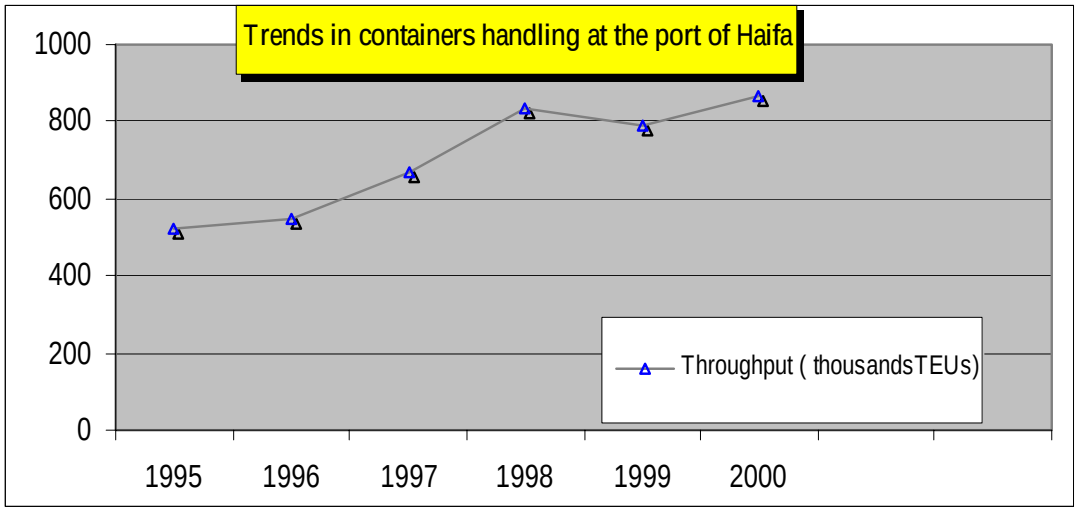


The nominal berthing sites of the two basins of the port in association with the type of the cargo normally handled is presented in the following table:

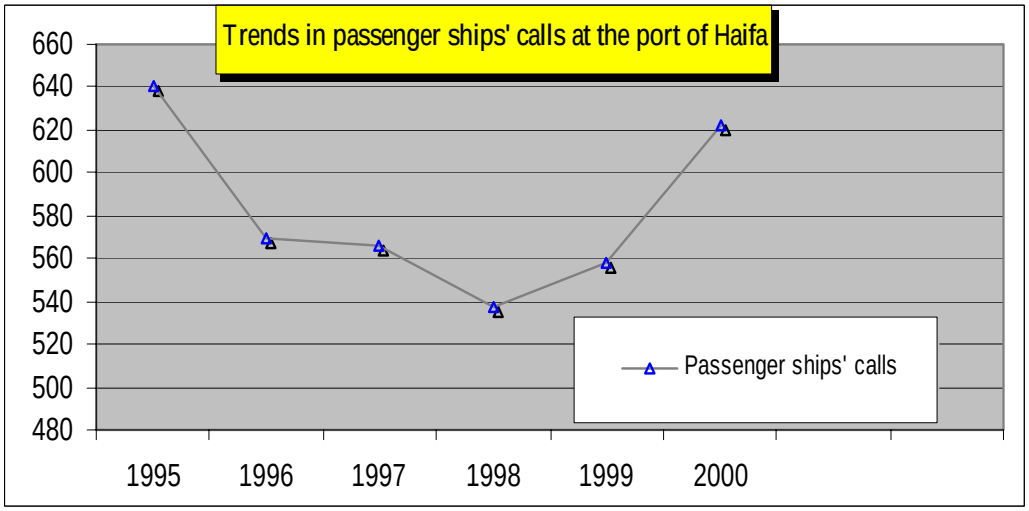
- **Main Port**			
Berths	**Port operation**	**Length (m)**	**Depth (m)**
1 – 4	General cargoes	497	4.6 – 10.0
5 – 6	Passenger ships and general cargoes	259	10.0 – 11.5
7	General and bulk cargoes	158	11.5
8 – 9	Unloading grain	232	13.8
10 – 11	West container terminal	396	8.5 – 10.5
12	Ro – Ro Ferry Quay	224	8.0
Finger berth	Passenger ships	400	7.5
Service and fuel piers		110	4.0
East quay		800	10.7
Dolphins		296	10.2 – 10.8
Piers for cargoes	Containers and bulk cargoes handling	1000	12.0 – 13.5
- **The Kishon Zone**			
Quays 1 - 4	General cargoes	625	10.0
North Chemicals terminal	Liquid chemicals	350	4.5 – 9.0
South chemicals terminal	Liquid chemicals	60	8.5
Fishery dock		450	4.0

The container terminal of the port consists of basically 2 quays, the East Quay which is located at the east of the main port, where 780 meters of its length are provided for the accommodation of container ships. The maximum depth of the quay is 13 meters while the whole East quay stretches over an area of about 37 hectares providing a storage site for about 15.000 TEUs along with electrical systems necessary for reefer containers and other associated mechanical equipment. Loading and unloading operations are carried out through a system of a sufficient number of gantry cranes and lifting means while a railway enables the connection of the quay with the mainland.

The 400 meters long and 10 meters deep West quay is located in the main port, covering an area of about 10 hectares where handling and storage of containers is carried out by a sufficient number of cranes and other mechanical handling equipment. The container traffic at the port of Haifa in the 1995 – 2000 period is illustrated below:



A privately operated grain terminal of 100.000 tons capacity is provided for the unloading, storage and loading of grains through a silo and its related mechanical and pneumatic evacuators able to achieve a 1.800 tons per hour nominal throughput. As far the passenger operation of the port is concerned, cruise ships are normally accommodated staying berthed for 1 – 2 days while the dedicated passenger terminal provides simultaneous berthing for three ships of this type and for two ships at anchor.



Chemicals and edible oils in bulk are unloaded or loaded, stored and distributed at the chemical terminals in the Kishon port where tankers of up to 20.000 tdw and 8.5 meters maximum draft can be accommodated.

C1. Existing receptions facilities for garbage

Privately operated facilities are available for collecting garbage from ships following a notice from directly the Masters of ships or their agents. Garbage collection is carried out basically on business hours at all berths of the port as well as at the designated anchorages. There is not any port - based treatment or temporary storage facility established in the port.

Solid waste generated by ships are collected by the port authority's authorized private contractor to be disposed to a proper landfilling site. The landfill site is operated by private contractor and is located about 70 km to the east. The landfilling operations are being inspected and frequently checked by the local authority and the Ministry of the Environment. The collection of garbage is carried out by container-vehicles (20 m^3) and also by barges with an average holding capacity of 4 cub. meters. A fixed fee incorporated into the standing port dues is charged to all ships as provided by the 1983 Marine Environment Protection Fee Regulations, under which ships with a LOA greater than 24 meters, should pay a fee at a rate of 25% of the lighthouse dues. There are not any requirements with respect to the separation and containment of garbage onboard prior to its delivery at the facilities. There is not any formal procedure for record keeping either the number of ships that wish to deliver garbage or the quantities received for transport and final disposal.

C2. Existing receptions facilities for oily wastes

As far as the reception and further treatment of dirty ballast and tank washings from tankers that call at the oil terminal of the port is concerned, information is provided in the relevant Activity C Report. To briefly mention the facilities, these include both jetty based, fixed facilities able to receive up to 1.000 cub. meters per hour and navigable collection means. The nominal storage capacity is 7.000 cub. meters.

It should be mentioned that the available fixed facility can serve also ships other than the oil tankers that normally call to discharge or load. Dirty ballast and other oily wastes collected are treated at the treatment facility of the terminal by employing basically, physical methods. Initial gravitational settling and treatment at standard API separators of industrial type achieve a treatment capacity of 300 – 400 cub. meters per hour and an oil content of the effluent water less than 15 ppm.

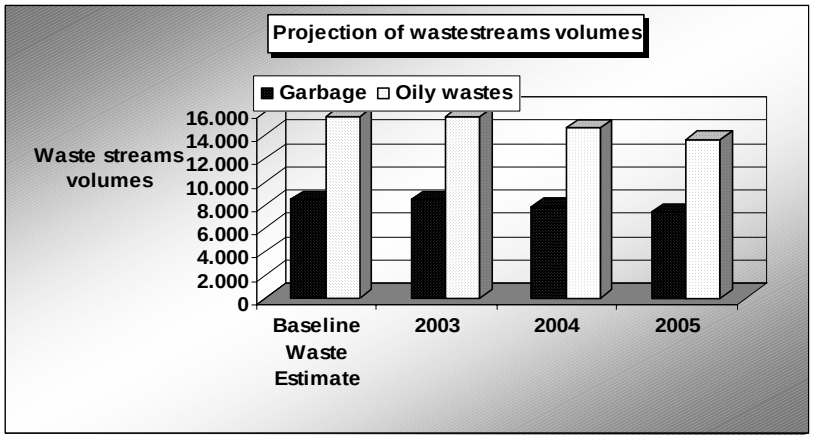
Collection of oily bilge water, sludge from fuel and lubricating oil separating equipment as well as other waste oils, is performed by the Port Authority's authorized contractor. Both, barges of 4 cub. meters holding capacity and a sufficient number of tank vehicles being available during working hours are allocated for collecting the abovementioned oily wastes.

Collected ship-generated sludge, oily bilge water and other waste oils are sent to a privately operated treatment facility, which is located within port limits at Gadot. It serves a wider area and all kinds of oily wastes. As it has been mentioned, for dirty ballast and garbage collection, a fixed fee has been arranged which provides the ships with the right to deliver their wastes retained onboard to the available facilities while an additional charge is collected for other oily wastes depending on their quantity and quality.

D. Estimations of wastestreams' volumes

Port : Haifa
Country: Israel

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily Wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	20.9	21.8	Reduced weekly volume (m^3/week)	154.7	13.4	-	168.1
Average annual volume (m^3/year)	-	-	7,646.4	7,965,0	Average annual volume (m^3/year)	8,045.7	700.9	-	8,746.6
Maximum volume to be received per ship/arrival (m^3)	-	-	15.0	25.0	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				10



A. General Information

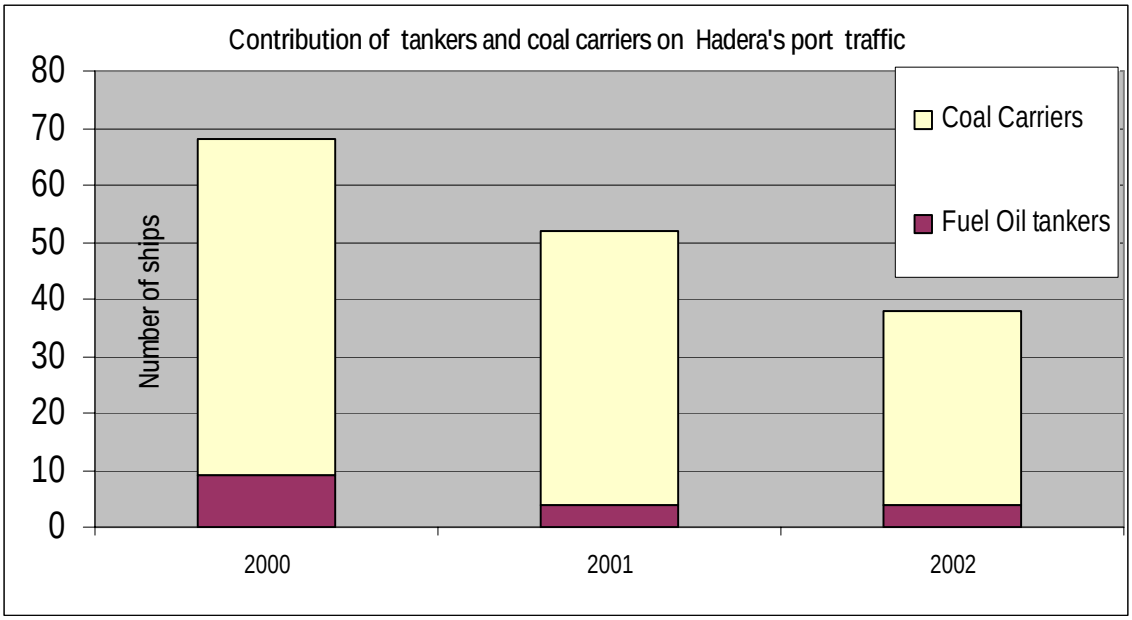
- **Port** Hadera
- **Port Authority** State of Israel**,** Ministry of Transport, Port of Hadera

B. Type and operation of the port

Port of Hadera is directly under the authority of the Ministry of Transport of the country, being an industrial port, the function of which is predominantly associated with the coal and fuel oil power plants that operate in the area. Electricity generation and supply in the country is provided by the Israel Electricity Corporation (I.E.C.), a state owned public entity, through basically the operation of power plants in Hadera, Ashkelon, Ashdod, Haifa and Tel Aviv. In terms of 1999, coal fired plants represented about 70% of the power produced while fuel oil power plants account for about 25%. Additional power was provided by diesel fuel power plants, industrial co-generation and solar units.

As far as the petroleum related operation of the port is concerned, multi buoy mooring facilities are provided north of the coal jetty at 18 meters depth and some 1.500 meters far from the nearest coastline. The facilities can accommodate up to 45.000 t.dw oil tankers. Annually, 6 oil tankers of 25.000 average deadweight call to the port to discharge 100.000 metric tons.

The coal unloading terminal serving the I.E.C. operated power station consists of a jetty that extends 1.8 km offshore with a berthing face at the end of about 300 meters, while the minimum depth alongside is 20.5 meters, capable of receiving coal carriers up to 200.000 d.wt. Bulk coal is discharged to the power station through a system of gantry cranes and belt conveyor systems.



C. Existing receptions facilities for oily wastes and garbage

The Authority of the port provides garbage collection services on a 24 hours basis. There is no need for the incoming ships to give a prior notice to arrange garbage collection. A 14 cub. meters container is allocated to receive and temporary store garbage before transport and final disposal at the nearby designated landfill.

Oily bilge water, sludge as well as other waste oils produced in the machinery spaces of incoming coal carriers can be received in the port, however a limitation of up to 10 cub. meters per ship applies. A fixed line along the coal jetty is provided for pumping out the abovementioned oily wastes to a 30 cub. meters capacity tank for reception and temporary storage purposes. Oily wastes collected are disposed of at the I.E.C. facilities in the port area. A 114 $ US, fee per ship, incorporated into the standing port dues, is charged for oily wastes and garbage collection.

Information on the available facilities to any interested ship is provided through the local agents.

D. Estimations of wastestreams' volumes

Port : Hadera
Country: Israel

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily Wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.45	0.75	Reduced weekly volume (m^3/week)	3.7	0.93	-	4.63
Average annual volume (m^3/year)	-	-	165.0	275.0	Average annual volume (m^3/year)	193.6	48.4	-	24.2
Maximum volume to be received per ship/arrival (m^3)	-	-	12.5	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				3.5

E. Assessment of the available Reception Facilities & Recommendations

Israel is a signatory Party of the Annexes I and II of MARPOL 73/78 but, has not yet ratified the optional Annex V of MARPOL dealing with garbage from ships. However, there is a determined political will to proceed to ratify and implement the Annex, having before settled any necessary arrangements to facilitate its requirements either those related with the Israel flagged ships' operations or those related to the provision of reception facilities in the ports of the country. It is obvious that the first set of requirements do not constitute a considerable burden for the ships themselves as well as for the organizational and enforcement work of the competent Authorities, since Annex V provides operational procedures for ships' personnel to practically give effect to the onboard management requirements, record keeping procedures, etc.

The introduction of the mandatory environmental fee for certain ocean-going ships has been acknowledged as a drastic measure to promote the delivery of garbage to the ports and enhance the prevention of marine pollution while at the same time a good reception service coupled with sound management was established around the ports of the country. The applying fixed fee system is almost identical with that one promoted through the implementation of the European Council Directive 2000/59/EC in the ports of the Europe as a significant part of the entire charging system.

In terms of the volumes that could be delivered at the ports under discussion, the available reception capacity is sufficient to handle them in a consistent and adequate manner either through the involvement of private companies (Ashdod and Haifa) or of the port authority itself (port of Hadera).

The effectiveness of the available reception facilities can be further improved by requiring or encouraging ships to notify their need to use reception facilities. At the same time, a dynamic tool is provided to the authorities and reception facilities' operators to systematically verify the adequacy of the capacity of the available facilities and the whole services. Reference to this approach as well as to the recommended use of a uniform document is made to the Conclusions & Recommendations at the end of this Report.

The landfills at which basically domestic like garbage from ships calling at the port of Ashdod and Haifa is disposed of, are located in a considerable distance from the ports area. A small scale, garbage transfer facility, associated with some kind of compaction, separation, and other waste handling processes could provide a sound management solution, provided that a specific study on that, assessed and justified the cost – effectiveness of this action and its consistency with the applicable waste management practices in the wider area.

The operation of the Centre for the Treatment of Hazardous Waste at Ramat Hovav could be of assistance in those cases where disposal of hazardous wastes produced during routine operations onboard ships is requested.

Regulations have been developed in a few countries across the world, aimed to ensuring that special wastes, in practice, potentially hazardous wastes from ships, are handled with responsibility from anyone who may carry and deliver or receive them.

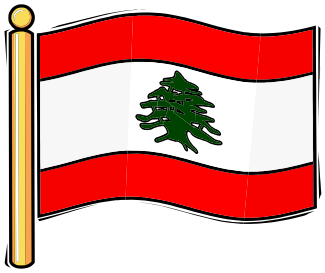
Wastes from ships that could be hazardous are those listed or outlined in terms of the properties they display, in specific catalogues of basic legal instruments such as the Basel Convention, the Barcelona Convention related Hazardous Protocol, the E.U. Council Directive 91/689/EEC, etc.

The capacity of the facilities for collecting oily wastes from ships at the ports of the country, in conjunction with the catalytic involvement of the private sector in operating waste oils treatment facilities matches both the recorded needs of ships by the Port Authorities and also the estimated waste streams volumes. However, the reception capacity that is currently provided in the port of Hadera that limits the delivery of waste oils to 10 cub. meters per ship should be at least doubled to cope with the estimated maximum volume of about 20 cub. meters per delivery. Proportionally, the available temporary storage capacity of 30 cub. meters should be doubled as well, to enable longer holding time and provide a safer margin to exceptional needs.

The following table presents the assessment of the existing collection service of garbage and oily wastes and the associated facilities in the ports, in accordance with the methodology developed and presented earlier in this Report. The N/A indicates the absence of information or that it was not relevant or appropriate to assess under this criterion.

Criteria for assessing the adequacy of existing reception facilities	Reception Facilities for oily wastes and garbage from ships	Yes	No	N/A
Ship/port interface				
Spatial and time availability of wastes collection scheme		√		
Availability of sufficient information / Notification procedures	*Further notice should be given to the masters of ships*		√	
Adequacy of capacity		√		
Reasonable cost of waste collection service		√		
Existence of submitted reports of alleged inadequacy			√	
Existence of serious operational restrictions			√	
Environmental considerations				
Environmental sound waste treatment		√		
Acceptable waste final disposal	*State of the art treatment and disposal*	√		
Environmentally sound waste management		√		

LEBANON



LEBANON

- **Introduction**

The ports' sector is an important productive asset for the country. As a not oil producing country, Lebanon due to its proximity to regional rich crude oil fields has been offered the advantage to play the role of a oil refining center and also of a major crude oil exporting center for a number of years. The pattern of maritime transport shows that the ratio between the unloaded and loaded cargo is about 15 to 1 in 2000, implying the importing nature of ports' operation, as illustrated below:

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	6.216	6.248	5.547	- 5.54

Quantities of goods loaded and unloaded in the main ports of the country *(in thousands tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro & other cargoes
Quantity of goods	5.547	5.195	352	1.666	1.749	1.505

The ports and terminals involved in the activities of the project are presented below, while the ports that are discussed here are those of Sidon, Tripoli, Beirut and Selaata:

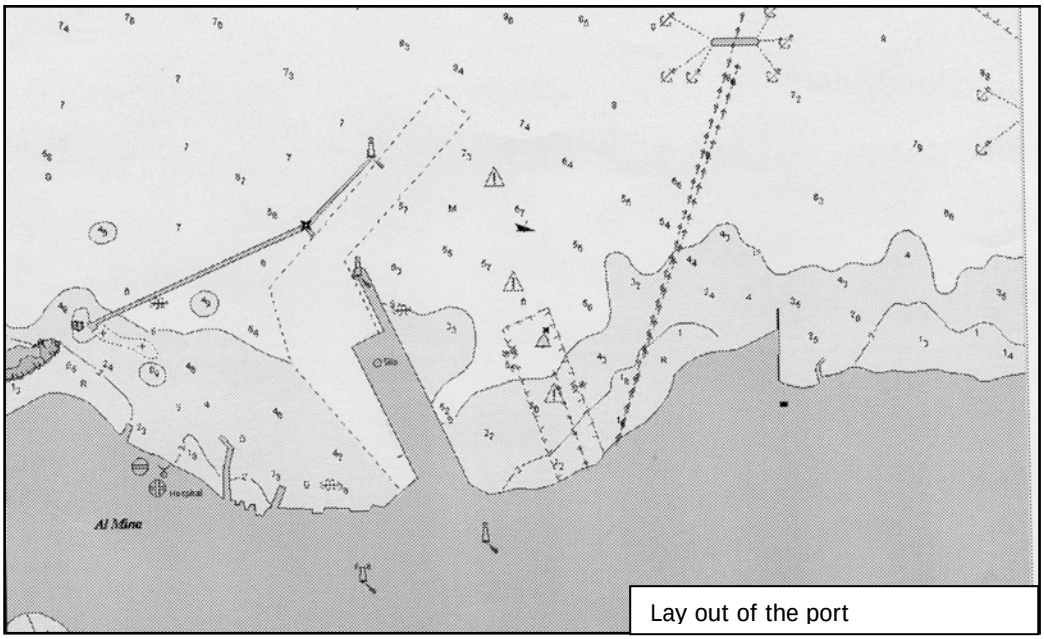
Ports & Terminals involved in the project	**Port**	**Oil Terminal**					
		Crude oil		Oil Products		Power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Tripoli	4				4	4 Deir Ammar	
Zahrani Oil Terminal					4	4	
Sidon	4						
Jounieh	4					4 Zouk	
Beirut	4			4	4		
Selaata	4						

A. General Information

- **Port** Tripoli
- **Port Authority** Service d' Exploitation du Port de Tripoli

B. Type and operation of the port

The port is accessed through an approach channel 13 meters deep, able to accommodate ships of up to 9 meters draft and 150 meters LOA at the Quay No.2, while at the Tripoli Oil Installations Terminal, four berths are provided to accommodate tankers up to 250.000 t.dw. This terminal was used as an exporting site of the Kirkuk Oilfield originated crude oil, now serving the energy needs of the internal market. The commercial operation of the port is concerned with the approach and service of about 450 ships per year (437 ships' calls in 2002) engaged in basically loading and discharging of general cargoes. A general, lay out of the port is shown below:



Lay out of the port

C. Existing receptions facilities for oily wastes and garbage

Limited facilities are provided at the port, upon request from any interested ship, to receive oily wastes or garbage. The Tripoli Oil Installations Terminal during its former operation as a crude oil exporting terminal didn't provide any fixed or other type of facilities for the collection of dirty ballast and/or tank washings from tankers since they were required to arrive with only clean ballast. In respect of the oily mixtures produced in the machinery spaces of ships, a road tanker of limited capacity, is currently engaged in their collection, upon request. Similarly, a garbage truck provides the garbage collection service.

D. Estimations of wastestreams volumes & Recommendations

Port: Tripoli
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues to be received at the port/terminal

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			6.1	1.8
Average annual volume (m^3/year)			2,250	680.5
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

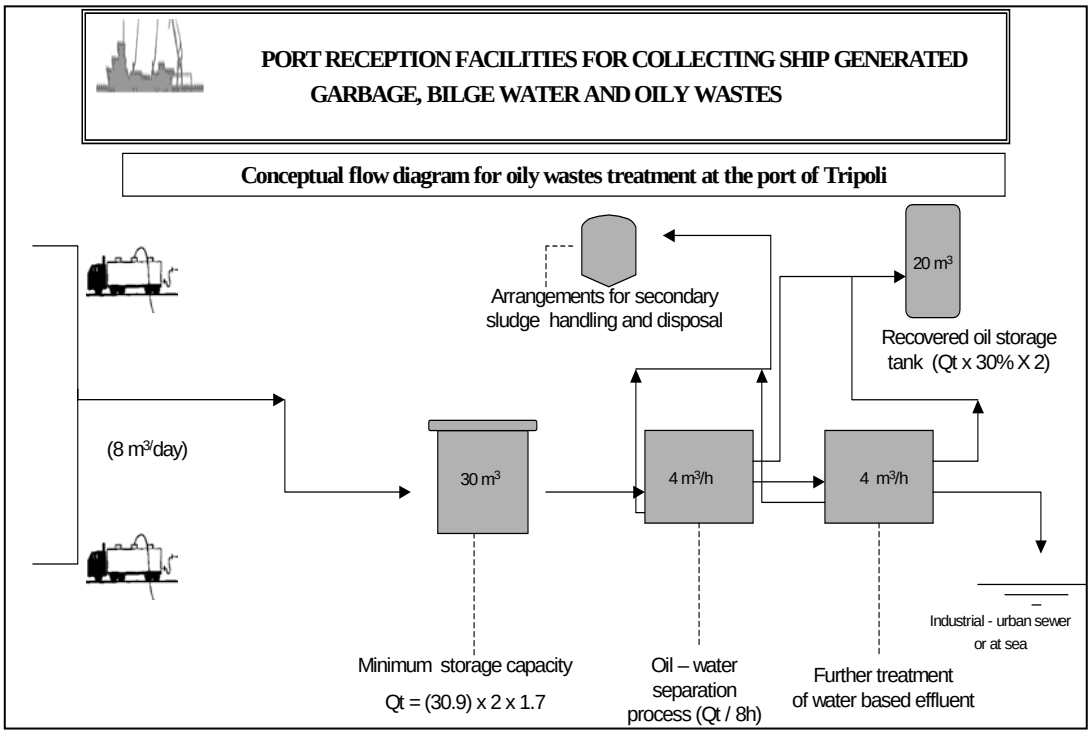
2 Estimates of ship-generated garbage to be received at the port/terminal

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced weekly volume (m^3/week)	6.7	2.0	-	8.7
Average annual volume (m^3/year)	352.8	107.8	-	460.6
Maximum volume to be received per ship/arrival (m^3)				5.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams.

The existing provision of reception facilities for both oily wastes and garbage meets the limited needs of ships as reflected in the above estimated volumes.

However, is considered as advisable for the port, to establish fixed facilities for centrally collecting and treating oily bilge water and sludge to ensure by this way a technically proper and environmentally sound disposal option. A rough, flow process diagram based on the estimated volume is provided below:



A. General Information	
– **Port**	Sidon
– **Port Authority**	Saida Port Authority

B. Type and operation of the port

The port provides a pier used mainly, on average, by 115 general cargo ships and lightering barges, engaged in the handling of about 200.000 tons of cargo. The maximum size of ships that can be accommodated is 10.000 t.dw while the average size is less than 4.000 t.dw. Planning for a future extension of the existing pier remains to be materialized. The port of Tyr, 16 kms south of Sidon, where 40 Ro-Ro ships call annually, is also under the jurisdiction of the Saida Port Authority. The annual throughput and the maritime traffic in the last three years' period is summarized below:

Year	Solid bulk and general non-containerized cargo throughput (met. tonnes)
2002	195.000
2001	198.000
2000	197.000

Year	Bulk Carriers and General Cargo Ships			
	Number of ships calling at the port	Average size of ships (t.dw)	Average duration of ships stay at the port (days)	Average duration of voyage from last port of call (days)
2002	114	4.000	5 – 6	4 – 7
2001	128			
2000	116			

Year	Container Ships and Ro-Ro carriers			
	Number of ships calling at the port	Average Size of ships (t.dw or grt)	Average duration of ships stay at the port (days)	Average duration of voyage from last port of call (days or hours)
2002	40	4.000	5	5
2001	38			
2000	39			

C. Existing receptions facilities for oily wastes and garbage

There are no facilities available for collecting either oily wastes and garbage from ships.

D. Estimations of wastestreams' volumes

Port: Sidon
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues to be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Average daily (m^3/day)			2.1	0.6
Average annual volume (m^3/year)			790.0	219.0
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

2 Estimates of ship-generated garbage to be received at the port/terminal

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Average weekly volume (m^3/week)	2.1	0.6	0.12	2.8
Average annual volume (m^3/year)	113.7	34.7	6.2	154.6
Maximum volume to be received per ship/arrival (m^3)				5.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams.

A. General Information

- **Port** Selaata
- **Operator** Selaata Huiles & Derives S.A.L.

B. Type and operation of the port

Selaata is a privately operated terminal used for the import and export of primarily solid bulk cargoes, phosphoric acids, and other cargoes.

Year	Number of ships	Bulk liquid Products other than oil throughput (met. tonnes)	Solid bulk and general non-containerized cargo throughput (met. tonnes)
2002	80	240.000	150.000
2001	80	240.000	150.000
2000	80	240.000	150.000

Name of Berth	Depth (m)	Berth length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
				LOA (m)	DWT (t.wt)
Ras Selaata	8,5	80	General Cargo/Bulk & Tankers	120	10.000
Oil and Ref. Ports	14	148	Bulk/Grain Liquid	200	70.000

Year	**Bulk carriers and general cargo ships**			
	Number of ships calling at the port	Average Size of ships *(t.dw)*	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(hours)*
2002	80	4.000	18	48
2001	80			
2000	80			

C. Existing receptions facilities for oily wastes and garbage

There are not any reception facilities available for oily wastes. Garbage collection is available by a private company only at business hours and at all berths, without requiring prior notice from ships. This service is charged additionally from port dues at a cost of about $40 per truck of 10 cubic metres capacity. Garbage collected is finally disposed of in a public controlled landfill. A minor number of ships normally discharge garbage at the port (3 ships annually).

D. Estimations of wastestreams' volumes

Port: Selaata
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues to be received at the port/terminal

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Average daily (m^3/day)			0.4	0.1
Average annual volume (m^3/year)			160.0	44.4
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

2 Estimates of ship-generated garbage to be received at the port/terminal

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Average weekly volume (m^3/week)	0.3	0.1	0.2	0.6
Average annual volume (m^3/year)	19.2	7.0	15	41.2
Maximum volume to be received per ship/arrival (m^3)				5

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams.
There are no needs for fixed or other type, reception facilities. The estimated volumes are limited reflecting the current, recorded waste delivery pattern at the port.

A. General Information

- **Port** Beirut
- **Port Authority** Service d' Exploitation du Port de Tripoli

B. Type and operation of the port

The port of Beirut plays an important role in Lebanon's commercial activities. The port is located at 33º 54' N 35º 31' E accessed through an entrance channel 480 m long in depth of 15.24 meters. At Dora 2.5 miles north of Beirut, seven private terminals engaged in the handling or petroleum products operate under the authority of the port. Vessels up to 60.000 t.dw can be accommodated in the port, the berthing capacity of which is provided in brief below:

Name of Berth	Designed/Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated
Dock 1	3 – 8	1026	Mainly container ships and Ro-Ro ships
Dock 2	8 – 13	1065	Mainly bulk carriers engaged in grain handling and other kind of ships and cargoes
Dock 3	10. 5 – 13	1392	
Dock 4	11	750	

Tankers can discharge into shore tanks by pipeline in the Bay of St. Andre, about 2.4 kms far from the port entrance.

C. Existing receptions facilities for oily wastes and garbage

Limited facilities are provided upon request at the port, by a private company, to receive oily wastes and garbage. Two road tankers and an open garbage truck are employed to collect and directly transport oily wastes and garbage respectively from ships.

D. Estimations of wastestreams' volumes and recommendations

Port: Beirut
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues to be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Average daily (m^3/day)			6.8	5.7
Average annual volume (m^3/year)			2,500	2,083
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

2 Estimates of ship-generated garbage to be received at the port

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Average weekly volume (m^3/week)	17.3	6.3	1.5	25.1
Average annual volume (m^3/year)	900.0	330.0	78.0	1,308
Maximum volume to be received per ship/arrival (m^3)				5.0

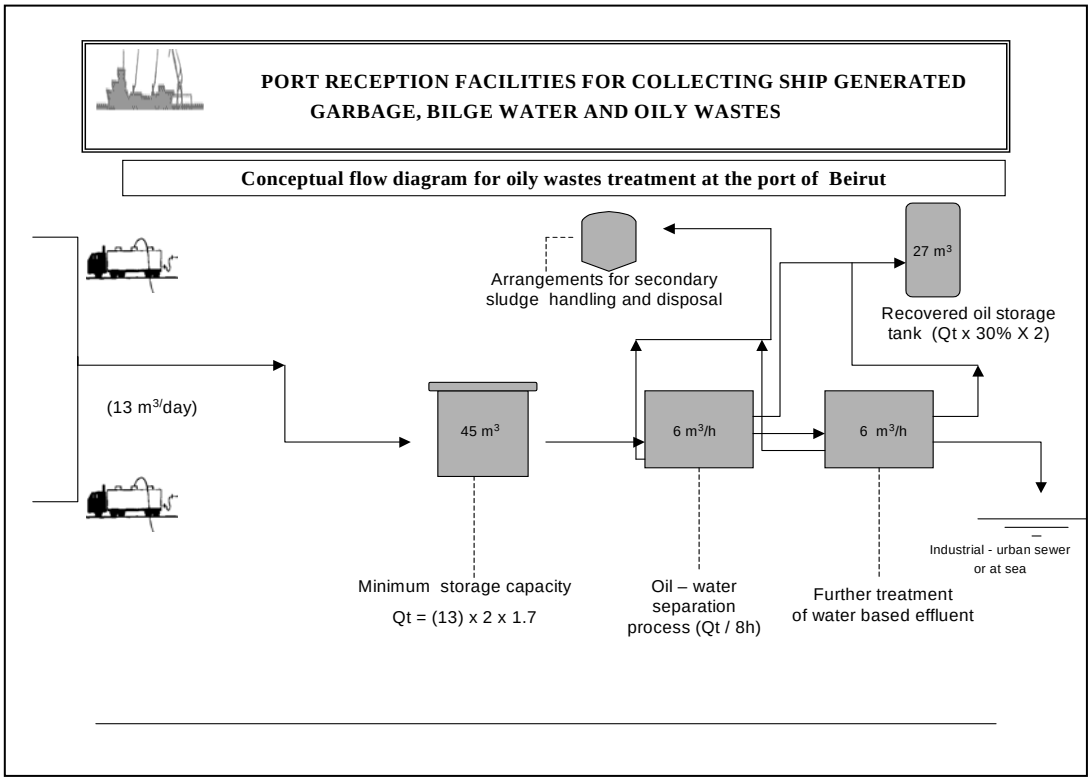
No significant changes in the future are expected to the above estimated volumes of the two major wastestreams.

As the most important port of the country, Beirut port should be provided with preferably, a fixed collection and treatment facility for oily wastes for the following reasons:

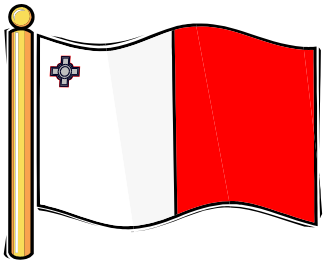
1. The estimated, volume of more than 4,500 cub. meters of oily wastes that can be delivered annually along with the daily, batch volume of about 13 cub. meters exceed the threshold that normally determines the feasibility of setting up a port, central collection and treatment system that could be cost effective and technically sound.

2. The existence of the facility either as a pierside application or in the proximity of the port area would ensure that wastes collected already by the private company are directed to the facility, maximizing the collection efficiency.

A conceptual, flow process diagram of the facility at the port of Beirut is illustrated below, in which only, the minimum capacities have been estimated, since detailed data and other information (waste characterization, peak flow determination, other design elements, spill capacity,treatment objectives, etc.) need to be taken into account and co-estimated.



MALTA



MALTA

– Introduction

Being an island country, Malta is dependent on maritime transport in particular in relation to the tourist industry, the import of goods and commodities and the export of manufactured products. The entire port system of the country includes basically two major port areas, the ports of Valletta and Marsaxlokk hosting cruise terminals, dockyard facilities, dedicated petroleum terminals, yachting centres, tank cleaning facilities, etc. The European Community is the main trading partner of the country, accounting for about 75% of overseas trade and being the principal source of imports and market for exports.

Ship-repair and ship-building are two other important sectors that depend on maritime transport. The container terminal operated by Malta Freeport Co. has been constantly growing, exceeding already the 1.2 million TEUs throughput, demonstrating its role as a major trans-shipment centre in the Mediterranean area. Tourism in Malta has been one of the country's most important economic activities as the island group constitutes one of the most favourite cruise ships' destinations presenting strong seasonal patterns during the peak summer months.

During the mission in the country, the Consultant was given the opportunity to witness the developments in the ports' sector from ongoing and forthcoming projects, such as the Viset Malta associated, project for the new Sea Passenger Terminal and the Valletta Waterfront Regeneration which will enhance the role of the port as a cruise ships' destination, the expansion planning of Oil Tanking terminal, etc.

An average annual growth of about 16% has been experienced in the 1998 – 2000 period in relation to the transport of goods from and to the major two ports of the country.

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	4.223	4.299	5.711	+ 16.28

The Malta Freeport has been already acknowledged as a major distribution port in the Mediterranean area, dealing with, apart from containers and

general cargo handling, also with oil products' storage through Oil Tanking Malta and other industrial warehousing activities.

The ports that are discussed here, are these of Marsaxlokk and Valletta, as shown in the following table, with reference, as much as possible, to their dedicated terminals:

Ports of the project	**Port**		**Oil Terminal**				
	Comm. Port	Major ship – repairing and/or tank cleaning facilities	Crude oil		Oil Products		Fuel oil Power plant & other facility
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal	
Marsaxlokk	4		4	4	4	4	4
Valletta	4	4			4	4	4

Malta is a signatory Party of the Annex I of MARPOL 73/78 through the Merchant Shipping Act and Malta Maritime Authority Act, but, has not yet ratified the optional Annex V of MARPOL dealing with garbage from ships. However, there is strong and determined political will to proceed to ratify and implement the Annex, having before settled any necessary mechanism to facilitate its requirements either those related with the Malta flagged ships' operations or those related to the provision of reception facilities in the Maltese ports. It seems, that the first set of requirements do not constitute a considerable burden for the ships themselves as well as the organizational and enforcement work of Malta Maritime Authority relevant Directorate, since Annex V provides operational procedures for ships' personnel to practically give effect to the onboard management requirements, record keeping procedures, etc. The Authority has been already in dynamic consultations with all interested parties in Malta to identify and solve any problems, that the implementation of Annex V will be about to bring in particular with the reception and further management of garbage from ships.

Malta has not ,so far, adopted Regulations dealing exclusively with the provisions of reception facilities for ship-generated wastes. Terminal operators are responsible to provide facilities for collecting either oily wastes or garbage from ships. According to Harbour Master's instructions, ships calling at the ports of the country are required to deliver oily wastes produced, to the available facilities, if upon inspection it is observed that a substantial volume, exceeding half of the holding capacity provided onboard (at least for wastes such as slops and sludge for which specific MARPOL Regulations determine the required capacities). However, existing legal instruments (Waste Management – Permit and Control Regulations) and other recently adopted (Waste Oils Management Regulations, 2002) incorporate into their scope of application the management of ship-generated garbage and oily wastes, respectively.

The competent Authorities of the country that are responsible for the planning, control and the implementation of the waste management strategy are the following:

- The Ministry of Infrastructure and Resources,

- The Ministry for Environment and Rural Affairs via the Malta Environment and Planning Authority (MEPA).

In preparing to become a full Member of the European Union in May 2004, Malta is rapidly transposing maritime or environment related E.U. Directives to achieve the alignment of national legislation with the E.U. legislation.

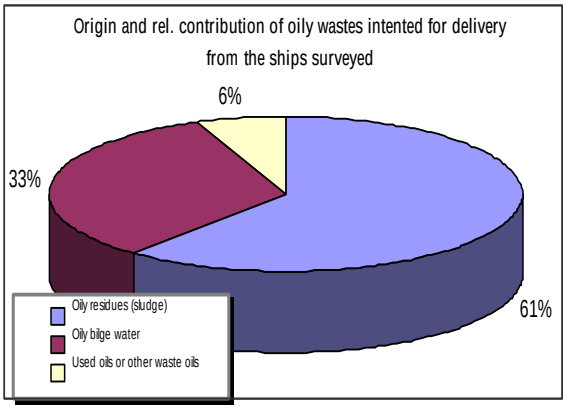
In September 2001, a new Environmental Protection Act was adopted, to basically represent the framework for the future waste management related legislation. Following the adoption of the above mentioned Act, subsidiary legislation has been already or will be adopted, regulating the wide spectrum of waste management including also activities such as disposal and recycling. It should also be noted that a Solid Waste Management Strategy for the Maltese Islands was approved by the Government of Malta in October 2001, which sets out invariably, the requirements under the applicable European legislation and specifically provides the country's policy on an integrated approach to waste management including national wide efforts towards a reduction in the quantity and hazard of wastes produced, the promotion of energy and raw materials recovery, the safe disposal of wastes and residues that can not be otherwise managed, etc.

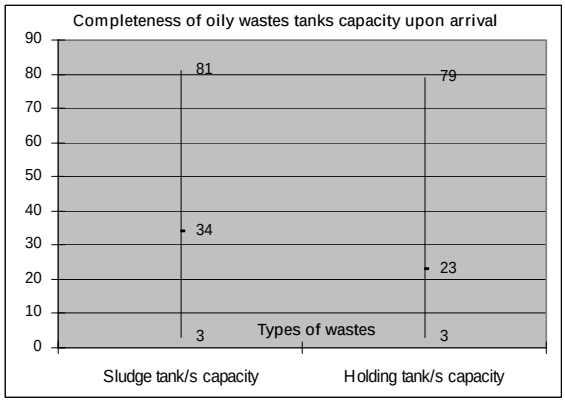
During the project, a valuable input was provided by the collected, completed questionnaires from a satisfactory number of ships that happened to call at the Maltese ports during the project. The collection of data, was enabled by systematic visits onboard, of the French experts' team, which is currently involved in a Malta – France Twinning project, co financed by the European Union, aimed at harmonizing the national legislation of Malta with the E.U. legislation and policy with regard to the 2000/59/EC and other maritime related Directives.

A number of 33 ships responded to the request to complete and provide any additional information to the Annexed Form of the Directive 2000/59/EC. A considerable percentage 18% of these ships wished to or actually delivered either oily wastes or garbage to the existing port facilities.

Number of ships responded	33
Number of ships that would deliver or delivered oily wastes	3 (9%)
Number of ships that would deliver or delivered garbage	5 (15%)

Oily wastes that were discharged consisted of exclusively oily water mixtures produced in the machinery spaces of ships (although a number of oil tankers responded to the questionnaire, no tank or ballast areas' oily wastes were declared for delivery) and specifically oily residues (sludge) accounted for 61% of the total, oily bilge water for 33% and 6% was used or exhausted oils, as shown in the following diagram:





The completeness of the available sludge tank/s capacity of those ships that didn't wish to deliver oily residues was, upon the arrival at the Maltese ports, 33.8% varying from 2.6 to 81.25%. The average completeness of ships that actually delivered oily wastes was 84.8% (in respect of the sludge tanks capacity) and 83.3% (in respect of the holding tanks of bilge oils).

Respectively, the average completeness of the holding tanks of the ships that didn't wish to deliver accumulated oily water mixtures was found to be 22.9% varying from 2.7 to 79%.

The abovementioned data were used in estimating the volumes of the wastestreams that are likely to be landed in the Maltese ports.

A. General Information

- **Port** Marsaxlokk
- **Terminals** Freeport Terminal (Container Terminal), Oil Tanking Terminal, Enemalta oil terminals, San Lucian terminal
- **Port Authority** Malta Maritime Authority

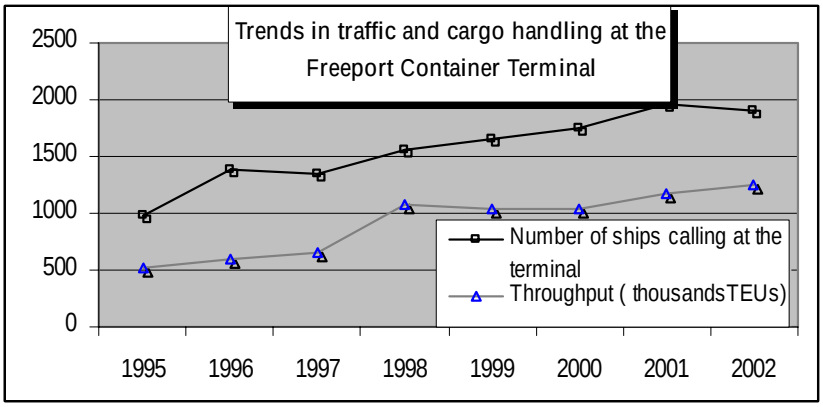
B. Type and operation of port

The Marsaxlokk port is located at 35^0 49 N, 14 34^0 E, situated in the Marsaxlokk Bay on the south coast of Malta which is accessed from an 800 meters wide entrance between the Delimara Point and the end of the breakwater from Benghisa Point. The Malta Freeport has been recognized as one of the most important transhipment ports in the Mediterranean, located in a strategic location that offers minimal diversion distances from the main trade routes in the Mediterranean Sea and high productivity rates enabled by state of the art equipment and motivated personnel.

Freeport Terminal is in charge of the operation of the container terminal, the containers' handling, storage and other activities. It should be noted that the Freeport provides a regular link of shipping for more than 100 international ports and for more than 50 ports and terminals in the Euromediterranean area. The berthing capacity of the container terminal is summarized below:

Terminal	Overall length (m)	Depth (m)	Remarks
Cont.Terminal 1 North Quay West Quay	 1000 168	 15.5 9.5	The total, terminal area is 263.648 sq. meters
Cont. Terminal 2 North Quay Ro-Ro Berth South Quay West Quay	 480 220 660 118	15.5	The total, terminal area is 210.998 sq. meters

In 2002, 1.911 ships called at the terminal (excluding those at Oiltanking Co.), while the annual handling throughput exceeded 1.2 million TEUs.



Apart Oil Tanking Malta oil terminal, four other oil terminal installations operate in the port of Marsaxlokk, the San Lucian Terminal where on average 15 oil tankers are engaged annually in loading/discharging operations of about 184.000 tons of fuel and gas oil, the Enemalta Delimara Power Station at which 240.000 tons of fuel oil are discharged annually from 25 oil tankers, and the Enemalta terminals at B'Bugia and Has S. Dolphin where 240.000 tons of oil products are discharged from 36 tankers annually and 250.000 tons of oil products are loaded and discharged from 30 tankers respectively.

C1. Existing receptions facilities for oily wastes

There are no fixed installations for collecting oily wastes from ships. Authorized private companies are engaged in collecting and managing in general, oily wastes from ships calling at both the container terminal as well as the oil terminal installations and the port. Waste Oils Company Ltd is the basic private company, the navigable or land based mobile means of which, provide the oily wastes collection service and the subsequent treatment at its own facilities in Valletta. The needs of ships to deliver oily wastes is usually addressed to their local agents. It remains a responsibility of the private contractor to manage and dispose off properly the collected oily wastes.

Since the terminal operators do not intervene in this service, there are no data maintained for the requests of ships to deliver their waste, the way they are disposed of, and any reports from the ships commenting on the quality and cost of this service. In respect of the Freeport Terminal, there is no doubt that since the operational standards of the terminal are high, its role upon the implementation of the 2000/59/EC requirements will be to provide a similar, high quality collection service enabling the traceability of wastes collected, the maintenance of data regarding the providers, the costs incurred, etc.

C2. Existing receptions facilities for garbage

With respect to Freeport Terminal, a number of temporary reception and storage skips have been positioned alongside the quays enabling the collection of garbage from ships. These means are emptied twice a week. Additional collection services can be requested by the agents of the ships.

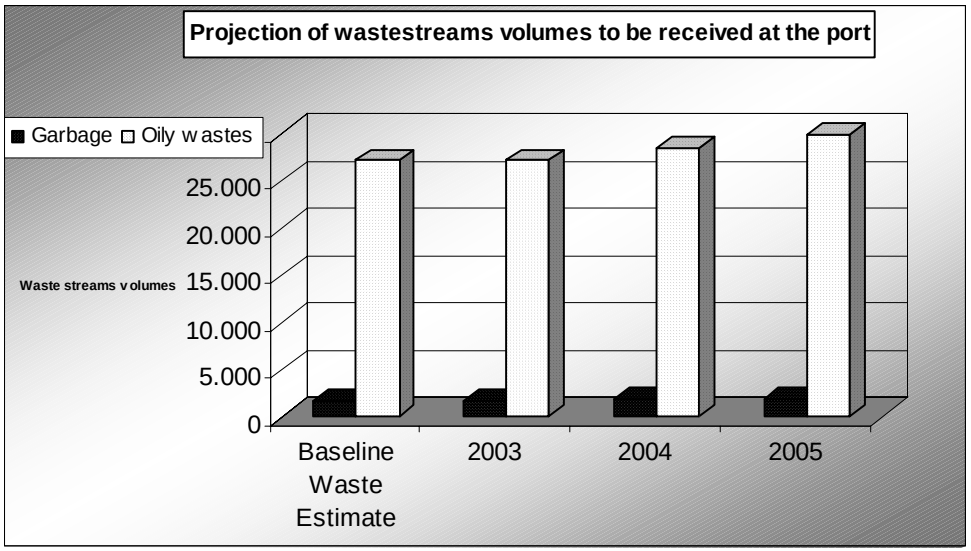
D. Estimations of wastes streams' volumes

Estimations were made on a separate basis for the terminals of Oil Tanking Malta and Freeport Terminal while data provided from all other terminals and the port in general, were used for a separate estimation of the wastestreams that could be delivered to the port.

The assessment of the establishment and operation of reception facilities in both the ports of Marsaxlokk and Valletta is presented at the end of the country's discussion section.

Port: Freeport Container Terminal
Country: Malta

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste (tons)	Total volume of garbage
Reduced Daily Volume (m^3/day)	-	-	23.1	51.3	Reduced Weekly Volume (m^3/week)	25.9	7.9	-	33.8
Average annual volume (m^3/year)	-	-	8,431	18,750	Average annual volume (m^3/year)	1,346.8	412.5	-	1,759.3
Maximum volume per ship/arrival (m^3)	-	-	25,0	60.0	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



Port: Marsaxlokk
Country: Malta

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste (tons)	Total volume of garbage
Reduced Daily Volume (m^3/day)	-	11.8	0.4	0.2	Reduced Weekly Volume (m^3/week)	0.7	0.2	-	0.9
Average annual volume (m^3/year)	-	4,340	144.0	79.5	Reduced Annual volume (m^3/year)	38.1	13.9	-	52.8
Maximum volume per ship/arrival (m^3)	-	96.5	15.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5

No significant changes to the above estimated volumes are expected in the near future.

Port:	**Oil Tanking Malta, Port of Marsaxlokk**
Country:	**Malta**

2 Estimates of ship-generated oily wastes and residues that could be received at the port					Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste (tons)	Total volume of garbage
Reduced Daily Volume (m^3/day)	-	32.8	1.7	1.3	Reduced Weekly Volume (m^3/day)	3.5	1.0	-	4.5
Average Annual Volume (m^3/year)	-	12,000	642.5	464.1	Reduced Annual Volume (m^3/year)	182.0	56.4	-	238.4
Maximum volume per ship/arrival (m^3)	-	3,600	25	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				1.5

An average, annual decline of the number of incoming tankers to the terminal equal to 11.3% has been experienced. Taking into account that the average size of the incoming tankers to the terminal is 50.000 t.dw, it is obvious that the need for any non- SBT tanker of this size to deliver dirty ballast would have been eliminated by 2005 and similarly drastically for tankers less than 50.000 and more than 5.000 t.dw according to the progressive scheme of single hull tankers phase out. In concluding, no significant variations to the above estimated volumes are expected in the near future.

A. General Information

- **Port** Valletta
- **Terminals** Cruise Terminal, Malta Drydocks, Kording Grain Terminal Enemalta oil terminals, Tank Cleaning Facility
- **Port Authority** Malta Maritime Authority

B. Type and operation of the port

The port of Valletta constitutes a multipurpose and diversified port in respect of the dedicated terminals, associated berthing sites and operations offered to ocean-going and local shipping. The port combines passenger and cruise ships operations under expansion and re-development perspective (Viset Malta plc), conventional solid bulk cargoes handling (Kording Grain Terminal), storage facilities situated around the port including petroleum storage facilities (Enemalta Corp. Petroleum Division at Church Wharf, Corradino and Grand Harbour), bunkering stations, major ship building and ship repairing zones (Malta Drydocks), tank cleaning facilities, etc. Information related with the terminals located in the wider port area and their operation is summarized below:

- Cruise Terminal (Viset Malta plc)

An ambitious project has been in progress in the wider port of Valletta aimed at the development of the existing infrastructure and facilities provided for the accommodation of cruise and passenger ships including among others the restoration of historic waterfront buildings, the development of a new basin and berths able to host ships in excess of 300 meters LOA. The whole project responds to the constant increase of the number of cruise and other ships that call to the port which has brought it to one of the most important and busy cruise ports in the Mediterranean. The existing berthing capacity is given below:

Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated LOA (m)
Pinto 1,2	8.4	264	Cruise ships, Ro-Ro Ferries	300
Pinto 3	9.8	171	Cruise ships	180
Pinto 4,5		250		248
Gun Wharf, Wine Wharf	7.4 8.0	165	Cruise ships and high speed craft	140

Year	Cruise ships and passenger ships			
	Number of cruise ships calling at the port	Average number of persons onboard	Number of ferries calling at the port	Average number of persons onboard ferries
2002	408	855	544	140
2001	358	742	523	159
2000	226	769	632	163

- Kordin Grain Terminal

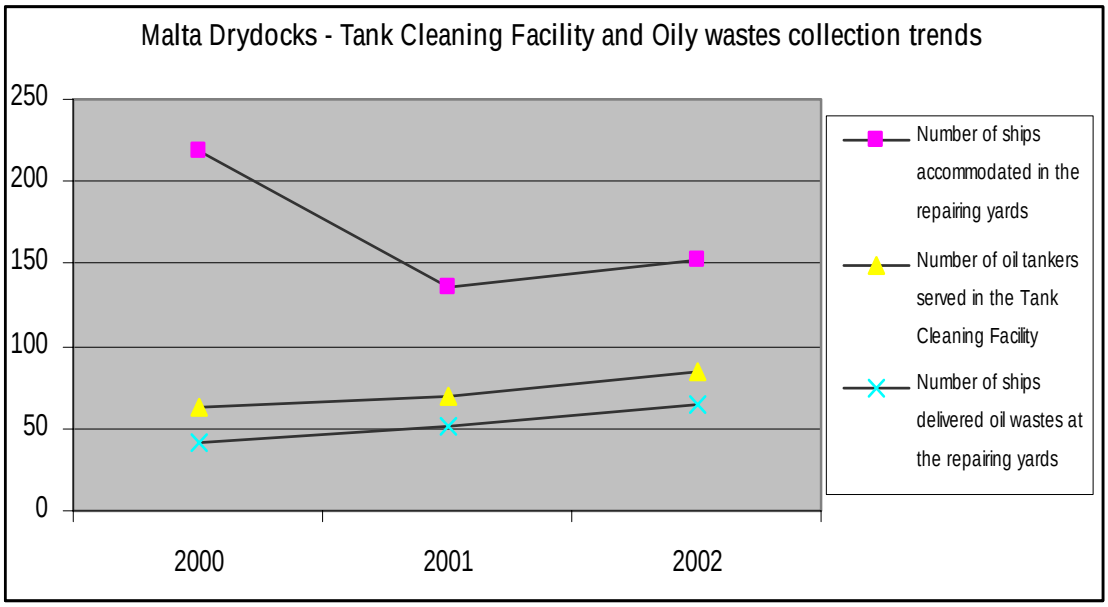
The terminal is situated at the Magazine Wharf and receives 45 bulk carriers (up to 80.000 t.dw) annually engaged in the handling of about 200.000 metric tonnes of cargo in the same period.

Name of Berth	**Designed/ Actual Depth (m)**	**Berth overall length (m)**	**Maximum sizes of ships accommodated**	
			LOA (m)	DWT (t.dw)
Magazine Wharf	10 - 14	320	220	80.000

- Malta Drydocks

The berthing and docking capacity of Malta Drydocks is summarized in the following table:

Dry docks		Other berthing facilities		
Docks	Maximum allowable size of ships Length/Breadth/Draught (m)	Berth site	Depth (m)	Length (m)
Dock 2	170 – 25 – 8.83	MDD Tank Cleaning Facility	10	100
Dock 3	140 – 18 – 8.83	Hamilton Wharf	6.7	750
Dock 4	262 – 40 – 8.53	Somerset Wharf	7.6	450
Dock 5	216 – 27 – 8.53	Burmola Wharf	9.1	400
Dock 6	360 – 62 – 3.14	Factory Wharf	8.2	310
Dock 7	98 - 35 - 3.03	Saw Mills Wharf	9.7	300
		Boat House Wharf	10	270
		Parlatorio Wharf	10.7	1400
		Boiler Wharf	8	1040



The jetty of the Tank Cleaning Facility operated by Malta Drydocks is situated at the left side of the entrance of the port of Valletta, able to accommodate up to 300.000 t.dw. ships with a draught restriction of maximum 10 meters. Apart its operation as a tank cleaning station providing cleaning equipment, steam and hot water, ventilation fans and compressed air, inert gas, etc., it also represents a properly equipped reception facility for almost all kinds of liquid oily wastes such as dirty ballast, tank washings, oily bilge water except of chemicals - contaminated mixtures, aimed to serve not only the needs of Malta Drydocks but also the port of Valletta.

Dirty ballast and other oil residues are collected through a fixed piping system consisting of one or two lengths of 10 inches hoses connected to a 18 inches pipeline through which up to 400 m^3/hour are pumped to the inshore tanks. Slops with chemicals, waste oils tested to contain PCBs/PCTs and naphtha or gasoline washings are not accepted.

The annual number of vessels which make use of the waste reception facilities of the station is about 70, being almost constant for the last few years, consisting of oil tankers, product tankers, gas carriers, OBOs, etc. In 2002, from 20 served tankers, 31.233 metric tonnes of dirty ballast and washings as well as 1.884 metric tonnes of oily bilge water were collected. The storage and treatment area consists of 3 tanks of 3.000 m^3 capacity where oily wastes are stored enabling the settling and primary separation of oil from water, two 200 m^3 tanks providing the further separation ending in an separated water sump before water effluent is discharged at sea while another 3.000 m^3 tank is used for storing separated oil destined either for burning at the boilers of the facility or for sale.

The operation of the cleaning station and its associated treatment and storage capacity for oily wastes in the wider port of Valletta is an important

asset for providing collection and disposal services not only to ships engaged in shiprepairing and other works, and there is no doubt that according to MARPOL criteria, it ensures the adequacy of reception facilities to the Malta Dry Docks.

Garbage and other solid wastes collection and further management is carried out by the Waste Collection Dept. of Malta Dry docks.

- Enemalta Corp. Oil Storage Facilities

In the wider area of the port of Valletta, there are three Enemalta Corp. operated oil terminals and associated storage facilities at Church Wharf, Corradino and Grand Harbour sites, engaged in the handling of a total quantity of less than 380.000 tons of fuel oil, gas oil, liquified petroleum gas and other products. On an annual basis 185 oil tankers and LPG carriers call to these terminals to discharge mainly but also to load the above mentioned bulk cargoes. It is obvious that since the 1.000 metric tons daily unloading rate is not exceeded by any oil terminal, they are not required, in accordance with the respective MARPOL 73/78 requirements, facilities for collecting any potential quantities of dirty ballast and tank washings from ships. Estimation of the anticipated wastestreams volumes for delivery have been incorporated in the overall estimations for the port of Valletta.

C1. Existing receptions facilities for oily wastes

Apart the Tank Cleaning Facility operated by Malta Drydocks summarized earlier in this report, Waste Oils Company Ltd. constitutes the Valletta based, integrated oily wastes reception and recycling facility in Malta providing collection services (from land based and marine sources). For the last 8 years, the company is the major undertaking in the country to collect, store and recover waste oils including dirty ballast, tank washings and oily residues from the machinery spaces of ships.

The waste oils collection system of the company, is based on both navigational and road mobile means (among them, 4 barges the storage capacity of which varies between 400 – 1.100 cub. meters are included). Waste oils from shipping sources are received following strict sampling and checking for contaminants not compatible with the treatment process. The waste oil treatment process flow, consists of an API, compact, inclined plates separator (350 m^3/hour) the function of which is enabled by the use of chemical demulsifying agents injected through a dose metering diaphragm pump. Afterwards, heating and dewatering takes place in the 20.000 cub. meters storage tanks. The achievable oil level in the water effluent prior its discharge at sea was claimed to be 5 ppm. Recovered oil after its blending with other virgin oils to obtain the necessary quality and properties, becomes a commercial product as fuel oil and it's important that the company by controlling its collection scheme, it has been succeeding to produce a commercial fuel oil.

C2. Existing receptions facilities for garbage

It is a routine procedure for most of the terminals and the ports of Valletta and Marsaxlokk that upon request from any interested incoming ships and the subsequent involvement of ships' agents, that private contractors to be called to collect, transport and dispose of, domestic like garbage and non – hazardous wastes.
Garbage collected is predominantly disposed of at the designated landfill in Maghtab under controlled operations. However, following the adoption and implementation of the Waste Management Strategy, the forthcoming changes in the entire system of municipal waste collection, the establishment of facilities for the interim storage of certain hazardous wastes, the development of new landfilling sites for non-hazardous wastes and also the development of technical specifications for the mechanical equipment, means and practices used for collecting, transporting and disposing of solid wastes will be also reflected in the collection of ship-generated wastes.

Terminal	**Type of Facility**			**Oily wastes received from the facility**												**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Tank Cleaning Facility Malta Drydocks	4			12.000	400	12.000	400	No	No	No		12.000	400	12.000	400	No chemical contaminated slops are accepted

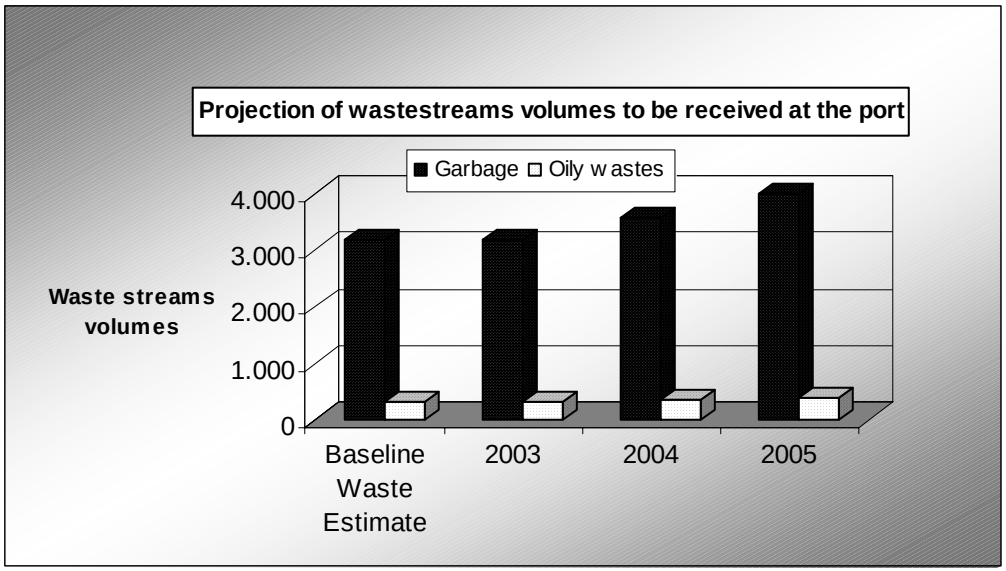
Facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
Malta Drydocks Joe Meli P.O. Box 581 Valleta CMR 01 Tel: 00356 23 993 999 Fax: 00356 21 800 021	Up to 300.000 t.dw ships (maximum permissible draught 10 meters) can be accommodated to the facility where pumping of oily wastes through ½ 10″ hoses connected to 18″ pipeline is carried out to the inshore tanks.	Mechanical type through settling tanks and separators achieving 2 – 7 ppm oil content in the water effluent .	Cost depends on quantity delivered	Oil recovered from the whole separation and treatment process can either be burned as boiler fuel or sold provided that a favourable flash point is achieved within the range of fuel oils

Oily wastes collection & treatment Facility	**Type of Facility**			**Oily wastes received from the facility**												**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Waste Oils Co.	4	4	4	1.100		1.100		No	No	Yes		1.100		1.100		

Facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
Waste Oils Co. Joseph Falzon Falzon House, Dr. Zammit Str., Birkirkara, Valleta CMR 01 Tel: 00356 2149 1026 Fax: 00356 2144 6508	*Collection means* 4 barges 4 – 1.1000 cub. meters reception capacity A fleet of road tankers for wastes uptake from ships when quayside Total land-based storage capacity 20.000 cub. meters	Mechanical treatment at 350 m^3/hour, thermal, enhanced dewatering, able to achieve less than 5 ppm water based effluent	Cost depends on quantity delivered	Oil recovered from the whole separation and treatment process can be blended to become a commercial fuel oil

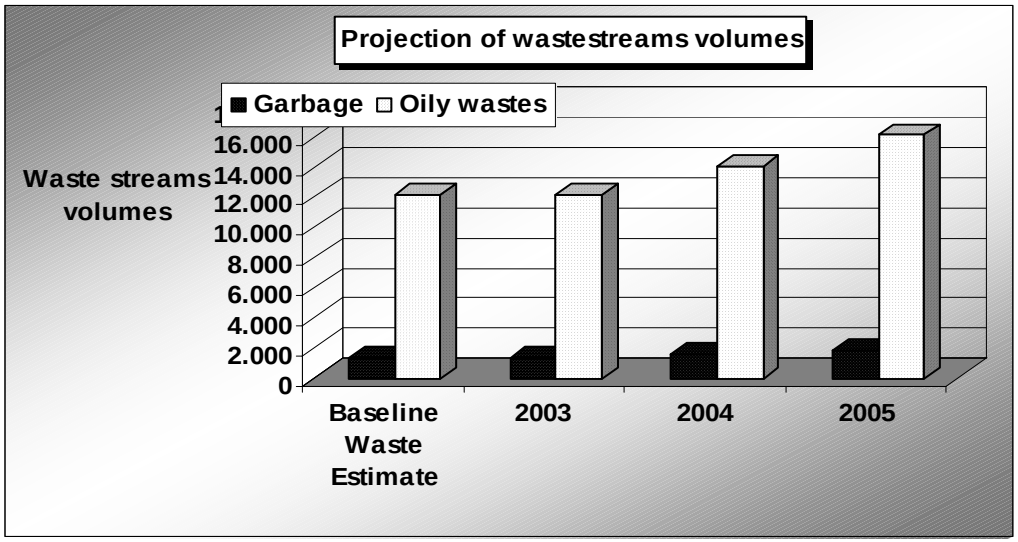
Terminal : Cruise Terminal (Port of Valleta)
Country: Malta

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste (tons)	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.4	0.4	Reduced weekly volume (m^3/week)	60.7	0.47	-	61.1
Average annual volume (m^3/year)	-	-	167.7	153.3	Average annual volume (m^3/year)	3,156.4	24.4	-	3,180
Maximum volume per ship/arrival (m^3)	-	-	5.0	7.5	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				6.0



Port : Valletta
Country: Malta

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste (tons)	Total volume of garbage
Reduced daily volume (m^3/day)	-	19.7	8.5	5.3	Reduced weekly volume (m^3/week)	18.0	6.6	1.8	26.4
Average annual volume (m^3/year)	-	7,106	3,120.0	1,950.0	Average annual volume (m^3/year)	936.0	343.2	94.6	1,373.8
Maximum volume per ship/arrival (m^3)	-	120.0	25.0	16.0	Maximum volume per ship/arrival (m^3) (only domestic and maintenance)				3.5



- **Assessment of the available provision of reception facilities & Recommendations**

Taking into account the available collection, treatment and storage capacity provided currently from the Tank Cleaning Facility and the Waste Oils Co., the anticipated for delivery, annual volume of about 57.000 cub. meters of tank washings, occasionally dirty ballast, sludge, bilge oil water and other waste oils can be absorbed without difficulty. Due to the limited distances among the ports' areas and the limited also steaming time for the navigable means to serve ships at anchor or quayside, the whole collection is consistent with the needs of ships and effective. The existing charging system was not able to be assessed in the absence of information.

The implementation of the 2000/59/EC Directive on port reception facilities will not bring any drastic problems in the actual, physical collection operations, since the technical standards are satisfactory, the conditions controllable and the supervision from the responsible authorities effective.

In respect of the waste oils as defined in the Waste Oils Management regulations, it is true that this kind of oils consisting of used and exhausted lubricating oils, hydraulic and transmission oils etc., represent a minor contributor to the volume of marine related oily wastes. From this point of view, the existing treatment of collected oily wastes from ships, at the Waste Oils facility is a preferred option according to the 75/439/EEC Directive on Waste Oils since regeneration through re-refining or other technology of any separated, waste oils from ships in the ports of Malta would not be a viable option.

The management of wastes and effluents produced from ship-repairing activities in Malta Drydocks and other workshops in the port of Valletta, can not be dealt with, efficiently in the framework of the Activity A of the project. Invariably, such activities are likely to release industrial liquid wastes other than ship-generated, including surface runoff, used sand blasting grit and other contaminants, the potential hazardous nature of which along, with the relatively larger volume, could make the collection and treatment process more demanding and the final disposal problematic.

It will be crucial for Malta Drydocks and the private sector in general, to be provided with all necessary guidance to identify the requirements stemming from the implementation of the E.C. Directives dealing with the management of hazardous wastes, the incineration and landfilling of hazardous waste, their transboundary transport, etc.

Experience from Greece and other European countries, has shown that the Ports' Waste Handling and Management Plans can be extended in scope to incorporate wastes produced from ship-building and ship-repairing activities, with the aim to identify technically and environmentally sound options for waste recycling and valorisation and also practices to ensure the safety and health of the personnel.

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- **Introduction**

Maritime transport plays an important role to the economy of the country and the contribution of its ports and terminals to the overall maritime transport in the Mediterranean Sea Area (as formed by the 10 countries of this project as well as Jordan) accounts for about 11%. Morocco's maritime traffic is dominated at its 55 % from the carriage and handling of dry bulk cargoes (mostly fertilizers, cereals, crude and processed minerals) while 28 % is related to liquid bulk cargoes (generally petroleum products and chemicals). The two Mediterranean ports of Tangier and Nador, out of the 8 major ports of the country, were involved in the project. In terms of the cargo handled, the ports of the country have been presenting an average 5.29 % annual growth in the 1998 – 2000 period, as shown below:

Total maritime transport of goods
(in thousands tons)

Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	48.212	52.872	53.444	+ 5.29

Quantities of goods loaded and unloaded in the main ports of the country
(in thousands tons)

	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro and other cargoes
Quantity of goods	53.444	29.560	23.884	14.526	28.699	8.721

Crude oil and oil products component $_{(10^3 \text{ tons})}$

Petroleum Products
9.792

Morocco is a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of ship-generated marine pollution from oil and garbage respectively.

In the ports of Nador and Tangier there are no petroleum facilities handling on average more than 1.000 metric tons daily and also major ship-repairing or tank cleaning facilities, as illustrated in the table below:

Ports involved in the project	**Port**		**Oil Terminal**					
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Nador	4							
Tangier	4							

The implementation of the Activity A of the project in Morocco concentrated at the identification of the existing reception facilities for oily wastes produced in the machinery spaces and garbage as well as to the estimation and identification of needs of those ships that normally call at the ports of Nador and Tangier respectively.

A. General Information

- **Port** Tangier
- **Port Authority** Office d'Expoitation des Ports (O.D.E.P.)

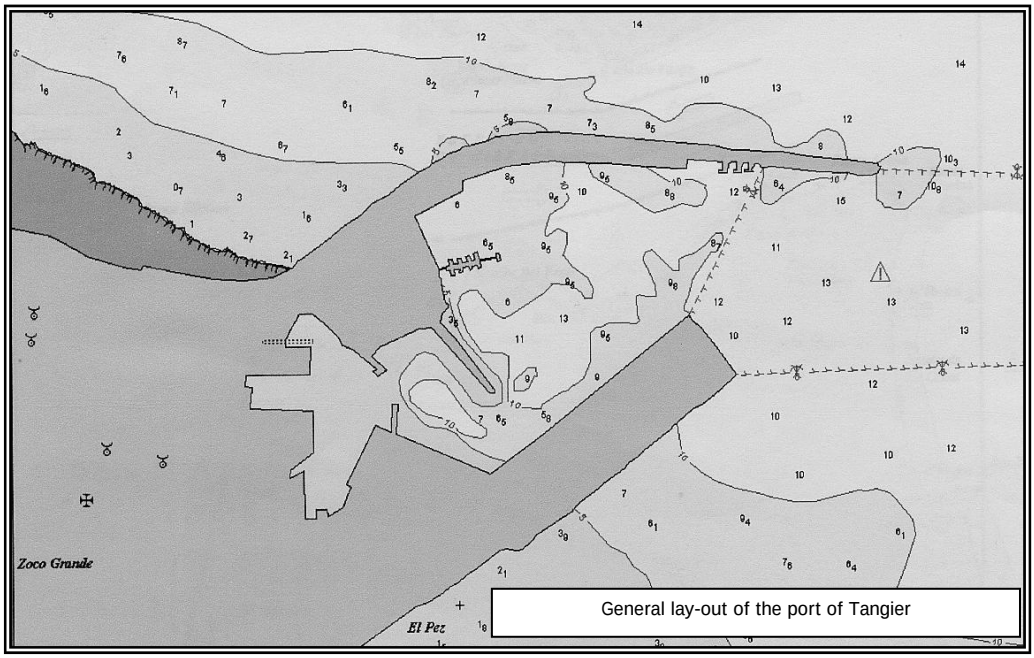
B. Type and operation of the port

Five berths are provided to accommodate, basically, passenger and Ro-Ro passenger ships, cruise ships and other cargo ships. Ships up to 200 meters long can berth at the quays while a special berth is allocated for the car ferry service to Spain and Gibraltar.

In accordance with the national planning, a new port (the Mediterranean Port of Tangier) is planned to be built and operate some 35 kms east of Tangier, designed to become a hub for regional sea transport that will allow a better distribution of cargoes and passengers absorbing also a part of the containers transhipment and other goods movements from the existing port. One of the new roles of the existing port of Tangier is that of a cruise port. Since the new port is expected to operate from 2007 influencing the maritime traffic and the operation of the existing port of Tangier, the scenario used to project waste production and disposal from ships calling at the latter was based at an average annual growth of traffic estimated from the last three years period.

A/A	Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated
					LOA (m)
1	T1	5,5	130	Passenger ships in general	130
2	T2		130		130
3	T3		125		120
4	T4	6,0	140		140
5	T5	9,0	200		200
6	P1	9,0	130	Container ships	133
6	P2	9,0	100	Container and cargo ships	100
6	P3	8,0	100	Cargo ships	100
6	P4	7,5	130	Cargo ships	100
6	Ro-Ro Berth	6,5	150	Ro-Ro Car ships	150

The lay out of the port as well as information related to its operation is provided below:



General lay-out of the port of Tangier

Year	Passenger ships & Ro-Ro Passenger ships			
	Number of ships calling at the port	Average number of persons onboard	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	76	150	8	1
2001	58			
2000	77			

Year	Bulk carriers and general cargo ships			
	Number of ships calling at the port	Average number of crew onboard	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call
2002	61	18	2	5
2001	76			
2000	86			

Year	**Container ships and Ro-Ro carriers**		
	Number of ships calling at the port	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	377	18	2
2001	386		
2000	286		

C. Existing receptions facilities for garbage

There are no facilities available in the port for collecting oily wastes, specifically oil residues and oily bilge water.

Since disposal of garbage from ships is compulsory, collection services are provided in the port by both, the public (Division Infrastructure) and private sector accomplishing a 24 hour basis service at all berths.

No prior notice is required from ships to deliver garbage while segregation and containment from ships personnel is requested as Annex V of MARPOL 73/78 recommends. A separate charge applies that fluctuates depending on the type of the ship, as presented below:

Type of ships	*Charge (DH/day)*
Car Ferries	300
Cargo ships	500
Cruise Ships	1000

A large number of receptacles of various types and capacities are placed quayside enabling the collection of garbage from ships and the subsequent emptying and disposal in the a designated landfill in the proximity of the port area. The total capacity of these garbage receptacles is about 16 cub. meters.

<table>
<tr><td rowspan="2">Port

Tangier</td><td colspan="4">Garbage reception capacity provided in the port (m³s)</td><td>Description of port- based treatment of garbage collected from ships</td><td>Operational restrictions on the use of the facilities</td></tr>
<tr><td>Trucks
(used as reception and transportation means)</td><td>Navigable means
(such as barges used as reception and transportation means</td><td>Receptacles provided at the quayside</td><td>Other reception means</td><td rowspan="2">There is no port based treatment facility or equipment</td><td rowspan="2">Segregation and containment of garbage is recommended from the Port Authority as per MARPOL Annex V essential technical guidance</td></tr>
<tr><td>Used only for collecting garbage from the reception means</td><td></td><td>53 receptacles of various capacities (16 m^3 total capacity)</td><td></td></tr>
<tr><td>Name, Address and other contact details of Operator</td><td colspan="2">Requirements for ships to deliver garbage</td><td>Method of final disposal</td><td>Charging system</td><td colspan="2">Other remarks</td></tr>
<tr><td>Division Infrastructure (Public) and M.I. (private company)</td><td colspan="2">Disposal of garbage is compulsory</td><td>Controlled landfilling</td><td>Charges are compulsory for each day in the port at about 300 – 1000 DH per day.</td><td colspan="2"></td></tr>
</table>

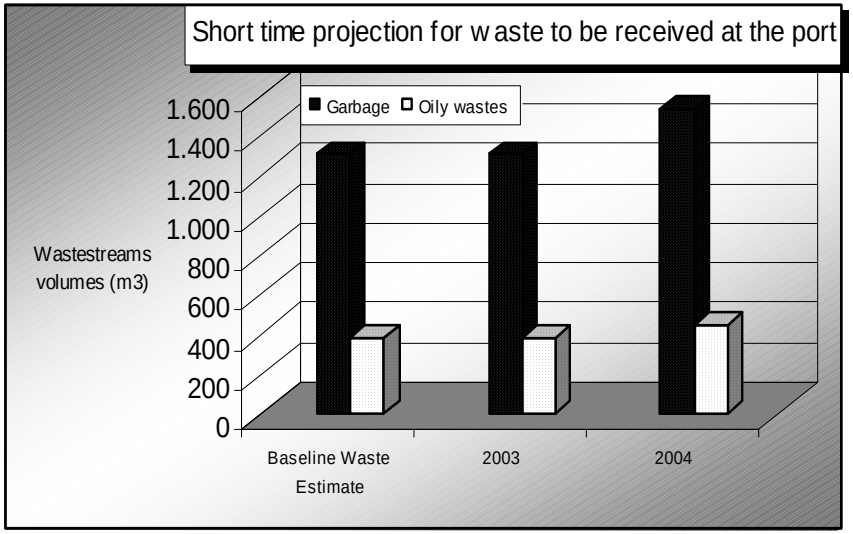
D. Estimations of waste stream volumes

Six ships, all Ro-Ro Passengers ships responded to the request to complete the relevant optional questionnaire providing input to the collection of information from Tangier users. None of these ships intended to deliver oily wastes or garbage at Tangier, appearing to be reasonable due to the dedicated route pattern, most of them were engaged (Algeciras – Tangier) and the option to dispose of, at the last port of call. Holding a reservation for the completeness of one of the collected questionnaires and the interpretation of the data, one of those ships arrived in Tangier with insufficient storage capacity for oily residues (sludge) for the intended next port of call.

All these ships were equipped with oil-water separating and filtering equipment with automatic stopping device and alarm making feasible the discharge at sea of oily bilge water according to MAPROL 73/78, Annex I relevant regulations related with the discharge of oily water mixtures from the machinery spaces of ships at sea.

Port: Tangiers
Country: Morocco

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.27	0.77	Reduced weekly volume (m^3/week)	5.89	1.22	17.8	24.91
Average annual volume (m^3/year)	-	-	98.5	281.5	Average annual volume (m^3/year)	306.28	63.44	925.5	1,295.2
Maximum volume to be received per ship/arrival (m^3)	-	-	13.1	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				1.84



E. Assessment of reception facilities and recommendations

The following table presents the assessment of the existing garbage collection service and associated facilities in the port, in accordance with the methodology developed and presented earlier in this Report. The N/A indicates the absence of information or that it was not relevant or appropriate to assess under this criterion.

Criteria for assessing the adequacy of existing reception facilities	Reception Facilities for garbage from ships	Yes	No	N/A
Ship/port interface				
Spatial and time availability of wastes collection scheme		4		
Availability of sufficient information / Notification procedures			4	
Adequacy of capacity		4		
Reasonable cost of waste collection service		4		
Existence of submitted reports of alleged inadequacy			4	
Existence of serious operational restrictions	Basically, domestic garbage is collected in the port		4	
Environmental considerations				
Environmental sound waste treatment				4
Acceptable waste final disposal according to waste management strategy and requirements		4		
Environmentally sound waste management		4		

Assessment of the provision of reception facilities for garbage

Less than Satisfactory	
Satisfactory	
Adequate	4

The capacity of the receptacles provided in the port in conjunction with the daily collection scheme matches both the recorded needs of ships by the Port Authority and also the estimated waste streams volumes. Since, there is no, at the time being, available hazardous waste treatment and disposal facility in the wider area where the port operates, collection of domestic garbage should be only carried out by recommending the Masters or the representatives of ships to retain onboard any potentially solid hazardous wastes. An efficient reporting and auditing mechanism could enable this procedure while it would be advisable that some level of garbage separation could be provided to maintain hygiene and also to enable any already operational or future recycling projects in the area.

With respect to the oily wastes collection, it is obvious that the estimated volume of oil residues and oily bilge water that could be potentially delivered to the port is very small. There is no need for any land based or other type of reception facility, however it would be advisable that the Port Authority provides a road tanker, preferably a vacuum truck, even with a less than 5

cub. meters capacity able, to collect and transport oily wastes to an approved disposal facility near the port area.

A. General Information

- **Port** Nador
- **Port Authority** Office d'Expoitation des Ports (O.D.E.P.)

B. Type and operation of the port

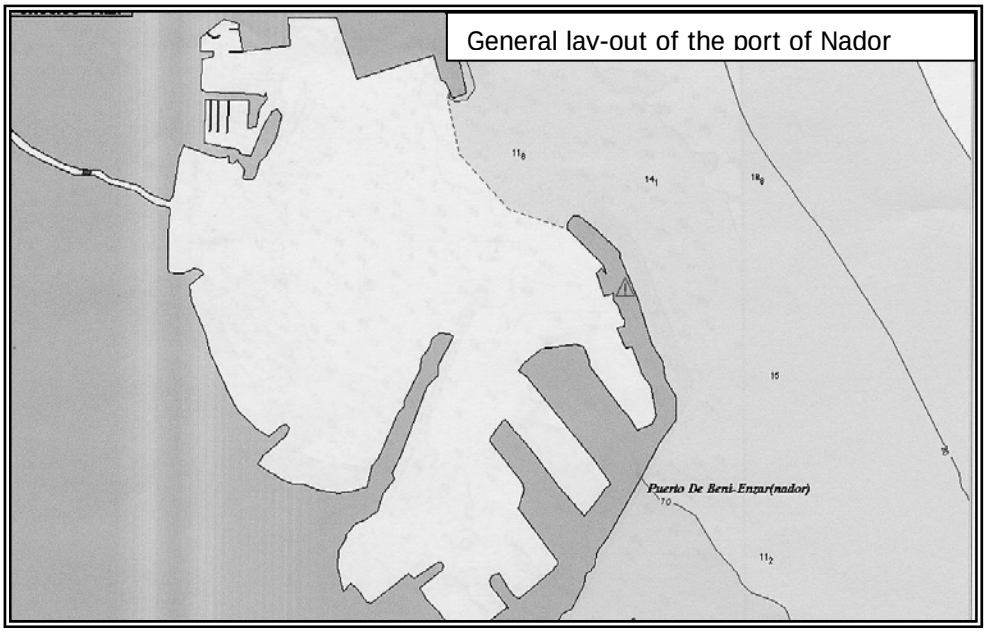
The port of Nador situated at 35° 16' N, 2° 55' E, is a multipurpose port providing commercial berths to accommodate a range of ships types related with the import and transport of ores and baryte minerals as well as of other bulk solid cargoes. The handling of these cargoes, as shown in the next table, dominates the traffic and the overall handling of goods at the port area:

Year	Total number of ship calls	Oil products throughput *(met. Tonnes)*	Bulk liquid products other than oil throughput *(met. Tonnes)*	Solid bulk and general non-containerised cargo throughput *(met. Tonnes)*
2002	2.546	56.820	-	1.022.234
2001	2.302	124.425	3.071	-
2000	2.491	121.336	-	936.165

In parallel, a 170 meters long car ferries quay is provided, a petroleum quay, 200 meters long with safe draught 10.7 meters and a series of other berthing sites, as summarized in the following table:

A/A	**Number of berths**	**Designed/ Actual Depth (m)**	**Berth overall length (m)**	**Type of ships that can be accommodated**	**Maximum size of ships accommodated** LOA (m)
1	2	10,7	320	All kind of ships except tankers and LPG carriers	200
2	2	9.3 - 10,7	320		200
3	2	9,30	400		200
4	2	9,30	200	Bulk carriers	100
5	3	6 - 9,3	185 x 2 100		200
6	2	6,00	200		100 100
7	1	10,70	200		100 100
8	1	10,70	100		100
9	1	6,60	3 x 170	Fishing craft basin	

The lay out of the port as well as information related to its operation is provided below:



General lay-out of the port of Nador

Year	Cruise ships and passenger ships				
	Number of ships calling at the port	Average Size of ships *(grt)*	Total number of passengers	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(hours)* *Algeria-Nador/ Nador-Siete*
2002	1082	12.046	800.125	4	6 – 36
2001	959	20.079	706.802		
2000	1049	20.220	593.439		

Year	Bulk carriers and general cargo ships			
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*	Average duration of ships stay at the port *(days)*	Average duration of voyage from last port of call *(days)*
2002	1.453	10.000	1 - 10	3 – 9
2001	1.340			
2000	1.431			

Year	**Container ships and Ro-Ro carriers**			
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*	Average duration of ships stay at the port *(hours)*	Average duration of voyage from last port of call *(days)*
2002	11	8.900	12	1
2001	3	2.000		
2000	11	2.000		

C1. Existing receptions facilities for oily wastes

In the port of Nador, there are no reception facilities for collecting oily wastes, in particular oily water mixtures and oil residues produced in the machinery spaces of ships that normally call at the port. The Port Authority strongly supported the view in discussions held during the mission in the country, that the port of Nador needs facilities for this type of ship-generated wastes.

C2. Existing receptions facilities for garbage

Collection of garbage in the port is provided by the private sector offering a 24 hour basis service at all berths. No prior notice is required from ships to deliver garbage and segregation and containment of garbage as MARPOL 73/78, Annex V recommends is only required.

No specific information was provided with regard to the means used in practice to receive, store and transport garbage as well as the fees incurred. Disposal of garbage is carried out in a designated landfilling area 25 kms from the area of Nador while a further option of open pit incineration might be provided for suitable types of garbage.

D. Estimations of waste stream volumes

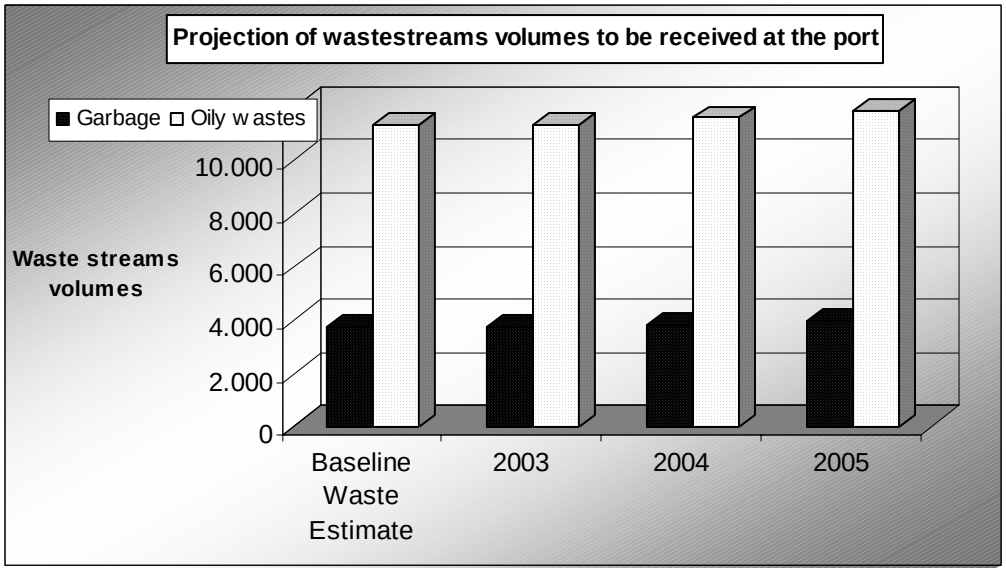
A completed, voluntary questionnaire was collected by a Master of a bulk carrier, 9.700 grt calling to the port following a voyage of 8 days from the port of Burgaz, Bulgaria aimed to discharge a cargo of steel billets.

It should be noted that this cargo ship was equipped with an oil water separating and filtering equipment, provided in addition with three separate tanks for holding sludge, waste and other exhausted oils (0.44 – 6.5 cub. meters storage capacity) apart the holding tanks for bilge oils (95.9 cubic meters).

No need was declared to deliver oily wastes, since the storage capacity (it was estimated that the sludge tank of the ship upon its entry to the port of Nador should have been 30% in full) was sufficient. However, 4.5 cub. meters of garbage including 1 cub. meter of food wastes were retained onboard, could have been delivered at the port although not requested. A 2.3% annual increase of traffic at the port was considered to project the waste streams in the near future.

Port: Nador
Country: Morocco

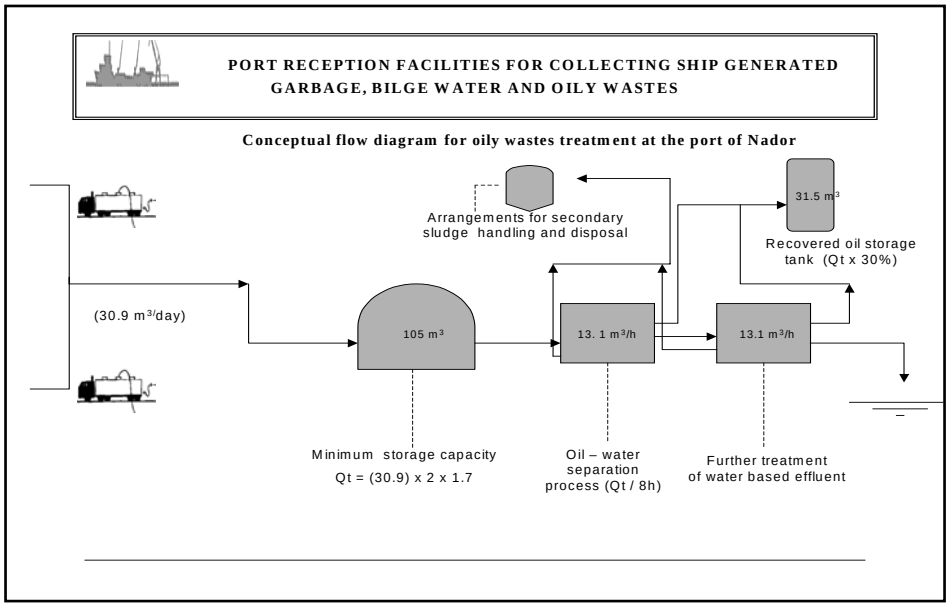
2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	14.4	16.5	Reduced weekly volume (m^3/week)	62.6	7.99	1.9	72.4
Average annual volume (m^3/year)	-	-	5,278	6,040	Average annual volume (m^3/year)	3,255	414.4	98.8	3,768.2
Maximum volume to be received per ship/arrival (m^3)	-	-	30.0	16.6	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5



E. Recommendations for the oily wastes reception in the port

The estimated reduced daily volume of sludge and oily bilge water (more than 30 cub. meters) that could be delivered from ships, leads to the safe conclusion that a reception facility followed by pre-treatment should be established and operate at the port of Nador. The objective of the treatment technology will be to remove oil from water to produce a water based effluent that could be discharged at sea provided that the local, discharge standards and requirements are met while another vital objective would be the recovery of oil for re-use or recycling. Guidance on that should be requested by the Environment Dept. of the Ministry of Territory Planning, Water and Environment which is the agency responsible for the management of hazardous liquid and solid wastes. It should be noted that on average, the oil content of both oil residues and oily bilge water is about 30 %.

In determining the capacity of the reception and collection system, the estimated reduced daily volume should be taken into consideration in relation to the requirement for no undue delay for ships, although the average time spent at port by bulk carriers and other cargo ships is relatively large to enable a satisfactory service. Although a more detailed study is always advised to identify the proper collection scheme for the port, it can be recommended that the provision of at least three road tankers (the specifications of which should meet the national and local requirements for land – based transport of waste oils) of 15 cub. meters capacity each, is considered as a sufficient solution for collection purposes from each nominal berth of the port. Alternatively, a 150 – 200 tdw barge, suitable for collecting and storing oil residues and oily mixtures in general could be employed for the same purpose.



A conceptual flow diagram of the recommended port based collection and pre-treatment system in the port is presented above.

SYRIA

SYRIA

- Introduction

The contribution of ports and terminals of the country to the overall maritime transport of goods in the Mediterranean Sea area by the countries involved in the project (including Jordan) is about 6%, and its ports have been presenting a 2.39% average annual growth in the last years period. Crude oil and other petroleum products represent an important share of cargoes carried by sea, and the volume of cargo loaded at the ports and terminals of Syria is 2.4 times greater than the volume discharged respectively. In accordance with the MED-TRANS data base, Banias is ranked as the 9th most important port in the Mediterranean in terms of the volume of cargo handled in 2000.

The general maritime transport at the ports of the country is outlined below:

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	27.622	28.846	28.959	+ 2.39

Quantities of goods loaded and unloaded in the main ports of the country *(in thousands tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro & other cargoes
Quantity of goods	28.959	8.521	20.438	21.190	3.917	3.852

At all three ports of the country involved in the project, there are oil terminals, however only the terminals at Banias and Tartous are in operational condition while this one at Lattakia is inactive at the time being.

The type of the ports in relation to the existence of crude or refined petroleum products terminals is presented below:

Ports & Terminals involved in the project	**Port**		**Oil Terminal**					
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Banias			4		4	4		
Tartous	4		4					
Lattakia	4							

Syria is a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of ship-generated marine pollution from oil and garbage respectively.

The Ministry of State for Environment is basically responsible for developing environmental policy, monitoring the implementation of environmental legislation and also for the inter-sectoral coordination. The General Directorate of Ports is responsible for planning and controlling the waste management in the country's ports and terminals. At the time being, a waste management strategy specific for ship-generated sources does not exist, but an integrated strategy along with other environmental issues has been adopted in the form of an Environment Law (Law 50) which has not yet entered into force.

Five different types of organizations have been identified, namely the Ports General Companies, the General Directorate of Ports, the City Councils, the Harbour Masters and the Terminal Operators sharing responsibility for the control of ship-generated wastes. There is no clear determination of the duties of each of the above organizations. In general terms, all except the General Directorate of Ports are dealing with the practical issues of ship-generated waste management, thus having a more practical role, whereas the General Directorate of Ports has a more supervisory role.

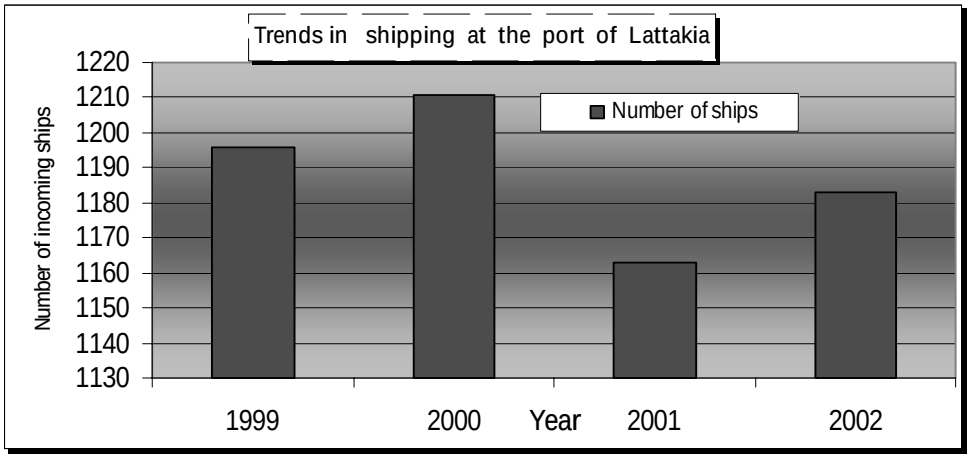
A. General Information
– **Port** Lattakia
– **Port Authority** Lattakia General Port Co.

B. Type and operation of the port

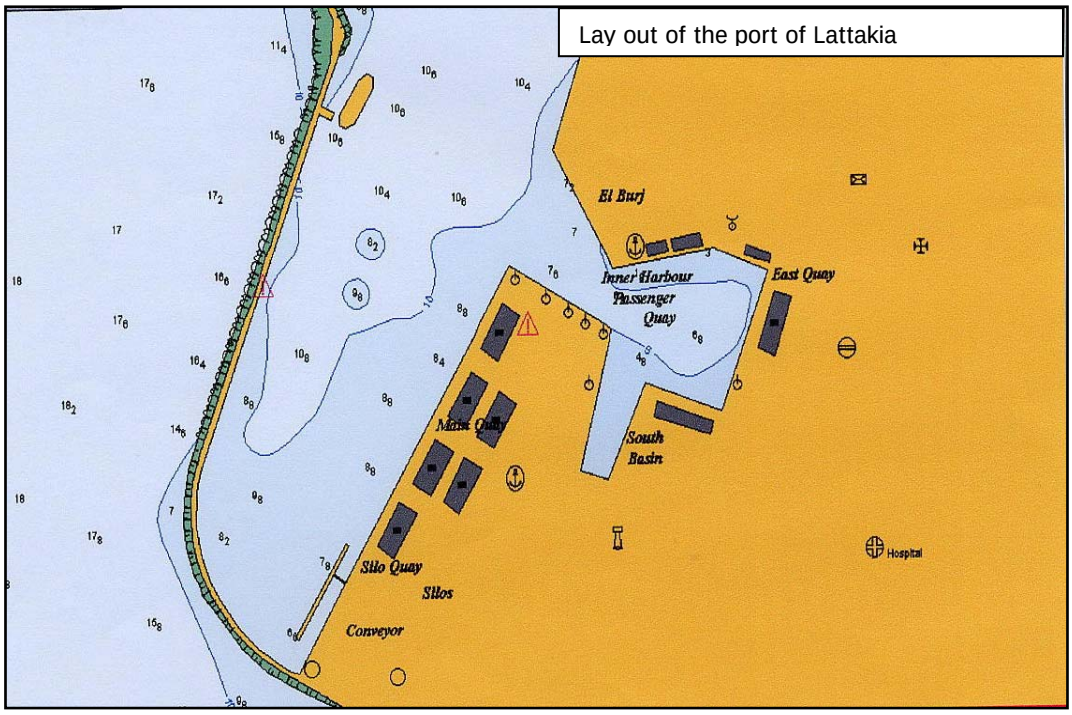
The port of Lattakia is located at 35° 45' E and 35° 31' N providing a 4.280 meters long, complex of quays while the draught of its marine basin varies between 7 to 13 meters. The port constitutes an artificial harbour enclosed by a breakwater 3.162 meters long (planned to be extended by 600 meters) consisting of an inner and an outer basin.

Berths	Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Khahaleh Quay	9.5	600	Basically, general cargo ships
Silo Quay	8.5	185	Loading and discharge of grain is mainly carried out
Passenger Quay	7.5	240	Passenger and cruise ships are accommodated
New Quays	9.8 – 12.30	1675	Container ships and other general cargo ships as well as support and auxiliary service vessels

The three mooring buoys allocated for oil tankers up to 183 meters LOA and 10.7 meters draught as well as the land based facilities and infrastructure have been inactive, thus there is no petroleum related operation at the port. On average, 1.185 ships call at the port every year engaged in the handling of more than 3 million tons of cargoes. The Lattakia General Port Company is currently studying plans for several future port expansions such as the dredging of the inner basin, the construction of a northern breakwater, a new 65.000 tons silo, etc. The following diagram presents the fluctuation of the number of ships that entered the port in the last 4 years period.



A general lay out of the port of Lattakia is shown below:



Lay out of the port of Lattakia

C1. Existing receptions facilities for oily wastes

In the port of Lattakia there are no fixed reception facilities for collecting oily wastes from ships. Since there are no longer petroleum operations at the port, the only needs of ships to deliver oily wastes are related with those originated from their machinery spaces. Only limited quantities of oily bilge water and oily residues can be received by a 8 cub. meters capacity road tanker currently providing the collection service at 20 $ US per ton of waste oil.

C2. Existing receptions facilities for garbage

Collection of garbage is provided by the Lattakia General Port Co. by means of trucks and a limited number of quayside placed receptacles through which collected garbage is transported to the local designated landfill 15 kms far from the port. It was not possible to collect information on the fees paid by ships interested to deliver garbage. On average, only a small portion of ships request and deliver garbage (3% of the total). The average volume of garbage collected annually is about 200 tons.

D. Estimations of wastes to be received at the port from incoming ships

Estimations of the two basic wastestreams (oily wastes from the machinery spaces of ships and garbage) reflect the current operational conditions of the port taking into consideration average parameters (annual number of ships, etc.). The average annual fluctuation of maritime traffic shows a 2.2% reduction which means in practice that the volumes of wastestreams would be reduced accordingly, therefore it was not intended to project them in the near future.

Port / Terminal: Lattakia
Country: Syria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily Wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	5.4	4.0	Reduced weekly volume (m^3/week)	13.6	5.0	3.0	21.6
Average annual volume (m^3/year)	-	-	1,971	1,460	Average annual volume (m^3/year)	707.2	260.0	156.0	1,123.2
Maximum volume to be received per ship/arrival (m^3)	-	-	15.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0

E. Recommendations for the oily wastes and garbage reception in the port

The existing garbage and oily wastes collection service provided by the Lattakia General Port Company is sufficient in terms of its capacity to cope with the current volumes landed normally by ships.

Taking into account, that at the time being, the country has no hazardous waste treatment or disposal facility, the reception and management of domestic garbage from ships as carried out is similar with the municipal solid waste collection and management in the country. It should be noted that the provision of garbage collection in the port of Lattakia is vital for the prevention of marine and in particular of the coastal pollution from ships, since the country's coastal zone is relatively small (about 180 kms corresponding to 2 % of the national territory but supporting more than 12 % of the population) and therefore sensitive in terms of its environmental and economic value.

The proximity of the final disposal site serves the current practice of collecting, unloading and returning to the primary task of receiving garbage from ships. There is no need for any port based treatment facility or transfer station to increase the collection efficiency.

In respect of oily wastes' collection, it's recommended that a monitoring and auditing system should be established to ensure that oily wastes are collected and disposed of without causing unavoidable damage to human health and the environment. Since there is no any central treatment facility for oily wastes in the country, their disposal and potentially their re-use for combustion purposes should be seen from the perspective of the future operation of such a facility in Banias as recommended in the respective part of the Report for the Activity C of this project.

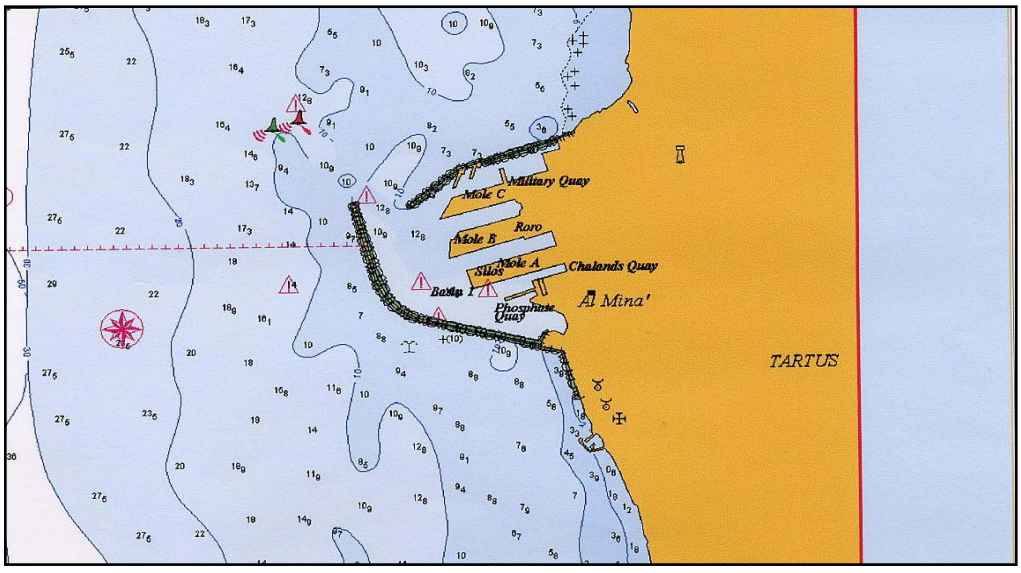
A. General Information

- **Port** Tartous
- **Port Authority** Tartous General Port Co.

B. Type and operation of the port

The port of Tartous constitutes a multipurpose port protected by a main breakwater 2.650 meters long and a secondary 1.620 meters long forming an access entrance 14.5 meters deep and 200 meters wide. The berthing capacity and a general layout of the port are provided below:

Berths	Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Pier A N and S Quays W Quay	 4 – 12 10.5	 930 160	Storing and handling of general cargo as well as of grains
Pier B N and S Quays	4 - 13	1430	Containers and Ro-Ro facilities
Pier C	4 - 13	1378	Berths normally accommodate Ro – Ro ships, barges, and grain carriers



C. Existing receptions facilities for oily wastes and garbage

There are no fixed facilities available for the reception of oily wastes and garbage from ships. A non systematic and limited oily wastes and garbage collection service is only available.

Port : Tartous
Country: Syria

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	9.4	4.7	Reduced weekly volume (m^3/week)	11.2	3.4	1.3	15.9
Average annual volume (m^3/year)	-	-	3,444	1,715	Average annual volume (m^3/year)	583.2	178.2	67.6	829.0
Maximum volume to be received per ship/arrival (m^3)	-	-	25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				3.5

Estimations of garbage volume include also those produced by oil tankers calling at the Tartous Oil Terminal. It was not possible to project the above estimated volumes of the two basic wastestreams in the near future, due to data unavailability.

E. Recommendations for the oily wastes and garbage reception in the port

The establishment of a fixed reception and treatment facility for oily wastes in Banias, as recommended in the respective part of the Report for the Activity C of this project, could enable the controlled and cost effective disposal of oily wastes collected currently and in the future at the port of Tartous.

The minimum required collection capacity should not be less than 35 cub. meters in the form, favourably of road tankers or small navigable means. Since the estimated, reduced daily volume is not more than 15 cub. meters, there is no need, at the time being, for the establishment and operation of a fixed facility. A monitoring and auditing system is also recommended to ensure that oily wastes collected and disposed from properly authorized operators without causing unavoidable damage to human health and the environment.

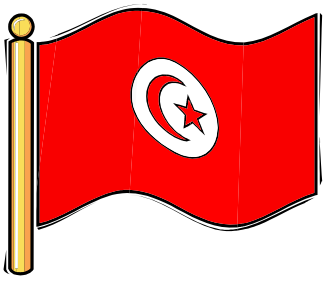
In general with respect to garbage collection, it should be ensured by the responsible country's organizations that:

- Any private company engaged in garbage collection to be subject to prior authorization. In the absence of any applicable standards or specifications for the equipment and means used for the reception and transportation of either garbage or oily wastes, they should be required to take all necessary measures to prevent negative effects on the environment during the whole wastes management.

- Garbage collected from ships is checked to verify that it's non – hazardous or at least present a trivial risk to the environment or health during the whole management process from reception to final disposal.

- Garbage is disposed of as closely as possible to the port from which is collected and at designated, authorized disposal sites.

TUNISIA



TUNISIA

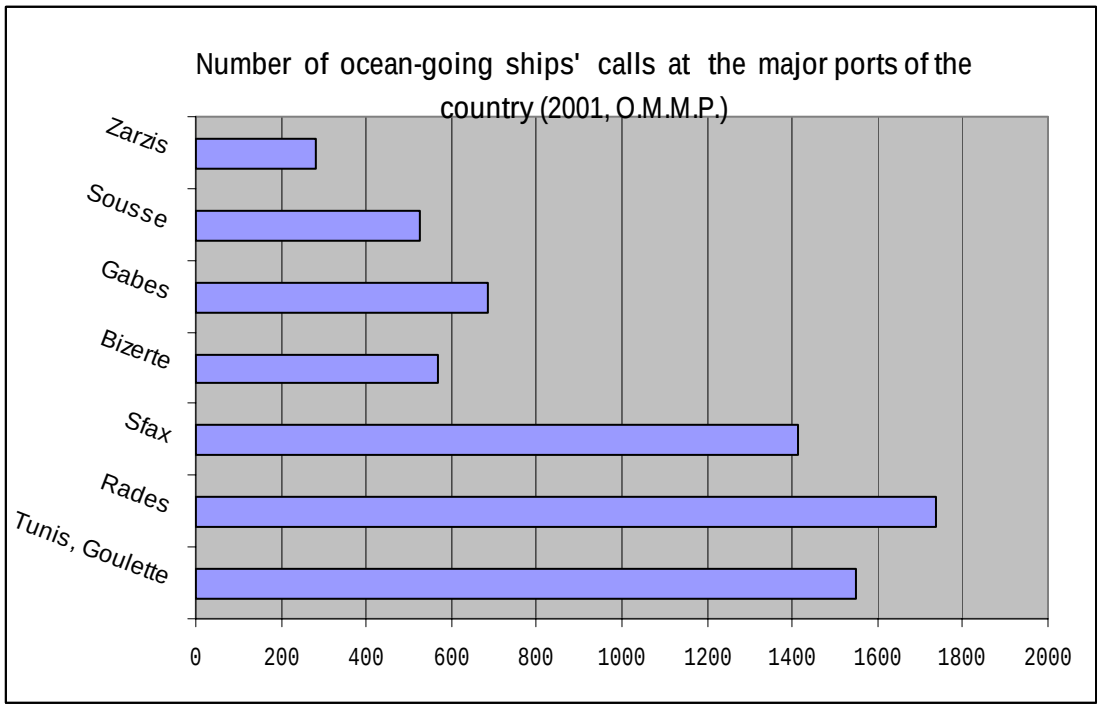
- Introduction

Maritime transport has been contributing significantly to the external trade and the economic development of Tunisia accounting for about 5.5% of the overall, maritime transport of goods at the ports and terminals of the countries involved in the project.

The average, annual growth of about 5% (achieved during the 1998 – 2000 period), as illustrated below, simply demonstrates the potential for further port productivity and increase of traffic flows in the future.

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	23.567	25.331	26.104	+ 5.24

Quantities of goods loaded and unloaded in the main ports of the country *(in thousands tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro & other cargoes
Quantity of goods	26.104	14.895	11.209	12.490	5.737	7.877



The ports and terminals of the country that are involved in the project are provided below according to their nature of operation, from which those of Sfax, Sousse, Bizerte and Menzel Bourguiba, La Goulette and Rades complex, and Zarzis are discussed here (Activity A of the project).

Ports & Terminals	**Port**	**Oil Terminal**					
		Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
La Skhira Oil Terminal		4			4		
Sfax	4						
Sousse	4						
La Goulette and Rades port complex	4						
Bizerte and Menzel Bourguiba	4	4		4	4		
Gabes	4						
Zarzis	4			4	4		

Tunisia is a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of ship-generated marine pollution from oil and garbage respectively.

The Merchant Marine and Port Authority (Office de la Marine Marchande et des Ports, O.M.M.P.) is the competent port authority charged with the management of ports, port state control, development of ports strategy, spill contingency planning, etc., while the Ministry for the Environment and the Management of Territorial Divisions which has incorporated the National Body for the Protection of the Environment, is basically responsible for developing environmental policy and monitoring the implementation of environmental legislation, etc.

A national system for the collection, transportation and final disposal of garbage applies to all ports of the country under the joint supervision of the

Office de la Marine Marchande et des Ports (O.M.M.P.) and the Ministry for the Environment and the Management of Territorial Divisions, which provide the specifications and obligations of any interested to participate in the collection scheme, private company, the authorization procedures, the establishment of the charging system, etc. Ships calling at the Tunisian ports are obliged to deliver garbage retained onboard unless adequate storage capacity is declared and upon contact with their agents, the licensed companies are subsequently notified to carry out the reception and further management of garbage. A maximum charge of 70 Dinars per ship, equivalent to the physical work provided by the collection trucks for approximately 3 cub. meters of garbage applies.

A very, effective national management system for waste lubricating oils has been extended to almost all the ports of the country. The system has been running for more than 10 years and it is really very satisfactory, particularly due to the technical and operational efficiency of the central treatment plant at the area of Bizerta, operated by SOTULUB with a nominal capacity of 16.000 m^3/year. The collection started in 1981, there are 12 depots scattered in similar points all around Tunisia which serve as temporary storage areas to minimize transportation costs. With regard the waste oils from ships calling to Tunisian ports, there is a possibility to deliver waste oils either in trucks or at special tanks placed in several places pierside.

A. General Information

- **Port** Sfax
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.)

B. Type and operation of the port

The port of Sfax is situated on the east coast of Tunisia at the northern side of the wide Gulf of Gabes, about 80 kms north of La Skhira. The port is operated by O.M.M.P. representing a major, commercial port that provides berths for a diversified range of ships such as Ro-Ro ships, container and cruise ships, general cargo ships, vegetable oil tankers, naval ships, etc.

The 42 ha main basin of the port, hosts almost all the commercial operation providing about 1.600 meters quays for the handling of phosphates, salt in bulk, sulphur, general cargo, containers, etc. while two, other, smaller basins are used for fishing and pleasure boats. The eastern quay of the port that hosted the fuel oil storage tanks of several oil companies is no longer used, since, due to the interference of the movement of road tankers with the commercial character of the port and the nearby urban area, a decision was taken to re-settle the tank farms to the area of La Skhira. The storage tanks' dismantling and demolition process was in progress during the mission to the port. A summary of the port berthing capacity is presented in the following table:

Berths	Depth (m)	Berths' length (m)	Type of ships that can be accommodated and cargo handling
NW Quay (Quay du Commerce)	10,5	520	General cargo ships
NE Quay (phosphates) NE Quay (Quai M'dhilla)	10,5	584 243	Phosphates and sulphur handling
Quay Cotusal	10,5	110	Used for loading salt
Quay NPK and Soufrier Quay extension	10,5	150 220	Used for loading superphosphate and unloading sulphur and coal
Quay Polyvalent	10,5	517	Mainly conventional ships
Basin for small craft	4,5	150	Fishing vessels and pleasure craft
Petroleum Quay	10,5	110	No longer in use

On average 1.250 ships are engaged in cargo discharge and loading operations annually.

C1. Existing receptions facilities for oily wastes

There are no fixed facilities for collecting and treating oily wastes from ships. However, private companies subject to the authorization of the port authority operate to receive oily wastes using their own road tankers with an average capacity of about 20 metric tons. Used or exhausted oils from the machinery spaces of ships can be collected into small portable tanks put alongside the port area by SOTULUB to be transported and disposed of at the installations of the company in Bizerta.

While this procedure appears to be ideal for the reception of this kind of waste oils, it was considered that the estimated volume of oily wastes that could be received at the port, justifies the establishment and operation of a land based treatment facility to facilitate the disposal of oily wastes, other than separated waste oils (oily water mixtures such as bilge oil, sludge, etc.).

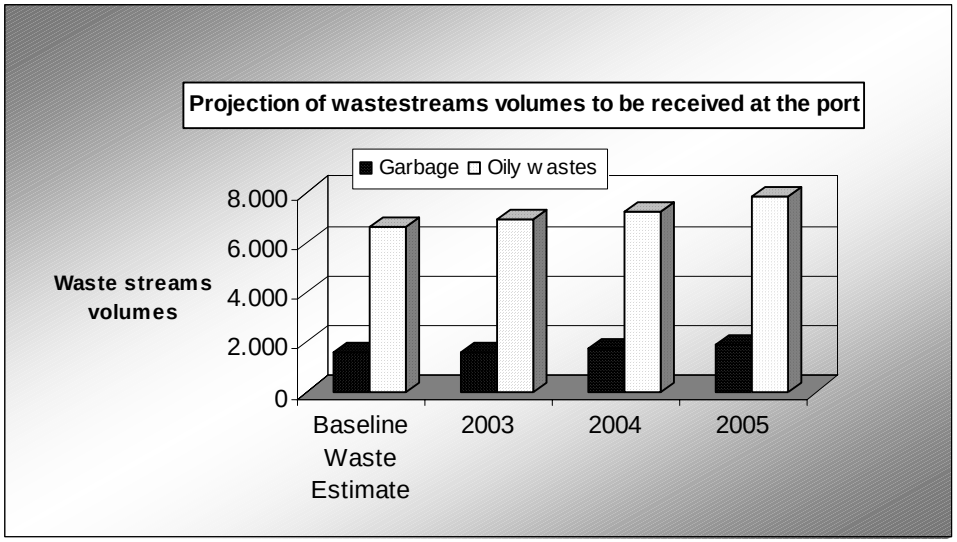
C2. Existing receptions facilities for garbage

As garbage delivery is compulsory, there are currently five local contractors engaged in the collection of garbage from ships who provide collection means and vehicles suitable for the port terrain. There are not any temporary storage areas in the port and garbage collected doesn't need, any prior transfer as it is normally transported directly to the designated landfilling areas.

D. Estimations of wastestreams' volumes & Recommendations

Port: Sfax
Country: Tunisia

2 Estimates of ship-generated oily wastes and residues that could be received at the port/					2 Estimates of ship-generated garbage that could be received at the port/terminal				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	7.4	10.8	Reduced weekly volume (m^3/week)	11.4	4.2	14.8	30.4
Average annual volume (m^3/year)	-	-	2,701	3,942	Average annual volume (m^3/year)	592.8	218.4	769.6	1580,8
Maximum volume to be received per ship/arrival (m^3)	-	-	50.0	24.0	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				6.5

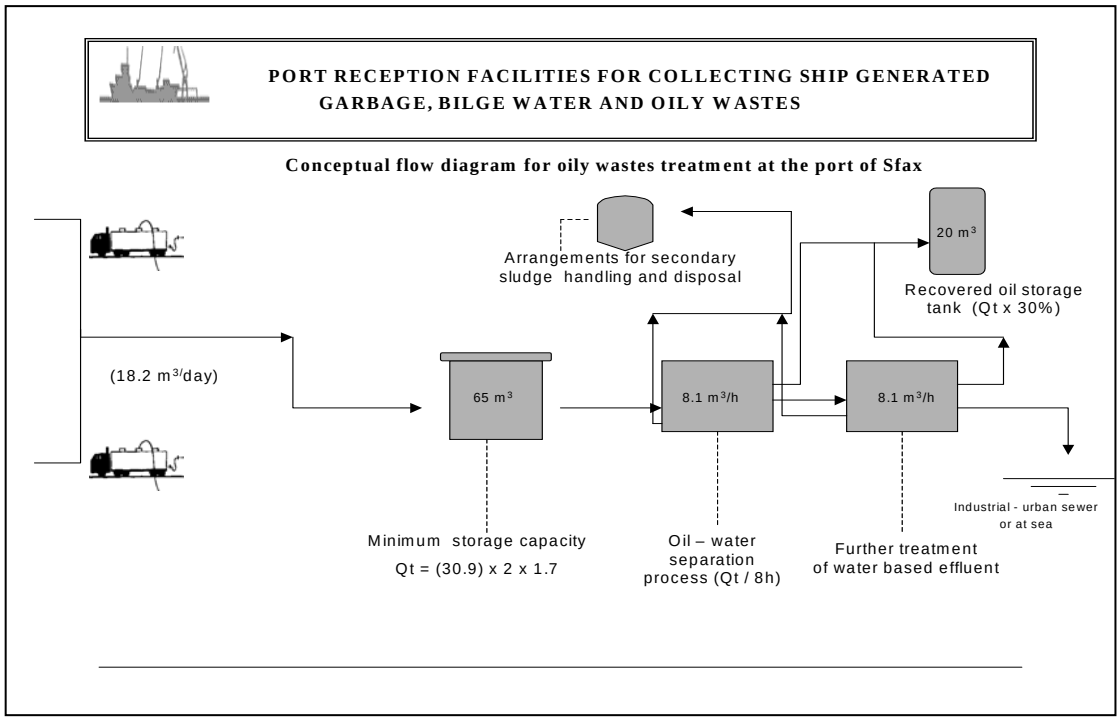


The establishment of a fixed collection and treatment facility for oily wastes in the port of Sfax is recommended for the following two reasons:

1. The estimated, volume of more than 6.500 cub. meters of oily wastes that can be delivered annually along with the daily, batch volume of about 18 cub. meters exceed the threshold that normally determines the feasibility of setting up a port, central collection and treatment system that could be cost effective and technically sound.

2. The existence of the facility either as a pierside application or in the proximity of the port area would ensure that wastes collected by the private companies are directed to the facility, minimizing the need for further transfer to the La Skhira facility and maximizing the collection efficiency.

A conceptual, flow process diagram of the facility at Sfax is illustrated below, in which only, the minimum capacities have been estimated, since detailed data and other information (waste characterization, peak flow determination, other design elements, spill capacity,treatment objectives, etc.) need to be taken into account and co-estimated.

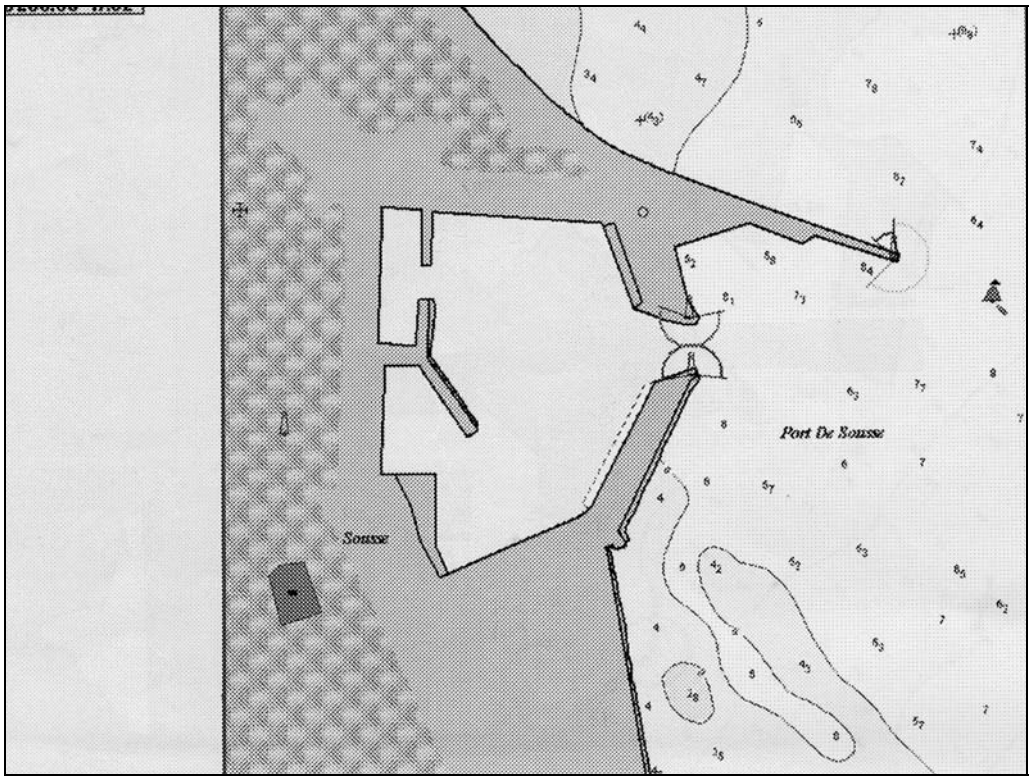


A. General Information

- **Port** Sousse
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.)

B. Type and operation of the port

The port of Sousse consists basically of three basins, the main of which provides seven berths where import mainly of timber, wood pulp, grain and general cargoes and export of olive oil, salt, textiles is normally carried out. The port is protected by the Jetee Nord 670 meters long, the North Pier 185 meters long, and the South pier 340 meters long while the entrance between the pierheads is 65 meters wide.



It should be noted that the discharge of fuel oil that was taking place at the 7th quay situated in the south eastern side of the port, aimed at supplying the nearby power station has stopped two years ago, when the power production process changed to natural gas burning. The only type of tankers calling at the port are edible oil carriers while there are not any barges for bunkering purposes.

Berths	Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Main basin			
Quay 1		125	Used for general cargo ships
Quays 2, 4	8.5	307	Used for general cargo ships and tankers carrying edible oils
Quays 5, 6		175	Used for handling of paper pulp, cement and other general cargoes
Quays 10,11		140	Bitumens handling mainly
Fishing Basin			
3 Quays	1.8 – 4.0	380	Berthing for ocean-going and near coastal voyages fishing vessels and pleasure craft
Yacht Basin			

In 2002, 592 ships called at the port handling 1.500.000 tons of cargo. A limited number of 12 cruise ships also call at the port annually, spending at least half a day in the area before departing.

C. Existing receptions facilities for oily wastes and garbage

Garbage collection is currently carried out by three private companies which also are called to collect any cargo associated waste left on the pierside, assisted by the port operated means (tractors and towed open vehicle containers). The potential existence of hazardous wastes from ships is not able to be identified by the contractors when garbage delivered, and the absence of proper means and practices to collect and manage them was presented as a problem.

There are no fixed facilities for collecting and treating oily wastes from ships. However, private companies subject to the authorization of the port authority operate to receive oily wastes using their own road tankers. Used or exhausted oils from the machinery spaces of ships can be collected into small portable tanks put alongside the port area by SOTULUB to be transported and disposed of at the installations of the company in Bizerta.

D. Estimations of wastestreams' volumes & Recommendations

Port: Sousse
Country: Tunisia

2 Estimates of ship-generated oily wastes and residues that could be received at the port/					2 Estimates of ship-generated garbage that could be received at the port/terminal				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.2	0.7	Reduced weekly volume (m^3/week)	5.8	1.2	17.8	24.9
Average annual volume (m^3/year)	-	-	98.5	281.5	Average annual volume (m^3/year)	306.2	63.4	925.5	1,295.2
Maximum volume to be received per ship/arrival (m^3)	-	-	13.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				1.8

No significant changes are expected to the above presented, estimated volumes for the two distinguished wastestreams. The estimated volumes are quite small and the available capacity provided by the privately operated mobile facilities is sufficient to manage them. As long as the appropriate, final disposal of both ship-generated oily wastes and garbage is monitored and ensured, the whole operation of the facilities at the port of Sousse is satisfactory.

A. General Information

- **Port** La Goulette and Rades Port Complex
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.) La Goulette

B. Type and operation of the port complex

La Goullete and Rades port complex is situated in the south-western corner of the Gulf of Tunis and constitutes the most important port in the country in terms of the maritime traffic (out of the 6.756 ships that approached all Tunisian ports in 2001, more than 3.200 entered this port area). The container terminal of Rades, ranked as the 10th African port as per its handling throughput, (about 200.000 TEUs annually) has been contributing significantly to the increase of containerised traffic in Tunisia.

La Goulette port consists of an inward, 12 meters deep, commercial basin and an outer one which accommodates pleasure craft and fishing vessels. At the south quay of the main basin, bulk cargoes such as iron ore and phosphates are handled while at the north quay, several berths are provided for general cargo and Ro-Ro ships.

Discharge of fuel oil takes place on the petroleum jetty at the south quay to the nearby tanks for power production purposes. A combined cycle power plant in Rades, expected to offer more than 20% of the country's power needs, is provided with fuel oil discharged by the incoming tankers (mainly from the refinery in Bizerta). In addition other oil products are discharged at the same jetty serving the needs of a number of active, oil products' distribution companies.

Quays	Draught (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
La Goulette			
North Quay (7 berths)	9.14	1080	General cargo ships, Ro-Ro ships, passenger ships, etc.
South Quay	9.7	>200	Handling of iron ore, cereals, phosphates, and other solid bulk cargoes
Rades			
Berths 1 - 7	9	1100	Mainly container ships through which import of machinery and manufactured products and export of fruits and other goods takes place

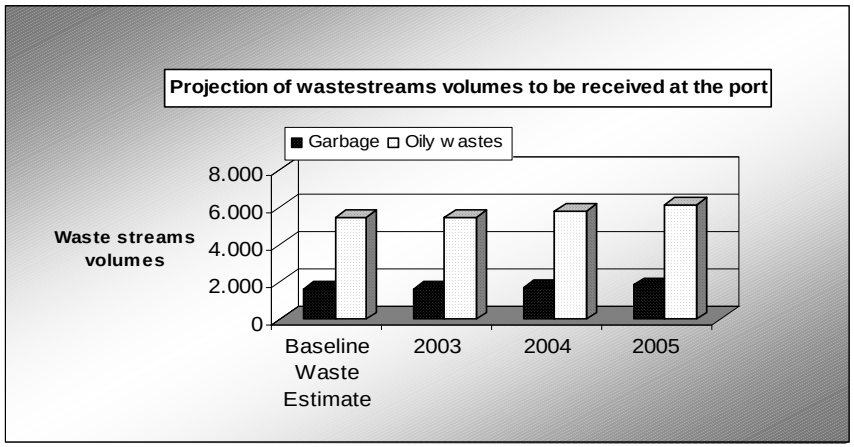
C. Existing receptions facilities for oily wastes and garbage

A similar, privately operated scheme with that one presented previously for the ports of Sousse and Sfax, is engaged in collecting oily wastes and garbage from ships calling at the port complex of La Goulette and Rades.

D. Estimations of wastestreams' volumes & Recommendations

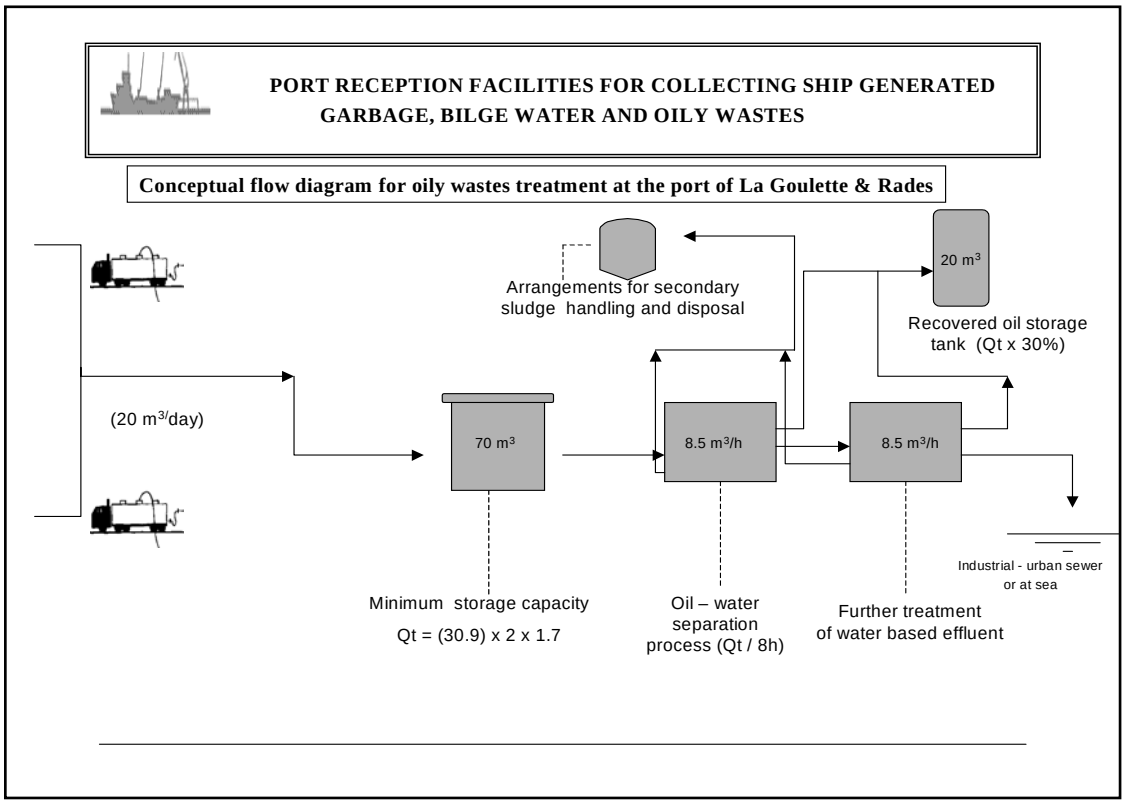
Port: La Goulette and Rades Port Complex
Country: Tunisia

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	8,5	6.3	Reduced weekly volume (m^3/week)	21.5	7.8	1.5	30.8
Average annual volume (m^3/year)	-	-	3,102	2,333	Average annual volume (m^3/year)	1119,9	410.0	82.3	1612,2
Maximum volume to be received per ship/arrival (m^3)	-	-	25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.5



The estimated volume of oily wastes from ships that could be delivered to the port exceeds certainly the figure of 20 cub. meters daily, if, also the needs of the port of Tunis are to be co-estimated, while the annual volume could be respectively more than 6.000 cub. meters. It seems as appropriate, that a port specific reception and treatment facility integrating the already available collection means offered by the private sector, to be established in the area. It is obvious that a significant portion of this volume is already collected towards the re-refining plant of SOTULUB in Bizerta or other permissible final disposal sites. However, a central facility, operating as a collection depot for other than waste oils, mixtures from ships, provided with a treatment capacity able to meet the local effluent discharge standards.

A rough, conceptual flow process diagram is provided below:



A. General Information

- **Port** Gabes
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.) Gabes

B. Type and operation of the port

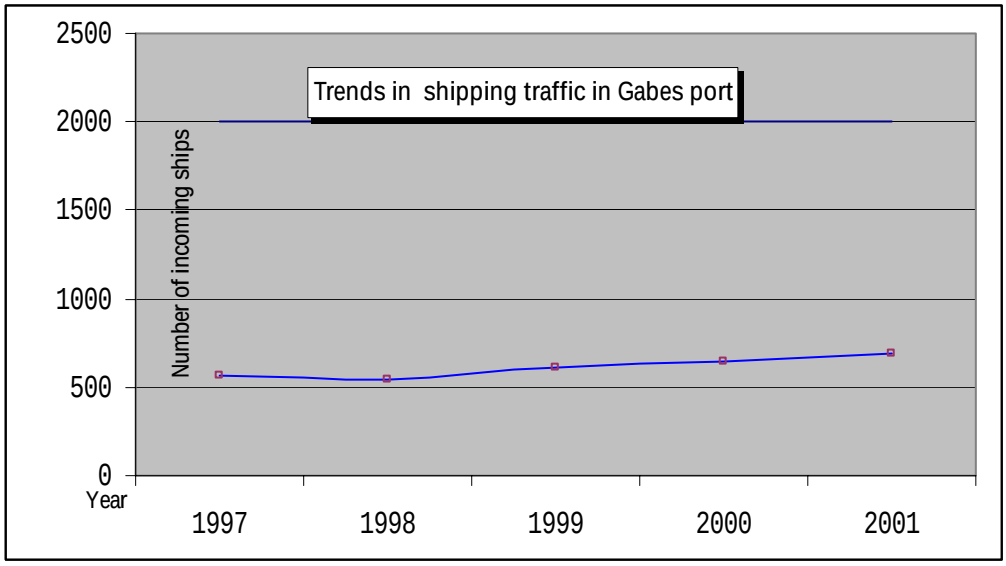
The port of Gabes is accessed through a channel 3.2 kms long and 130 meters wide and serves the industrial area of Gabes by facilitating the import and export of about 4.000.000 tons of products per year.

On average, 650 ships call at the port annually (for the last five years this figure has not changed drastically). The movement of cruise ships is limited while a new project for building and operating an new LPG jetty at the area of the northern quay has been planned. The berthing capacity of the port is summarized below:

Basins/ Quays	Draught (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Outer Basin, Quay and other berths	10.5 – 12.5	1.735	For vessels up to 25.000 t.dw engaged in phosphoric, sulphuric acid and other general cargoes. Berths 4 and 5 suitable for cruise and passenger vessels also Ro-Ro vessels while discharge of liquid substances from chemical tankers takes place at 3, 5, 7, and 8 berths General cargo ships, Ro-Ro ships, passenger ships, etc.
Mineral Quay	11.86		For vessels up to 50.000 t.dw. engaged in loading and discharging ammonia

International traffic dominates the overall traffic pattern of the port with 2.249.000 and 1.692.000 tons of goods imported and exported respectively in 2000, while about 2.252.000 and 1.881.000 tons were imported and exported in 2001.

The traffic of international shipping remains constant in the last few years as shown in the following diagram:



C. Existing receptions facilities for oily wastes and garbage

The collection and management of garbage is carried out by four companies, which also act as ship chandlers in the port. There are no fixed, port installations for the reception and treatment of oily wastes the collection and further management of which is carried out similarly as in the previously mentioned ports of the country.

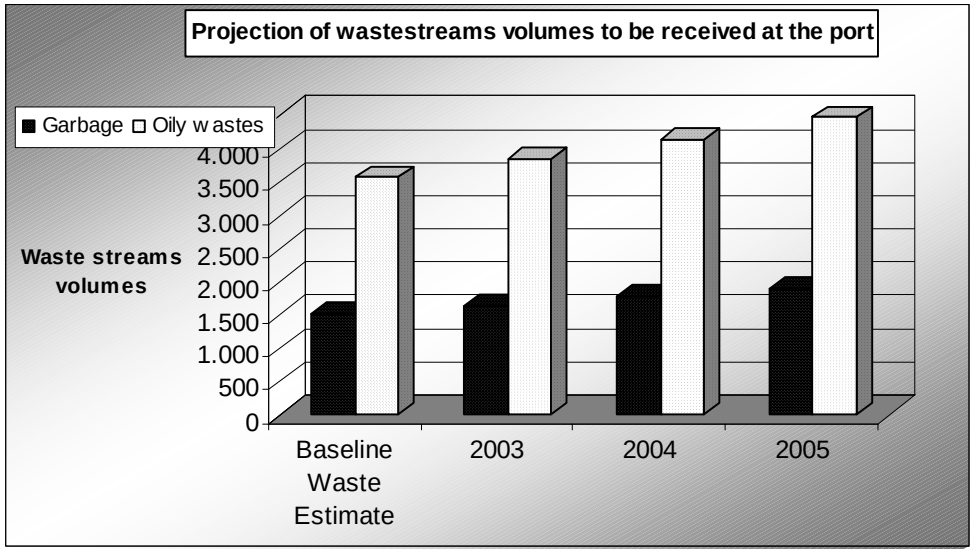
D. Estimations of wastestreams' volumes

The calculation of waste streams was made on the basis that 650 ships call at the port annually. The maximum allowable deadweight that the port can accommodate was used to estimate the BHP and the fuel consumption, while a 10 days time was considered as voyage and berthing duration. An annual increase of the shipping traffic was also considered for the respective short term future estimation of wastes produced onboard the ships that call to the port and they could be delivered to the reception facilities.

The needs of ships that normally call at the port, are sufficiently covered by the engagement of the privately operated facilities, while in addition, the proximity of La Skhira oil terminal with the port of Gabes, ensures the disposal of collected oily wastes to its treatment facility apart from any operational difficulties, the latter practice might have to the facility.

Port / Terminal: Gabes
Country: Tunisia

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	9.8	1.6	Reduced weekly volume (m^3/week)	18.0	5.5	5.8	29.3
Average annual volume (m^3/year)	-	-	3,577	605,0	Average annual volume (m^3/year)	936.0	286.0	304.4	1526,4
Maximum volume to be received per ship/arrival (m^3)	-	-	50.0	27.9	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				3.5



A. General Information

- **Port** Bizerte and Menzel Bourguiba
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.) Bizerte

B. Type and operation of the port

Both these ports are situated near the northernmost area of the country where important oil-related and other commercial activities take place. The terminal of STIR operated petroleum refinery (Societe Tunisienne des Industries de Raffinage) is situated at the eastern side of the Bizerte port consisting of the north quay able to accommodate up to 60.000 t.dw ships (where handling of crude oil, naphtha, gas and fuel oil, etc. takes place with maximum pumping rates 2.000 tons/hour) and the south quay, able to accommodate up to 15.000 t.dw ships (where handling of LPG, kerosene, etc. takes place).

Quays	Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Bizerte			
Avant port Tanker berth A' Tanker berth B'	10.67 8.2	250 150	Oil tankers carrying crude oil, fuel and gas oil, naphtha and other oil products
Bassin Canal Commer. Quay Silo Berth Cement Berth Tunis Acier	8.8 – 9.1 9.75 10.5 9	500 220 180 120	General cargo ships, bulk carriers carrying cement and clinker
Menzel Bourguiba			
South Quay	9.5	150	Handling of ore, coke, steel bars

The Societe Tunisienne de Constructions et de Reparations Mecaniques et Navales (SOCOMENA) operates four drydocks with the following sizes: one at 240 x 35 x 12 meters, two at 190 x 30 x 9 and one at 90 x 15 x 4.5 meters in the port area of Menzel Bourguiba.

C1. Existing receptions facilities for oily wastes

Dirty ballast and other tank areas oil residues produced from oil tankers engaged in the operation of STIR Refinery are received by the reception and treatment plant of the refinery (discussed in the respective section of the Report of Activity C of the project).

Oily wastes from the machinery spaces of ships can be collected and disposed of for re-refining at the installations of the Tunisian Lubricating Oils Company, (SOTULUB), which reprocesses some 14.000 cub. meters of waste oils annually (that originate basically from land-based applications) after having developed and patented an innovative and cost – efficient method for recycling industrial waste oils. 65% of collected waste oils are transferred to two types of base lubricating oils. There are specific criteria for accepting waste oils from ships to be received in the installations of the company. The national-scale collection system includes 12 depots around the country. It is obvious that the estimated, below, volumes of oily wastes can be easily collected and directed for re-refining into the installations of the company.

C2. Existing receptions facilities for garbage

The privately operated scheme - as outlined in all, - previously discussed ports of the country - is engaged in collecting garbage from ships calling at the ports of Bizerte and Menzel Bourguiba.

D. Estimations of wastestreams' volumes & Recommendations

Port: Bizerte – Menzel Bourgouiba
Country: Tunisia

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)			2.3	1.3	Reduced weekly volume (m^3/week)	3.2	1.4	0.5	5.1
Average annual volume (m^3/year)			875.0	486.1	Average annual volume (m^3/year)	166.4	77.0	27.6	271,0
Maximum volume to be received per ship/arrival (m^3)			25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				3.0

Due to almost constant traffic during the last years' period, no significant changes to the above estimated volumes are expected in the future.

A. General Information

- **Port** Zarzis
- **Port Authority** Office of the Merchant Marine and Ports (O.M.M.P.)

B. Type and operation of the port

The port of Zarzis, which is located in the southeast area of the country, was established in 1990 with the primary purpose to serve the onshore and offshore oil exploration and production. Operated by the Office de la Marine Marchande et des Ports (O.M.M.P.) , the port offers a 5.000 m^2 warehouse capacity and a 40 ha onshore area, representing, an oil field supply base, a commercial port, and an export activities centre, providing also a free zone.

Quays/Basins	Draught (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Commercial Quay	10.5	610	Ro-Ro ships, handling of salt and edible oils, berthing for support craft, etc.
Petroleum berth	9.0	175	Oil tankers carrying crude oil and other petroleum refined products

In respect of crude oil and other petroleum products handling, about 178.790 tons of crude oil were exported from the port (more than 70% of the total cargo).

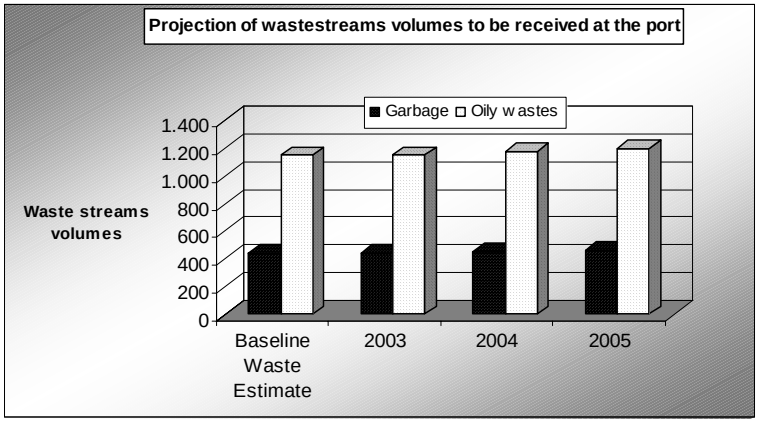
C. Existing receptions facilities for oily wastes and garbage

Arrangements for garbage collection is carried out between the Masters of incoming ships and their agents. The collection of garbage is compulsory in the port, as it equally applies to all Tunisian ports.

D. Estimations of wastestreams' volumes & Recommendations

Port: Zarzis
Country: Tunisia

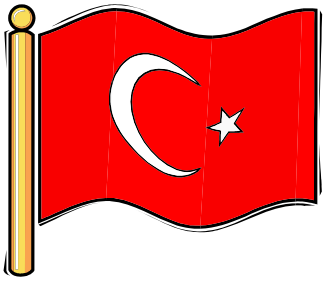
2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)			2.0	1.1	Reduced weekly volume (m^3/week)	4.1	1.2	3.2	8.5
Average annual volume (m^3/year)			743.0	412.5	Average annual volume (m^3/year)	213.8	62.4	169.6	445.8
Maximum volume to be received per ship/arrival (m^3)			25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				3.5



In respect of oily wastes from the machinery spaces of ships (other than those produced in the ballast or tank areas of the limited number of oil tankers that call at the port), the collection and final disposal of them could be integrated in the recommended scheme (see the respective section of the Report of Activity C) for the petroleum type of operation of the Zarzis port.

A minimum number of road tankers with a capacity sufficient to accommodate the maximum, anticipated volumes of wastes (less than 33 cub. meters per ship) is recommended for receiving and providing oily bilge water and sludge to either the suggested floating separator or other central reception and pre-treatment facilities.

TURKEY



TURKEY

- Introduction

The privileged geographic position of Turkey in the Eastern Mediterranean close to traditional and vital searoutes of world significance, in relation to the 8.500 kms of coastline have fostered the growth of the ports' sector and the wider maritime activities of the country.

Turkey's contribution to the maritime transport of the Mediterranean Sea area is almost one third of the overall contribution of all the countries involved in the project. With a turnover of about 150 million tonnes, Turkish ports, according to the statistics compiled from MEDTRANS data base, account for about 30.6 % of the total seaborne trade in the Mediterranean Sea area, followed by Algeria and Morocco. In the combined Mediterranean and Black Sea areas, 17 major ports handling more than 1 million tons of goods annually, operate in the country presenting an remarkable growth in the 1998 – 2000 period.

From the Mediterranean based ports, those of Aliaga, Mersin and Iskenderun are ranked in the first 15 ports in terms of gross weight of goods handled. The total maritime transport of goods from/to the ports of the country is presented below:

Total maritime transport of goods *(in thousands tons)*				
Year	1998	1999	2000	Average Annual Growth (%)
Quantity of goods	121.160	128.938	186.470	+ 25.5

Quantities of goods loaded and unloaded in the main ports of the country *(in thousands tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro & other cargoes
Quantity of goods	186.470	106.933	79.536	89.092	30.701	51.197

The roles and responsibilities of the Prime Ministry Undersecretariat for Maritime Affairs (PUMA), acting as the responsible agency for the development of maritime transport and ports in the country is, among other, to ensure navigational safety and prevention of pollution of the marine environment.

This Agency is divided into 3 General and 7 Regional Directorates as well as 68 Harbour Master Offices along the national coastline.

Apart the ports' privatisation policy for the future, the current management scheme of ports in Turkey includes basically two entities that operate the ports in the country, the T.C.D.D. (Turkish Republic State Railways Management, General Directorate) and the T.D.I. A.S. (Turkish Maritime Organization). However, dedicated oil or other terminals are operated by state owned companies like TUPRAS (Turkish Petroleum Refinery Co.), BOTAS (Pipeline and Transport Co.), T.T.K. (Turkish Hard Coal Management) and T.C.D.I. (Turkish Iron and Steel Work), while there are 76 private ports and marinas.

The ports and terminals involved in the project are presented in the following table, from which those of Izmir, Iskenderun, Nemrut Bay, Dikili, Mersin, Kusadasi, Antalya, Marmaris and Bodrum are discussed here.

Ports involved in the project	**Port**		**Oil Terminal**				
			Crude oil		Oil Products		Fuel oil power plant & other facility
	Commercial Port	Port with major ship - repairing and/or tank cleaning facilities	Loading terminal	Unloading terminal	Loading terminal	Unloading terminal	
Izmir	4						
Iskenderun	4				4	4	
Nemrut Bay	4				4	4	
Dikili	4						
Ceyhan	4		4	4			
Aliaga				4	4	4	
Mersin	4						
Kusadasi	4						
Antalya	4						
Marmaris	4						
Bodrum	4						

A. General Information

Port Iskenderun

Port Operator TCDD Liman Isletmesi Mudurlugu, Iskenderun

B. Type and operation of the port

The T.C.D.D. operated port of Iskenderun is situated within the wide Iskenderun Bay which is currently hosting a number of port terminals and facilities which due to their geographical proximity represent together a major gateway area to the Middle East region. The Port of Iskenderun constitutes a multi purpose port with a considerable port area of about 750.000 sq. meters, 1.600 meters long quays, able to accommodate up to 12 meters draught ships. Its berthing capacity is summarized below:

Berths	Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Berths 1 – 5	8 – 13	1.345	A number of different operators are engaged predominantly in bar,scrap iron and coal handling as well as fertilizers and other general cargoes
Quays 1 – 4 and other dedicated berths	8.5 - 11	275	A number of berths are provided for phosphoric acids, bitumens, gasoline and other products handling

C1. Existing reception & treatment facilities for oily wastes

The fixed reception and treatment facility for oily wastes has been established in 1984 enabling the provision of collection service to any interested ship. In practice there is no volume restriction for the reception of mainly oily bilge water and oily residues from ships, currently collected by a 13 tons capacity road tanker for subsequent storage and treatment at the fixed facility.

The latter consists of a 98 met. tons tank serving as temporary storage and initial settling/separation tank, a conventional oily water separator enable to treat and discharge separated water with an oil level less than 15 ppm and also two tanks for storing recovered oil of 30 tons, total capacity. Ships wishing to deliver oily wastes are charged $ US 45 for each 1.000 gross tons tonnage.

C2. Existing reception facilities for garbage

Collection of garbage is arranged similarly by the Port Authority. Ship-generated garbage is collected favourably within working hours without any prior notice from ships to be required. The cost of garbage collection service is $ US 30 for each 1.000 gross tons tonnage. The local municipality provides the trucks for the reception of garbage, which are finally disposed of at the local, designated landfill.

PORT RECEPTION FACILITIES FOR COLLECTING SHIP-GENERATED GARBAGE, BILGE WATERS AND OILY WASTES

Activity A – Collection and treatment of solid and oily wastes from ships

Port	**Type of Facility**			**Oily wastes received from the facility**												Operational restrictions on the use of the facility
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Iskendeun Port	4	4		No need		No need						100	10	100	10	

Reception Facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
T.C.D.D. operated reception and treatment facility	A road tanker of 13 tons capacity is currently collecting oily wastes for final storage and treatment at a land based facility.	Mechanical (settling tanks/ conv. separator) type in a 98 tons tank.	$ US 45 per each 1.000 gross tons of tonnage	Effluent water free of oil (oil level around 15 ppm) is finally discharged at sea.

D. Estimations of waste streams' volumes & recommendations

Port: Iskenderun
Country: Turkey

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	4.2	2.1	Reduced weekly volume (m^3/week)	8.5	2.6	0.1	11.2
Average annual volume (m^3/year)	-	-	1,550	766.5	Average annual volume (m^3/year)	442.0	136.2	8.3	586.5
Maximum volume to be received per ship/arrival (m^3)	-	-	25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0

The average annual grow of traffic at the port remains relatively constant (<1%) at least in the period of the last three years. It is concluded that no significant changes might occur in the estimated waste streams flow for the next years. The previously outlined, collection scheme for both oily wastes and garbage is deemed as adequate for the needs of ships that normally call at the port. The oily wastes reception and treatment facility in the port of Iskenderun constitutes a representative example of the measures taken in the major ports of the country following the entry into force of the Annex I of MARPOL 73/78, to establish and operate appropriate installations.

A. General Information

Port Dikili

Port Operator TDI Dikili Liman Sefligi

B. Type and operation of the port

The small port of Dikili is situated some 130 kms north of Izmir Bay and provides a jetty suitable for up to 6.000 t.dw. mainly bulk carriers and general cargo ships. On average 4 – 10 ships call monthly at the port to load perlite, granite plates and other cargoes. In 2001 about 205.000 tons of this kind of cargo was handled in the port area. The port also accommodates 25 passenger ships per year up to 165 meters long carrying about 11.000 passengers and also some 25 ocean-going and coastal fishing vessels berth in its main basin.

Berths	Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Jetty	6 - 1 0	130	Used for handling of bulk inert minerals as well as for the accommodation of passenger and cruise ships
Harbour basin	Used for the accommodation of ocean going, coastal fishing vessels and pleasure craft		

C. Existing reception facilities & Recommendations

There are no fixed facilities available for collecting oily wastes from ships. It should be noted that there are no requests, recorded so far, from the Masters of ships to deliver oily wastes. From the information collected with respect to the last port of call of incoming ships, the days spent at sea, the average horsepower, etc. it's concluded that the needs of the port to provide facilities for oily wastes are minimum encompassing to the occasional engagement of an appropriate road tanker for the reception and transfer of oily wastes to the regionally operating refineries or other disposal sites for waste oils.

The Municipality of Dikili using its own 10 – 15 metr. tons trucks provides the collection of garbage delivered by ships. The ships are obliged to give a prior notice to the Port Authority, at the earliest, upon departure from the last port of call, in order to arrange garbage collection. The cost for garbage collection is $ US 45 per each 1.000 gross tons of tonnage. The final disposal is carried out at the local, designated landfill located 10 Kms from the port area.

Port: **Dikili**
Country: **Turkey**

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	0.1	0.6	Reduced weekly volume (m^3/week)	3.1	0.3	-	3.4
Average annual volume (m^3/year)	-	-	36.5	219	Average annual volume (m^3/year)	161.2	15.6	-	176.8
Maximum volume to be received per ship/arrival (m^3)	-	-	9.0	15.8	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.5

A. General Information

Port Kusadasi

Port Operator TDI Kusadasi Liman Sefligi

B. Type and operation of the port

The port of Kusadasi is situated some 100 kms south of Izmir. It is exclusively a passenger and cruise port providing two piers, an old one 175 meters long and a new one 208 meters long with depths varying from 7.5 to 12.5 meters, able to accommodate ships up to 130.000 t.dw or 250 meters long. A marina, operates in the north-eastern part of the bay, able to accommodate about 360 pleasure craft. There are only two harbour ships (a pilot and a tug boat) berthed on a permanent basis in the port. On average 700 cruise ships, passenger and Ro-Ro passenger ships call at the port every year carrying in total 440.000 passengers. Some 650 small pleasure craft enter the marina annually. The berthing capacity of the port is outlined below:

Berths	Length (m)	Depth (m)
Old Jetty (Outer)	239	7.3 – 12.5
Old Jetty (Inner)	175	
New Jetty (Outer)	208	
New Jetty (Inner)	175	

C1. Existing reception facilities for oily wastes and garbage

There are no reception facilities for oily wastes. Passenger and cruise ships know through their agents, that this kind of service is not available in the port, therefore there are no requests to deliver this kind of wastes. Almost 90% of these ships deliver garbage, (on average 15 – 18 cub. meters per ship) the reception and management of which is carried out by the Kusadasi Municipality. The Municipality operates a number of 20 cub. meters capacity, trucks while, eventually, garbage collected is disposed of at a landfill 7 kms far from the port area.

The marina, operated by the Setur Marinas company is a well organized one in terms of the wastes' management, providing a 800 lts capacity boat for collecting oily mixtures from ships, free of charge, as well as sufficient storage means for collecting separated garbage (at least three types, mixed domestic, glass and aluminum items).

A particular interest has been given to the management of the wastes produced by the land-based workshop of the marina, since all kinds of maintenance and repair work are carried out (epoxy-polyester works, generator and outboard repairs, painting and varnishing, etc).

Port: Kusadasi
Country: Turkey

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty Ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	1.0	0.5	Reduced weekly volume (m^3/week)	36.3	0.5	-	36.8
Average annual volume (m^3/year)	-	-	365.0	194.4	Average annual volume (m^3/year)	1,890	216.1	-	2,106.1
Maximum volume to be received per ship/arrival (m^3)	-	-	<10.0	< 3.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.4

It's obvious, that since there are no considerable needs for those ships that call at the port of Kusadasi to discharge oily wastes produced during the voyage, however a flexible collection system through the engagement of an appropriate road tanker of at least 15 cub. meters capacity, that could be provided upon request, would be sufficient to meet the non-systematic needs of ships. Garbage collection is sufficient both in terms of capacity and wastes management in general.

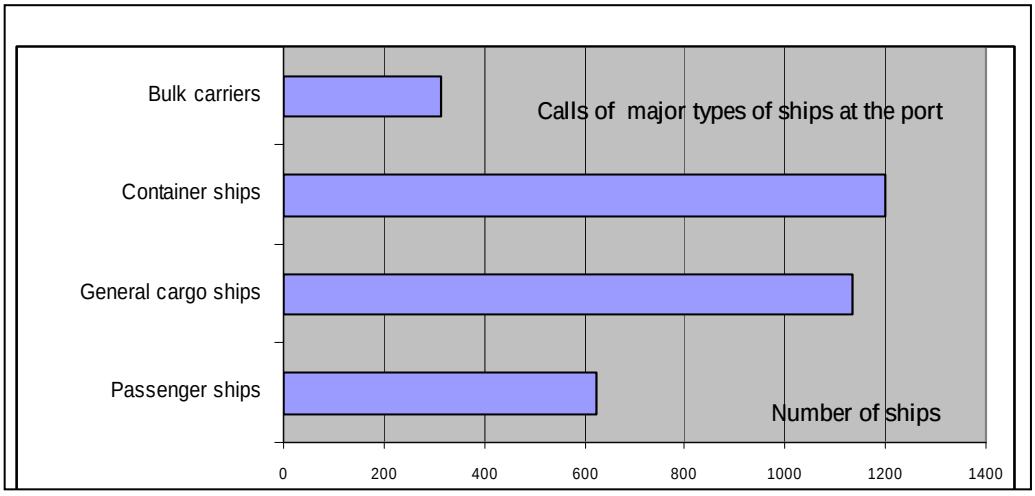
A. General Information

Port	Mersin
Port Operator	General Directorate of Turkish State Railways (T.C.D.D.), Mersin

B. Type and operation of the port

The port of Mersin is a multipurpose port, the basin of which is protected by two breakwaters 2.800 and 1.525 meters long respectively. It has a considerable length of quays (4.6 kms) while its container terminal covers an area of 252.350 sq. meters with a total length of berths 980 meters, equipped with all necessary facilities for handling refrigerated and other containerised cargoes. Future port development has been planned to be achieved through the establishment and operation of two jetties one designed to accommodate container ships and one for multipurpose use. The port receives on average more than 3.500 ships and handles more than 5.5 million tons. It also provides a free zone that covers about 777.000 sq. meters and a single finger pier for oil tankers calling at the terminal of Atas refinery. The entire berthing capacity of the port is summarized in the following table:

Berths	Maximum Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
Berth No.1	10	150	Used by passenger and cruise ships
A number of berths used for general cargo handling	12	1.450	Mainly general cargo ships. In 2001 more than 1.5 million tons of cargo was handled
Containers and Ro-Ro berths	10 - 14	1.020	Used by container and Ro – Ro ships involved in the handling of more than 3.0 million tons annually
Dry bulk cargo berths	14.5	550	Used by bulk carriers engaged in handling of grain and other bulk cargoes at three berths, equipped with a 100.000 tons silo and other facilities



C1. Existing reception facilities for oily wastes

A combined (fixed and mobile) collection and treatment facility for oily wastes is provided at the port, operated by the Port Authority. Three road tankers (15 cub. meters capacity) collect, invariably, oily residues and bilge oil waters from ships, for subsequent storage in a 250 cub. meters tank. Mechanical separators treat at a maximum rate of 10 cub. meters/hour the oily mixtures. A separate tank of 150 cub. meters capacity is provided for oil recovered from the separation process while, water practically free of oil (< 15 ppm) is discharged at sea.

Recovered oil might be used in the port operated boilers for heating purposes. On average, up to 750 cub. meters of oily wastes are collected at the port annually. Ships wishing to deliver are charged $ US 45 per 1.000 gross tons of tonnage.

C2. Existing reception facilities for garbage

The Port Authority provides also a 24 hour basis service for garbage collection. A truck of about 10 cub. meters capacity is employed for directly receiving garbage from ships.

Garbage collected is emptied/transferred to the local municipality temporary storage means for final landfilling. A charge of $ US 45 applies for each 1.000 gross tons.

Port	**Type of Facility**			**Oily wastes received from the facility**												Operational restrictions on the use of the facility
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Mersin	4	4		No need		No need						250	5	250	5	

Reception Facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
T.C.D.D. operated reception and treatment facility	Oily wastes are collected from (3) road tankers of 15 cub. meters capacity to be subsequently stored in a 250 cub. meters tank	Mechanical (settling tank/ conv. separator) type of treatment at 10 cub. meters per hour rate.	$ US 45 per each 1.000 gross tons of tonnage	Effluent water free of oil (oil level around 15 ppm) is finally discharged at sea. Oil recovered from the treatment process can be used to the port based boilers as supplementary fuel oil.

Port: Mersin
Country: Turkey

2 Estimates of ship-generated oily wastes and residues that could be received at the port					2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	8.0	7.4	Reduced weekly volume (m^3/week)	27.1	8.3	0.9	36.3
Average annual volume (m^3/year)	-	-	2,945.7	2,727.5	Average annual volume (m^3/year)	1,413.9	432.0	48.7	1,894.6
Maximum volume to be received per ship/arrival (m^3)	-	-	25.0	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				12.0

It should be noted that the NATO and ATAS specific traffic has not been incorporated in the estimations. No changes are expected in the abovementioned volumes of the wastestreams that could be delivered to the facilities of the port. The combined system (land-based treatment facility and mobile collection means) meets all the criteria of adequacy in respect of the actual needs of ships and also of the environmental conditions that collection, treatment and disposal is carried out.

The port has been alleged to provide garbage collection services not consistent with the needs of the ships. In terms of capacity, as estimated above the allocation of one 10 m^3 truck doesn't match the maximum, possible volume of 12 m^3 per ship, particularly when the emptying schedule is likely to cause delays to the reception of garbage from ships. At least two 10 –15 m^3, trucks with a capacity of need to be engaged in the daily operation of the port for collecting garbage.

A. General Information

Port Bodrum

Port Operator Bodrum Municipality

B. Type and operation of the port

The Bodrum port, managed by the local municipality authority, constitutes a comparatively small harbour, serving mainly ocean-going cruise ships and other passenger ships engaged in near coastal voyages. The Bodrum Milta Marina operates in the area enriching the passenger character of the port, providing 475 berths for pleasure craft. In accordance with the traffic data of the last three years' period, 9.100 passenger ships of various sizes called annually at the port.

C. Existing reception facilities for oily wastes and garbage & Recommendations

The Bodrum Municipality provides a free of charge, garbage collection service by means of a fleet of 8 trucks (25 m^3 capacity) without any serious restrictions to the volumes that could be landed at the port.

A prior notice is required from any interested ship to deliver garbage. During peak summer periods the volume of garbage collected can exceed 250 cub. meters daily. Almost all ships wish to deliver garbage produced onboard, the greater percentage of which is domestic like items. Once garbage is collected, depending the applicable sorting and containment onboard ships, items consisting of glass, aluminum, etc., can be separated and recycled regionally.

There are no facilities available for collecting oily water mixtures from ships.

Port: Bodrum
Country: Turkey

2 Estimates of ship-generated oily wastes and residues that could be received at the port				2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily water mixtures from the engine room	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	2.4	Reduced weekly volume (m^3/week)	32.6	-	-	32.6
Average annual volume (m^3/year)	-	-	876.0	Average annual volume (m^3/year)	1,695.4	-	-	1,695.4
Maximum volume to be received per ship/arrival (m^3)	-	-	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				7.5

The facilities provided for collecting garbage are consistent with the needs of small ships and the passenger ships that call to the port.

Oily wastes would virtually consist of light sump oils draining from the engine room since small ships do not use fuel oil or marine distillate oils that need to be purified before burning. The idea promoted by the International Maritime Organization, that small harbours establish and operate Environment Stations to deal with limited but diversified wastes from small craft could be a suitable solution for the port of Bodrum. Pump out stations with appropriate piping and uptake systems positioned in suitable positions alongside the quays could enable the safe and smooth collection of oily water mixtures from small ships.

A. General Information

Port Marmaris

Port Operator TDI Marmaris Liman Isletme Sefligi,

B. Type and operation of the port

Marmaris is another cruise port on the Mediterranean coast of the country, providing a 133 meters long and 14 meters wide, pier, particularly for cruise liners and other passenger ships that sail the bay of Marmaris with final destination the so named resort.

It is also used from general cargo ships engaged in loading marbles and other materials, a port operation that actually started in 2003. The passenger terminal is located at the end of the abovementioned quay. In 2001 and 2002 1.163 and 820 ships respectively called at the port.

C1. Existing reception facilities for oily wastes

A 500 cub. meters, storage capacity, barge is provided to collect oily water mixtures at a maximum, 150 cub. meters/hour rate. Charges vary from $ US 75 to 120 (quayside and at anchor) per 1.000 gross tons.

C2. Existing reception facilities for garbage

A private company has been authorized to collect garbage from ships, offering a 24 hour basis service by means of three, 20 cub. meters capacity barges and two trucks of 20 cub. meters capacity, each one.

The charges incurred, vary similarly from $ US 45 to 75 (quayside and at anchor collection) per 1.000 gross tons. In 2002, 60 ships requested to deliver garbage amounting to approximately 150 cub. meters in total.

Port: Marmaris
Country: Turkey

2 Estimates of ship-generated oily wastes and residues that could be received at the port				2 Estimates of ship-generated garbage that could be received at the port				
Oily wastes	Dirty ballast	Tank washings	Oily water mixtures from the engine room	**Garbage**	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced daily volume (m^3/day)	-	-	3.6	Reduced weekly volume (m^3/week)	3.0	1.6	-	4.6
Average annual volume (m^3/year)	-	-	1,314.0	Average annual volume (m^3/year)	158.4	87.1	-	245.5
Maximum volume to be received per ship/arrival (m^3)	-	-	7.5	Maximum volume to be received per ship/arrival (m^3) (only domestic and maintenance)				5.0

It is obvious that the provision of reception facilities in the port is adequate for both oily water mixtures and garbage. The estimated volumes which basically rely on the delivery of all wastes produced onboard demonstrate that the facilities can also meet more demanding needs of service.

A. General Information

Port	Industrialized port of Nemrut Bay
Port Authority	Aliaga Port Authority

B. Type and operation of the port

The industrialized port of Nemrut Bay is situated on the southern side of the Aliaga port where a number of privately owned and managed terminals operate both in the inner area (PETKIM petrochemical complex) and the outer one (Habas, Ege Gubre, Limas, Nemtas and Cukurova).

The 826 meters long quays operated by Ege Gubre A.S. provide an area where urea in bulk is discharged, bagged fertilizers are loaded while separate piping is provided for the handling of sulphuric and phosphoric acid.

Year	Total number of ships	Bulk liquids *(met. tons)*	Solid bulk and general non- containerised cargo throughput *(met. tons)*
2002	127	63.707	383.455
2001	106	75.341	289.234
2000	153	103.402	244.902

Name of Berth	Actual Depth (m)	Berth overall length (m)	Maximum size of ships accommodated	
			LOA (m)	DWT (t.dw)
E.G. (N)	13	130	160	16.000
E.G. (S)	10,5	120	125	7.000
EGE GUBRE	24	576	320	100.000

The Habas Co., operated terminal is provided for scrap iron discharging purposes at the operations of which, 300 ships are engaged annually. At the nominal 9 – 10 berths, superstructure for accommodating chemical carriers is under construction.

Berths	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated

1-2-3	6.3 – 40.0	490	Bulk and General Cargo
4-5-6	7.0 – 40.0	490	
7-8	4.0 – 6.0	123	
9-10	7.0 - 11.0	320	

At the 386 meters long pier, operated by Nemtas, more than 300 bulk carriers up to 60.000 tdw., call annually engaged in the handling of more than 2.3 million tons of cargo.

In addition, at the 790 meters long, quays operated by Limas Liman Isletmeleri, situated on the south of the port, scrap iron is discharged from about 160 ships per year. The pier's berthing details and the traffic in the last three years is presented below:

Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
				LOA (m)	DWT (t.dw)
LIMAS PIER No.1	11-17	205	Bulk Carriers & General cargo ships	195	35.000
LIMAS PIER No.2	17-36	196		190	90.000
LIMAS PIER No.3	17-36	196		190	90.000
LIMAS PIER No.4	6,5	195		140	5.000

Year	**Bulk carriers and general cargo ships**	
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*
2002	81	10.000
2001	132	17.297
2000	259	30.716

The Petkim Terminal, operated by Petkim – Petrochemical Co. Inc. is used for loading/unloading petrochemical products providing 4 berths in total to accommodate

chemical and LPG carriers and general cargo ships. 15 general cargo ships carrying palletised cargo and 300 chemical tankers carrying mainly benzene, polypropylene, ethylene oxide, etc., call annually.

Oily waste water coming from the machinery spaces of ships is collected and treated at a fixed API separator (550 m^3/hour) and a biological reactor 120 m^3/hour. Garbage collection is very efficient, several containers for separate kinds of garbage are placed in all dockside berths.

Year	Number of ships	Bulk liquid products other than oil throughput *(met. Tonnes)*	Solid bulk and general non-containerised cargo throughput *(met. Tonnes)*
2002	349	1.193.146.000	17.430.000
2001	305	888.597.000	33.630.000
2000	328	761.102.000	58.520.000

Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
				LOA (m)	DWT (t.dw)
No 1	6.50	163	Chemical Tankers	163	10000
No 2	9.50	175	Chemical Tankers	175	20000
No 5	12	219	Chemical Tankers	219	40000
Petkim Berth for general cargo	9.50	338	General Cargo Ships	175	40000

Finally, Cukurova operated terminal used for discharging scrap iron, consists of a 1.225 meters long quay, able to accommodate bulk carriers up to 55.000 t.dw. and 260 meters long.

Year	Total number of ships	Solid bulk and general non-containerised cargo throughput *(met. Tonnes)*
2002	670	3.161.156
2001	500	1.700.799
2000	417	1.418.152

Berth	Depth (m)	Berth overall	Type of ships that can be	Maximum size of ships accommodated

		length (m)	accommodated	LOA (m)	DWT (t.dw)
1	7.5 – 11	110	Bulk carriers and general cargo ships	125	3.500-4.000
2	9 – 25	186		185	15.000
3	25 - 35	200		260	55.000
4		185		210	55.000
5	11 – 25	214		215	50.000
6	5 - 13	120		138	6.000
7		100		100	2.500-3.000

C. Existing reception facilities for oily wastes & Recommendations

The collection of garbage from the incoming ships is arranged from the port Authority through the involvement of the Aliaga Municipality and its resources.

There are no facilities available for collecting oily wastes from ships that call to the privately operated terminals in Nemrut Bay (apart from PETKIM, described earlier). From the very beginning of the visit at the port of Nemrut Bay, it was realized that the heavily industrialized port of Nemrut Bay should be provided with land-based facilities to deal with the estimated oily wastes flow.

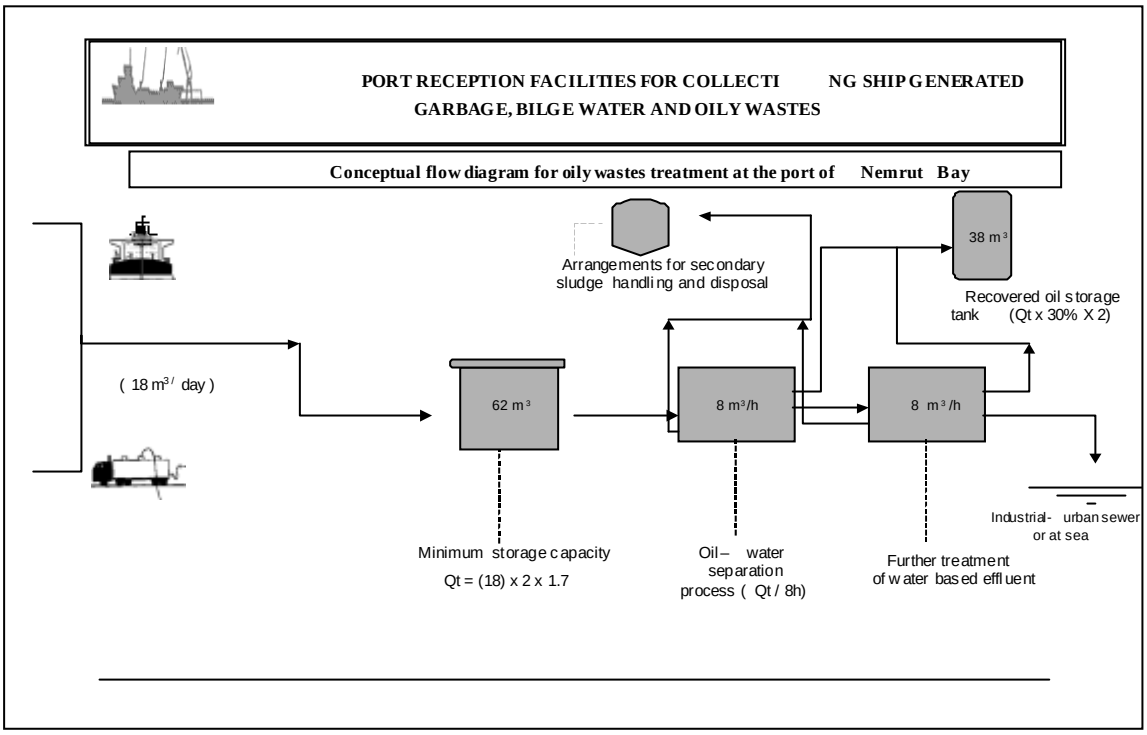
The establishment of a land – based collection and treatment facility for oily wastes in the port of Nemrut Bay is recommended for the following two reasons:

1. The estimated, volume of more than 6.300 cub. meters of oily wastes that can be delivered annually along with the daily, batch volume of about 17 cub. meters exceed the threshold that normally determines the feasibility of setting up a port - based, collection and treatment system that could be cost effective and technically sound.

The collection means should certainly incorporate a barge of less than 100 t.dw since the frequent loading and discharging operations of cargo such as scrap iron to vehicles could hamper the transfer of oil wastes from ships to road tankers.

2. The existence of the facility either as a pierside application or in the proximity of the port area would ensure that oily water mixtures are treated effectively to a certain level, so that oil recovered from the process can, in turn, be easily disposed of at the nearby TUPRAS operated refinery.

A conceptual, flow process diagram of the facility at Nemrut Bay is illustrated below, in which only, the minimum capacities have been estimated, since a further study needs to be drawn covering waste characterization, peak flow determination, other design elements, spill capacity, treatment objectives, etc.


PORT RECEPTION FACILITIES FOR COLLECTI NG SHIP GENERATED
GARBAGE, BILGE WATER AND OILY WASTES
Conceptual flow diagram for oily wastes treatment at the port of Nemrut Bay
Arrangements for secondary sludge handling and disposal
38 m3
Recovered oil storage tank (Qt x 30% X 2)
(18 m3 / day)
62 m3
8 m3/h
8 m3/h
Industrial- urban sewer or at sea
Minimum storage capacity
Qt = (18) x 2 x 1.7
Oil – water separation process (Qt / 8h)
Further treatment of water based effluent

D. Estimations of wastes to be received at the port

Port : Nemrut Bay
Country: Turkey

2 Estimates of ship-generated oily wastes and residues to be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced Daily volume (m^3/day)			11.6	5.8
Average annual volume (m^3/year)			4,241.6	2,120.0
Maximum volume to be received per ship/arrival (m^3)			25.0	18.5

2 Estimates of ship-generated garbage to be received at the port

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced weekly volume (m^3/week)	21.1	6.4	4.3	31.8
Average annual volume (m^3/year)	1,099.4	335.9	227.6	1,662.9
Maximum volume to be received per ship/arrival (m^3)				5.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams. The reception and further management of domestic like and maintenance waste does not present a problem, since the cargo-associated waste, although in the above estimated figures represent less than 15% of the volume, has been proved a much more demanding activity following the routine loading and discharge operations.

A. General Information

Port Izmir

Port Operator T.C.D.D. Izmir

B. Type and operation of the port

The port of Izmir plays a significant role as a trans-shipment centre in the eastern Mediterranean Sea, with relatively, new dedicated terminals for container and Ro-Ro ships, bulk carriers, general cargo ships, passenger as well as ocean-going cruise ships.

The port has 25 nominal berths providing a 2.959 meters long quay in total, and it is operated by the General Directorate of Turkish State Railways (T.C.D.D.). The container terminal allocates 7 berths on a 1.050 meters long pier where 5 gantry cranes (40 tons lifting capacity) operate. In 2002, nearly 1.680 container ships out of the total 2.100 ships, called at the port contributed to the handling of about 5.300.000 tons of containerised goods.

Following the 1999 earthquake in Turkey, the Izmir shipyards passed to the Naval Navy while the old, petroleum terminal is no longer operating.

Type of Berths	Maximum Depth (m)	Berth overall length (m)	Type of ships that can be accommodated and cargo handling
General Cargo	7 – 10.5	1.429	810 general cargo ships are berthed annually
Container ships	13.0	1.050	1.500 container ships are berthed annually
Dry bulk cargo ships	10.5	150	80 bulk carriers are berthed annually
Passenger berth	8 – 10.5	330	Provided for coastal and ocean-going passenger ships, cruise ships and local ferries

C1. Existing reception facilities for oily wastes

A fixed, well designed oily wastes reception facility has been established in the port since 1986 enabled with the necessary mobile land based and navigable collection means.

A non, self-propelled barge able to collect and store 350 cubic meters of oily mixtures without any thermal treatment capability and three road tankers of 20 tons maximum capacity are engaged in collecting oily wastes from ships when alongside or at anchor. The barge was out of operation during the mission, presenting severe hull fouling, deck piping in good condition and without oily mixtures in her six tanks. The

land based storage and treatment facility consists of two (200 cub. meters each) storage tanks which feed a compact, industrial twin (two series of three, coalescing type, separators) API separator, with a nominal treatment capacity of 60 tons/hour.

Waste water with oil less than 15 ppm is discharged directly at sea while recovered oil is skimmed in a 20 cub. meters tank located within the safety basin of the facility. An oil content meter with a stopping device, re-circulates oil/water mixtures to the storage tanks when the oil concentration exceeds this level. Ships wishing to deliver oily wastes are charged $ US 45 for each 1.000 gross tons tonnage.

C2. Existing reception facilities for garbage

The Port Authority provides the facilities for collecting garbage by means of a number of trucks (8 cub. meters average capacity) and a number of strategically positioned receptacles in the port area for small volume items.

Garbage collected is landfilled at the local designated area. The charges vary similarly from $ US 45 to 75 (quayside and at anchor collection) per 1.000 gross tons.

PORT RECEPTION FACILITIES FOR COLLECTING SHIP-GENERATED GARBAGE, BILGE WATERS AND OILY WASTES

Activity A – Collection and treatment of solid and oily wastes from ships

Port	**Type of Facility**			**Oily wastes received from the facility**										Operational restrictions on the use of the facility
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily bilge water from machinery spaces		Oily residues from machinery spaces *(sludge)*		
				Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	Nominal reception capacity (m^3)	Maximum receiving rate (m^3/hour)	
Izmir Port	4	4	4	No need		No need						350	30	350	30	

Reception Facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
T.C.D.D. operated reception and treatment facility	*1. Collection means* A non self propelled barge of 350 cub meters capacity Three road tankers of 13 tons of 20 m. tons capacity *2. Land based storage & treatment facility* Two (200 cub. meters each) storage tanks, a compact, industrial twin, coalescing API separator, with a nominal treatment capacity of 60 tons/hour. A 20 m. tons tank for recovered oil	Mechanical, API coalescing separator of 60 tons/ hour capacity. No further treatment apart the enhanced separation	Ships wishing to deliver oily wastes are charged $ US 45 for each 1.000 gross tons tonnage.	Effluent water free of oil (oil level around 15 ppm) is finally discharged at sea.

D. Estimations of wastes to be received at the port

Port : Izmir
Country: Turkey

2 Estimates of ship-generated oily wastes and residues to be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			9.5	6.7
Average annual volume (m^3/year)			3,467.5	2,472
Maximum volume to be received per ship/arrival (m^3)			25.0	15.5

2 Estimates of ship-generated garbage to be received at the port

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Average weekly volume (m^3/week)	15.9	6.1	4.5	26.5
Average annual volume (m^3/year)	830.4	320.3	234.0	1384,7
Maximum volume to be received per ship/arrival (m^3)				5.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams. In terms of capacity, the combined facilities provided in the port are sufficient to meet the needs of ships. The modernization of the treatment process with the addition of another stage for emulsified oils might enhance the gravitational/coalescing function since oily bilge water and sludge collected from ships is likely to contain apart from free oil (oil is basically present as droplets 20 microns of larger having little or no water associated with it), also physically emulsified oil (oil present at droplets 5 – 20 microns in size, dispersed in water as a stable form, originated by mixing through pumping, restrictions in flow, etc) and, chemically emulsified oil (chemical emulsions are usually formed when detergents, alkaline fluids, or other agents are used in the machinery spaces of ships, having a droplet size less than 5 microns). Provided that the existing facility can afford the establishment of another stationery treatment plant, best available, demonstrated technologies that could be incorporated include basically, membranes (successfully used for both batch processing and continuous process streams) and induced or dissolved air flotation process.

A. General Information

Port Antalya

Port Operator Ortadogu Antalya Port Management Inc.,

B. Type and operation of the port

The privately operated port of Antalya is a multipurpose port engaged in handling solid bulk cargoes, break bulk cargo providing also services to cruise liners and passenger ships.

Year	Total number of ship calls	Containerised cargo throughput *(TEUs)*	Solid bulk and general non- containerised cargo throughput *(met. Tonnes)*
2002	954	7.519	1.500.000
2001	879	5.478	1.250.000
2000	806	2.092	680.000

Berths	Length (m)	Depth (m)
Passenger Quays	170	10
Mixed Cargo Quays	770	5.5 – 10
Ro/ro Quay	35	5.5 - 10
Dry Bulk Quays	925	4 - 8

C1. Existing reception facilities for oily wastes

An obsolete system consisting of a conventional oily-water separator not able to deal with emulsified oils and other heavier oily mixtures along with a 20 cub. meters storage and primary settling tank are currently provided in the port. Oily wastes are collected by a road tanker, 10 cub. meters capacity at a $ US 45 charge per 1.000 gross tons.

C2. Existing reception facilities for garbage

A truck able to collect directly from ships, store and transport garbage to the local landfill is currently employed to provide the service, at $ US 45 per 1.000 gross tons.

D. Estimations of wastestreams' volumes & Recommendations

Port : Antalya
Country: Turkey

2 Estimates of ship-generated oily wastes and residues to be received at the port

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			4.5	2.0
Average annual volume (m^3/year)			1642,5	730.8
Maximum volume to be received per ship/arrival (m^3)			25.0	7.5

2 Estimates of ship-generated garbage to be received at the port

Garbage	Domestic garbage	Maintenance waste	Cargo-associated waste	Total volume of garbage
Reduced weekly volume (m^3/week)	6.0	2.2	0.6	8.8
Average annual volume (m^3/year)	313.2	114.8	32.5	460.5
Maximum volume to be received per ship/arrival (m^3)				5.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams. Although oil/water separators are common applications either in the marine industry or in pierside for port-based or other industrial applications, the varied quality of oily wastes generated from ships, may hamper their designed function or might require a treatment technology able to deal with emulsified oils or to meet the necessary flow rates. While, in terms of the reception capacity, the existing means of the facility meet the needs of ships that call to the port of Antalya, a new stationary plant would maximize the collection, the subsequent treatment and the final purification of the water effluent before it is discharged at sea or in any available port or industrial sewer.

Garbage collection and management in general is effective and adequate both in terms of the collection capacity as well as in terms of the safe and environmental sound transport and disposal.

SUMMARY TABLE
OF THE
ANALYSIS OF RESULTS

Summary Table of Analysis

Port	Oily wastes						Garbage		
	Estimated, average annual volume for delivery (m^3/year)	Existing Reception Facilities				Remarks - Proposed Reception Facilities	Estimated, average annual volume for delivery (m^3/year)	Adequacy of existing facilities	Remarks - Proposals
		Type	Holding capacity (m^3)	Treatment rate (m^3/hour)	Adequacy				
Algiers	6.930					A fixed treatment facility is proposed with minimum sizes 70 m^3 hold. capacity and 10 m^3/hour treat.rate	1.467	Ac	Sufficient collection through pre-positioned receptacles and trucks
Annaba	725					For the limited needs of the port, minimum,essential collection means should be provided upon request	336	Ac	Adequate garbage collection
Arzew - Bethioua	4.907					A fixed treatment facility is proposed with minimum sizes 50 m^3 hold. capacity and 6 m^3/hour treat.rate	1.363	Ac	Sufficient collection through pre-positioned receptacles and trucks
Bejaia	4.362	V			Ac	Collection is carried out through Naftal and D.D.D resources	583	Ac	Sufficient collection through pre-positioned receptacles and trucks
Ghazaouet	603					Minimum,essential collection means should be provided upon request	207		
Jizel	228	V + P			Ac	Waste oils can be collected for treatment in the regional Naftal facilities.	69	Ac	
Mostaganem	1.021	V + P				Limited needs. Collection upon request can be achieved through the involvement of the Port Authority or private contractors.	352	Ac	
Oran	2.326					Minimum,essential collection means should be provided upon request	786	Ac	Adequate reception and collection capacity
Skikda	50.840	F	15.000	250	I	The fixed facility has to do with cargo associated wastes from oil tankers calling to Sonatrach oil terminal. A facility is proposed with minimum sizes 450 m^3 hold. capacity and 55 m^3/hour treat.rate with a sufficient number of collection means as outlined in the Report.	1.914	Ac	A garbage transfer station would optimize the collection and transport pattern
Tenes	100	V + P			Ac	Waste oils can be collected for treatment in the regional Naftal facilities	13	Ac	Limited needs.
Larnaka	1.406	B + V	600 (max)		Ac		458	Ac	

Limassol	13.870	B + V	600 (max)		Ac		4.970	Ac	Although adequate, a garbage transfer station could be established
Vassiliko	317	F + V	2.000	120	Ac		38	Ac	
Alexandria & Dhekelia	14.400	B	200 (max)		I	A Dhekelia based facility (140 cub. meters hold. capacity, 18 m^3/hour throughput rate) is proposed	4.426	Ac	A garbage transfer station in Alexandria would optimize the collection and transport pattern
Damietta	5.183	F + B + V	700 (max)		Ac		991.6	Ac	Damietta is the only port in the area of the project in which a port based incinerator for dry garbage operates
Port Said	3.555	B	200		I	A fixed treatment facility is proposed to optimize the available collection scheme	1.032	Ac	
Ashdod	13.009	V	15		Ac	Waste oils collected are treated at a nearby treatment facility	3.994	Ac	
Hadera	440	F	10		Ac	The limitation of delivery of 10 cub. meters should be withdrawn by providing additional holding capacity	242	Ac	
Haifa	15.611	B + V			Ac		8.746		
Beirut	4.583	V	25		I	A fixed treatment facility is proposed with minimum sizes 45 m^3 hold. capacity and 6 m^3/hour treat.rate	1308	Ac	
Saida	1.009				I	Essential collection means should be provided upon request	155	I	Although the needs are limited, storage receptacles and a skip loader truck should be provided
Selaata	205				I		41	Ac	
Tripoli	2.930	V	25		Ac	A fixed treatment facility is proposed with minimum sizes 30 m^3 hold. capacity and 5 m^3/hour treat.rate	461	Ac	
Marsaxlokk	31.744	B + V	1.100		Ac	Oil Tanking is out of this estimation	2.049	Ac	
Valletta	12.497	F + B + V	1.100 (B) 12.000 (F)	350 (B)	Ac	The facilities indicated are provided by the Tank Cleaning Facility and Waste Oils Co.	4.553	Ac	Establishment of a transfer station at a suitable place in the port area to optimize garbage collection and transport
Nador	11.318					A fixed treatment facility is proposed with minimum sizes 105 m^3 hold. capacity and 13 m^3/hour treat.rate	3.768	Ac	Mandatory disposal of garbage has achieved sufficient collection service through pre-positioned receptacles and trucks
Tangiers	380					Essential collection means should be provided upon request	1.295	Ac	
Lattakia	3.431	V	<10		Ac	Operational improvements as outlined in the Report	1.123	Ac	Operational improvements
Tartous	5.159	V			I	Minimum 35 m^3 capacity in the form of mobile collection means	829	I	Although the needs are limited, storage receptacles and a skip loader truck should be provided

Bizerte & Menzel Bourguiba	1.361	V + P	20		Ac	Used oils regeneration plant ensures collection and treatment of waste oils from ships	271	Ac	
La Goulette & Rades	5.435	V + P	20		I	A fixed treatment facility (minimum 70 cub. meters hold. capacity, 8.5 m^3/hour throughput rate) is proposed	1.612	Ac	
Sfax	6.643	V + P	20		Ac	Distant transport of collected waste oils to Bizerta dictates the establishment of a fixed treatment facility (65 cub. meters hold. capacity, 8 m^3/hour throughput rate)	1.580	Ac	Effective involvement of local contractors charged in collecting garbage
Sousse	380	V + P	20		Ac		1.295	Ac	
Gabes	4.182	V + P	20		Ac		1.526	Ac	
Zarzis	1.155	V	20		I	The storage and treatment facility proposed to deal with cargo associated oily wastes from tankers can absorb also this kind and volume of wastes	445.8	Ac	Effective involvement of local contractors charged in collecting garbage
Iskenderun	2.316	F + V	13 (V) 98 (F)		Ac		586.5	Ac	
Dikili	255	V			Ac	Limited needs of ships that call to the port	176.8	Ac	Limited needs of ships that call to the port
Kusadasi	559					Established practice for incoming ships not to discharge waste oils. Essential collection means only are recommended.	2.106	Ac	Adequate collection pattern has achieved 90% of ships to deliver garbage
Mersin	5.674	F + V	15 (V) 250 (F)	10	Ac		1.894	I	At least two 10 – 15 cub. meters trucks or/and proper receptacles
Bodrum	876				Ac	A small scale Environment Station to collect oily wastes and garbage is proposed	1.695	Ac	
Marmaris	1.314	B	500		Ac		245	Ac	
Nemrut Bay	6.361					A fixed treatment facility (minimum 62 cub. meters hold. capacity, 8 m^3/hour throughput rate) is proposed	1.662	Ac	
Izmir	5.939	B + F	400	60	Ac	Modernization of the treatment process with emphasis to the handling of emulsified oils	1.384	Ac	
Antalya	2.373	F + V	20		Ac	Modernization of the treatment technology through potentially the establishment of a new facility	460.5	Ac	

Where

F means a port area based, collection and treatment system , usually linked through piping to the jetties or piers and its associated equipment including holding tanks

B means navigable means, self or non – propelled, separating or not the collected oily water mixtures
P means small portable tanks appropriate for collecting and temporary storing used and other waste oils

V means road tankers able to collect and transport wastes oils and other oily water mixtures

Ac means adequate facilities in terms of capacity

I means inadequate facilities in terms of capacity

CONCLUSIONS & RECOMMENDATIONS

5. Conclusions & Recommendations

A. Introduction

The aim of this comprehensive set of recommendations and conclusions, is to provide guidance to the port authorities, the terminal operators, the ship-generated wastes collection providers and other responsible authorities of the beneficiary countries, on a series of issues that were deemed to be essential for the improvement of the use and the sound operation of the existing reception facilities.

Since, a number of new, reception and pre-treatment facilities have been proposed to be established in the area of the project, it was attempted also to provide guidance on their integration with the Mediterranean Action Plan steering framework.

The proposed actions discussed here can be divided to those related with policy – institutional issues and those related with practical and operational items, as follows:

Policy – Institutional issues

- Establishment of reception and pre-treatment facilities for oily wastes
- Action – oriented waste management plans in ports
- Assessment of the environmental effects of waste management in ports
- Adoption of a uniform system for the notification of the needs of incoming ships

Operational issues

- Collection and transfer of garbage in ports
- Collection of recyclable materials
- Port-based garbage transfer facilities
- Collection and management of hazardous wastes
- Oily wastes treatment and disposal

B1. Establishment of reception and pre-treatment facilities for oily wastes

From the estimation of the waste streams (basically, of the average annual volume, the reduced daily volume and the maximum volume per arrival) as well as the assessment of the needs of each port separately, it was concluded that at least ten of them, need to establish a port – based reception and pre-treatment facility, as follows:

Port	Estimated, average annual volume of oily wastes (m^3/year)	Proposed reception & pre-treatment facilities	
		Minimum holding capacity (m^3)	Minimum treatment throughput (m^3/hour)
Tripoli	2.930	30	5
Beirut	4.583	45	6
Port Said	3.555	34	5
Alexandria - Dhekelia	14.400	140	20
Nemrut Bay	6.362	82	10
Sfax	6.643	65	10
La Goulette - Rades	5.435	70	10
Nador	11.318	105	15
Arzew - Bethioua	4.908	50	6
Algier	6.930	70	10

All the proposed facilities are outlined in this Report in terms of their conceptual primary and secondary treatment flow process, the necessary collection means and the minimum storage capacity for oil, separated and recovered.

B1. Action – oriented waste management plans for ports

All the beneficiary countries of the project are signatory parties of the International Convention MARPOL 73/78 and its optional Annex V dealing with the prevention of marine pollution from ship-generated garbage, apart from Israel and Malta which are currently in preparatory work to ratify this Annex, as explained below:

Status of Annexes I and V of MARPOL 73/78 in the area of the project *(July 2003)*		
Country	**Annex I**	**Annex V**
Algeria	4	4
Cyprus	4	4
Egypt	4	4
Israel	4	- [*1]
Lebanon	4	4
Malta	4	- [*2]
Morocco	4	4
Syria	4	4
Tunisia	4	4
Turkey	4	4

[*1] During the implementation of the project the Maltese responsible Authorities were engaged in a preparatory work to ratify the optional Annex V of MARPOL dealing with ship-generated garbage. A strong and determined political will to promptly proceed to ratify and implement the Annex was witnessed, by ensuring that any necessary measures to enforce its requirements either those related with the Maltese flagged ships' operations or those related to the provision of reception facilities in the ports of the country would have been taken.

[*2] Similar preparatory work has been undertaken by the responsible Authorities of Israel, in particular from the Administration of Ports and Shipping, to enable the immediate ratification and implementation of the Annex V.

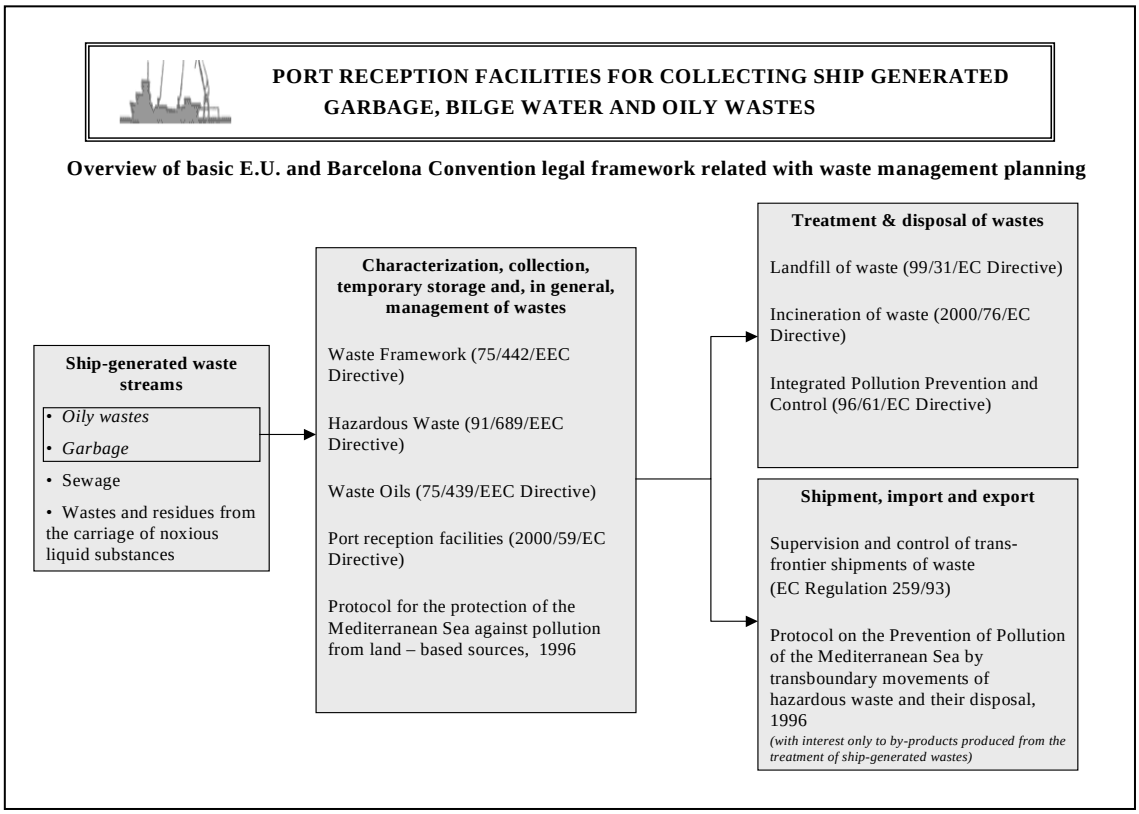
A number of countries, involved in the project, have already developed or currently develop national or local waste management plans with the aim to achieve sustainable waste management, providing an agreed strategy from all interested and responsible parties, but also certain objectives.

It should be noted that these plans may be required from regional obligations that these countries should comply with, such as those stemming from the European Union legislation (i.e. Waste Framework Directive, 75/442/EEC) or the Barcelona Convention, related Protocols (i.e. Protocol for the protection of Mediterranean Sea against Pollution from Land Based Sources and Activities).

It was considered as a drastic step for those countries that either their ports' areas have not been incorporated in the relevant local or national waste management plans or the latter plans have not yet been developed at all, to proceed through their responsible port authorities or/and terminal operators to develop a port waste management plan.

The Eur. Council Directive 2000/59/EC promotes the development and implementation of up-to-date waste reception and handling plans in ports of each E.U. Member State to improve the adequacy of the reception facilities.

The next diagram presents the basic legislation that requires or recommends some kind of waste management planning.



The production of a standard, national plan that could be developed and implemented across the ports of the country would contribute to the consolidation and formulation of numerous elements, such as the dynamic assessment of the need for port reception facilities, the development of procedures for the reception, collection, pre-treatment and final disposal of ship-generated wastes and cargo residues, the description of the charging system, the development of procedures for record-keeping the actual use of the facilities, e.t.c.

B2. Assessment of the effects of waste management in ports on the environment

Assessment of the environmental effects of ongoing or forthcoming waste management activities in the ports of the project, such as the establishment and operation of reception and treatment facilities, garbage transfer stations, etc., is recommended as a formal procedure, basically, for the following reasons:

- The existing uncertainty over the final disposal of collected ship-generated wastes, as pointed out from several port authorities to the Consultant during the missions,

- The need for initiating and maintaining a procedure to achieve the traceability of wastes received at the ports,

- The need for safeguarding the environment from future waste management actions and the operation of port – based facilities as those recommended by the Consultant, in particular, for the collection and pre-treatment of oily wastes from ships.

In order, to identify and control the potential effect of waste management activities in ports and to ensure their authorization and licensing from the responsible Authorities, it is recommended that an assessment of the impacts to the environment be carried out in advance.

Notwithstanding, the environmental impacts assessment is already an institution for certain projects in a few countries of the project or it is going to become soon in those that will join the European Union, it was felt during the missions, that this kind of assessment could ensure that national or local requirements with respect to the protection of the environment are met from those providing ship-generated collection and management in ports.7

It should be noted that for candidate countries to join the Eur. Union, the Directive 85/337/EEC as amended by the 96/61/EC and 2003/35/EC provide a coherent framework on the assessment of the effects of certain public or private projects on the environment.

B3. Adoption of a uniform system for the notification of the needs of incoming ships

During the missions at the beneficiary countries, it was realized that a few port authorities, have established their own systems to receive and process information from incoming ships with respect to their needs to deliver wastes retained onboard, with the aim to facilitate the work of the available reception facilities.

The effectiveness of port reception facilities has been demonstrated that can be improved by requiring or encouraging ships to notify their need to use

reception facilities. In parallel, a dynamic tool is provided to the respective port authorities and reception facilities' operators to systematically verify the adequacy of the capacity of the available facilities and the efficiency of the whole collection service.

It is recommended that the port authorities and the dedicated terminal operators in the area of the project, require or encourage the Masters of ships to notify their needs by making use of a standard, notification document. Such a document has been incorporated in the Eur. Council Directive 2000/59/EC, being already in use across the Eur. Community navigable waters and ports.

This format has been reproduced as Annex I of this section of the Report. It should be noted that the above mentioned Directive excludes certain types of ships such as fishing vessels and small, recreational craft and provides exemptions for ships engaged in frequent and regular port calls upon evidence of arrangements that ensure the delivery of wastes in a port along the ships' route.

Issues, such as, the time prior to the arrival of a ship that the notice should be transmitted, the processing of the information included, the way the operators of the reception facilities are notified, etc., can be decided upon the judgement of the port authorities.

B4. Collection and transfer of garbage in ports

It is true that as the background of the countries involved in the project varies demographically, economically and platonically which in turn, determine policy and institutional frameworks for waste management, the types and forms of garbage collection from ships in the ports vary significantly in terms of the reception means and the collection vehicles used, the favourable disposal options, etc.

In the absence of stationary systems for garbage processing in the majority of the ports and because of the fact that garbage collection is predominantly carried out through the involvement of the local municipalities, the assessment of the entire, garbage management system of each country was not possible. For most of the ports which are located either within or on the outskirts of large cities, the collection rates were found to be high.

Suggestions for the improvement of the existing collection systems are outlined below:

- Collection trucks used either for direct reception of garbage from ships such as Ro-Ro Cargo ships or Ro-Ro passenger ships, or used for the unloading of containers and other receptacles, should be appropriate for the size and particulars of these ships and in general for terrain of the port area, ensuring that they do not interfere with routine operations, in particular, in congested ports.

- In ports where dense, cargo – associated waste is normally collected, compactor trucks or small capacity receptacles should not be involved in the collection process.

- When garbage collected from ships is transported on open trucks towards a transfer station or a disposal site, measures should be applied to prevent leakages or emissions along the route.

- Selection of locally made receptacles or other equipment to enable collection of garbage, would be advisable in areas where a special, uniform regime needs to be maintained, i.e. in ports located close to traditional or historic towns.

- Selection of receptacle means should support the sustainability of the whole collection system, in particular of the collection vehicles and their loading gears as well as of any other mobile or stationary waste processing facilities.

B5. Collection of recyclable materials

Garbage management onboard ships varies from simple, collection schemes that enable delivery of garbage at port reception facilities and discharge at sea according to MARPOL 73/78, Annex V Regulations, to more complicated systems in particular on those types of ships that due to their type and voyage pattern, large volumes of garbage are generated, the handling of which often requires use of mechanical equipment, sorting out of materials, etc. Cruise and passenger ships often represent a good example of ships which through either their shipping associations or independently implement codes of practice that recommend separate collection of recyclable items, aimed at recovering certain materials from the common waste streams prior to disposal. Paper, aluminum and glass items are among the most common recyclable materials that are collected separately.

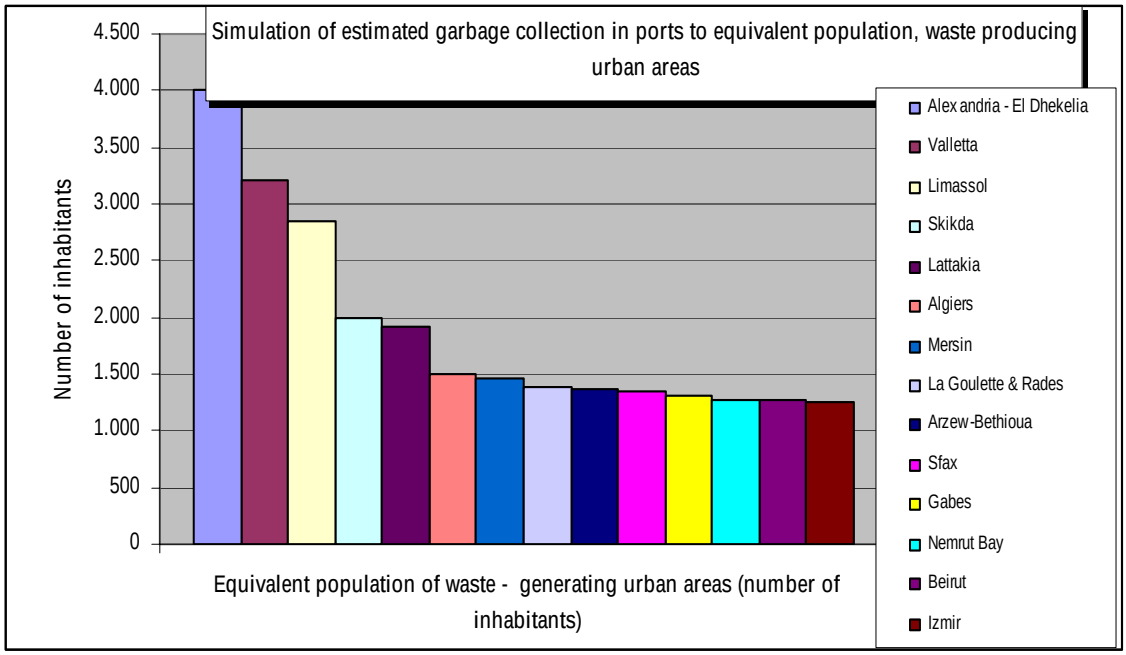
The provision of separate, reception means for recyclable materials is recommended at those ports where recycling is currently taking place in the wider area and also when practices of separate collection have been demonstrated to perform by ships that normally call. In ports that normally accommodate cruise liners and passenger ships, the collection of recyclable garbage is likely to have a considerable effect on the feasibility of recovering materials from both domestic and ship-generated garbage.

B6. Port-based garbage transfer facilities

Transfer facilities for domestic garbage, are mechanized or not facilities where garbage is unloaded from relatively small capacity collection trucks and containers to larger means for transport to a final disposal or processing site. This type of operation is almost always associated with some kind of

compaction, separation, and other waste handling processes. Small scaled, garbage transfer facilities, were considered to represent sound, management practices for ports where large volumes of garbage are delivered from the incoming ships.

It should be noted that a few major ports involved in the project, in terms of the volume of waste streams that are called to manage, can be seen as waste generating, urban areas with equivalent population of more than 2.000 inhabitants.



The establishment and operation of port, garbage transfer facilities could be justified when some or all of the following reasons exist:

- The final, disposal site is situated far from the port area and there is a need for the collection trucks to travel a shorter distance to return quickly to their primary tack of receiving garbage from ships. The fact also that several ports are located within or close to urban areas and the trend of building new landfills or other processing sites at a considerable distance from the collection service areas, could make attractive the operation of transfer stations.

- The collection trucks that are employed for accessing the berthing sites of a port to collect garbage are small and not suitable for the terrain they have to move to reach the disposal sites. The use of larger trucks, trailers or compacting vehicles can enable the disposal of larger volumes of garbage in longer distances increasing the collection productivity.

- When needs exist for inspecting any potentially hazardous waste from ships prior to final disposal, for separating recyclable materials or removing bulky cargo-associated waste, etc.

The incorporation of a transfer facility in a waste management plan of a port should be studied in detail to provide its type and functions and most importantly to assess the feasibility whether its operation is economically viable in relation with the capital costs required, labor needs and the garbage collection fees. However, it is recommended that mechanically assisted, garbage transfer facilities, to be established on a pilot basis, at least in ports where garbage delivery exceeds the rate of 2.000 capita - waste producing urban areas (ports of Alexandria, Valetta, Limassol and Skikda).

B.7 Collection and management of hazardous wastes

During the missions to the ports of the project, concerns were expressed by several Port Authorities on the potential presence of hazardous materials and wastes into the solid waste streams normally collected from ships.

The International Convention for the Prevention of Pollution from Ships, MARPOL 73/78 and its related Annexes including those of Annex I and V, does not provide details for the disposal of ship-generated wastes to reception facilities, therefore the proper handling and management of them remains to be achieved in compliance with the local rules and legislation.

This kind of management becomes more demanding when hazardous wastes produced either during the normal operation of ships or during repairs and other works in ship repairing zones and facilities, are collected for further disposal.

Regulations have been developed in a few countries across the world, aimed to ensuring that special wastes, in practice, potentially hazardous wastes from ships, are handled with responsibility from anyone who may carry and deliver or receive them.

Wastes from ships that could be hazardous are those listed or delineated in terms of the properties they display, in specific catalogues of basic legal instruments such as the Basel Convention, the Barcelona Convention related Hazardous Protocol, the E.U. Council Directive 91/689/EEC, etc.

To indicate a few of these potentially, hazardous wastes from ships, the following table of Wastes and Substances that may be onboard a vessel has been extracted from the “List of hazardous waste and substances under the Basel Convention that are onboard or inherent in the ships’ structure when a vessel arrives at a dismantling site” which is incorporated in the Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships, Decision VI/24 as adopted by the Sixth Meeting of the Conference of Parties to the Basel Convention, 13/12/2002.

Wastes (excluding those specified on List B of the Convention)	**Product where waste may be found**
A 1170 Unsorted waste batteries	Portable radios, torches
A 3140 Waste non halogenated organic solvents	Solvents and thinners
A 3150 Waste halogenated organic solvents	Solvents and thinners
A 4010 Wastes from the production, preparation and use of pharmaceutical products	Miscellaneous medicines
A 4030 Wastes from the production, formulation and use of biocides and phytopharmaceuticals including waste pesticides and herbicides which are outdated, off-specification or unfit for the intended use	Insecticide sprays
A 4070 Wastes from the production, formulation and use of inks, dyes, pigments and paints etc.	Paints and coatings
A 4140 Waste consisting of or containing off specification or outdated chemicals corresponding to Annex I categories and exhibiting Annex III hazard characteristics	Consumables

It should be noted that in the framework of the 1996, Barcelona Convention related LBS Protocol and the Strategic Action Program to Address Pollution from Land-Based Activities, a number of important targets and proposed measures in national and regional level have been adopted with regard to hazardous waste management. The recommendations set below are in line with the abovementioned Action Program:

- Where facilities for the environmentally sound treatment and disposal of hazardous wastes are to be established or currently operate, considerations should be made for the hazardous waste streams that may originate from major shipyards and ship repairing zones and the feasibility of properly disposing them to these facilities.

- When national plans are developed for the management of hazardous wastes, an evaluation of the quality and quantity of hazardous wastes from ships delivered in the ports and other facilities of the country should be included.

- The cost recovery and polluter pays principles should be integrated into future hazardous waste management plans to ensure their economic viability and to encourage the involvement of private sector.

- Ship – port notification systems and procedures, established to facilitate the collection of wastes from the available facilities, should enable the formal exchange of information on the existence of hazardous wastes or substances and the subsequent need for disposal at the port.

B8. Oily wastes treatment and disposal

Bilge water and sludge produced in the machinery spaces of ships represent a kind of liquid waste, usually heavily contaminated with fuel and lighter oils, pollutants such as inorganic salts, metals, sea water, etc. Similarly regardless of the hydrocarbons concentration, oil contaminated ballast and tank washings may contain pollutants such as residues from crude oil, fuel oils and other oil products carried as cargo on oil tankers. Taking into account the IMO recommended practices for new buildings, waste oils such as used or exhausted mineral – based lubricating oils, which have become unfit for use, could be contained in separate tanks from those where sludge or drainage is stored.

It should be noted that oily wastewater mixtures in general and waste mineral oils are distinguished for the purposes of the:

a) Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Waste and their Disposal, where in Annex I (Categories of hazardous wastes), the following categories are given:

Y8 Waste Mineral oils unfit for their originally intended use

Y9 Waste oils/water, hydrocarbons/water mixtures, emulsions

- Protocol for the Prevention of the Mediterranean Sea against Pollution from Land Based Sources and Activities, where in Annex I, C, the following categories of substances are given:

6. Used lubricating oils

10. Crude oils and hydrocarbons of petroleum origin

Wastestreams estimations and assessment of ports' needs led to the proposal of the establishment of a number of facilities to collect and treat oily wastes at 12 ports and terminals of the project.

Since collection of oily wastes either in the form of oily bilge water and sludge or dirty ballast and tank washings from ships is a batch process, the reduced daily volume to be received and treated for each one of these facilities was estimated to enable the further study of the whole treatment process. These volumes vary from 8 to 1.100 cub. meters/day. Two items that were considered to be essential for identifying the favourable level of treatment were as follows:

a) Discharge of effluent water from port-based reception and treatment facilities

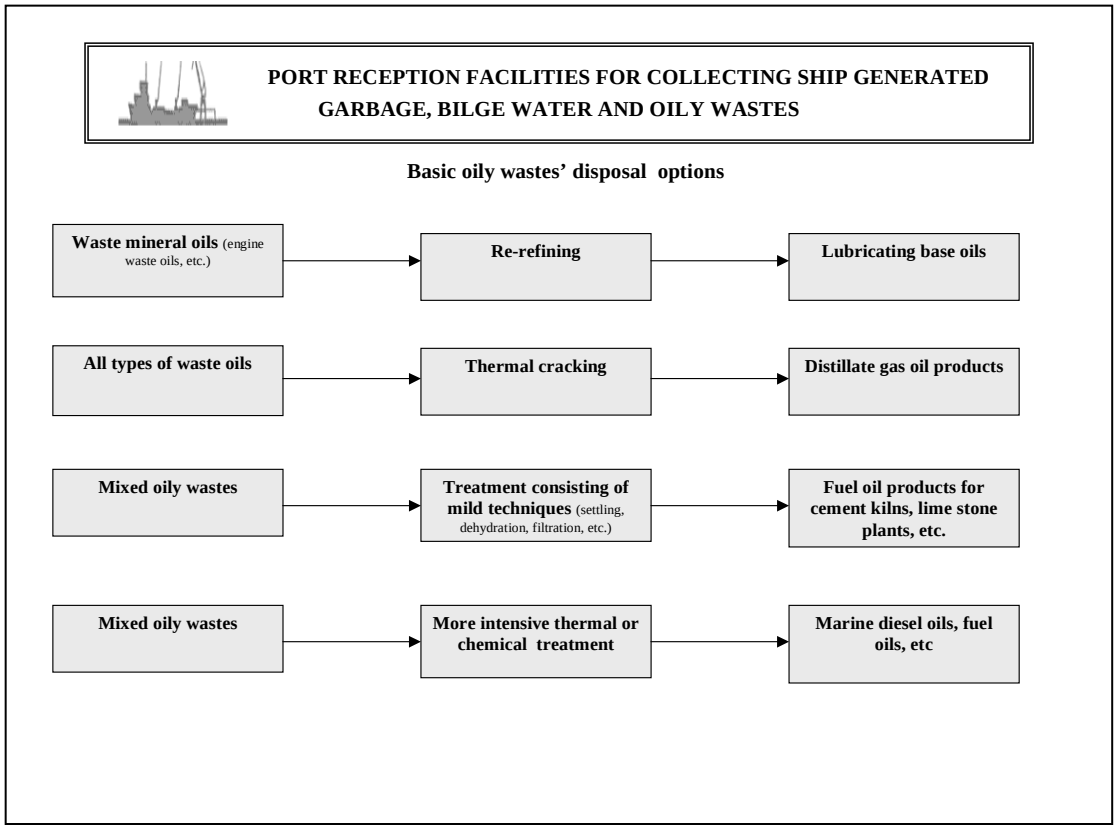
Discharges of effluent water produced during treatment of oily wastes can be considered as point source, industrial discharges, the authorization and

control of which can be dealt with, in the framework of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and certainly in accordance with any national or local existing regulations. Unless wastewater reclamation is to take place, the basic, recommended principle that must be taken into account, is that the resultant effluent water should be subjected to such a treatment that discharges directly at sea or into an existing sewage network have the prescribed concentration limits for petroleum hydrocarbons but also for other pollutants that are likely to be present.

b) Treatment and final disposal of oily wastes

The operation of a port-based treatment facility assisted by an efficient collection system can ensure that illegal dumping or even burning of oily wastes collected from ships is prevented. Waste Oils Directive 75/439/EC as amended, gives priority, in managing waste oils, to processing by regeneration, then to combustion and finally to safe destruction and disposal. In parallel, Guidelines for treatment of used lubricating oils have been issued by the UNEP/MAP in collaboration with WHO.

A comprehensive diagram of the different oily wastes routes in terms of the after-treatment and disposal processes used and the final products, is presented below:



Generally, oily wastes can be recovered and recycled, either directly in the case of high oil content wastes or after some form of separation and concentration from high aqueous content wastes such as dirty ballast. While certain types of oily wastes such as waste mineral oils in particular, can be subjected to regeneration processes which give products of comparable quality to the original base material, a large volume of oily wastes is used for its energy potential as a secondary or substitute fuel.

Apart from economic considerations, regeneration of waste mineral oils from ships is an option depending to some degree on the quality of waste oils and in particular on the presence of contaminants that can disrupt the technical performance of some of the processes used. There is no doubt that the most important sources of waste oils in the form of waste mineral oils are the land – based ones such as the industry, motor vehicles, etc.

National or local programs that will be implemented or currently are in progress for collecting, recycling and disposing of used lubricating oils is recommended to be extended also in ports and terminals where the delivery of separated, waste oil from ships has been demonstrated.

During the missions in the ports of the project, it was realized that most of the existing oily wastes treatment facilities employ mild processing techniques to produce either replacement fuel oil for cement kilns, large boilers, or more severe processing techniques to produce marine, fuel oils following blending with standard fuels.

The operation of the recommended, new reception and pre-treatment facilities should ensure that oil recovered from the treatment process, is disposed of in the proximity of the port area minimizing the need of distant road or sea transport and that are re-used in a way that does not pose risks to the environment or to human health.

Annex I

Directive 2000/59/EC on Port Reception Facilities – Notification Document

INFORMATION TO BE NOTIFIED BEFORE ENTRY TO THE PORT OF .....

1. Name, call sign and, where appropriate, IMO identification number of the ship:

2. Flag State:

3. Estimated time of arrival (ETA):

4. Estimated time of departure (ETD):

5. Previous port of call:

6. Next port of call:

7. Last port and date when ship-generated waste was delivered:

8. Are you delivering

   all ☐ some ☐ none ☐(*)

   of your waste into port reception facilities?

9. Type and amount of waste and residues to be delivered and/or remaining on board, and percentage of maximum storage capacity:
   If delivering all waste, complete second column as appropriate.

   If delivering some or no waste, complete all columns.

Type	Waste to be delivered m^3	Maximum dedicated storage capacity m^3	Amount of waste retained on board m^3	Port at which remaining waste will be delivered	Estimated amount of waste to be generated between notification and next port of call m^3
1. Waste oils					
Sludge					
Bilge water					
Others (specify)					
2. Garbage					
Food waste					
Plastic					
Other					
3.Cargo-associated waste(1) (specify)					
4.Cargo residues(1) (specify)					

(1)May be estimates

(*) Tick appropriate box

Notes:

1. This information may used for port State control and other inspection purposes.
2. Member States will terminate which bodies will receive copies of this notification.
3. This form is to be completed unless the ship is covered by an exemption in accordance with article 9 of Directive 2000/59/EC.

I confirm that

the above details are accurate and correct and

there is sufficient dedicated onboard capacity to store all waste generated between notification and the next port at which waste will be delivered.

Date……..

Time……..

Signature……..

ANNEX

QUESTIONNAIRES RELATED TO ACTIVITY A

QUESTIONNAIRE 1

ρ **REVIEW OF THE NATIONAL LEGISLATIVE FRAMEWORK RELATED TO THE PROVISION OF PORT RECEPTION FACILITIES FOR SHIP - GENERATED WASTE**

A. General

1. As a Signatory Party to the International Convention MARPOL 73/78 and its Annexes I and V dealing with the prevention of oil and garbage pollution respectively from ships, has your country adopted any regulations dealing exclusively with the provision of reception facilities for ship-generated waste at its ports, harbors and terminals?

☐ No ☐ Yes

If yes, please mention the legal instrument/s (act, regulations, etc), and provide a summary of its/their requirements *(you are kindly requested to attach a copy of it/ them).*

If not, please mention the legal instrument, in accordance with, MARPOL 73/78 and its Annexes I and V were ratified.

2. Annex I and V Regulations of MARPOL 73/78 require that all ships within the designated Special Area of the Mediterranean Sea, may discharge oily wastes and garbage at sea by complying with particularly strict criteria. Do you apply more stringent requirements than those of the abovementioned Annexes in your ports or the territorial sea? If yes, please specify.

3. Indicate the legal entities/authorities who are responsible to provide reception facilities for ship-generated oily waste and garbage at the ports of the country?

☐ Port Authorities

☐ Terminal Operators

☐ Other *(please mention accordingly)*

4. Does your country require from specific major ports to provide waste reception facilities for ships? If yes, please name these ports and mention any relevant regulations/legal instruments that the above mentioned requirement stems from (*(you are kindly requested to attach a copy of them).*

5. Are the Port Authorities of the country required to have an approved Waste Management Plan for either ship-generated waste or waste produced from normal port operations?

☐ No ☐ Yes

If yes, please answer the following questions:

ρ Which ports exactly should comply with the above mentioned requirement *(e.g. all oil loading terminals, etc)*

ρ Which governmental authority or/and local agency is entitled to approve the Plan?

ρ Does the Waste Management Plan constitute a part of an overall Environmental Management System for ports?

☐ No ☐ Yes

6. Are ships calling to the ports of the country required to deliver their waste to port reception facilities before departing from the port? If yes, please mention any possible exemptions granted from this requirement.

☐ No ☐ Yes

7. Are ships calling at the ports of the country subject to inspections, to verify compliance with MARPOL Annex I and V discharge criteria and waste retention onboard requirements? If yes, please provide a summary of the relevant inspection procedures.

B. Waste management in ports and their surrounding areas

8. Please, mention the competent authorities of the country that are responsible for the planning, control and the implementation of the waste management strategy, summarizing also their relevant responsibilities

9. Is there a management strategy *(e.g. addressing issues such as the hierarchy of the favorable disposal methods, treatment standards and targets for the safe and environmentally sound disposal of waste, etc),* for those waste products included in the LBS Protocol of the Barcelona Convention or any other instruments?

☐ No ☐ Yes

If yes, please mention the legal instrument/s and provide a summary of its/their general requirements

B.1 Oily waste and residues from ships

10. Is there a separate legal instrument dealing with the collection, treatment and disposal of oily wastes from either land-generated or ship-generated sources?

☐ No ☐ Yes

If yes, or in any case that general waste regulations apply, please answer the following:

11. Mention the respective instrument (e.g. Act, Regulation, etc.) (you are kindly requested to attach a copy of them).

12. Are ship-generated oily wastes *(such as bilge oil and sludge from machinery spaces, oily ballast and tank washings, etc.)* included in the above instrument or in other regulations?

☐ No ☐ Yes

If not, please mention any other relevant regulations dealing with these wastes *(you are kindly requested to attach a copy of them).*

13. Summarize any initiatives or measures taken to ensure that waste oils are collected and disposed of without causing any avoidable damage to the environment and human health.

14. Is there a licensing and supervision scheme for those collecting, treating and disposing of waste oils?

☐ No ☐ Yes

If yes, please indicate below or add accordingly, the criteria that they should meet in order to obtain this permit:

☐ Technical Capability (means, equipment and personnel) to handle the anticipated types and quantities of waste oil delivered at port

☐ Compliance of the equipment used with any relavant technical requirements

☐ Approval of the environmental terms, according to, waste oil collection should be carried out

☐ Working experience and competence

☐ Proper treatment and disposal methods

15. Which is/are the approved, preferable method/methods for waste oils treatment and disposal? Please indicate one or more of the following or supplement other if necessary, by providing also a number that indicates the hierarchy of the preferred methods:

☐ Regeneration (refining into base oils)

☐ Combustion (following a primary treatment, use as fuel oil in cement kilns, power plants, etc)

☐ Combustion (following distillation, use as fuel oil in industrial and other applications, etc)

☐ Incineration as waste

☐ Other ways of disposal

16. Are oily wastes generated from oil spill incidents within the ports or in the wider territorial sea of the country regulated in accordance with the previously outlined framework?

☐ No ☐ Yes

If not, please give an outline of any separate control and management system for this kind of oily wastes

B.2 Garbage from ships

17. Is there a separate legal instrument dealing with the collection, treatment and disposal of garbage from either land-generated or ship-generated sources?

☐ No ☐ Yes

If yes, or in any case that the existing national regulations for waste in general, provide already a legal framework for garbage, please answer the following:

18. Mention the instrument (e.g. Act, Regulation, etc.) (you are kindly requested to attach a copy of them).

19. Please, indicate which of the following undertakings, may collect and manage garbage delivered at ports:

☐ Public Authorities (*e.g. Local Municipalities, etc.)*

☐ Private Companies

☐ Other organizations *(please specify)*

20. Are those undertakings required to have an appropriate permit to carry out the collection, storage, transportation and disposal of garbage received from ships?

If yes, please indicate below or add accordingly the general criteria, they should meet to obtain this permit:

☐ Technical Capability (means, equipment and personnel) to handle the anticipated types and quantities of garbage delivered in port

☐ Compliance of the equipment used with any relevant, technical requirements

☐ Approval of the environmental terms, according to, garbage collection should be carried out

☐ Working experience and competence

☐ Proper treatment method and final disposal

21. Please, provide a summary of any technical specifications that the collection, temporary storage, transportation, treatment and disposal of ship-generated garbage or domestic garbage in general should meet:

22. Please, indicate the allowable disposal methods of ship-generated garbage or domestic garbage and *attach* any information regarding treatment plants and disposal sites locating in the proximity of the ports involved in the project:

- ☐ Disposal in approved landfills
- ☐ Sorting and recycling of specific materials
- ☐ Sorting and production of garbage derived fuels
- ☐ Composting of organic material
- ☐ Other

23. Please indicate the legal instrument/s used to provide the classification of hazardous waste:

- ☐ Barcelona Convention Protocol on the prevention of pollution of the Mediterranean Sea by transboundary movements of hazardous waste and their disposal, 1996
- ☐ Basel Convention on the control of transboundary movements of hazardous waste and their disposal, 1989
- ☐ Other Regional or International Agreements *(please specify)*

_____

_____

_____

_____

_____

- ☐ National Regulations *(please specify and attach a copy)*

_____

_____

_____

24. In case that national regulations apply, please, indicate which of the following approaches are used to identify, classify and describe hazardous waste:

☐ Description of waste indicating type, origin and its constituents

☐ Definition of waste by certain characteristics involving testing procedures

☐ Definition of waste in association with concentration limits of harmful substances

☐ Other *(please specify)*

25. Are oily and soild wastes produced by ships listed as hazardous waste? If yes, please mention those types of ship-generated wastes listed as hazardous.

1. Are there any measures provided for the protection of specific agricultural products, indigenous wildlife or the human population of the country that might be threatened by quarantine waste delivered by ships?

☐ No ☐ Yes

If yes, please answer the following questions:

ρ Are ships calling at the ports of the country notified to take appropriate steps to properly store and deliver such waste?

☐ No ☐ Yes

ρ Are separate receptacles required for the reception of quarantine waste?

☐ No ☐ Yes

ρ Are these receptacles required to be located in specific sites of the ports?

☐ No ☐ Yes

ρ How are these wastes disposed of?

☐ Incinerated

☐ Disposed to landfills

☐ Sterilized

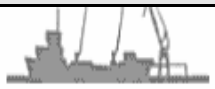
☐ Other disposal methods *(Please, specify)*

ρ Please, mention any other measures taken for the management of quarantine waste

C. Other information to be requested for collection during the task mission

- Any up to date inventory of available reception facilities at ports and terminals
- Any evaluation results of the adequacy of port reception facilities
- Any information on the national planning and development of the ports involved in the MEDA project
- List and details of approved oily waste treatment installations and disposal plants
- List and details of approved solid waste treatment installations and disposal sites

QUESTIONNAIRE 2



MEDA PROJECT - QES.2

QUESTIONNAIRE FOR OIL TERMINALS

A. General Information

– **Port / Terminal**

– **Port Authority**

Name

Address

Telephone

Fax

E-mail

- **Terminal Operator**

Name

Address

Telephone

Fax

E-mail

- **Terminal Contact Person Details**

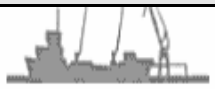
Name

Address

Telephone

Fax

E-mail



MEDA PROJECT - QES.2

QUESTIONNAIRE FOR OIL TERMINALS

1. Please, indicate the type of the terminal and provide the requested information

Type of Terminal	Operations		
	Loading	Unloading	Average loading /unloading rate *(metric tonnes per year)*
- **Crude Oil Terminal** *(tick accordingly)*	☐	☐	☐

- **Oil Products Terminal**			Average rate *(metric tonnes per year)*	
Type of oil product	Loading	Unloading	Loading	Unloading
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

2. Indicate the type of the terminal in terms of the berthing/mooring infrastructure provided to tankers

- Dockside berth/s ☐
- Jetty Berth/s ☐
- Single Buoy Mooring Terminal ☐

- Multi Buoy Mooring Terminal ☐
- Fixed Mooring Tower ☐

3. Is there a requirement for oil tankers calling at the terminal to arrive with only clean or segregated ballast

Yes ☐

No ☐

4. Is there a navigational entrance along a seawater course to the terminal with low depth contour that might require a draught reduction through ballast discharge?

Yes ☐

No ☐

If yes, please provide the location of this entrance and the necessary underkeel clearance for approaching tankers

_____

_____

_____

5. Mention any other ballast and cargo handling requirements addressed by the terminal to oil tankers engaged in its operation.

_____

_____

_____

QUESTIONNAIRE FOR OIL TERMINALS

6. Provide, if available, the information requested below

Year	S.B.T./D.C.B.T. Tankers			Non S.B.T. tankers					
				Tankers whose last port of call was within the Mediterranean, Black or Red Sea			Tankers whose last port of call was outside these areas		
	Number of tankers arrived at the terminal	Average deadweight of tankers (t.dw)	Maximum deadweight of tankers (t.dw)	Number of tankers Arrived at the terminal	Average deadweight of tankers (t.dw)	Maximum deadweight of tankers (t.dw)	Number of tankers Arrived at the terminal	Average deadweight of tankers (t.dw)	Maximum deadweight of tankers (t.dw)
2002									
2001									
2000									

7. How is information on the availability and use of port reception facilities for oily wastes and garbage provided to ships?

8. Are there any procedures for receiving and processing reports of alleged inadequacy of the port reception facilities? If yes, please specify.

9. Is prior notice by the Master of an oil tanker wishing to deliver dirty ballast or other oily residues required to arrange collection?

Yes ☐ **No** ☐

If yes, please provide a summary of the terminal notification requirements for the receipt of oily wastes

_____

_____

_____

10. Does the terminal have an approved Oil Spill Contingency Plan?

Yes ☐ **No** ☐

If yes, summarize the existing arrangements (port operated pollution fighting means, contractors, etc.), emphasizing on the temporary storage and treatment capacities for spill generated liquid and solid waste *(please attach additional information, if necessary)*

_____

_____

_____

QUESTIONNAIRE FOR OIL TERMINALS

B. Terminal Operated Reception Facilities for Dirty Ballast and other Oily wastes

B1. Collection means and capacity

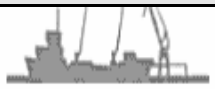
– **Does the terminal provide a reception facility for dirty ballast, oil tank washings and other oily wastes from oil tankers ?**

Yes ☐

No ☐

If yes, please provide the requested information to the following table:

Type of oily waste	**Terminal Operated Collection Facilities**	
Dirty ballast	– **Type of collection means** Fixed Piping Installation ☐ Floating Mobile Means (Barges, etc) ☐ Land based Mobile Means (Road tankers, etc) ☐ – **Location of facilities/ Berth Availability** *(attach any necessary diagram or map)*	**Collection capacity** (m3/hour) / **Storage capacity** (m^3 or metric tonnes) – **Brief Description of dirty ballast collection facility** *(i.e. number and capacity of barges, jetty pipeline dimensions, etc)* – **Limitations/Restrictions** *(i.e. presence of chemicals, etc)* - **Cost for the collection of dirty ballast**



MEDA PROJECT - QES.2

QUESTIONNAIRE FOR OIL TERMINALS

Type of oily waste	**Terminal Operated Collection Facilities**	
Tank washings	– **Type of collection means** Fixed Piping Installation ☐ Floating Mobile Means (Barges, etc) ☐ Land based Mobile Means (Road tankers, etc) ☐ – **Location of facilities/ Berth Availability** *(attach any necessary diagram or map)*	**Collection capacity** (m3/hour) / **Storage capacity** (m^3 or metric tonnes) – **Brief Description of tank washings collection facility** *(i.e. number and capacity of barges, jetty pipelines, etc)* – **Limitations/Restrictions** *(i.e. presence of chemicals, etc)* - **Collection cost**
Other oily residues	If a reception facility is available for machinery spaces oily waste as well as for cargo tanks scale and sludge, please provide similar information as above.	

11. Please, provide the following information, if available

Dirty Ballast and other oily residues delivered from tankers							
Year	Total Number of tankers arrived at the terminal	Number of tankers that requested to deliver dirty ballast and other oily residues	Quantities of oily waste delivered at the terminal (tonnes or m^3)				
			Oily waste from cargo and ballast spaces			Oily waste from machinery spaces	
			Dirty ballast	Tank washings (slops)	Scale and sludge from tanker cleaning	Oily bilge water	Sludge and other used oils
2002							
2001							
1999							

12. Is the reception facility open to vessels other than oil tankers engaged in the operation of the terminal ?

Yes ☐

No ☐

If yes, please mention the conditions that oily wastes from these ships might be accepted by the Terminal

B2. Treatment and Disposal

13. Please, summarize the treatment process for each type of oily waste collected

Type of oily waste	Oil/water separation and treatment process		
	Primary treatment		
	Type of process *(i.e. settling tanks, API separators, etc.)*	Treatment capacity *(m^3/hour or other m.unit)*	Oil content in the effluent *(mg/lt or %)*
Dirty ballast			
Tank washings (slops)			
Scale and sludge from tanker cleaning			
Other oily wastes from machinery spaces			

Type of oily waste	Oil/water separation and treatment process		
	Secondary or other additional treatment		
	Type of process *(i.e. DAF, filtration, biological treatment, etc)*	Treatment capacity *(m^3/hour or other m.unit)*	Oil content in the effluent *(mg/lt or %)*
Dirty ballast			
Tank washings (slops)			

Scale and sludge from tanker cleaning			
Other oily wastes from machinery spaces			

14. Please, specify the quality that effluent water from oily wastes treatment, should meet to be discharged at sea? In case that the effluent quality involves more parameters than the oil content, please fill in the following table accordingly.

Effluent water parameters	Maximum allowable concentration for direct discharge
Oil concentration	
BOD_5	
COD	
pH	
Metals	
N	
P	
Other	

15. Have you identified any contaminants in the collected oily wastes, the presence of which may constitute a problem for their treatment and disposal? If yes, please specify:

16. How is oil, recovered from the separation and treatment process, disposed of?

17. Provide the cost of oily wastes treatment and disposal (In case that the collection cost indicated previously incorporates treatment and disposal costs, do not take into account this question)

18. Provide, any quality specifications that recovered oil should meet to be properly disposed of.

QUESTIONNAIRE FOR OIL TERMINALS

C. Reception Facilities for Dirty Ballast and other oily wastes provided by local contractors

C1. Collection means and capacity

19. Please mention any potential contractors or other organizations that are able to receive dirty ballast and other oily wastes from tankers calling at the terminal

Name and contact details of the contractor	Type of waste collected	Collection means and capacities			Collection cost per type of waste
		Means of collection	Collection capacities (m^3/hour)	Temporary storage capacity (m^3 or metric tonnes)	

20. Please, provide if available, the requested information to the following table

Dirty Ballast and other residues from tankers collected by the registered contractors							
Year	Total Number of tankers arrived at the terminal	Number of tankers that requested to deliver dirty ballast and other oily residues	Quantities of oily waste delivered at the terminal (tonnes or m^3)				
			Oily waste from cargo and ballast spaces			Oily waste from machinery spaces	
			Dirty ballast water	Tank washings (slops)	Scale and sludge from tanker cleaning	Oily bilge water	Sludge and other waste oils
2002							
2001							
1999							

QUESTIONNAIRE FOR OIL TERMINALS

C2. Treatment and Disposal

21. Where are collected dirty ballast and other oily wastes treated? (Please, provide the name, location and capacity of the treatment facility)

22. Please, summarize below, how collected oily waste is treated

Type of oily waste	Oil/water separation and treatment process		
	Primary treatment		
	Type of process (settling, separation in API equipment, etc)	Treatment capacity (m^3/hour or other m.unit)	Oil content in the effluent (mg/lt or %)
Dirty ballast			
Tank washings (slops)			
Scale and sludge from tanker cleaning			
Other oily wastes from machinery spaces			

Type of oily waste	Oil/water separation and treatment process		
	Secondary or other additional treatment		
	Type of process (i.e. DAF, filtration, biological treatment, etc)	Treatment capacity (m^3/hour or other m.unit)	Oil content in the effluent (mg/lt or %)
Dirty ballast			

Tank washings (slops)			
Scale and sludge from tanker cleaning			
Other oily wastes from machinery spaces			

23. Please, specify the quality that effluent water from oily wastes treatment, should meet to be discharged at sea? In case that the effluent quality involves more parameters than the oil content please, fill in the following table accordingly.

Effluent water parameters	Maximum allowable concentration for direct discharge
Oil concentration	
BOD_5	
COD	
pH	
Metals	
N	
P	
Other	

24. Have you identified any contaminants in the collected oily residues, the presence of which may constitute a problem for their treatment and disposal ? If yes, please specify:

_____

_____

25. Provide the treatment and disposal cost (In case that the collection cost indicated previously incorporates treatment and disposal costs, do not take into account this question)

26. How is the oil, recovered from the separation and treatment process, disposed of?

27. Mention any quality specifications that oil recovered, should meet to be disposed of.

28. Does the terminal provide any facilities for collecting garbage from oil tankers and other ships?

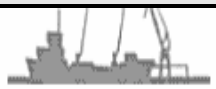
Yes ☐

No ☐

If yes , please mention who provides the garbage collection, the existing collection capacity and means used, any restrictions as well as the final disposal method.

29. Please, provide any other information or comments on your terminal needs for providing reception facilities that need to be taken into account and reflected in our study.

QUESTIONNAIRE 3



QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

A. General Port Information – Infrastructure and Traffic

- **Port**

- **Port Authority**

Name

Address

Telephone

Fax

E-mail

- **Port Authority Contact Person Details**

Name

Address

Telephone

Fax

E-mail

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

1. Please indicate the legal status *(tick accordingly)* of port management and provide any additional information, if appropriate

- National State managed ☐

- Local State managed ☐

- Private Enterprise ☐

- Other *(please specify)* ☐

2. Please, indicate the type of the port

Solid bulk cargoes Terminal ☐

Container terminal ☐

Oil Terminal ☐

NLS/Liq. gasesTerminal ☐

Break bulk Cargo Terminal ☐

Cruise Terminal ☐

Passenger Terminal ☐

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

Multipurpose Port ☐

Ship-repairing Port ☐

Other ☐

3. Please, complete the following table

Year	Total number of ship calls *	Containerized cargo throughput *(TEUs)*	Crude oil & oil products throughput *(met. Tonnes)*	Bulk liquid products other than oil throughput *(met. Tonnes)*	Solid bulk and general non-containerized cargo throughput *(met. Tonnes)*
2002					
2001					
2000					

** (excluding harbour vessels engaged in the daily operation of the port and passenger/cruise ships)*

4. Complete the following table and attach a ground plan or a map of the port demonstrating the location of existing terminals and berths

A/A	Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
					LOA (m)	DWT (t.dw)

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

A/A	Name of Berth	Designed/ Actual Depth (m)	Berth overall length (m)	Type of ships that can be accommodated	Maximum size of ships accommodated	
					LOA (m)	DWT (t.dw)

5. Please, provide the following information related to the shipping traffic at the port

Year	Cruise ships and passenger ships				
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*	Average number of persons onboard	Average duration of ships stay at the port *(days or hours)*	Average duration of voyage from last port of call *(days or hours)*
2002					
2001					
2000					

Year	Bulk carriers and general cargo ships				
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*	Average number of crew onboard	Average duration of ships stay at the port *(days or hours)*	Average duration of voyage from last port of call *(days or hours)*
2002					
2001					
2000					

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

Year	**Container ships and Ro-Ro carriers**				
	Number of ships calling at the port	Average Size of ships *(t.dw or grt)*	Average number of crew onboard	Average duration of ships stay at the port *(days or hours)*	Average duration of voyage from last port of call *(days or hours)*
2002					
2001					
2000					

Year	**Harbour Ships and Craft (Tugs, Bunker Supplying Craft, etc.)**	
	Number of ships	Average duration of stay at the port *(days out of a week)*
2002		
2001		
2000		

6. In case that there is a designated anchorage within the port area, please provide the following information:

Position of anchorage

Depth

Type of ships normally anchored

Average monthly number of ships anchored

Average stay duration at the anchorage

7. Please, provide a brief summary of the future port development planning *(e.g. development of new or shifting of existing terminals, potential port expansion projects, etc)* and attach any additional information

8. How is information on the availability and use of port reception facilities for oily wastes and garbage provided to ships?

9. Are there any procedures for receiving and processing reports of alleged inadequacy of port reception facilities? If yes, please specify.

B. Ship repairing and tank cleaning facilities

10. Please, provide the following information in case that the port has ship-repair yards and/or tank cleaning facilities

10.1 Ship repair yards

Dry docks		Other berthing facilities (quays, etc)	
Name of yard operator / Location of dry dock	Maximum allowable size of ships that can be accommodated (t.dw)	Name of operator/ Location of berthing facility	Maximum allowable size of ships that can be accommodated (t.dw or LOA)

Annual number of ships accommodated in the ship repair yards				
Year	Oil tankers	Other cargo ships	Passenger ships	Other
2002				
2001				
2000				

10.2 Tank cleaning facilities

Tank cleaning facilities details				
Name of facility operator/Location of tank cleaning facility	Maximum allowable size of oil tankers that can be serviced (t.dw or LOA)	Rate of reception (m^3/h)	Storage Capacity (m^3 or metric tonnes)	Type of washings that can be received

Annual number of oil tankers and other ships serviced in the facilities		
Year	Oil tankers	Other ships
2002		
2001		
2000		

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

C. Reception facilities for garbage from ships

11. Is there a facility for collecting garbage from ships?

Yes ☐

No ☐

If yes, please answer the following questions:

12. Please, indicate who provides the garbage collection services in your port? In other than a port operated facility, please provide below the name and other contact details of the entity.

Port Authority ☐

Private Company ☐

Public Service ☐
(i.e. Local Municipality, etc)

Other ☐

13. In case that there are restrictions to the reception of garbage, please indicate accordingly and provide any necessary information:

☐ Limited quantities can be only collected

☐ Special ship-generated garbage can not be collected (i.e. halon containing pressure vessels, pyrotechnics, etc)

☐ Other

14. Indicate the garbage collection service availability:

☐ Businness hours only

☐ 24 hours/day

☐ Other, (please specify)

☐ At all berths

☐ At a limited number of berths

☐ To ships anchored within or outside the port

☐ Other (please specify)

15. Is prior notice required from ships to arrange garbage collection?

Yes ☐

No ☐

If yes, please indicate accordingly:

☐ At least 24 hours prior to ship arrival

☐ At the earliest upon departure from the last port of call

☐ Other, *please specify*

16. Mention any port requirements to ships regarding the separation and containment of garbage to be delivered

17. Indicate the nature of the cost charged for the garbage collection service

☐ At no cost

☐ At a cost incorporated into the standing port use charge

☐ At a cost charged additionally

☐ Ships are paid

☐ Other, please specify

18. Please, provide the cost of garbage collection service and any variations in terms of the type of ships, quantity collected, etc)
(per cubic meter or ton collected)

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

19. Please, provide the following information on the existing garbage collection means

Receptacles *(i.e. containers, barrels, etc)*		**Floating barges** (used as reception and transportation means)		**Trucks** (used as reception and transportation means)		**Other reception means**	
Number of receptacles provided at the port	Total reception capacity (m^3)	Number of barges berthed at the port	Total reception capacity (m^3)	Number of barges berthed at the port	Total reception capacity (m^3)	Number of items provided at the port	Total reception capacity (m^3)

20. Mention, any temporary storage means, other than the above, provided in the port where collected garbage may be stored prior to its final disposal

Temporary storage means		Total storage capacity (m^3)
Type / Location	**Number**	

21. Mention, any compacting or sorting equipment operating in the port, if available

22. Please, provide, if available, the following information on the quantities of ship-generated garbage delivered to port for the last three years

Year	Number of ships requested to deliver garbage	Quantity or volume of garbage collected from ships (tons, m^3)
2002		
2001		
2000		

23. Please, indicate and provide any necessary information on how and where garbage collected from ships is finally disposed of. In any case, mention

- the location of the treatment/disposal facility,
- its distance from the port,
- its identity (public or private),
- any specifications that garbage to be disposed of should meet and,
- disposal costs

☐ Controlled Landfilling

☐ Separation and Recycling

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

☐ Incineration of non biodegradable garbage

☐ Composting of organic garbage

☐ Other disposal method

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

D. Reception facilities for oily wastes from ships

24. Are there facilities for collecting oily wastes from ships? (Answer Yes or No and please indicate who provides the collection service *)

Collection service provider* *(name and other contact details)*	Oily waste and residues originated from ships				
	Dirty Ballast Water	Tank washings	Scale and sludge from tank cleaning	Oily bilge water	Sludge from fuel oil purifiers

*

- Port Authority
- Private Company
- Public Service
- Other

25. In case that there are restrictions to the reception of oily wastes, please indicate accordingly and provide any necessary information:

☐ Limited quantities can be only collected

☐ Oily waste containing chemicals or other contaminants can not be collected

☐ Other

26. Indicate the availability of oily wastes collection:

☐ Businness hours only

☐ 24 hours/day

☐ Other, *please specify*

☐ At all berths

☐ At limited berths

☐ To ships anchored within or outside the port

☐ Other (please specify)

27. Is prior notice required from ships to arrange oily wastes collection?

Yes ☐

No ☐

If yes, please indicate accordingly:

☐

At least 24 hours prior to ship arrival

☐ At the earliest upon departure from the last port of call

☐ Other, *please specify*

28. Mention any port requirements to ships with regard to the delivery of oily wastes (i.e. separation of used lubricating oils, fuel residues, etc)

29. Indicate the nature of the cost charged for the collection service

☐ At no cost

☐ At a cost incorporated into standing port use charge

☐ At a cost charged additionally

☐ Ships are paid

☐ Other, please specify

30. Please, provide the cost of collection service and any variations in terms of the type of ships, quantity collected, etc)
(per cubic meter or ton collected)

QUESTIONNAIRE FOR PORTS INVOLVED IN THE PROJECT

31. Please, provide the following information on the available collection means

Fixed Port Reception Facilities			**Barges and other floating means**			**Road Tankers and other specialized vehicles**		
Number of installations	Total collection capacity *(m^3/hour)*	Total storage capacity *(m^3)*	Number of barges provided at the port	Total collection capacity *(m^3/hour)*	Total storage capacity *(m^3)*	Number of road tankers provided at the port	Total collection capacity *(m^3/hour)*	Total net weight or volume *(m^3 or tons)*

32. Please, provide, if available, the following information

Year	Number of ships requested to deliver oily wastes	Quantity or volume of collected from ships (tons, m^3)				
		Dirty Ballast Water	Tank washings	Scale and sludge from tank cleaning	Oily bilge water	Sludge from fuel oil purifiers
2002						
2001						
2000						

33. Does the port have an Oil Spill Contingency Plan?

Yes ☐

No ☐

If yes, summarize the existing arrangements (port operated pollution fighting means, contractors, etc.) emphasizing on the temporary storage and treatment capacities for spill generated liquid and solid waste *(please attach additional information, if necessary)*

34. Please, provide any available information on how and where each type of oily wastes collected from ships is treated and finally disposed of. It would be appreciated, if you could provide information on the following:

- the location and identity of any treatment/disposal facility including distance from the port area,
- treatment process details and relevant costs
- any specifications that effluent water to be disposed of, should meet
- disposal of recovered oil and relavant costs

Dirty Ballast Water

Tank Washings

Scale and sludge from tanker cleaning

Oily bilge water and sludge

35. Please, provide any other information or comments regarding your port needs for providing reception facilities that need to be taken into account and reflected in our study.

QUESTIONNAIRE 4

VOLUNTARY QUESTIONNAIRE FOR MASTERS OF SHIPS CALLING AT THE PORT

Dear Captain,

We kindly inform you that a project regarding the needs for oily waste and garbage reception facilities in our port is carried out under the coordination of the Regional Marine Pollution Emergency Response Center for the Mediterranean Sea (REMPEC).

The voluntary completion of this questionnaire by you will contribute significantly to the correct estimation of the capacity that our port should have to collect the waste produced by your ship.

We thank you very much for your kind cooperation and we wish a Happy and Prosperous New Year and calm seas as well. Please, make sure that the questionnaire is delivered back to the Competent Port Authority.

1. YOUR SHIP PARTICULARS

Name of ship _____

Port of Registry - Flag _____

Shipping Company Name _____

Gross Tonnage (GT)_____

Type of ship :

- ❑ Oil tanker
- ❑ Chemical tanker
- ❑ Liquefied gas tanker
- ❑ Passenger Ship
- ❑ RO-RO Passenger ship
- ❑ RO-RO cargo ship
- ❑ Cruise ship
- ❑ Cargo Ship
- ❑ Bulk carrier
- ❑ Container ship
- ❑ Reefer ship
- ❑ Fishing craft
- ❑ Recreational Craft
- ❑ Other (please specify) _____

Number of crew _____

Number of passengers on board _____

Number of days at sea before calling to the port _____

2. PORT RELATED ACTIVITIES

Name of Port / Terminal :

_____

Type of activity the ship is engaged:

- ❑ Crude Oil loading
- ❑ Refined product loading
- ❑ Crude oil unloading
- ❑ Refined product unloading
- ❑ Repairs
- ❑ Tank Cleaning
- ❑ Bunkering
- ❑ Supplies
- ❑ Other (please describe) _____

Date of arrival _____
Date of departure _____
Last port of call _____
Next port of call _____
Last port and date when ship generated waste was delivered: _____
_____

3. SHIP'S EQUIPMENT

The ship is equipped with :

For all ships:

- ❑ Oil filtering equipment (15 ppm)
- ❑ Oil filtering equipment (15 ppm) with alarm and automatic stopping device
- ❑ Sludge tanks
  Capacity .....m^3
- ❑ Bilge holding tanks
  Capacity.....m^3
- ❑ Incinerator for oily residues, filters, grinder, comminutes, shredder, compactor (please specify)

❑ Other acceptable means for the disposal of sludge (please specify)

……

Only for oil tankers :

❑ The ship is provided with slop tanks with a total capacity of ……. m^3 which is ……..% of the oil carrying capacity

The oil tanker is designated as :

❑ Single Hull
❑ SBT
❑ Double Hull
❑ COW
❑ CBT

Storage space for garbage	Storage Capacity (m^3)
Non recyclable-non separated	
Recyclable -separated	
Paper products	
Food wastes	
Glass	
Plastics	
Metals	
Other (please specify)	

4. TYPE AND AMOUNT OF WASTE FOR DISCHARGE TO THE PORT RECEPTION FACILITIES

4.1 Oil

Type of oily waste Quantity

❑ Bilge water _____ m^3
❑ Sludge from FO purifier _____ m^3
❑ Scale and slops from tanker cleaning _____ m^3
❑ Dirty ballast water _____ m^3
❑ Tank washings _____ m^3
❑ Other (please specify) _____ m^3

Where facilities available ?

❑ Yes
❑ No

Are the services satisfactory ?
- ❑ Yes
- ❑ No
- ❑ Other (please specify)

Is the cost reasonable in terms of services ?
- ❑ Yes
- ❑ No
- ❑ Other (please specify)

4.2 Garbage

Type of garbage	Quantity
❑ Plastic _____	m^3
❑ Floating dunnage, lining or packing materials _____	m^3
❑ Ground paper products, rags, glass, metal, bottles, crockery, etc _____	m^3
❑ Paper products, rags, glass, metal, bottles, crockery, etc _____	m^3
❑ Food waste _____	m^3
❑ Incinerator ash _____	m^3
❑ Ash from plastic _____	m^3
❑ Other (please specify) _____	m^3

Where facilities available ?
- ❑ Yes
- ❑ No

Are the services satisfactory ?
- ❑ Yes
- ❑ No
- ❑ Other (please specify)

Is the cost reasonable in terms of services ?
- ❑ Yes
- ❑ No
- ❑ Other (please specify)

4.3 Other wastes (please specify)

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5. MASTER'S SIGNATURE ……

DATE ……