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

EURO-MED PARTNERSHIP

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MAP

PROJECT MED.B7.4100.97.0415.8

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

ACTIVITY C

COLLECTION AND TREATMENT OF OILY BALLAST WATERS FROM TANKERS

FINAL REPORT

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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 C

COLLECTION AND TREATMENT OF OILY BALLAST WATERS FROM TANKERS

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

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- EXECUTIVE SUMMARY

Subject and Scope

Activity C of the project entitled "Port Reception Facilities for Collecting Ship-Generated garbage, bilge water and oily wastes" – MED.B7.4100.97.0415.8, is concerned with the identification of the required capacities for collection and treatment of oily ballast water from tankers, taking into consideration the type and capacity of existing installations and specific nature of traffic of oil tankers in each country and port and terminal involved. Dedicated oil terminals and ports in general with oil handling activities that dictated either their examination in the framework of MARPOL 73/78, Annex I reception facilities provisions or under the new regime established through the implementation of the Directive 2000/59/EC, are as follows:

- **Algeria**

  Algiers, Arzew - Bethioua, Bejaia, Skidka

- **Cyprus**

  Dhekelia, Larnaka, Moni, Vassiliko

- **Egypt**

  Sidi Kerir

- **Israel**

  Ashqelon, Haifa

- **Lebanon**

  Jounieh, Tripoli, Zahrani Terminal

- **Malta**

  Marsaxlokk, Valletta

- **Syria**

  Banias, Tartous

- **Tunisia**

  Bizerte & Menzel Bourguiba, La Skhira, Zarzis

- **Turkey**

  Aliaga, Ceyhan, Nemrut Bay

Methodology

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:

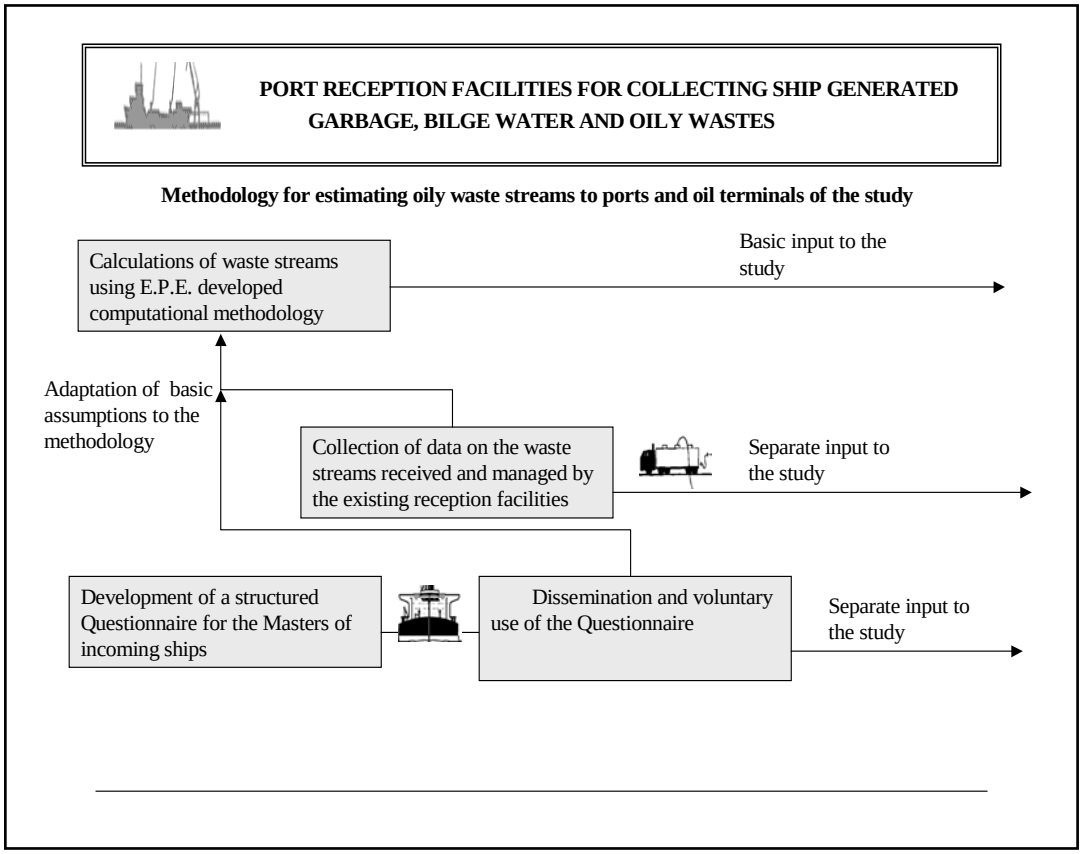
1. Calculation of the volumes of wastestreams by means of a series of formulas, that were developed taking into account:

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.

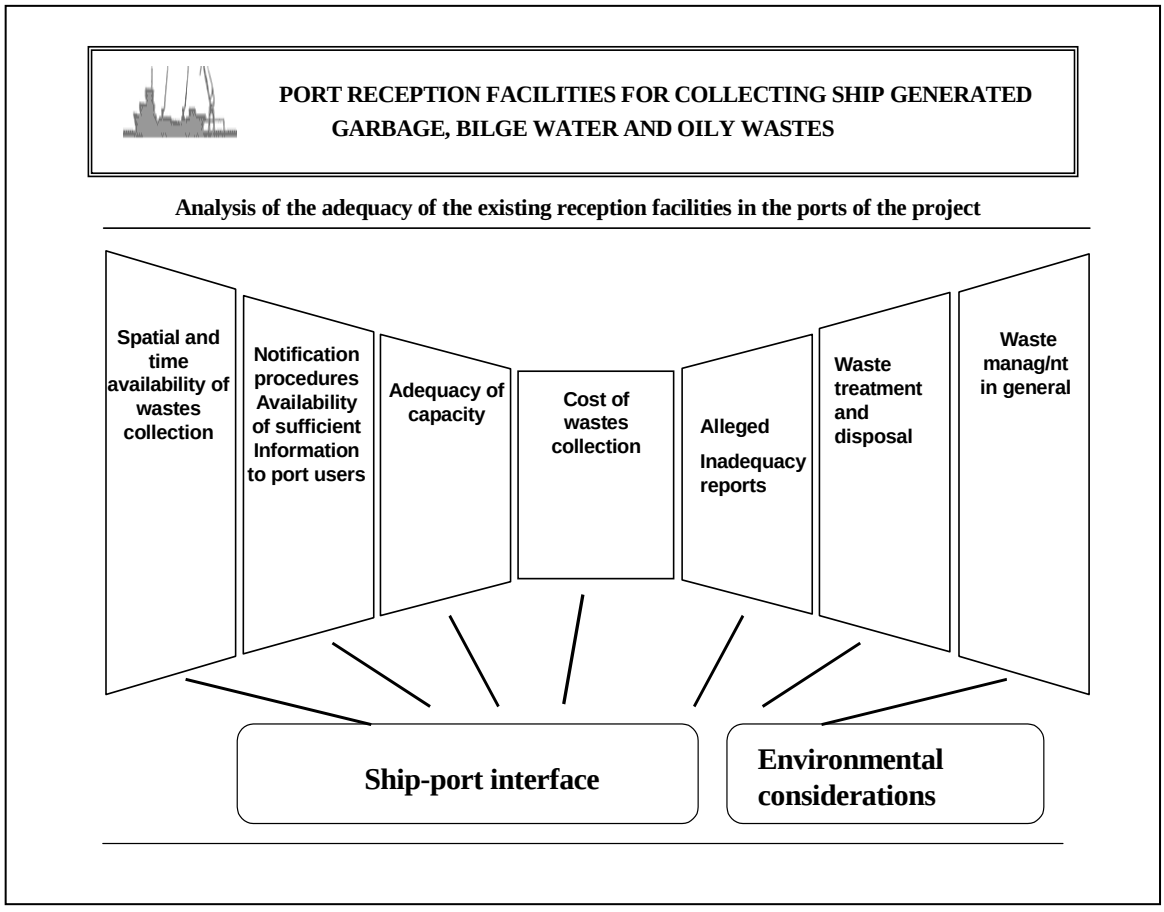
1b Data on terminals specific traffic, collected from the responsible port authorities and/or other maritime-related sources, the berthing infrastructure in relation with the permissible and average sizes of ships, the volume of oil as cargo handled on average, any operational requirements imposed to 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:



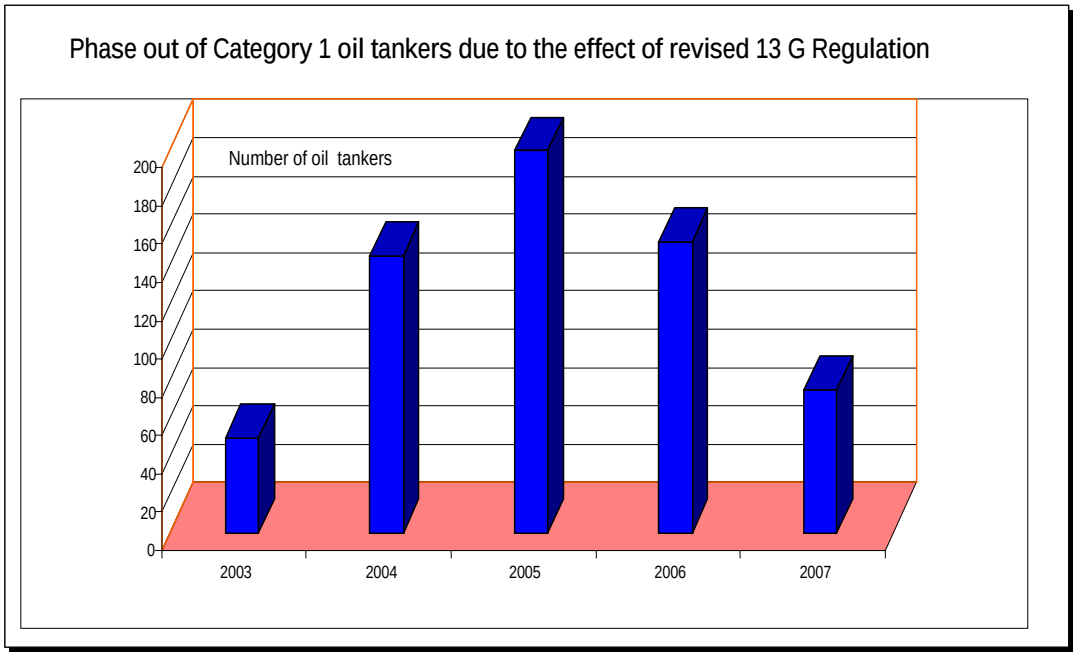
The criteria used to assess the adequacy of the existing reception facilities are schematically presented in the following diagram:



General Results

Regulation 9 of Annex I of MARPOL 73/78 provides requirements with respect to the control of discharges of oily mixtures produced in the cargo and ballast areas of oil tankers. In principle, this kind of discharge is prohibited within the Mediterranean Sea, as a designated Special Area, except of clean or segregated ballast.

The obvious impact of the revised 13 G to the non SBT oil tankers is their accelerated phase out. The following graph shows the number of Category 1 (pre PL SBT tankers) phase out in the period between 2003 and 2007. While the percentage of non SBT tankers that normally call at the terminals of the project was less than 14%, the potential needs for dirty ballast discharges are further reducing.



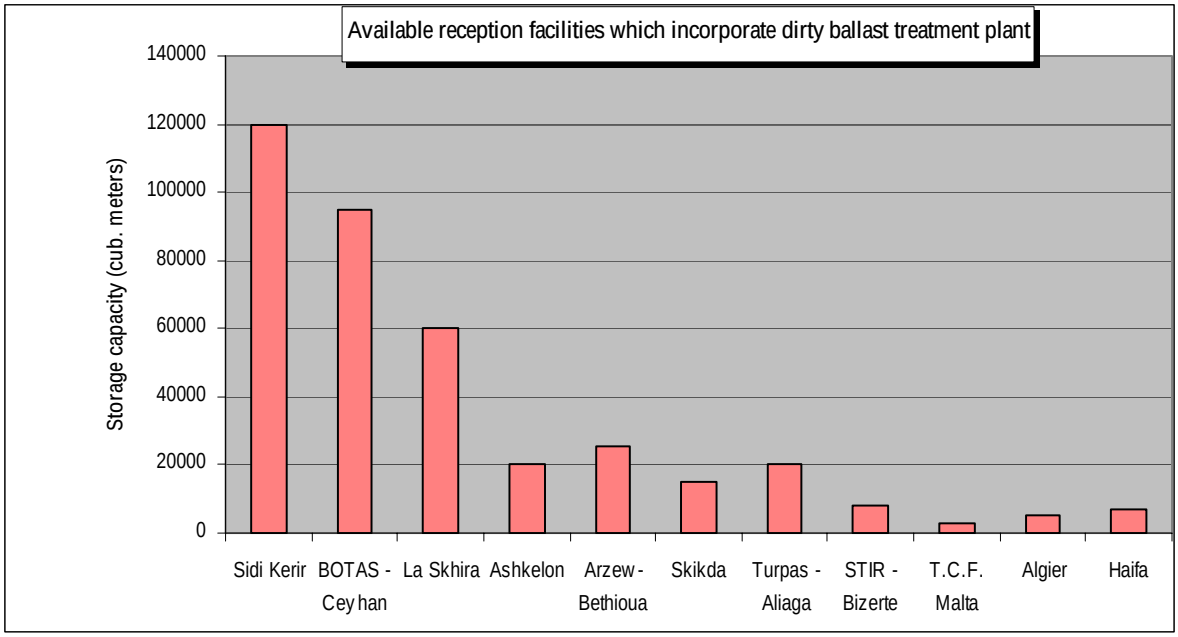
Several operational changes of the oil handling pattern takes place in a number of oil terminals (from crude oil exporting to fuel oil receiving terminals, establishment as depots for small or considerable lots of oil products, etc.).

A number of new reception and treatment facilities are proposed to establish in certain oil terminals while improvements or optimization of the available techniques of dirty ballast treatment were deemed as necessary.

Taking into account the estimation of the wastestreams for each terminal, the available storage capacity and the nominal flow through rates of the available reception facilities, in general, the available facilities for dirty ballast and tank washings at almost all major crude oil terminals (at least those that allow

non SBT oil tankers to call either in offshore installations or in jetties and dockside berths) meet the minimum needs of these ships.

While in a number of cases, their original scheme was limited both in function and throughput, changes to the oil handling pattern, made the available facilities adequate to meet the new needs of tankers. A view of the available storage capacities for dirty ballast in certain oil terminals is presented below:



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.

The operation of new reception and 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.

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.

GENERAL

1. General

1.1 Subject and scope of the Activity C of the project

Activity C of the project entitled "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 the required capacities for collection and treatment of oily ballast water from tankers, taking into consideration the type and capacity of existing installations and specific nature of traffic of oil tankers in each country and port and terminal involved.

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).

It should be noted that although it was attempted to expand the study to other cargo - associated wastes from tankers (tank washings, slops, scale and sludge) because of the drastic reduction of the needs for dirty ballast delivery, the criteria of Regulation 12 of Annex I of MARPOL 73/78 were taken into account to identify those ports that need to provide facilities for dirty ballast from tankers. However, for Malta and Cyprus that will become full Members of the European Union, the study expanded to all oil terminals (including also fuel oil power plants and other storage facilities with cargo throughput below MARPOL relevant thresholds) due to the application of the Eur. Council Directive 2000/59/EC. The same criteria applied to some oil loading terminals operating outside the administrative area of the respective port Authority. The following ports and oil terminals are those visited and studied within the framework of Activity C of the project:

Algeria: Algiers, Arzew - Bethioua, Bejaia and Skidka

Cyprus: Dhekelia, Larnaka, Moni and Vassiliko

Egypt: Sidi Kerir

Israel: Ashqelon and Haifa

Lebanon: Jounieh, Tripoli and Zahrani

Malta : Marsaxlokk and Valletta

Syria: Banias and Tartous

Tunisia: Bizerte & Menzel Bourguiba, La Skhira and Zarzis

Turkey: Aliaga, Ceyhan and Nemrut Bay

1.2 Definitions

Water ballast taken and discharged from oil tankers, in accordance with the Regulations of Annex I of MARPOL 73/78, is distinguished into clean, segregated and dirty ballast water with respect to its contamination with hydrocarbons and also the shipboard spaces where in principle water ballast is carried.

It was deemed as appropriate to provide definitions for those terms related with the identity of different oily mixtures and residues produced onboard oil tankers, as well as those related with the age, the structural and operational requirements of tankers that influence the volume and kind of the abovementioned mixtures.

The following terms and definitions have been extracted basically from the Regulations and Unified Interpretation of Annex I of MARPOL 73/78.

Oil means petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products (other than petrochemicals) including at least those substances listed in the Appendix I to the Annex I of MARPOL 73/78.

Oily mixture means a mixture with oil content.

Oil tanker means a ship constructed or adapted primarily to carry oil in bulk in its cargo spaces and includes combination carriers and any chemical tanker when they carry a cargo or part of cargo of oil in bulk.

Clean Ballast means the ballast in a tank, which since oil was last carried therein, has been so cleaned that effluent therefrom, if it were discharged from a ship which is stationary into clean calm water on a clear day would not produce visible traces of oil on the surface of the water or on adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

If the ballast is discharged through a type approved Oil Discharge Monitoring and Control System, evidence based on such a system to the effect that the oil content of the effluent did not exceed 15 parts per million shall be determinative that the ballast was clean, notwithstanding the presence of visible traces.

It was realized during the project, that a number of oil terminals involved in the project in the absence of reception facilities for dirty ballast and tank washings, require from incoming non segregated ballast tankers (SBT) oil tankers to approach the petroleum berths with only clean ballast that can be discharged during loading operations. In some cases, prior sampling or control of the discharge of clean ballast at sea during loading operations is exercised.

Segregated ballast means the ballast water introduced into a tank which is completely separated from the cargo oil and oil fuel system and which is permanently allocated to the carriage of ballast or cargoes other than oil or noxious substances.

Mediterranean Sea area means the Mediterranean Sea, including 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.

Instantaneous rate of discharge of oil content means the rate of discharge of oil in litres per hour at any instant divided by the speed of the ship in knots at the same instant.

Slop tank means a tank specifically designated for the collection of tank drainings, tank washings and other oily mixtures.

New oil tanker means an oil tanker delivered, in practice, after 1/6/1982 or an oil tanker that has undergone a major conversion completed after the above mentioned date.

Crude oil tanker means an oil tanker engaged in the trade of carrying crude oil.

Product Carrier means an oil tanker engaged in the trade of carrying oil other than crude oil.

REGULATIONS & RULES

2. Regulations and Rules

2.1 Criteria for discharging oily mixtures from cargo spaces of oil tankers at sea

Regulation 9 of Annex I of MARPOL 73/78 provides requirements with respect to the control of discharges of oily mixtures produced in the cargo and ballast areas of oil tankers.

In principle, this kind of discharge is prohibited within the Mediterranean Sea, as a designated Special Area, except of clean or segregated ballast. In addition, outside Special Areas and at a specific distance from the coastline, oily mixtures from tankers proceeding en route, can be discharged at sea provided that:

(i) the instantaneous rate of discharge of oil content does not exceed 30 litres per nautical mile;

(ii) the total quantity of oil discharged into the sea does not exceed for existing tankers the 1/15,000 of the total quantity of the last cargo from which the residue formed a part, and for new tankers the 1/30,000 of the total quantity of the cargo respectively,

(iii) the tanker has in operation an oil discharge monitoring and control system as well as slop tank/s arrangements as required by the respective Annex I Regulations.

No discharge at sea shall contain chemicals or other substances in quantities or concentrations which are hazardous to the marine environment or similar substances introduced for the purpose of circumventing the conditions of discharge outlined above.

The oily mixtures discharge criteria related with oil tankers engaged in voyages within the Mediterranean Sea and Special Areas in general (that is important for oil tankers engaged in voyages within the adjacent to the Mediterranean Special Areas of Black and Red Sea) or outside them are presented schematically into the next table:

Sea Areas		Discharge Criteria
Within a Special Area		No discharge except Clean or Segregated ballast
Outside a Special Area	Within 50 n.miles from the nearest coast	No discharge except Clean or Segregated ballast
	More than 50 n. miles from the nearest coast	No discharge except either: (a) of clean or segregated ballast (b) When: (1) the tanker is en route; and (2) the instantaneous rate of discharge of oil does not exceed 30 litres per nautical mile; and (3) the total quantity of oil discharged does not exceed 1/15.000 (for existing tankers) or 1/30.000 (for new tankers) of the total quantity of cargo which was carried on the previous voyage (4) the tanker has in operation an oil discharge monitoring and control system and slop tank arrangements

2.2 Applicable regulations dealing with the provision of Reception Facilities in ports and terminals

The table below summarizes 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 oily 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.
Regulation 12 ***Reception Facilities***	*All ports and terminals 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. *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 <u>crude oil is loaded into oil tankers</u> 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 Such ports and terminals shall have efficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with Regulation 9(1)(a) of Annex I from all oil tankers on voyages as described previously. - *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* They should have efficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with 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 should 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.

Regulation 12 ***Reception Facilities***	In addition reception facilities should be provided in: - *All ports and terminals which handle ships provided with the tanks (sludge tanks) required by Regulation 17 of Annex I.* All facilities provided to the abovementioned ports and terminals shall be sufficient to receive all residues retained as above 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 as mentioned above. - *All loading ports for bulk cargoes in respect of oil residues from combination carriers which cannot be discharged in accordance with Regulation 9 of Annex I.*

2.3 Applicable regulations dealing with Segregated Ballast Tanks and Double Hull arrangements for oil tankers

A summary of the requirements of Annex I, Regulations dealing with the segregated ballast tanks arrangements, as adopted by Resolution MEPC.52(32), before the adoption of the Resolution MEPC.95(46), on 27 April 2001 is illustrated in the next table:

Type of oil tanker	Deadweight (t.dw.)	Time of delivery	
		Before 1/ 6/1982	After 1/6/1982
Crude oil tanker	< 20.000	No any relevant requirements	No any relevant requirements but 13 F provides that all oil tankers of 600 t.dw and above delivered after 6/7/1996 should have hull spaces and tanks that can potentially take ballast water
Crude oil tanker	20.000 – 40.000	No any relevant requirements but in practice, due to the effect of Regulation 13G (4), this class of tankers, becomes PL/SBT tankers 25 years after delivery	Every tanker should be provided with segregated ballast tanks
	> 40.000	They should be provided with SBT, or they can operate with COW in accordance with Regulation 13B (similarly the abovementioned 13 G (4) Regulation applies)	Every tanker should be provided with segregated ballast tanks
Product Carrier	< 30.000	No any relevant requirements but in practice, due to the effect of Regulation 13G (4), this class of tankers, become PL/SBT tankers 25 years after delivery	No any relevant requirements but 13 F provides that all oil tankers of 600 t.dw and above delivered after 6/7/1996 should have hull spaces and tanks that can potentially take ballast water
	30.000 – 40.000	In practice, due to the effect of Regulation 13G (4), this class of tankers, become SBT tankers 25 years after delivery	Every tanker should be provided with segregated ballast tanks

	> 40.000	Alternatively of the provision of segregated ballast tanks, they can operate with dedicated clean ballast tanks in accordance with the requirements of 13 A Regulation (same effect of Regulation 13 G (4))	Every tanker should be provided with segregated ballast tanks

On crude oil tankers of 20.000 tons deadweight and above and product carriers of 30.000 tons deadweight and above, the aggregate capacity of wing tanks, double bottom tanks, forepeak tanks, and afterpeak tanks is required to be not less than the capacity of the segregated ballast tanks necessary to meet the requirements of the relevant Regulation 13 of the Annex I of MARPOL 73/78.

In addition wing tanks, or spaces and double bottoms tanks used to meet the requirements of the abovementioned Regulation shall be located as uniformly as practicable along the cargo tank length. Additional segregated ballast capacity provided for reducing longitudinal hull girder bending stress, trim, etc. may be located anywhere within the ship.

In April 2001, during the 46th session of the IMO Marine Environment Protection Committee, amendments to the 13 G Regulation of Annex I, were adopted which entered into force on the 1st September 2002. The impetus for the revision of the abovementioned Regulation was caused by the effects of the serious pollution that the total loss of the 23 year old product tanker Erika in December 1999 caused, along with other subsequent casualties particularly in European waters.

The new requirements are expected to have a dramatic impact on the world' tanker fleet since the adopted phase out criteria guide a significant number of oil tankers not only those built before 1982 (pre MARPOL tankers) but also new ships out of service.

For the purpose of the revised 13 G Regulation, oil tankers are classed into three categories, as follows:

- Category 1 oil tanker means an oil tanker of 20.000 tons deadweight and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30.000 tons deadweight and above carrying oil other than the above, which does not comply with the requirements for new oil tankers as defined in Regulation 1(26) of Annex I.

- Category 2 oil tanker means an oil tanker of 20.000 tons deadweight and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30.000 tons deadweight and above carrying oil other than

the above, which complies with the requirements for new oil tankers as defined in the Regulation 1(26) of Annex I.

- Category 3 oil tanker means an oil tanker of 5.000 tons deadweight and above but less than the sizes previously mentioned.

Category 1 oil tankers

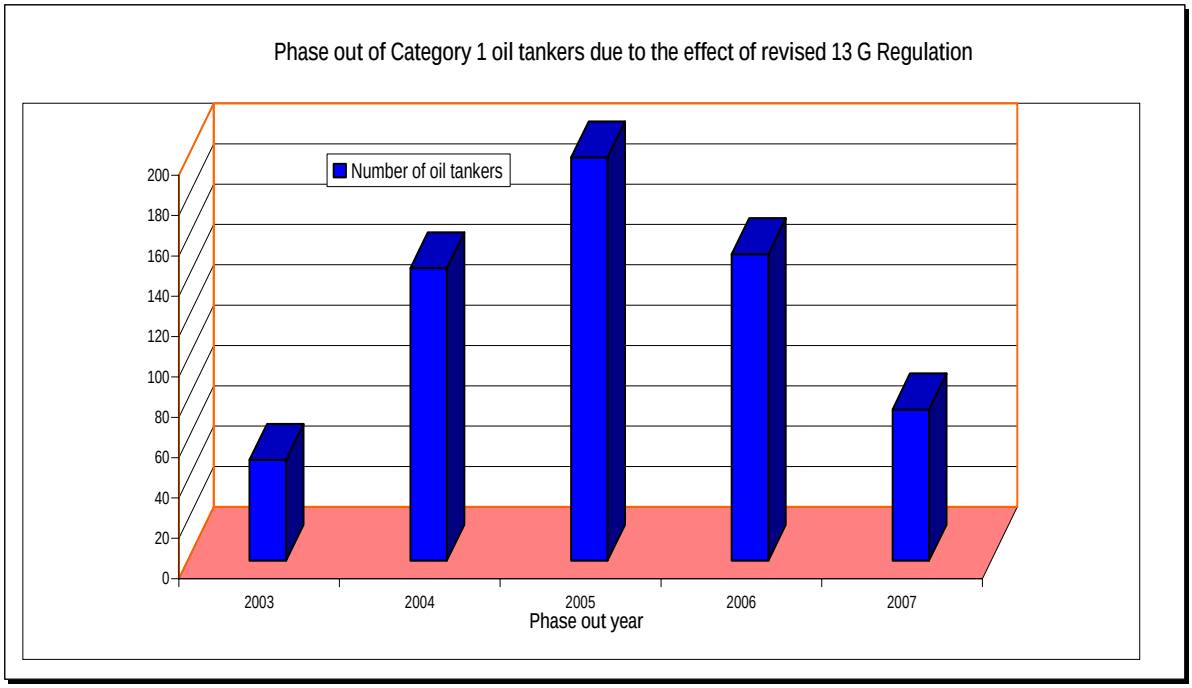
This category of oil tankers represent those, pre Protectively Located - SBT and non double hull oil tankers, which in practice, should be withdrawn by their anniversary date occurring between 2003 and 2007. Every oil tanker falling under this category, shall comply with the requirements of the Regulation 13 F of the Annex I, not later than the anniversary of the date of delivery of the ship in the year according to the following table:

Category of oil tankers	Phase out Year
Category 1	2003 for ships delivered in 1973 or earlier 2004 for ships delivered in 1974 and 1975 2005* for ships delivered in 1976 and 1977 2006* for ships delivered in 1978, 1979 and 1980 2007* for ships delivered in 1981 or later
	* Subject to compliance with the Condition Assessment Scheme, in accordance with MEPC Resolution 94(46)

According to an INTERTANKO study, incorporated in an another study titled *"Oil Tanker Outlook, Assessing the impact of the revised IMO MARPOL 13G Phase out"* produced by ABS, it is estimated that about 600 oil tankers falling under the Category 1 representing in total 73 million tons deadweight, will be phased out between 2003 and 2007, reflecting the combined impact of the remnants of the 1970s VLCC fleet and a large number of pre-MARPOL product tankers.

The obvious impact of the revised 13 G to the non SBT oil tankers is the accelerated schedule of their compliance with the requirements of 13 F, since the option to extent the time period for complying with 13 F up to 30 years after the date of delivery (provided that wing tanks or double bottoms not used for the carriage of oil, covering 30% of the side or the bottom) is lost and thus the 2007 year is determined as a key date where the presence of this size non-SBT tankers is fully eliminated.

The following graph shows the number of Category 1 oil tankers phased out in the period between 2003 and 2007.



Category 3 oil tankers (oil tankers of 5.000 t.dw and above but less than 20.000 t.dw)

Taking into account the 13F (2) Regulation, every new oil tanker of 5.000 tons deadweight and above has been provided with the following alternative structural and operational choices to comply with the requirements aimed at the prevention of oil pollution in the event of collision or stranding:

- Segregated ballast tanks and spaces other than oil tanks within the cargo tank length to be arranged as to comply with specific requirements,

- The entire cargo tank length to be protected by ballast tanks or spaces other than cargo and fuel oil tanks (double hull requirements),

- Other methods of design and construction accepted as alternatives including hydrostatic ballast loading that ensure at least the same level of protection against oil pollution in the event of collision or stranding.

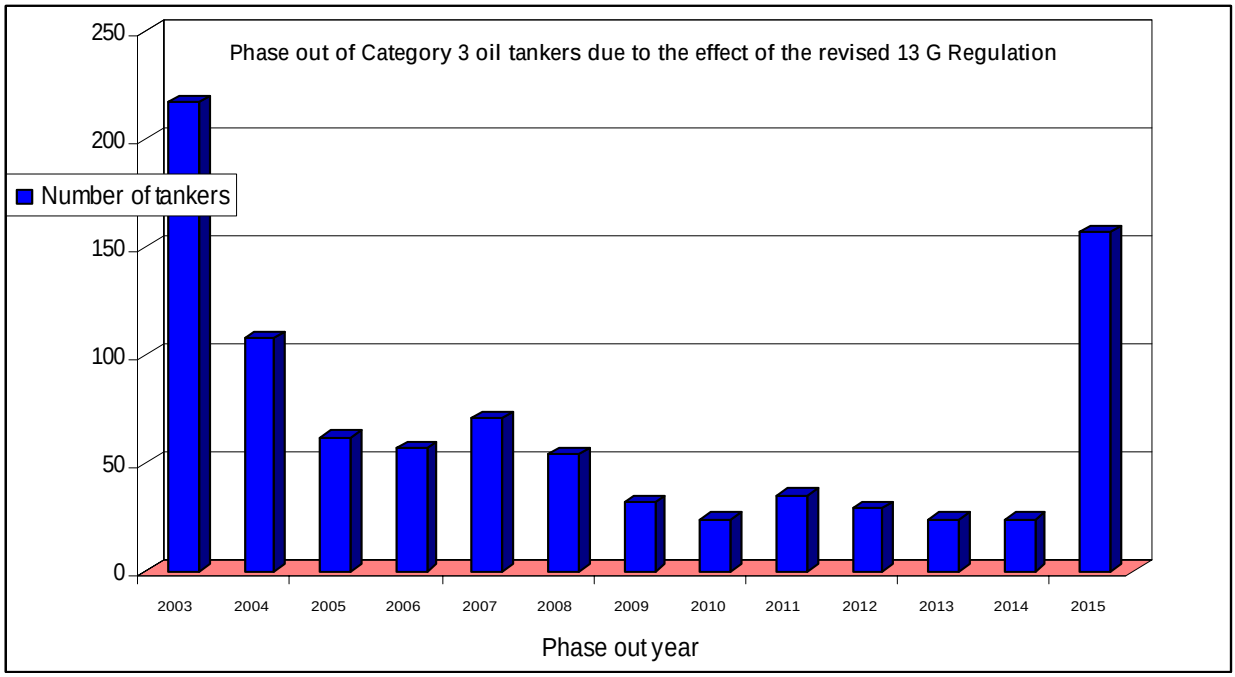
Since through the Resolution MEPC.52(32) adopted on 6 March 1992, the new Regulations 13 F and G entered into force on 6 July 1993, it is concluded that while the new oil tankers more than 5.000 tdw but less than 20.000 tdw, are built and operated with arrangements for segregated ballast tanks, the existing oil tankers of this size should comply due to the effect of the revised

13 G with the abovementioned requirements not later than their 26th anniversary date, effective from 2003 forward.

Phase out by Anniversary of delivery date in	Year of delivery	Tanker age
2003	earlier than and including 1973	30
2004	1974 – 1975	30 – 29
2005	1976 – 1977	29 – 28
2006	1978 – 1979	28 – 27 – 26
2007	1980 – 1981	27 – 26
2008	1982	26
2009	1983	26
2010	1984	26
2011	1985	26
2012	1986	26
2013	1987	26
2014	1988	26
2015	later than and including 1989	26 - 19

The most important peaks in the abovementioned phase out coincide with the beginning and end of the whole period when a large number of oil tankers that do not meet the double hull standards will be forced out of service. In 2003 and 2015 respectively, 217 and 157 of these tankers will have to be withdrawn.

The impact of phase out to the small tankers which most of them are product carriers of between 5.000 and 20.000 tons deadweight is considered as significant due to the large number of these tankers. It can be projected that by 2007 (which was the beginning of the phase out process of the previous 13 G Regulation) 515 oil tankers of this size should be withdrawn.



2.4 Dirty ballast and other oily mixtures produced from oil tankers

Activity C of the project is concerned with the dirty ballast from tankers, however it was considered as advisable to incorporate in this Report and the work done, tank washings and other oily mixtures and residues produced in areas other than the machinery spaces of tankers for the following two reasons:

1. Due to the already significant decrease of non SBT tankers and the anticipated dramatic decline in the future, the potential quantity of dirty ballast to be received at the oil loading terminals in the Mediterranean Sea Area is expected to be minimized, therefore the next most important - in terms of quantity - oily mixtures are tank washings collected in the nominated slop tanks or other shipboard areas (1.5 - 8 % of tankers deadweight).

2. MARPOL 73/78 Regulations related with the reception facilities in oil terminals and ports, provide in practice, that these facilities should be capable to receive all oily wastes including - apart dirty ballast and tank washings - oily wastes from the machinery spaces of ships. Calculations of dirty ballast and tank washings waste streams for each port and oil terminal, have been made also in this Report for the other two oily wastes streams (oil residues and oily bilge water).

IMO has provided guidelines for estimating the quantities of oily wastes in general, which would be required to be retained on board and discharged to reception facilities within the constraints of the:

- origin of oily wastes or residues;
- ship type and design;
- ship operating route; and
- the various types of ports and terminals required to provide reception facilities to ships.

Dirty ballast water can not be discharged to the sea at oil terminals, while discharge of clean ballast might be carried out provided that local or national regulations allow this operation, usually under control and supervision. The discharge of the bulk of the settled dirty ballast is characterized by a high flow rate, large in quantity but of low oil content. Oil content is typically (during for instance discharge in good weather outside a Special Area) around 30 ppm but higher oil content may be expected if there is substantial ship movement and disturbance of the water - oil interface.

The amount of dirty ballast aboard a tanker on arrival in the appropriate categories will vary from ship to ship and also with weather conditions. Generally, the total ballast weight on average might exceed 30 per cent of deadweight. Invariably, oil tankers arriving with dirty ballast may also have

on board tank washings from tank cleaning performed en route which needs to be received ashore in any available reception facilities.

According to CONCAWE (the Oil Companies European Organization for Environment, Health and Safety, October 2000 Review), during studies focused on the emissions control at marine terminals, data from seven terminals indicated that in 1999, the share of involvement of non-SBT tankers in the loading operations of oil, in particular volatile products was less than 20%. Other studies mentioned therein, showed a gradual downward trend in the use of non-SBT tankers from 45 per cent in 1993 to 13 per cent in 1999.

Oily mixtures accumulated in slop tanks (the content of which is not allowed to be discharged within the Mediterranean Sea Area), are produced basically during the following operations:

- Washing of cargo tanks in crude oil tankers before loading ballast or in product carriers before changing the type of cargo. Crude oil washing has significantly reduced the amount of water needed for washing of cargo tanks required for clean ballast or not. If crude oil washing is undertaken in all tanks during the cargo discharge immediately prior to entering a ship repairing yard for repairs, the total quantity of slops and sludge for disposal at the tank cleaning berth will be substantially reduced.

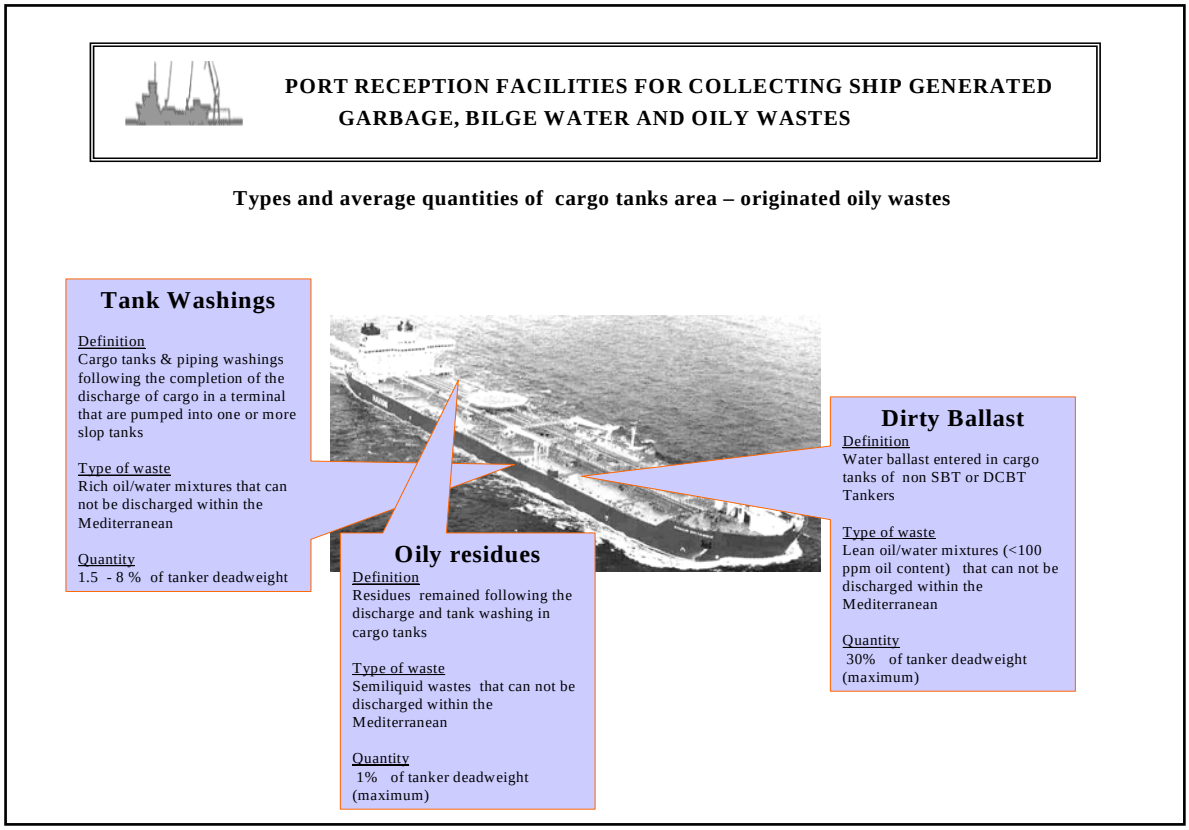
- Drainage and stripping of the cargo pumping system, flushing of cargo lines and pumps, stripping of oil residues of dirty ballast to slop tanks. The discharge of the bulk of settled water from a slop tank is characterized by a moderate discharge rate and oil content which could be typically around 150 ppm while the slow discharge (outside Special Areas) of slop tank water as the oil-water interface approaches the tank suction is characterized by very slow discharge rate but usually of a higher oil content, on average 500 ppm which can rise more during the discharge.

The wash water quantity, however, will be small in comparison with the quantity of dirty ballast (probably less than 5 per cent). Retention of oil onboard requirements, provide that adequate means shall be provided for cleaning the cargo tanks and transferring the dirty ballast residues and tank washings from the cargo tanks into slop tank or a combination of slop tanks.

The arrangement of the slop tank or tanks (new oil tankers of 70.000 t.dw and above are provided with at least two tanks) shall have a capacity necessary to retain slops generated by tank washings, oil residues, and dirty ballast residues.

The total capacity of the slop tank/s shall not be less than 3% of the oil carrying capacity of the oil tankers. However, the abovementioned capacity can be reduced up to 1.5 % for oil tankers and 1% for combination carries provided that specific conditions apply accepted by the Flag State

Administration of ships. The different oily wastes from the cargo areas of oil tankers are shown schematically below:



While, in general, a tank, the content of which has been discharged to a terminal, should be washed and all contaminated washings should be discharged to a reception facility before the ship leaves the port of discharge for another port, however there are some exceptions from this rule such as:

1. The tanks that are discharged are to be reloaded with the same substance or another substance compatible with the previous one and that the tanker will not be washed or ballasted prior to loading,

2. The tanks that are discharged are neither washed or ballasted at sea if the tanker is about to proceed to another port unless it has been confirmed in writing that a reception facility at that port is available and adequate for the purpose of receiving the residues and solvents necessary for the cleaning operations.

For many of 25 year old and older pre-MARPOL tankers, the most attractive option for meeting the requirements of Regulation 13G is to utilise Hydrostatically Balanced Loading. It's estimated that this kind of option to comply with the requirements of the abovementioned Regulation, was of preference for most of the tankers over 50.000 t.dw. currently operating worldwide.

It should be noted that according to OCIMF (Oil Companies International Forum), the application of the Hydrostatically Balanced Loading process to a tanker engaged in performing multi port operations, requires that tanks covering at least 30% of the side of the length of the cargo section should remain empty until the last loading location or they should be unloaded at the first discharge port.

The result of the condition of a tanker in ballast upon its arrival at a loading oil terminal is the need for a distribution of ballast in such a way to enable the centre tanks and some of the wing tanks to be loaded first.

Consequently, clean ballast should be loaded to wing tanks, which have a higher percentage of shadow sectors which make them more difficult to clean to enable clean ballast to be hosted into them and due to the greater surface area to tank volume ratio, generation of bigger quantities of oil slops would be produced at the end of tank washing, that should be retained onboard and discharged to a suitable reception facility.

Oil tankers which are not provided with segregated or dedicated ballast tanks, carry dirty ballast water during voyage without cargo, which corresponds to about 25% of the deadweight, however during adverse weather conditions, additional ballast up to 10 - 15% of the deadweight may be required (a 30% of the deadweight factor was considered as a safe margin for the abovementioned cases).

Although uptake of water ballast in cargo tanks of SBT tankers can not be excluded in similar weather and sea state conditions, the respective column in the following table it was intentionally left without any entry.

In the following table, a synopsis of the quantities of dirty ballast, tank washings and other oily residues produced from cargo and ballast operations in oil tankers is illustrated.

Types and quantities of oily mixtures generated from cargo and ballast operations on oil tankers at oil terminals			
Type of oil mixtures and residues	Oil contaminated ballast (dirty ballast)	Tank Washings	Oil Residues
	Loading Terminals, Ship-repairing Ports & Tank Cleaning Facilities	Loading Terminals, Ship-repairing Ports & Tank Cleaning Facilities	Loading Terminals, Ship-repairing Ports & Tank Cleaning Facilities
Crude oil tankers	30% of Dwt for non-SBT oil tankers	1.5 - 8 % of Dwt The minimum quantity is related to tankers performing tank cleaning en route to the terminal and arriving with washings wholly accumulated in the slop tanks	1 % of Dwt
Product Carriers	30% of Dwt for non-SBT oil tankers	1.5 - 8 % of Dwt The minimum quantity is related to tankers performing tank cleaning en route to the terminal and arriving with washings wholly accumulated in the slop tanks	0.5 % of Dwt for black oil products 0.1 % of Dwt for white oil products

METHODOLOGY

3. Methodology

3.1 Methodology for estimating the volumes of oily mixtures wastestreams

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

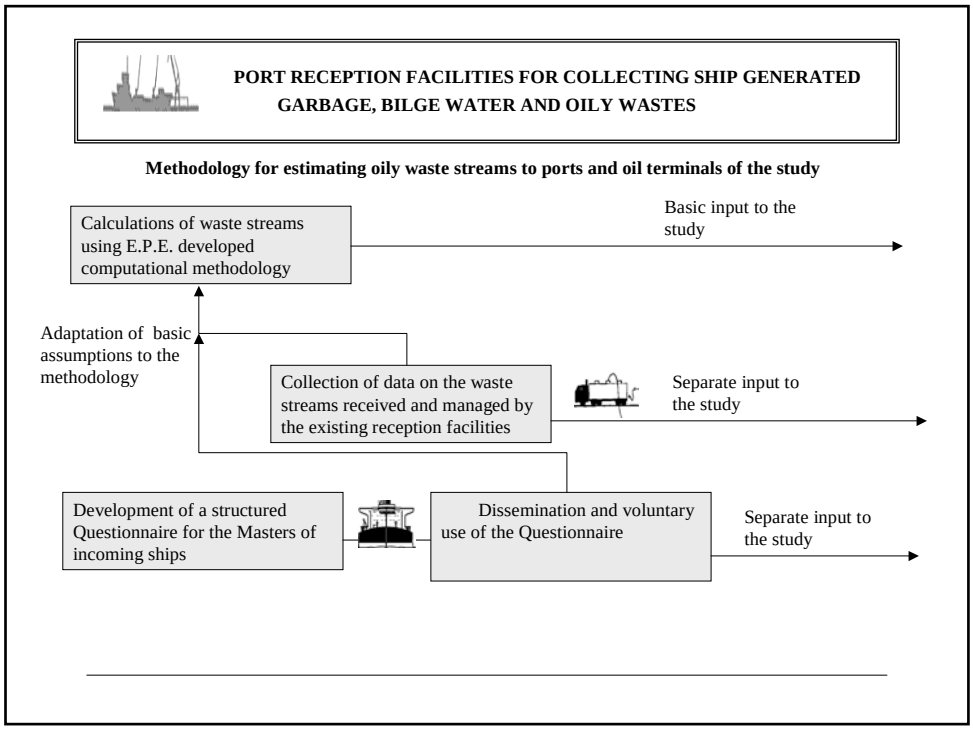
1. Calculation of the volumes of wastestreams by means of a series of formulas, that were developed taking into account:

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. Where difficulties were faced with regard to the collection of proper, accurate and detailed data, maximum values were considered to provide safer estimates.

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. In parallel, these data provided a separate input to this Report.

3. A structured questionnaire based on the IMO relevant Guidelines was developed to be disseminated on a voluntary basis, to a number of oil tankers with the aim to capture as much as possible information for their actual needs. It should be noted that a number of factors effected to have a limited input from this task including those related with the specialized and demanding operation of oil tankers in particular at offshore mooring systems, the limited time spent at the terminals, etc. The methodology outlined before is presented schematically below:



The basic formulas used, before any adaptations as explained earlier, in estimating the different oily wastestreams are provided below:

$$\mathbf{D_b = \frac{0.3 \times N_t}{365} \times D_m} \text{ (tons)}$$

D_b = Reduced daily quantity of dirty ballast (tons)

N_t = Average annual number of oil tankers calling at the terminal

D_m = Maximum permissible deadweight of non-SBT oil tankers at the terminal (tons)

$$\mathbf{T_w = \frac{C_t \times N_t}{365} \times D_m \text{ (tons)}}$$

where

T_w = Reduced daily quantity of tank washings (tons)

N_t = Average annual number of oil tankers calling at the terminal

D_m = Maximum permissible deadweight of oil tankers at the terminal (tons)

C_t = Tank washings Coefficient factor varying from 0.015 – 0.08

$$\mathbf{O_w = \frac{C_r \times N_t}{365} \times D_m \ (tons)}$$

where

O_w = Reduced daily quantity of oily liquid residues (tons)

N_t = Average annual number of oil tankers calling at the terminal

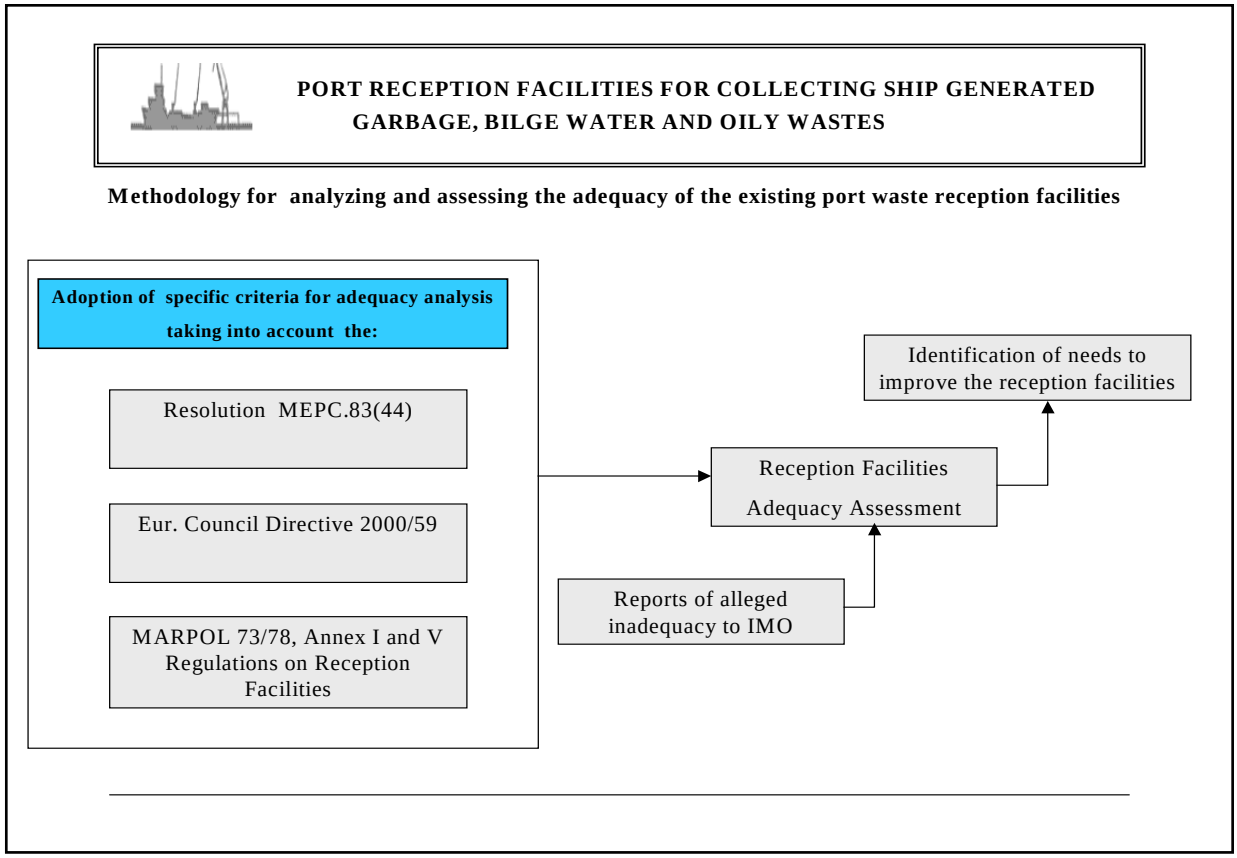
D_m = Maximum permissible deadweight of oil tankers at the tank cleaning facility
or ship - repairing port (tons)

C_r = Oily residues Coefficient factor varying from 0.001 – 0.01

3.2 Methodology for analysing 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, valorisation 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.

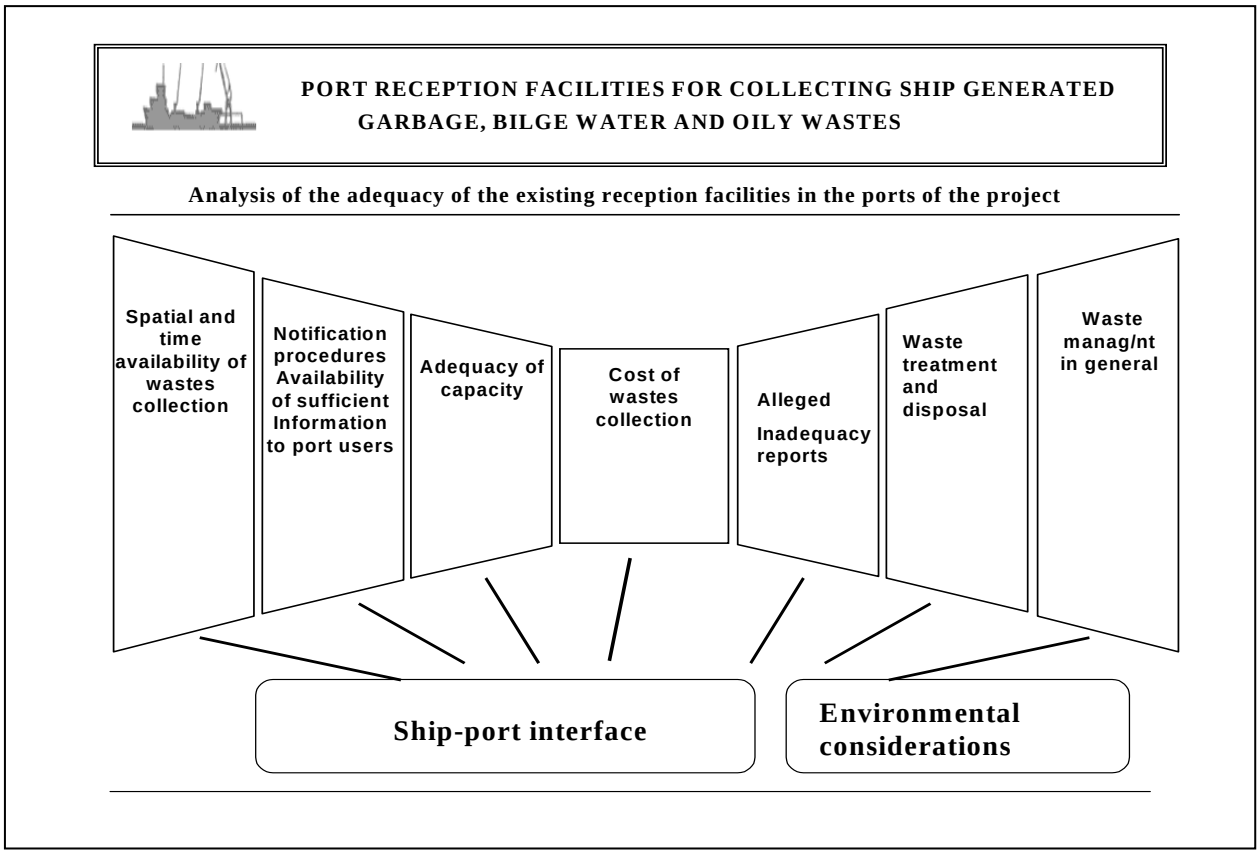
The first set provides a series of criteria emphasizing on the operational needs of ships normally calling at the ports and terminal of the project. There is no doubt that a port to become successful and adequate in providing reception facilities for ship-generated waste, should have regard to the operational 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 minimise 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)*
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. 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. 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 analysed, 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. It should be pointed out that the response rate of IMO Member states is apparently quite low.

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 endeavoured 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,

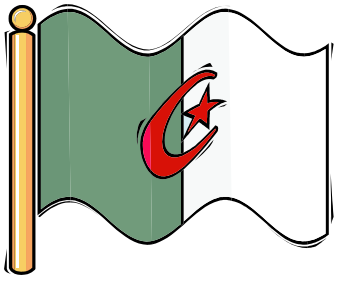
- Procedures for recordkeeping requests from ships to deliver wastes at the port, quantities and types of wastes received and handled,

- 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, as carried out by the ten countries involved in this project.

European Union accounts for about 60% of the maritime transport flow from and to 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.

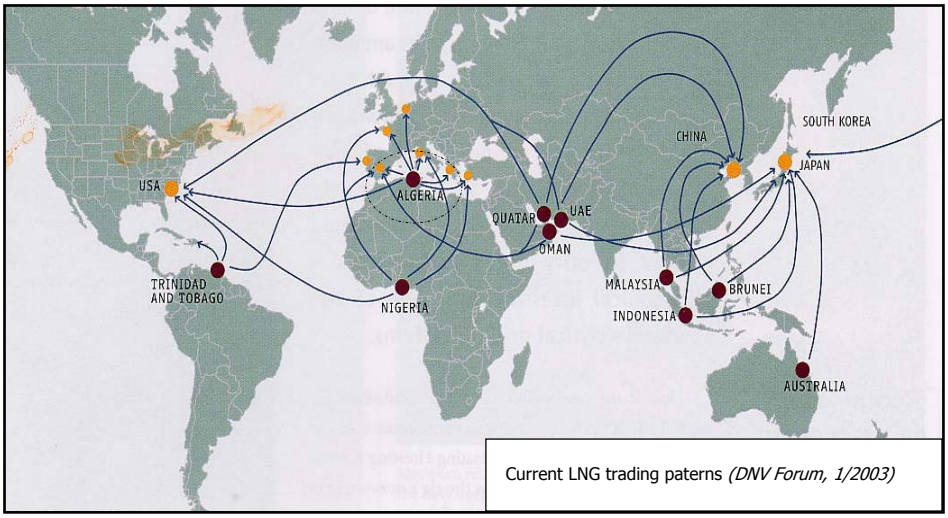
Bethioua has been handling the largest volume of cargo from all the other Mediterranean ports of the project, reaching about 36.4 million tons in 2000. Crude oil and petroleum products represent an important component of the volume of the cargo handled in the Algerian ports. In addition, the volume of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

Between, 1998 and 2000, a 30% increase of container and Ro-Ro cargo units' handling was 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 oil terminals, that are discussed here, because of the interest they present in relation with the delivery of dirty ballast, are those of Skikda, Bejaia, Algiers and Arzew - Bethioua, as shown in the following table:

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	
Arzew & Bethioua	4		4	4	4	4	
Bejaia	4		4			4	
Skikda	4		4	4	4	4	
Algiers	4		4	4	4	4	

Algeria 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 applicable legislative framework dealing with waste management is currently 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 which 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.

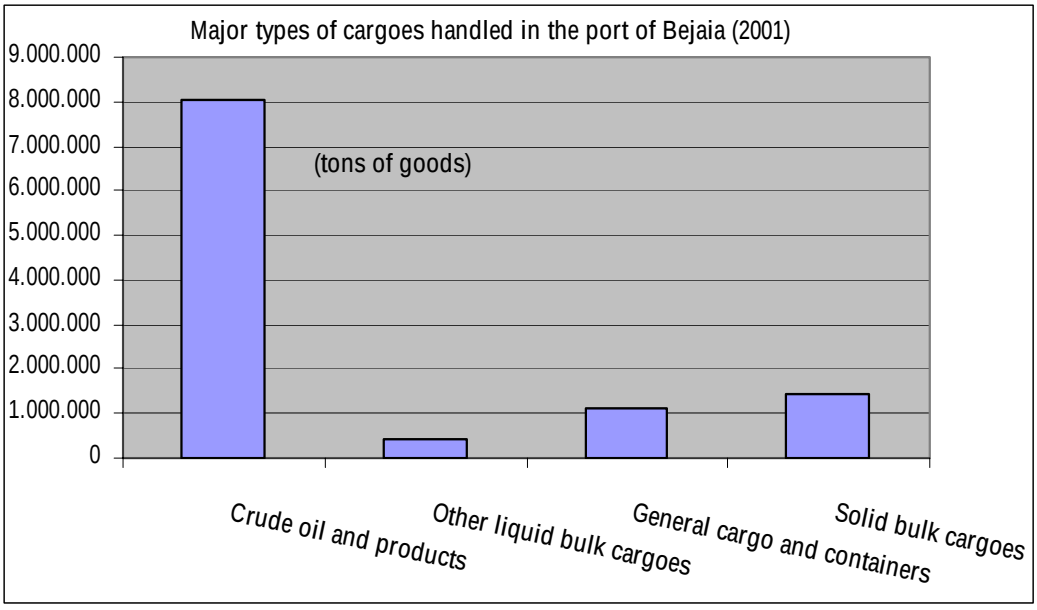
A. General Information

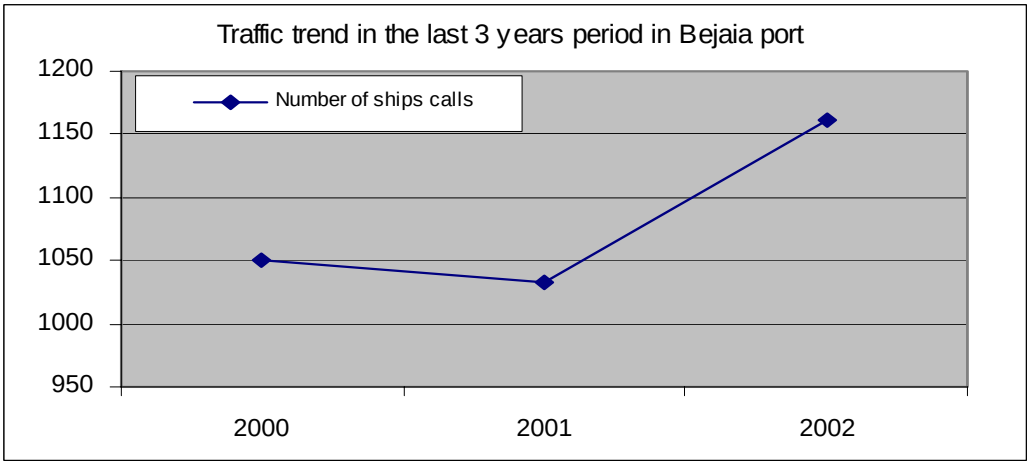
- **Port** Bejaia
- **Port Authority** Enterprise Publique Economique S.P.A.

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:





C. 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

In the immediate future, the progressive phase out of all pre MARPOL oil tankers that will take place from 2003 to 2007, will certainly ensure that exclusively SBT tankers will approach the oil terminal.

Theoretically speaking, dirty ballast from oil tankers larger than 20.000 t.dw will not be discharged to the terminal, unless these SBT tankers would need, for strictly navigation safety purposes in adverse weather conditions, to take water ballast in empty cargo tanks.

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 accounts for about 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 specialized 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 dirty ballast and other oily mixtures

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.

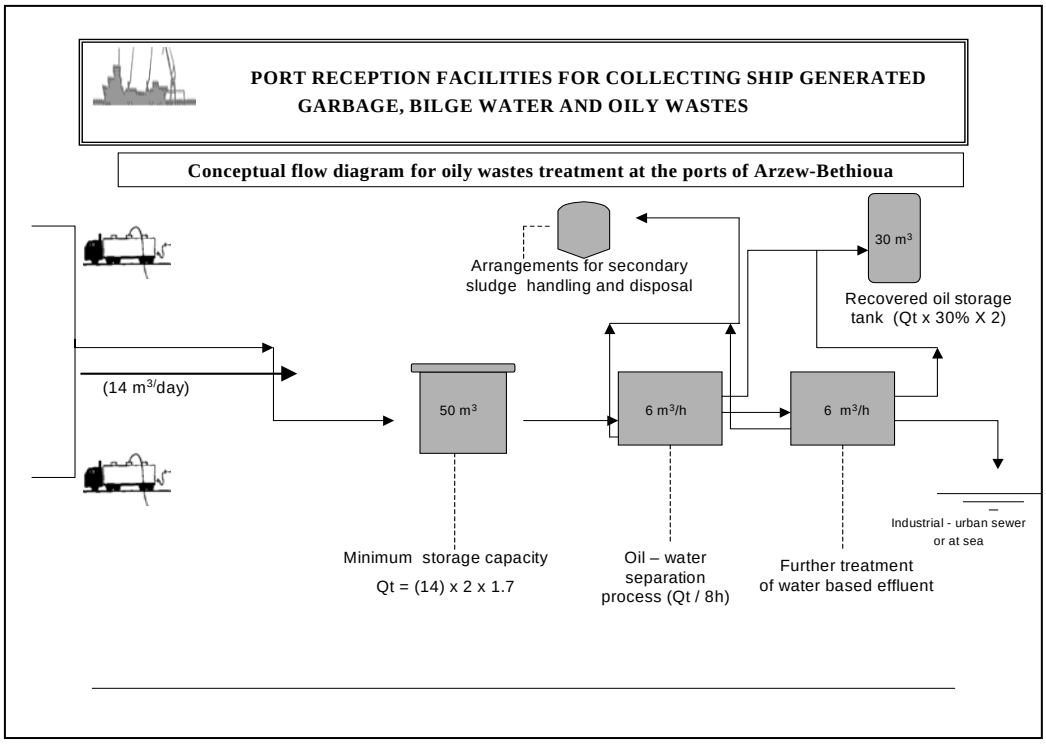
Port : Arzew & Bethioua
Country: Algeria

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:



A. General Information

- **Port** Algier
- **Oil Terminal** NAFTEC S.p.a., Algier Refinery Terminal

B. Type and operation of the terminal

The National Society of Oil Refining Company (NAFTEC S.p.a.) operated, petroleum terminal is related with the import of crude oil and export of refined and other products from the Algier Refinery. The NAFTEC refinery has a nominal crude oil process capacity of about 2.7 million tons per year, basically producing LPG, gasoline, gas oil, fuel oil and naptha. The terminal is located at the 37/1 & 2 quays sites which are 606 meters long and 10.3 meters deep. On average, 1.3 million tons of crude oil are discharged annually at the terminal.

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

The terminal provides an adequate and consistent to the needs of incoming tankers, fixed deballasting facility consisting of a 16" line, separate from the cargo piping system, able to receive 800 cub. meters per hour, oil contaminated ballast and a storage capacity of 5.100 cub meters. 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. Quality of effluent water is as follows:

Parameters	Maximum allowable concentration
Hydrocarbons	20 mg/lt
BOD_5	40 mg/lt
COD	120 mg/lt
pH	5.5 – 8.5
Fe	5 mg/lt
Pb	1 mg/lt
Zn	5 mg/lt

In 2002, 11 oil tankers discharged dirty ballast and oily wastes from the machinery spaces respectively out of 192 that called to the terminal, while in 2001, 20 tankers out of 106, discharged similar types of wastes. On average, less than 12 % of the incoming oil tankers engaged in products loading operations discharge dirty ballast while less than 10% discharge oil residues or bilge water.

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)	
NAFTEC spa Oil Terminal Quay 37/1 & 2 Port of Algiers	4			5.100	800	5.100	800			No		Same as dirty ballast		Same as dirty ballast		

Reception facility Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
NAFTEC spa Petroleum Terminal Tel: + 213 21 42 35 78 Fax: + 213 21 67 12 64	A fixed deballasting facility consisting of a 16” line, separate from the cargo piping system, able to receive 800 cub. meters per hour, oil contaminated ballast and other oily wastes with a storage capacity of 5.100 cub meters.	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

A. General Information

- **Port** Skikda
- **Oil Terminal** SONATRACH Region Transport Est.
- **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:

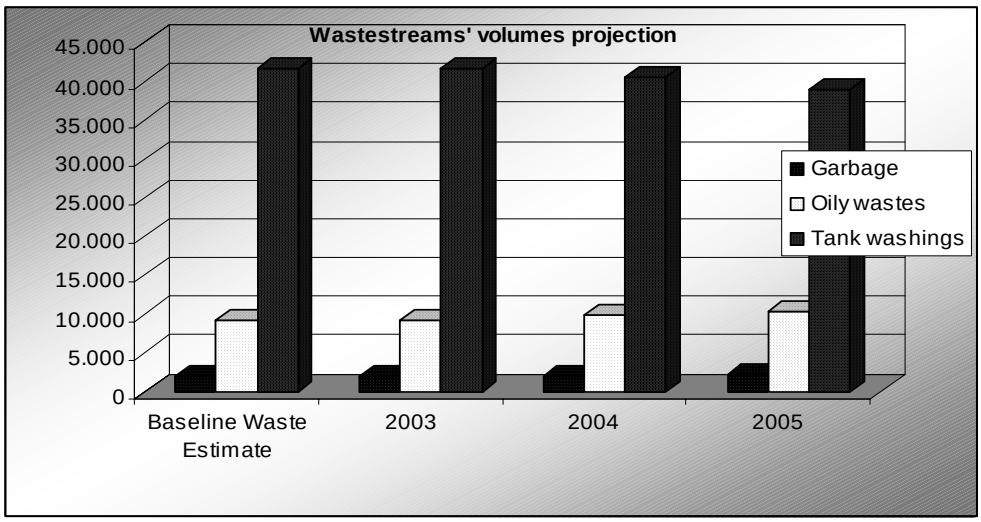
Year	**Number of tankers**	**Average size (t.dw) of tankers**	**Maximum size (t.dw) of tankers**
2002	529	80.000	125.000
2001	551	60.000	99.000
2000	539	60.000	99.000

C. 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

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	113.9	13.4	11.8
Average annual volume (m^3/year)	-	41,600	4,898	4,342
Maximum volume per ship/arrival (m^3)	-	2,400	20.0	22.0



D. Existing receptions facilities & Recommendations

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, as outlined in the next table.

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.

Activity C – Collection and treatment of oily ballast water from tankers

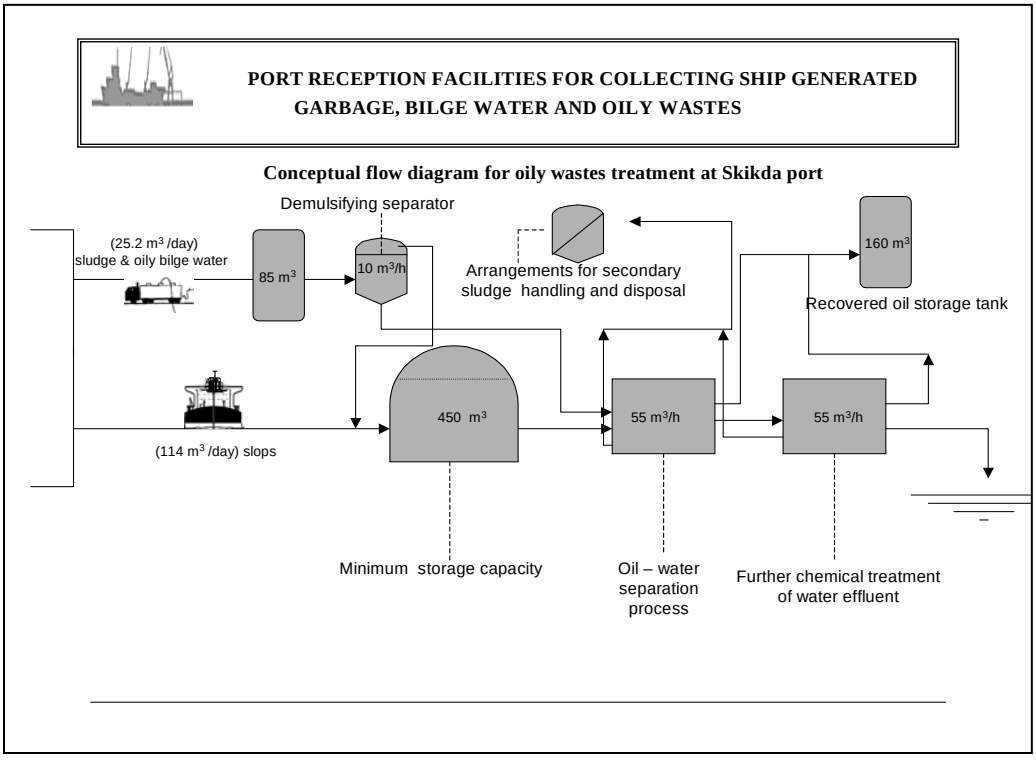
Terminal	**Type of Facility**			**Oily wastes received from the facility**												**Operational restrictions on the use of the facility**
	Fixed	Land based Mobile	Navigable Mobile	Dirty ballast water		Tank washings		Chemicals contaminated oily mixtures		Scale and sludge from tanker cleaning		Oily 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

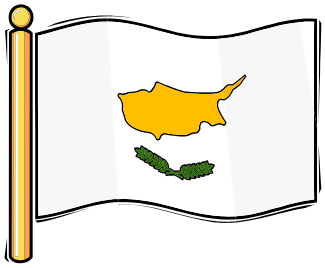
Slops from tanker operations, are considered to be rich in oil, mixtures compared to those of oily bilge water and sludge making preferable a different treatment while the use of a initial, holding and equalization tank could enhance a single treatment process.

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 facility, as shown below:



CYPRUS



CYPRUS

Crude oil and petroleum products carriage and handling in Cyprus is served basically by the operation of the terminals of Vassiliko, Moni and Dhekelia engaged in supporting power production plants and also the wider, dedicated zone at the port of Larnaka where the Cyprus Petroleum Refinery and other privately operated oil products distribution companies are located in. The general maritime traffic and port based cargo handling in relation with the contribution of oil transportation in Cyprus is illustrated below:

Total maritime transport of goods *(in thousands 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 tons)*						
	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro and other cargoes
Quantity of goods	7.281	5.475	1.805	3.095	1.845	474

Crude oil and oil products component (10^3 tons)

Crude Oil	Petroleum Products
1.200	1.600

The character of each port and terminal is also presented 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 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

A. General Information

Oil Terminals Zone	Larnaka
Port Authority	CYPRUS PORTS AUTHORITY (C.P.A.)
Terminal Operators	Cyprus Petroleum Refinery Ltd. (C.P.R.L.) ExxonMobil Cyprus, Petrolina, Mobil, Synergas, Centragas.

B. Type and operation of the terminals

The port of Larnaka is the nearest port to Nicosia, the capital city of Cyprus, and constitutes the country's most important port for the transportation and export of a variety of products produced in the neighbouring mainland. A dedicated, oil terminals' zone consisting of the berthing installations of the Cyprus Petroleum Refinery Ltd and other oil distribution companies, operate in the wider port area serving the country's energy trade, power production and refined products distribution.

The Cyprus Oil Refinery berthing installations, able to accommodate oil tankers of 214 meters LOA and 12.7 meters draught receives crude oil from a 12" pipeline for storing in the land-based tanks prior to refining. On average 1.200.000 metric tonnes of crude oil are received annually while 280.000 tons of heavy fuel oil are discharged to a number of about 22 (annually) oil tankers of 56.000 t.dw maximum size.

From the ExxonMobil Cyprus operated oil berth, which is able to accommodate tankers of 110 meters LOA and 11 meters draught, a variety of petroleum products (220.000 tons annually) is discharged to the incoming oil tankers. On average 48 oil tankers are engaged in the operation of the terminal annually carrying about 4.000 tons per voyage.

C. Existing Reception Facilities for dirty ballast and other oily wastes

The authorized, privately operated scheme of ECOFUEL Cyprus Ltd. (representing the central oily wastes treatment facility) and VGN Ltd. (representing the provider of navigable collection means) is engaged in the reception of slops and other oily wastes from the tankers normally calling at the abovementioned zone of oil terminals. Details on these facilities are provided below as well as in the respective section for Cyprus of the Report for the Activity A of the project.

D. Estimation of dirty ballast and other oily waste streams

In accordance with the respective Annex I of MARPOL 73/78 Regulations, there is no need or requirement for the terminals to receive dirty ballast from the incoming tankers since crude oil carriers basically discharge crude oil to the land based storage tanks of the refinery. Similarly the average daily quantity of refined products loaded to product carriers is in any case less than 1.000 metric tons.

However, taking into account the requirements of the European Council Directive 2000/59 with respect to the mandatory disposal of all wastes and residues retained onboard, the potentially volumes of tank washings as well as of other oily wastes produced in the machinery spaces of tankers have been estimated as follows:

Terminals: Larnaka Oil Terminals
Country: Cyprus

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

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	5.4	0.3	0.1
Average annual volume (m^3/year)	-	1,974	138.0	69.0
Maximum volume to be received per ship/arrival (m^3)	-	525.0	25.0	30.0

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 Vassiliko	4	4		2.000		2.000		-	-	*	*	2.000		2.000		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. Collection of oily wastes is also enabled through VGN Ltd. which operates 2 barges of 600 m^3 total capacity.	Settling, chemical treatment, centrifugation and vacuum evaporation is carried out to separate oil fuel before its further filtration, homogenisation to pb provided as a commercial, replacement fuel oil Effluent water is treated by DAF (5m^3/hour) and biological treatment reducing the oil content below 15 ppm. It is not allowed to be discharged at sea.	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 also received and treated in the facility

A. General Information

Oil Terminal	Moni
Port Authority	CYPRUS PORTS AUTHORITY (C.P.A.)
Terminal Operator	Electricity Authority of Cyprus (E.A.C.)

B. Type and operation of the terminal

The oil terminal of Moni is located some 14 kms from the Limassol port, providing a MBM fuel oil berth for oil tankers up to 213 meters LOA and 12 meters maximum safe draught. Fuel oil is discharged through a 12 inches pipeline, 1204 meters long (from the end of flexible hoses to the land-based tanks) to the Moni power station with maximum pumping pressure 9 bars. The maximum deadweight of oil tankers that can be accommodated is 50.000 t.dw.

On average, 110.000 metric tons of Heavy Fuel Oil are discharged annually to the oil terminal by 8 oil tankers of 45.000 t.dw deadweight.

From the data maintained by the Electricity Authority of Cyprus on the particulars of the tankers engaged in providing fuel oil to its power plants (Moni, Dhekelia and Vassiliko), it was attempted through the selective communication with some of the managing shipping companies of the tankers to identify the actual needs of these tankers to retain onboard or deliver dirty ballast and other tank area oily wastes. It's worth mentioning, that the trade of heavy fuel oils which are actually blended products based on the residues from various refinery distillation and cracking processes for use in industrial and power plants (such as those in Cyprus and other Mediterranean countries), etc., is complicated since the range of products of this kind is wide, covering residual fuel oils, bunker fuel, etc.

From the age of the tankers calling at E.A.C. terminals it was estimated that only a low percentage of them represents non SBT tankers, however, even for those ships there is no need to discharge dirty or clean ballast since they normally approach the terminals in loaded or semi loaded condition. For tank washings produced after the discharge of fuel oil and for slops accumulated from the previous voyages, it was estimated that a considerable percentage of the tankers calling at the terminals (70%) are engaged almost exclusively in the trade of heavy fuel oils, taking advantage of the option to retain residues onboard and load the new cargo on top of them.

In estimating the tank washings that could be produced and delivered to the oil terminals, it was presumed that 10 % of the oil tankers need to clean their cargo tanks, and deliver the washings and other residues produced before leaving the ports of the country.

There are no reception facilities operated by the oil terminals for collecting oily wastes from the incoming oil tankers, however the Vasilikos based, authorized facilities, described earlier can undertake their reception and further management.

The following table presents the results of the calculations for the potential volumes of oily wastes for delivery to the oil terminal of Moni.

Terminal: Moni EAC Oil Terminal
Country: Cyprus

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

Current quantities of ship-generated oily wastes to be received	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	2.4	0.06	0.21
Average annual volume (m^3/year)	-	876.0	24.0	79.0
Maximum volume to be received per ship/arrival (m^3)	-	900.0	30.0	7.5

A. General Information

Oil Terminal Vassilikos

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

Terminal Operator Electricity Authority of Cyprus (E.A.C.)

B. Type and operation of the terminal

Vassilikos oil terminal is located 30 kms from the port of Larnaka, providing a fuel oil SPM for oil tankers up to 80.000 t.dw with maximum safe draught and LOA 13.9 and 260 meters respectively. The whole piping system consists of a 26 inches , 650 meters long shoreline to fuel oil storage tanks, a submerged sea line 20 inches, 2275 meters long and 16 inches, 259/268 meters flexible hoses enabling the discharge of fuel oil at maximum 10 bar pumping pressure.

On an annually basis, 360.000 tons of heavy fuel oil are discharged to the oil terminal of Vassilikos from about 7 oil tankers of 50.000 t.dw size on average. The same approach used for the Moni oil terminal has been also applied for this terminal.

Terminal: Vassilikos EAC Oil Terminal
Country: Cyprus

2 Estimates of ship-generated oily wastes and residues that could 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)	-	7.8	0.05	0.2
Average annual volume (m^3/year)	-	2,871	21	73.0
Maximum volume to be received per ship/arrival (m^3)	-	500.0	30.0	7,5

A. General Information

Oil Terminal Dhekelia

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

Terminal Operator Electricity Authority of Cyprus (E.A.C.)

B. Type and operation of the terminal

Dhekelia oil terminal is located 8 kms from the port of Larnaka, providing a MBM fuel oil berth for oil tankers up to 224 meters LOA, 12 meters maximum safe draught and 50.000 t.dw maximum deadweight. Fuel oil discharge at the land-based tanks is carried out through a 12 inches, submarine pipeline 651 meters long extending from the end of flexible hoses to tanks, operating at 10 bars maximum pumping pressure.

For the last three years, 20 oil tankers of 30.000 t.dw average deadweight, call at the terminal discharging 500.000 metric tons of heavy fuel oil on an annual basis. The estimates for the potential volumes of oily wastes that could be collected from the oil tankers calling at the terminal are presented below:

Terminal: Dhekelia
Country: Cyprus

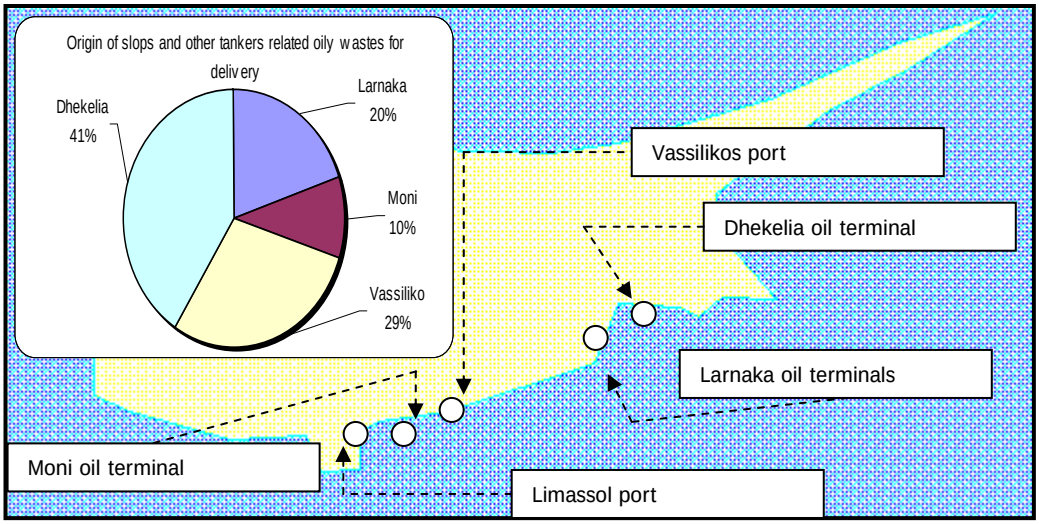
2 Estimates of ship-generated oily wastes and residues that could be received at the port/terminal

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	10.9	0.16	0.44
Average annual volume (m^3/year)	-	3,978	60.0	160.92
Maximum volume to be received per ship/arrival (m^3)	-	450.0	30.0	7.5

C. Assessment of the existing facilities for oily wastes from tankers

The Vassilikos - based oily wastes treatment facility, apparently, serves the needs of the tankers engaged in the petroleum handing related activities at the terminals of Moni, Vassiliko, Dhekelia and Larnaka, but also those of the commercial ports of Limassol, Larnaka and Vassiliko. The nominal reception capacity of the facility in conjunction with the spatial, reception flexibility that the navigable, collection means of VGN Ltd. offer, is sufficient to handle the estimated volumes of oily wastestreams. A limited number of oil tankers, prior or following the completion of loading/discharge operations at the oil terminals are used to delivering tank washings or other oily-water mixtures, basically at the ports of Larnaka and Limassol during routine operations.

The anticipated maximum volumes of slops retained in dedicated slop tank/s, does not appear to be a problem for the aggregate reception capacity of the collection barges.



In accordance with the methodology developed and outlined 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

EGYPT

EGYPT

- Introduction

The crude oil and petroleum refined products' carriage by sea has been always contributing significantly to the operation of either dedicated oil terminals from which basically crude oil is imported or exported or in separate zones of the commercial ports. There are important, ongoing projects related with the construction of storage areas, offshore development sites and other infrastructure facilities, envisaged to facilitate crude oil transportation from terminals such as the Sidi Kerir terminal to the country's refineries that operate in the proximity of port areas.

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

Crude oil and oil products component (10^3 tons)

Crude Oil & Petroleum Products
> 7.000

The dedicated, oil terminal that is discussed here is the SUMED operated, Sidi Kerir terminal. The privately, operated Mersa El Hamra (Western Desert Petroleum Company, WEPCO) terminal was not feasible to be visited and surveyed during the mission in the country.

Terminals	**Port**	**Oil Terminal**					
		Crude oil		Oil Products		Power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Sidi Kerir			4				
Mersa El Hamra			4				

A. General Information

Oil Terminal Sidi Kerir

Terminal Operator Arab Petroleum Pipelines Co. (SUMED)

B. Type and operation of the terminal

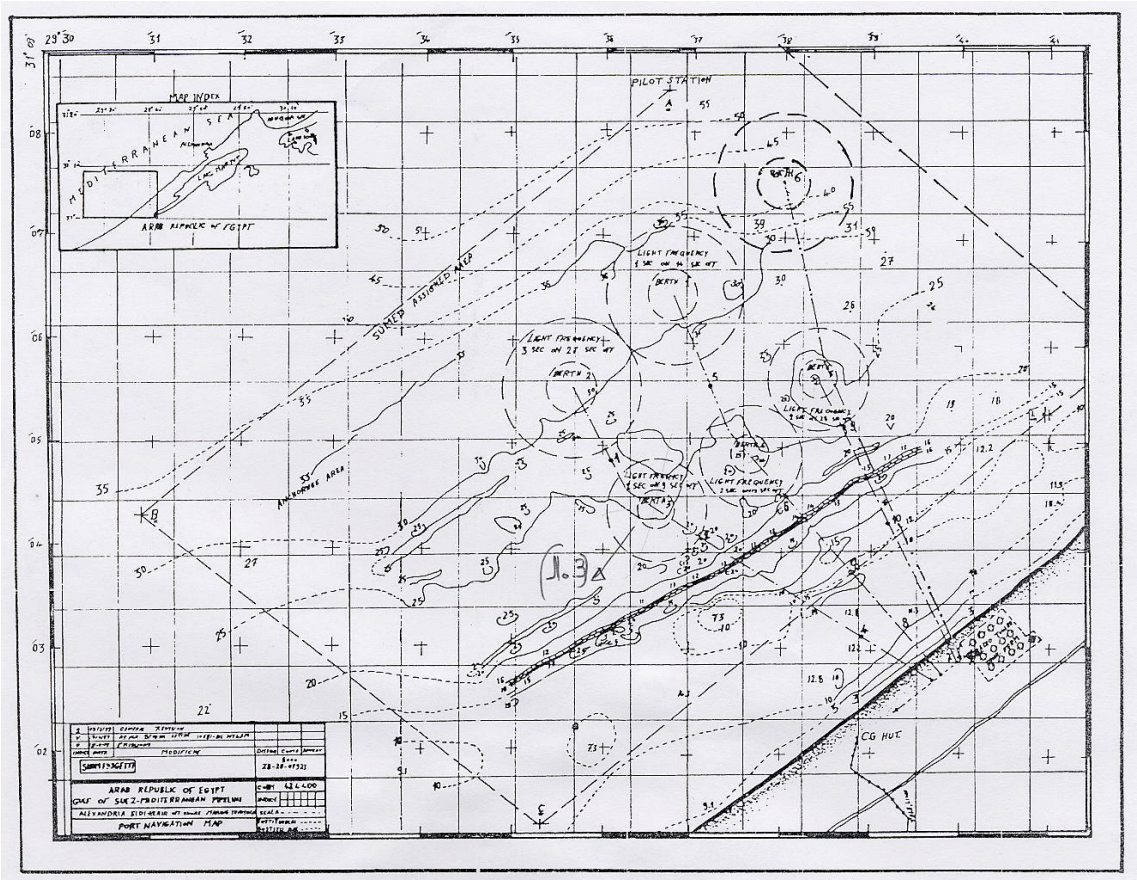
Sidi Kerir Oil Terminal is located 27 kms west of Alexandria, operated by the Arab Petroleum Pipelines Co. (SUMED). SUMED project constitutes an initiative of a number of Arab countries, including Egypt to form the Arab Petroleum Pipelines Company (SUMED) in 1977, constructing and operating a system of pipelines from Ain Sukhna in the Red Sea to Sidi Kerir, through which crude oil produced from the Arabian Gulf is led to the Mediterranean Sea.

SUMED pipelines make a variety of crude oils available at Sidi Kerir within 17 days providing significant savings both in distance and time compared to the flow of crude oil around the Cape of Good Hope. The Arab Petroleum Pipelines Company, enjoys administrative independence within Egypt and its ownership is shared by the major oil producing nations. It is obvious that Sidi Kerir oil terminal is a major distributing centre of Arabian Gulf and Red Sea crude oils. Since 1977, 33 different types of crude oil have been stored and loaded to oil tankers at Sidi Kerir. The twin, 42" parallel lines are 320 kms long extending in their beginning at a western direction and then at a north westerly one.

The offshore facilities consists of 6 SBMs located 5 to 8 kms from the nearest coastline. The three external moorings can accommodate tankers up to 500.000 t.dw, and the other three up to 150.000 t.dw. At the time of the mission at the oil terminal, the SPM No. 3 had been out of operation for economical reasons.

SBMs	Max dwt of tankers that can be accommodated	Max draft of tankers that can be accommodated	Maximum loading rate (tons/hour)
A1	500.000	22.8 m	12.000
A2	500.000	22.8 m	12.000
A3	150.000	16.4 m	10.000
A4	150.000	16.4 m	10.000
A5	150.000	16.4 m	10.000
A6	500.000	22.8 m	12.000

The land-based facilities consist of 21 floating roof welded steel tanks the aggregate storage capacity of which exceeds 2 million cubic meters. A lay out of the SBMs is illustrated below:



C. Existing Reception & Treatment Facilities for dirty ballast and other wastes

Each one of the SPMs, is equipped with a separate deballasting line so that tankers can deliver their dirty ballast to the onshore treatment plant while loading. The deballasting facility allows a rate of maximum 5.000 cubic meters per hour at 150 psi for the external, bigger SPMs through 32 inches line and a respective maximum rate of 3.000 cubic meters per hour at 100 psi for the internal moorings through 16 inches lines.

In 2001, 722 oil tankers called at the terminal while a quantity of 90.493.000 tons of crude oil was handled as well. 250 oil tankers, on average per year representing approximately 35% of the total, deliver dirty ballast and tank washings produced during their short or long haul voyage to the terminal.

Dirty ballast and tank washings received from tankers are treated at the onshore treatment plant which consists of four fixed – roof tanks each one with a capacity of 30.000 cub. meters. Pure mechanical treatment enables an 8.000 cubic meters per hour treatment capacity. Four skimming devices installed at each one tank, skim the gravity induced, separated oil while effluent water is discharged to concrete basins where with the assistance of tilted plate interceptors, the remaining oil is more efficiently separated from the water. Clean water, typically, free of oil is pumped into a water basin and after control of the hydrocarbons level, effluent water is discharged at sea with an average oil content of 5 ppm.
The above level of oil is considered as the most favourable one in most of the Mediterranean and other countries, with respect to direct discharges at sea of oily effluents from land – based reception facilities and industry in general. SUMED operated Sidi Kerir oil terminal represents a well designed, offshore reception and land–based storage and reception facility provided to oil tankers from the beginning of its operation, aimed at meeting MARPOL 73/78 requirements. As expected, dirty ballast discharges from oil tankers at Sidi Kerir are reducing dramatically, as SBT tankers dominate against pre - MARPOL tankers. It was not possible to collect information for the collection of oily wastes other than dirty ballast and tank washings, such as oily bilge water and sludge.

With respect to garbage collection, support and supply crafts operated by the terminal can, upon request and free of charge, collect up to 25 cub. meters per tanker, properly contained in plastic bags. Garbage collected is forwarded to Dhekelia for final disposal.

The respective, completed matrix used for auditing purposes, is provided below, which illustrates the adequacy of dirty ballast and other oily mixtures collection from oil tankers at Sidi Kerir oil terminal.

Terminal: Sidi Kerir Oil Terminal
Country: EGYPT

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		4		
Availability of sufficient information / Notification procedures		4		
Adequacy of capacity		4		
Reasonable cost of waste collection				4
Existence of submitted reports of alleged inadequacy			4	
Existence of serious operational restrictions			4	
Environmental sound waste treatment		4		
Acceptable waste final disposal		4		
Environmentally sound waste management		4		

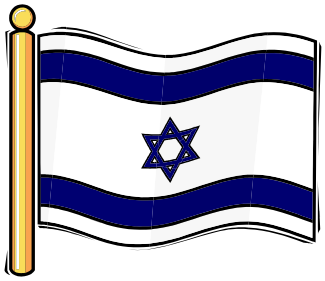
Less than Satisfactory	
Satisfactory	
Adequate	4

Activity C – Collection and treatment of oily ballast water from tankers

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)	
Sidi Kerir Terminal	4			120.000	5.000	120.000	5.000									

Name, Address and other contact details of Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
Arab Petroleum Pipelines Co. (SUMED), Sidi Kerir Terminal	Each SPM is equipped with a separate deballasting line (16 or 32 inches depending the mooring) for receiving dirty ballast or other cargo tanks originated residues. Oil tankers engaged in the operation of the terminal should be equipped with a 10 tons lifting gear to take onboard the mooring and piping connection associated systems. The onshore treatment plant consists of four fixed – roof tanks each one with a capacity of 30.000 cub. meters	Mechanical type achieving 8.000 m^3/hour through settling of water and skimming of separated oil.	-	Treated effluent water free of oil (oil level around 5 ppm) is finally discharged at sea.

ISRAEL



ISRAEL

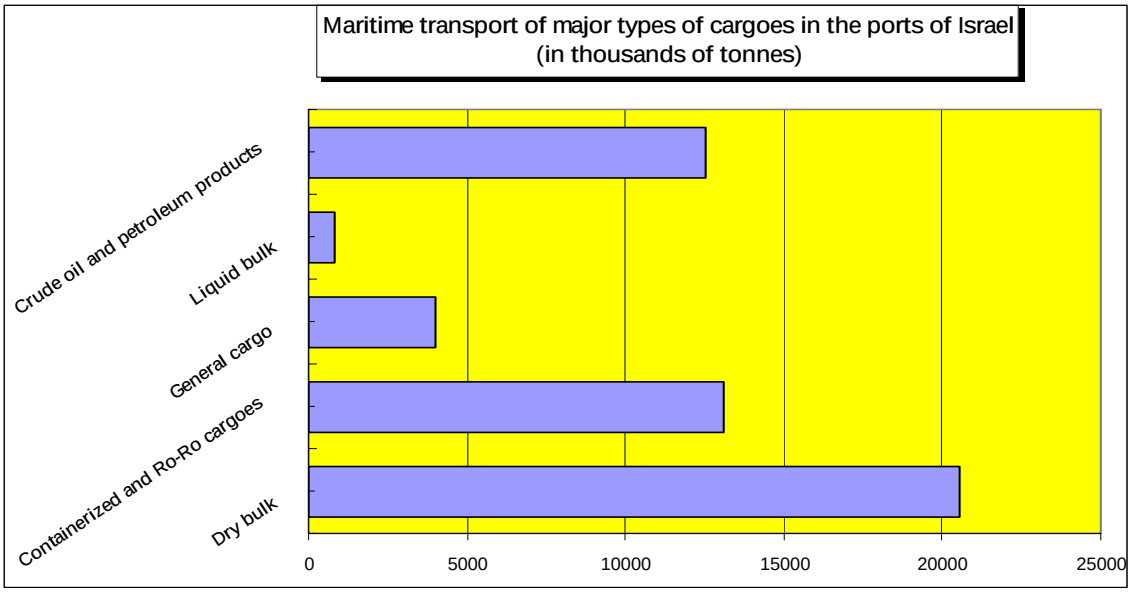
- Introduction

Import of oil is basically carried out at the dedicated oil terminal of Ashqelon and the ports of Haifa and Eliat. Crude oil storage facilities in these ports are connected by a pipeline system to the refineries of the country. These activities are performed by the Eliat – Ashqelon Pipeline Co. (E.A.P.C.) and the Petroleum and Energy Infrastructures (P.E.I.).

This system has a throughput capacity of 55 million tons of crude oil annually playing also the role of the land based link for crude oil carriage between the Mediterranean and Red Sea. From the abovementioned ports, these of Ashqelon and Haifa, as illustrated below, which currently accommodate tankers with actual needs to deliver dirty ballast and other cargo residues, are discussed here.

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		
Haifa								
Ashqelon								Planned desali-nation plant

The break down of shipborne carriage from/to the ports of the country in 2000 associated with the contribution of petroleum related cargoes is shown below: (*Medtrans Database):*



Crude oil refining is carried out by the Oil Refineries Ltd. (O.R. Ltd.) a company jointly owned by the public and the private sector, at its Haifa and Ashdod based facilities.

Refined products are distributed from the abovementioned company either through the P.E.I. operated pipeline system to storage and distribution facilities across the country, directly to oil fired power plants (Ashdod, Haifa and Tel Aviv), or through the storage facility at the port of Haifa where refined products are imported and exported.

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

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 in terms of bilge separating equipment and filtering system, etc., are being regularly exercised by the responsible Port State Control Officers.

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 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 Eliat, Ashdod and Haifa which are discussed here. In 1988 the Government merged Israel Railways into the Authority creating the Ports and Railways Authority but recently legislation was adopted to separate the management of ports and railways.

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 (Marine Environment Protection Fee) , 1983 which imposes 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 Regulations, 1984 which deal with the dumping of waste at sea.

- Prevention of Sea Pollution from Land-based Sources Law, 1988, and the respective Regulations, 1990 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.

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.

A. General Information

- **Terminal** Haifa Oil Terminal
- **Terminal Operator** Fuel Services Company Ltd.
- **Port Authority** Israel Ports & Railways Authority, Port of Haifa

B. Type and operation of the oil terminal

Petroleum related activities are carried out within the port area and also in the outer anchorage. Handling of fuel oil and other refined products for import or export purposes is performed by the Fuel Services Company at a jetty able to accommodate 2 tankers of up to 32.000 tons deadweight and 10.4 meters draft, on either side. A rate of up to 1.000 tons per hour is achieved by a 10"/12" piping system.

Crude oil is handled in the outer anchorage to be stored in the land-based tank farm, through a buoy mooring system connected to a 32'' pipeline that enables discharge rates up to 2.500 tons per hour. The near by petroleum refinery is engaged in refining crude oil and providing oil products to the market and along with the Ashdod refinery reach a combined refining capacity of 3 million tons of crude oil annually.

With respect to oil handling operations in the port, a number of 300 oil tankers call annually engaged in discharging of about 2 million tons of crude oil and other quantities of refined products. The average size of these tankers is about 7.000 tdw.

As it will be discussed later in this section, Haifa based refinery is served by the Ashkelon terminal from which three separate pipelines for crude oil extend to the Red Sea port of Eliat, to Ashdod Refinery and Haifa Refinery as well.

There is not any requirement for tankers engaged basically in loading refined products to arrive with only clean or segregated ballast. Ballast handling operations are subject to the applicable Port Regulations. Information on the availability of facilities for collecting dirty ballast and tank washings from tankers is provided by the local agents of ships.

Any reports of alleged inadequacy of the existing reception facilities are properly processed by the Ministry of Environment in accordance with IMO respective guidelines.

A prior notice from the Masters of incoming ships is required for arranging the reception of oily wastes retained onboard.

C. Existing receptions facilities for dirty ballast and tank washings

Reception facilities of fixed and mobile - navigable type are provided at the oil terminal for collecting dirty ballast and other cargo – associated oily wastes. Specifically, a 8" fixed pipeline along with its associated connections that enables pumping rates up to 1.000 cub. meters per hour is established on the jetty of the terminal for this purpose.

The nominal storage capacity is 7.000 cub. meters. Data on the requests of ships to deliver and volumes of oily wastes handled are not retained. The facility is also open to vessels other than the oil tankers that normally call to load or discharge. 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.

The quality standards of the terminal with respect to potential discharges of effluent water at sea that apply today will change drastically in 2004, incorporating a number of additional parameters for control and monitoring and making others more stringent, as shown below:

Sea water quality standards of the terminal		
Parameter	*2003 (max. value)*	*2004 (max. value)*
Oil and fatty acids	20 mg/lt	
Mineral oils*	15 mg/lt	
Total Suspended Solids	60 mg/lt	35 mg/lt
Detergents	5 mg/lt	
pH	9.5 > pH>6.0	
Heavy metals range of allowable concentrations	0.005 (Hg) – 3.0 (Zn) mg/lt	
Turbidity		25 NTU
BOD		40 mg/lt
Phenol		0.15 mg/lt
Benzene		0.15 mg/lt
Toluene		0.25 mg/lt
Cresol		0.25 mg/lt
Sulfide		0.75 mg/lt

In consistency with the above mentioned criteria for discharging effluent water at sea, the treatment process of oily wastes from tankers and other ships, will be upgraded at the end of 2005 through the incorporation of biological treatment aimed at the further reduction of the organic load and the level of hydrocarbons at less than 5 ppm.

A 15 $ US per cubic meter, fixed fee, for collecting dirty ballast and tank washings applies to those tankers that wish to deliver this type of oily wastes.

Activity C – Collection and treatment of oily ballast water from tankers

Terminal	**Type of Facility**			**Oily wastes received from the facility**												Operational restrictions
	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)	
HAIFA OIL TERMINAL	4			7.000	1.000	7.000	1.000			*[1]		*[2]		*[2]		

Reception facilities operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
HAIFA OIL TERMINAL Tel : +972 (4) 8413684 Fax : +972 (4) 8518359	The fixed facility consists of a 8" deballasting line from the loading/discharging oil jetty to the 7.000 cub. meters reception and storage area	Gravitational settling of water in the reception and storage tank and treatment at standard API separators at a maximum rate of 400 cub. meters/hour	A fixed fee of 15 $ US per cubic meter of dirty ballast and tank washings collected applies according to Port Regulations	*[1] Scale and sludge retained onboard from tank cleaning operations can be accepted and treated to recycle as road construction material or disposed of in designated landfills following stabilization *[2] Oily wastes from the machinery spaces of ships can be similarly collected from the facility

D. Estimations of oily waste streams' volumes & Recommendations

The estimations appeared below, were carried out on the basis of absence of data that reflect the actual use of the available reception facilities for oil tankers. It is obvious that crude oil is currently discharged in the outer anchorage, thus eliminating the need for receiving potential quantities of dirty ballast either from non SBT tankers or SBT tankers that happened to ballast, empty cargo spaces.

As far as the handling of fuel oil at the oil terminal, it should be noted that the trade of heavy fuel oils which are actually blended products based on the residues from various refinery distillation and cracking processes, for use in industrial and power plants but also in marine engines, is complicated since the range of products of this kind is wide.

As it was concluded from other countries, only a low percentage of the incoming oil tankers engaged in discharging or loading operations are non SBT tankers. For tank washings produced after the discharge of fuel oil and for slops accumulated from the previous voyages, it was estimated that a considerable percentage of the tankers are engaged almost exclusively in the trade of heavy fuel oils, taking advantage of the option to retain residues onboard and load the new cargo on top of them.

In estimating tank washings that could be produced and delivered to the oil terminals, it was presumed that 10 % of the oil tankers need to clean their cargo tanks, and deliver the washings and other residues produced before leaving the Haifa oil terminal.

Terminal : Haifa Oil Terminal
Country : Israel

2 Estimates of ship-generated oily wastes that could be delivered at the terminal

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced Daily Volume (m^3/day)	-	105.2	2.0	6.1
Average Annual Volume (m^3/year)	-	38,400	750.0	2,250
Maximum volume per ship/arrival (m^3)	-	2,560	25.0	15.5

It is obvious that the maximum volume of tank washings that could be delivered to the available facilities is much less than 40% of the existing storage capacity. Discharge of this kind of oily wastes from two tankers can be similarly afforded by the 7.000 tons holding capacity provided at the terminal and also by the relatively high treatment rates.
In terms of the reduced daily volume as estimated above, the existing storage capacity can match for more than a two months period taking into account daily inputs of this size.

As far as the treatment process employed at the reception facility is concerned, the environmental standards of the marine area of the terminal, determine to a significant extent the quality of effluent water produced during the separation of oily water mixtures. The incorporation of a stage of biological treatment in the whole process is expected to reduce the organic load and other potential contaminants to the oily wastes normally collected.

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.

A. General Information

- **Terminal** Ashkelon oil and gas terminal
- **Terminal Operator** Eliat – Ashkelon Pipeline Co.

B. Type and operation of the terminal

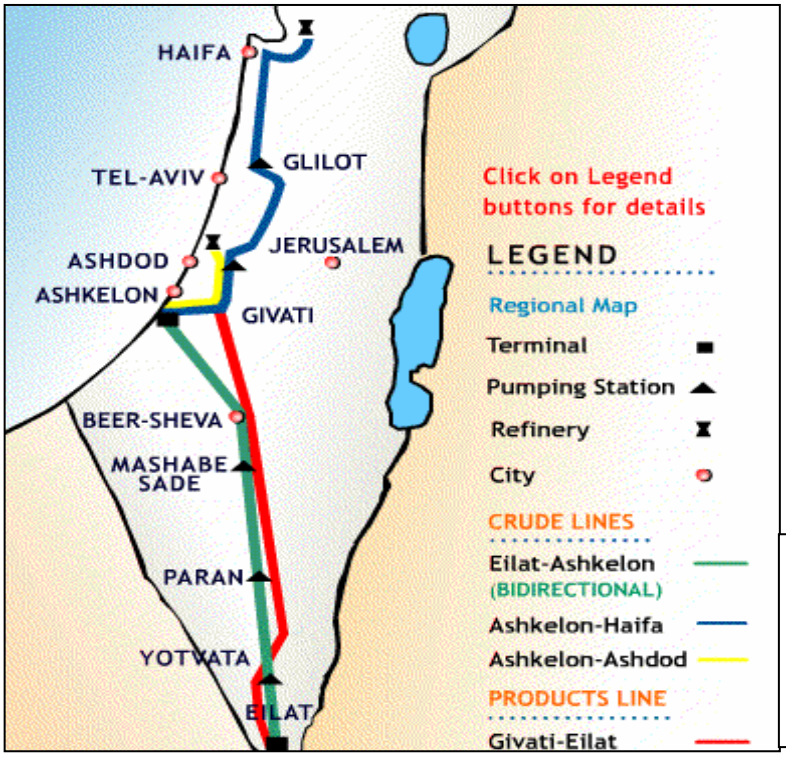
Ashqelon terminal is located at $31^0$40 N, 34^0 33 E south of the city of Ashkelon and is operated by the Eliat – Ashkelon Pipeline Company. On average 300 ships call at the terminal annually, to discharge, basically, heavy fuel oil, other oil refined products, crude oil, liquified petroleum gas and coal.

The discharging and loading facilities related to oil tankers operations are outlined below:

- Multibuoy Berth No. 1 able to accommodate tankers up to 80.000 t.dw, through which distillates such as gasoline, jet fuel and gas oil are unloaded for transfer to the adjacent, land-based tanks.

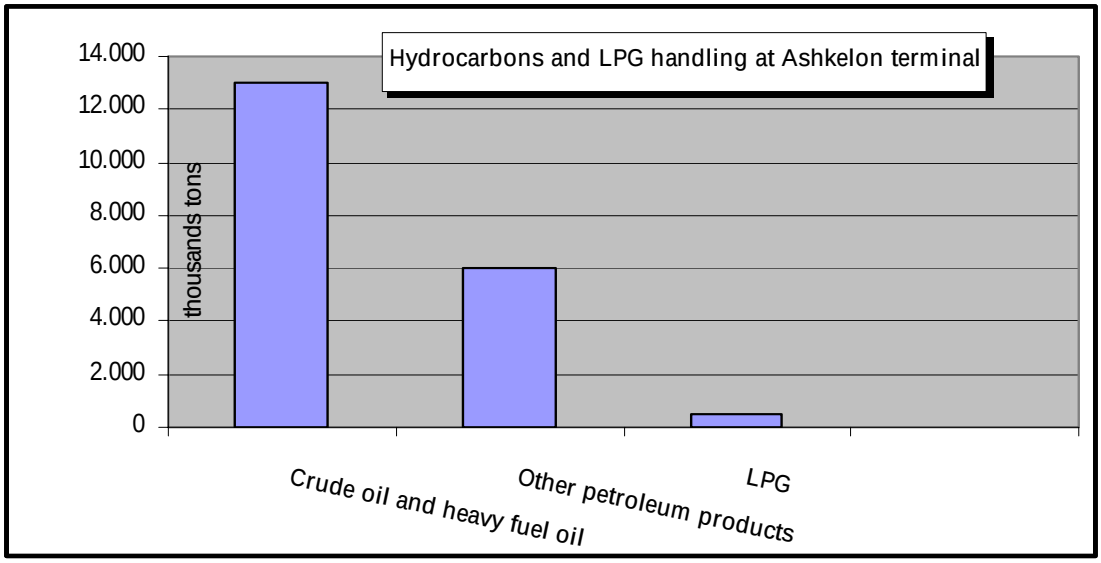
- Multibuoy Berth No.2, able to accommodate oil tankers of up to 80.000 t.dw where fuel oil is discharged to the near by Israel Electricity Company's power stations.

- SPM 3 and 4 are located 3.2 and 3.5 kms respectively offshore at a water depth of 31 meters, used for discharging and loading crude oil carriers of up to 250.000 t.dw. It should be noted that the terminal serves three separate pipelines for crude oil, one 254 kms long linking the terminal of Ashkelon with the Red Sea based port of Eliat, a line 197 kms long connecting the terminal with the Haifa Refinery and another one 36 kms long connected with the Ashdod Refinery. The crude oil piping system running from the terminal is shown below:



Geographical extension of crude oil and oil products lines from Ashkelon oil terminal *(from EAPC Co.)*

Further, a coal jetty able to handle coal carriers of up to 100.000 t.dw, serves the Israel Electricity Company's power station while an LPG berth in the form of a multibuoy system, operates in the area of the terminal to accommodate gas carriers of up to 8.000 t.dw. The average, annual handling of crude oil, petroleum products and LPG cargoes is illustrated below:



Berths 3 and 4 in the form of Single Point Mooring Systems, used for discharging but also for loading crude oil carriers present interest with regard to potential deliveries of dirty ballast, in particular from SBT carriers in cases where adverse weather and sea state conditions have been encountered prior berthing. Each berth is connected to shore by two 32" submarine pipelines for loading and discharging, the associated floating hose and couplings. The maximum loading and discharging rates is 6.500 cub. meters per hour while the maximum working pressure on tankers' manifolds should be 8 bars.

Only clean ballast water from segregated ballast tanks may be discharged at sea in the area of the terminal. Random samples can be taken from these tanks for verifying the absence of oil contamination. Any potential quantities of oil contaminated ballast should be delivered ashore to the designated reception facilities.

C. Existing receptions facilities for dirty ballast and other oily wastes

The terminal allows only to SBT tankers to call for the purpose of loading crude oil or other oil products, thus eliminating the need to provide facilities for collecting and processing dirty ballast. In cases of emergency and depending of the allowable storage capacity at the time of ships' request, the terminal can receive up to 20.000 cub. meters of dirty ballast and tank washings.

The twin, piping system of Berths 3 and 4 can be used for receiving dirty ballast and tank washings enabling collection rates up to 6.500 cub. meters per hour.

A conventional settling and oil – water separation treatment plant is engaged in dealing with the subsequent treatment of collected oily water mixtures. At the same facility, oily wastes from the machinery spaces of tankers as well as of coal carriers can be collected and treated.

In accordance with the applicable Port Regulations, vessels which are greater than 24 meters long, must pay a fee at a rate of 25% of the lighthouse dues imposed under these Regulations, while the owners of tankers calling at the port of Ashkelon must pay a fee at the rate of lighthouse dues.

The standard format with which the available reception and treatment facilities are outlined is presented below:

Activity C – Collection and treatment of oily ballast water from tankers

Terminal	**Type of Facility**			**Oily wastes received from the facility**												Operational restrictions
	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)	
ASHKELON TERMINAL	4		4	20.000	6.500	20.000	6.500									

Reception facilities operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
E.A.P.C. P.O.B. 194 Ashkelon, 78 101 Tel : +972 8 674 0200 Fax : +972 8 673 5971	The facility consists of two deballasting lines from the loading/discharging sites of SPM 3 and 4 to the 20.000 cub. meters reception and storage tank	Gravitational settling of water in the reception and storage tank and treatment at standard API separators at a maximum rate of 500 cub. meters/hour	In accordance with the applicable Port Regulations, vessels which are greater than 24 meters long, must pay a fee at a rate of 25% of the lighthouse dues imposed under these Regulations, while the owners of tankers calling at the port of Ashkelon must pay a fee at the rate of lighthouse dues.	Oily wastes from the machinery spaces of ships can be collected from barges operating in the area of the terminal

D. Estimations of oily wastestreams' volumes & Recommendations

It was considered as appropriate to attempt to estimate the potential quantities of tank washings and other oily wastes produced from the operation of oil tankers and all ships respectively, in an effort to consider the actual needs of all ships but also to assess the adequacy of the existing reception facilities.

Terminal : Ashkelon Terminal
Country : Israel

2 Estimates of ship-generated oily wastes that could be delivered at the terminal

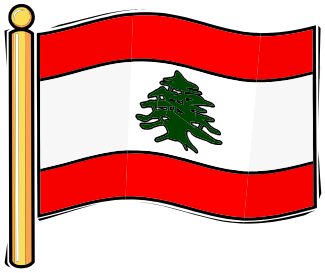
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced Daily Volume (m^3/day)	-	184.9	2.0	6.1
Average Annual Volume (m^3/year)	-	67,500	750.0	2,250
Maximum volume per ship/arrival (m^3)	-	20,000	25.0	15.5

It is obvious that as far as dirty ballast discharges from oil tankers are concerned, the available piping system at berths 3 & 4 along with the storage and treatment facilities, sufficiently match the exceptional needs of SBT tankers to deliver oil contaminated ballast water retained in cargo tanks before loading operations. The prevailing practice in oil tankers operations has shown that those tankers which are not provided with segregated ballast tanks carry dirty ballast during voyage without cargo, which corresponds to about 25% of their deadweight. However for both SBT and non SBT tankers, during adverse weather conditions, additional ballast up to 10 – 15% of the deadweight may be required. Taking into account the progressive phase out of single hull tankers of certain sizes, due to the revised 13 G Regulation of Annex I of MARPOL 73/78, the crude oil berths of the terminal are capable of taking a significant part of the dirty ballast from SBT tankers forced to ballast empty cargo tanks.

Similarly, the available facilities can afford the maximum, potential volume of tank washings related to tankers performing tank cleaning operations en route to the terminal and arriving with washings wholly accumulated in their nominated slop tanks, (8% of dwt or about 20.000 tons of the maximum allowable size of crude oil carriers). Only in cases where loading of oil tankers is going to take place at both 3 and 4 berths, and due to the incompatibility of the crude oil to be received and the last cargo, tank washings have been retained onboard for disposal ashore at the terminal, the available storage

capacity for oily wastes could be demonstrated to be not sufficient. However, this scenario is not possible to occur, while at the same time new, more effective tank cleaning techniques and systems employed onboard oil tankers are expected to decrease the volume of washings produced, reducing further those volumes that could be delivered ashore before berthing and loading.

LEBANON



LEBANON

- Introduction

Lebanon, due to its proximity with crude oil producing countries has been offered the advantage to play the role of a oil refining centre and also of a major crude oil exporting centre for a number of years. At the time being, there is no crude oil handling related activity in the petroleum terminals of the country since they are predominantly engaged in the import of fuel oils and other refined products for power production and energy purposes. The terminals which are discussed here, are the Zahrani, Tripoli oil installations and Jounieh.

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 and other cargoes
Quantity of goods	5.547	5.195	352	1.666	1.749	1.505

Petroleum products' share *(10^3 tons)*

Petroleum Products
1.494

Terminals	**Port**	**Oil Terminal**					
		Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
Tripoli	4				4	4 Deir Ammar	
Zahrani Oil Terminal					4	4	
Jounieh	4					4 Zouk	
Beirut (privately operated oil products distribution companies)	4			4	4		

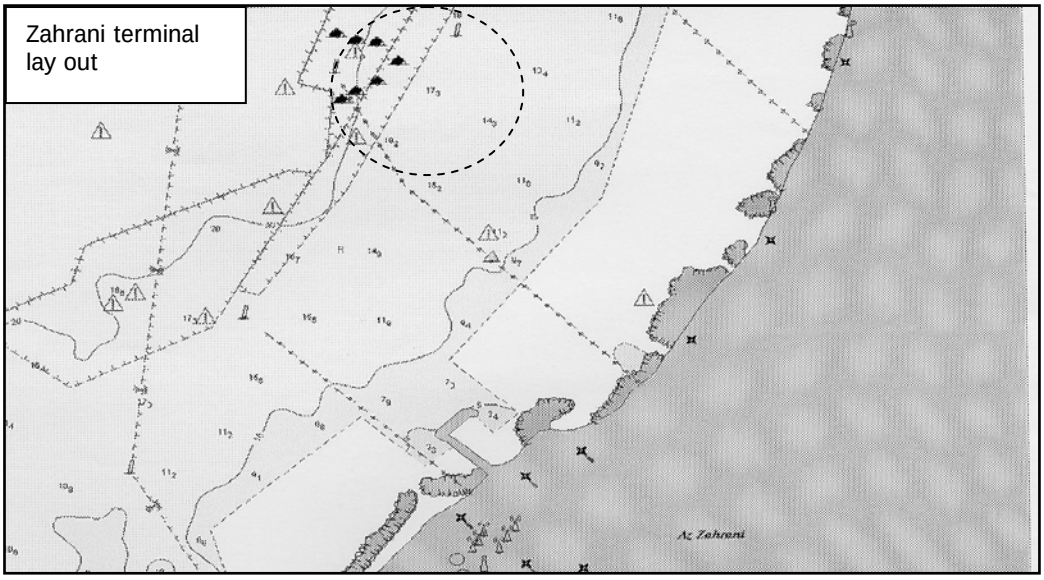
A. General Information

- **Port** Zahrani Oil Terminal
- **Port Authority** Saida Port Authority

B. Type and operation of the port

The terminal is located in an open, unsheltered roadstead north of the Zahrani River and about 8 km south of the town of Sidon (Saida). It is approximately 56 kms south of Beirut and 27 kms north of Tyr. Its facilities, normally consist of four berths, but at present only one berth, No.2 is operational. The Trans-Arabian Pipeline Company (TAPLINE) which started operations in 1950 transporting crude oil to the terminal at Zahrani (as the end station of the pipeline) to the world oil related market, is no longer operational. There are three submarine lines, two for crude and one for bunkers. The lines are spaced about 792.4 meters apart and extend about 1.6 kms offshore.

Zahrani terminal lay out



One of the two state owned oil refineries is located in the area where the Zahrani oil terminal. The 52.000 barrels per day nominal capacity refinery, is no longer used limiting the function of the oil terminal only to the unloading of gas oil and fuel oil from oil tankers, basically for domestic consumption purposes. Both crude and bunker hoses are lifted on the port side (with ship's gear). On average, 20 oil tankers discharge about 600.000 tons of fuel and gas oil annually at the terminal storage tanks.

Type of oil handled	**Average, annual quantity discharged** (metric tonnes)
Gas oil	500.000
Fuel oil	70.000

The maritime traffic of the terminal during the last three years is presented in the following table:

Year	Number of tankers arrived at the terminal	Average deadweight of tankers (t.dw)	Maximum deadweight of tankers (t.dw)
2002	17	40.000	80.000
2001	24		
2000	19		

C. Existing receptions facilities for oily wastes

During the operation of the terminal as crude oil discharge facility , no fixed or other flexible type of reception means were provided to collect dirty ballast and other oily residues from the incoming tankers, a situation which remains similar today. The operation of the terminal as a fuel oil receiving facility makes the provision of reception facilities for oily wastes originated from the cargo or ballast area of tankers, not necessary, however, the need to provide facilities for oily wastes originated from the machinery spaces of ships exists.

D. Estimations of oily wastestreams & Recommendations

Terminal: Zahrani
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			1.5	0.3
Average annual volume (m^3/year)			555.5	109.5
Maximum volume to be received per ship/arrival (m^3)			25.0	32.4

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams. The estimated, daily volumes do not justify the establishment and operation of a fixed facility for the

abovementioned types of oily wastes, however any change to the current operational scheme of the terminal rendering it from oil receiving to oil discharging terminal would similarly change the hypothesis of estimations in particular with respect the need of oil tankers to discharge dirty ballast and tank washings.

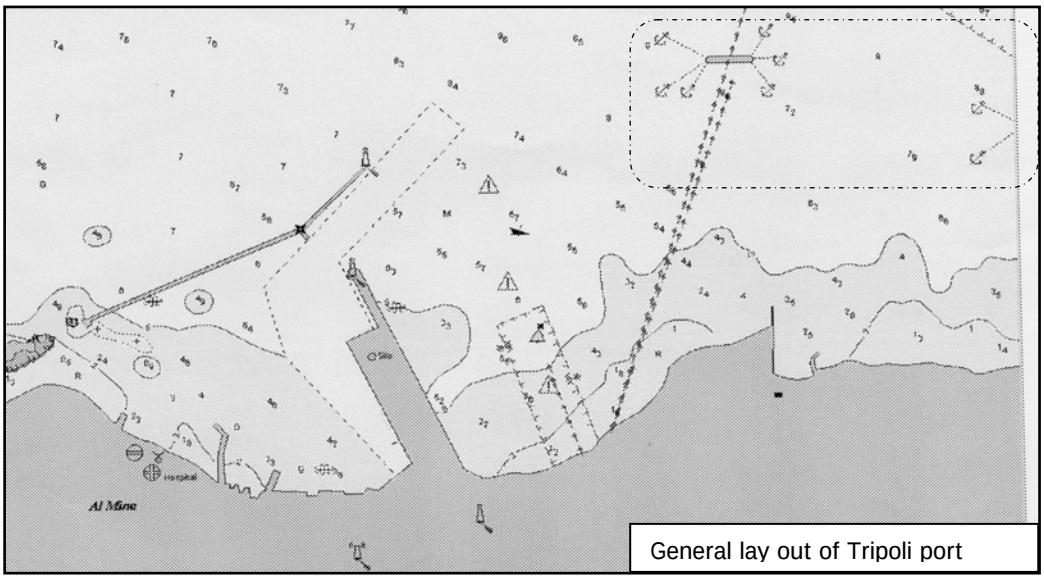
Taking into account the existing operation of the terminal, it would be advisable that a navigable collection facility of at least 100 cub. meters capacity, to be provided for receiving oily wastes from the machinery spaces of incoming tankers and occasionally cargo oily residues retained in slop tank/s.

A. General Information

- **Port** Tripoli
- **Port Authority** Service d' Exploitation du Port de Tripoli
  Oil Terminal Operator Tripoli Oil Installations (T.O.I.L)

B. Type and operation of the port

Tripoli Oil Installations terminal, provides four berth areas to accommodate oil tankers up to 250.000 t.dw. The terminal was used as an exporting site of the Kirkuk Oilfield originated crude oil, now serving the energy needs of the internal market. On average, at the MBM terminal situated 8 kms from the port area, 1 million tons of petroleum products including LPG are handled annually while 40 tankers of an average size of 35.000 t.dw are annually engaged in its operation.



General lay out of Tripoli port

Year	Number of tankers arrived at the terminal	Average deadweight of tankers (t.dw)	Maximum deadweight of tankers (t.dw)
2002	40	35.000	250.000
2001	39		
2000	40		

C. Existing receptions facilities for oily wastes and garbage

Limited facilities are provided at the port of Tripoli in general, upon request from any interested ship, to receive oily wastes. 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 which were required to arrive with only clean ballast that could be discharged during loading operations.

D. Estimations of oily wastestreams & Recommendations

Terminal: Tripoli Oil Installations
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			2.9	1.1
Average annual volume (m^3/year)			1,058.5	401.5
Maximum volume to be received per ship/arrival (m^3)			25.0	35.0

No significant changes in the future are expected to the above estimated volumes of the two major wastestreams. The case of the terminal of Tripoli Oil Installations is almost similar with that of Zahrani.

The anticipated, daily volumes of oily wastes do not justify the establishment and operation of a fixed facility, however any change to the current operational scheme of the terminal rendering it from oil receiving to oil discharging terminal would similarly change the hypothesis of estimations in particular with respect the need of oil tankers to discharge dirty ballast and tank washings. It would be advisable that a suitable barge, able to collect at least 100 cub. meters of sludge and oil water mixtures could serve the relatively limited needs of the tankers that normally call at the terminal.

A. General Information

- **Port** Jounieh
- **Port Authority** Jounieh Port Authority
- **Oil Terminal Operator** Electricity du Liban

B. Type and operation of the terminal

The operation of the port of Jounieh is strongly related with the operation of the terminal of Zouk power plant which is situated 10 miles north of Beirut and 5 miles south of Jounieh, at which, about 850.000 tons of fuel oil are discharged annually, as shown below:

Year	Number of tankers arrived at the terminal	Annual volume of cargo discharged (tonnes)	Maximum deadweight of tankers (t.dw)
2002	45	859.000	30.000 - 40.000
2001	34	747.000	
2000	59	998.000	

C. Estimations of oily waste streams & Recommendations

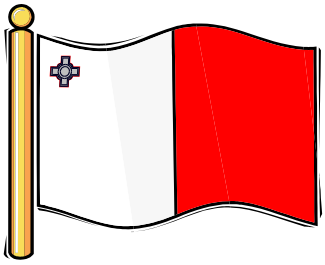
Port: Jounieh
Country: Lebanon

2 Estimates of ship-generated oily wastes and residues

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)			1.0	0.1
Average annual volume (m^3/year)			383.3	63.8
Maximum volume to be received per ship/arrival (m^3)			15.0	7.5

No significant changes in the future are expected to the above estimated volumes. Since there are no facilities established in the Jounieh port area for oily wastes and the anticipated volumes for delivery at the port are limited, collection from the Beirut operated facilities could easily absorb the latter, meeting the needs of ships that normally call at the terminal. It is also possible, that those tankers which are engaged in fuel oil discharging operations for the power plant of Zouk, call at the port of Beirut for other routine needs such as bunkering, supplying, etc. requesting also the collection of oily wastes or garbage.

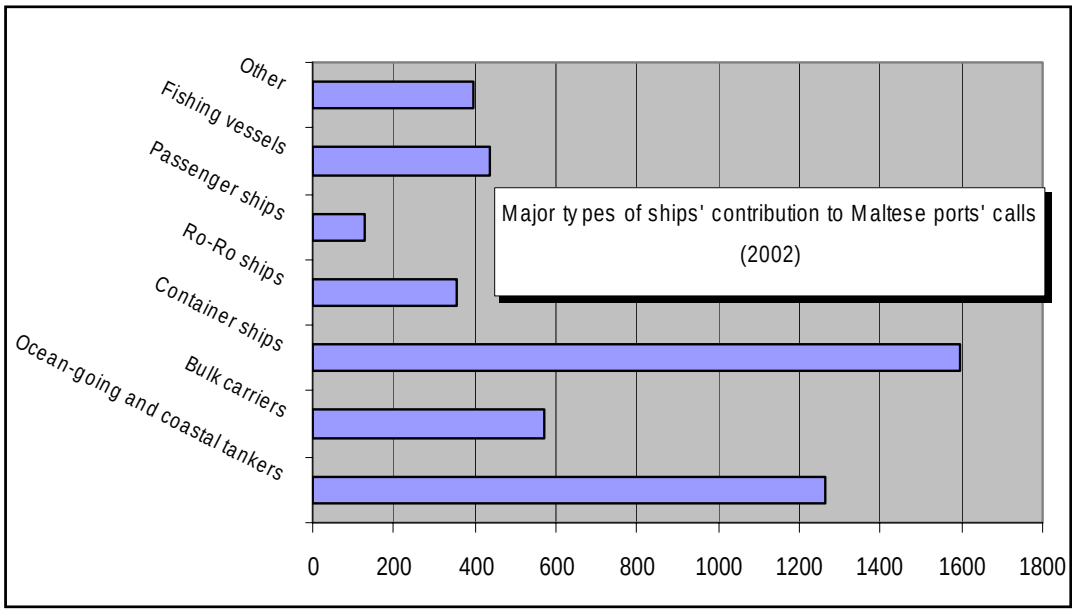
MALTA



MALTA

Introduction

Occasional, crude oil loading and discharging operations are limited only at the Oil Tanking installations within the area of Malta Freeport, while other oil products' handling operations take place in a number of terminals for supporting, invariably, power production and refined petroleum products' distribution in and outside the country. It should be noted that Malta terminals play an important role in the Mediterranean bunker fuels market, the growth of which is determined by the volume of sea borne trade passing through the area.



The terminals that are discussed here are these of Oil Tanking Malta in the port of Marsaxlokk and the Tank Cleaning Facility of Malta Drydocks in the port of Valletta.

Terminals involved in the project	Port	Ship-repairing port – Tank cleaning facility	Oil Terminal				
			Crude oil		Oil Products		Fuel Oil power plant
			Loading terminal	Unloading terminal	Loading terminal	Unloading terminal	
Oil Tanking Terminal, Malta Freeport	Marsaxlokk		4	4	4	4	
Tank Cleaning Facility, Malta Drydocks	Valletta	4					

A. General Information

- **Terminal** Oil Tanking Terminal, Malta Freeport, Port of Marsaxlokk
- **Operator** Oil Tanking Malta Ltd.

B. Type and operation of the terminal

Oil Tanking terminal is a modern facility, located within the Malta Freeport in the port of Marsaxlokk, dealing in principle with tank rental, by providing a series of services such as storage of crude oil and oil products, blending, botanising, etc., as well as other petroleum related operations including ship to ship transfers, etc.

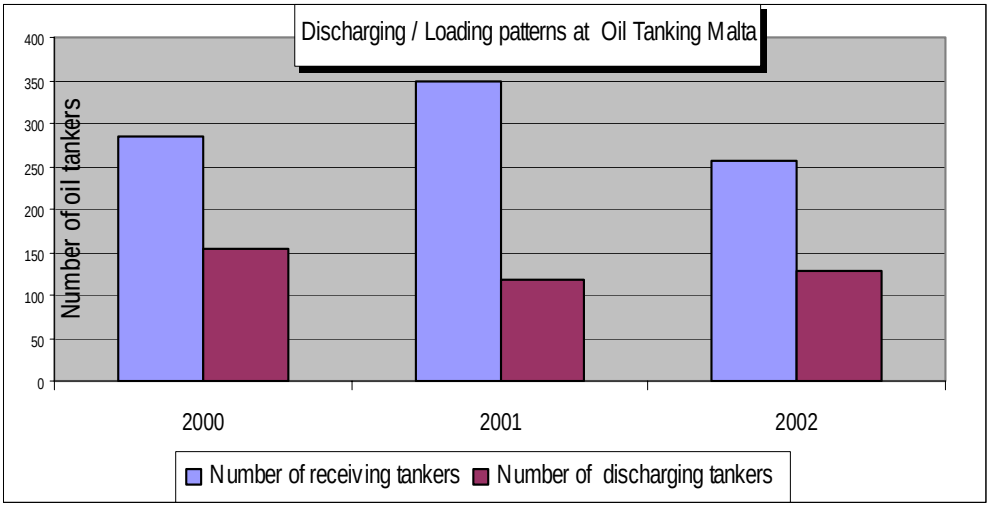
A 750 meters long jetty consisted of three loading/discharging sites, able to accommodate up to 120.000 t.dw oil tankers is provided, which operate in strictly controllable and safe conditions. At the time being, the storage capacity is about 360.000 m^3, in 17 tanks the size of which varies between 5.000 and 35.000 m^3. Six new tanks of about 165.000 m^3 and an expanded jetty along the north side of the terminal are under development. A lay out of the jetty of the terminal is shown below:

Berths	Allowable Draught (m)	Remarks
Jetty 1	6.0	Up to 6.000 t.dw tankers engaged in black and white oil products handling at a maximum rate of 2.000 m^3/hour
Jetty 2	13.5	Up to 50.000 t.dw tankers, where oil products are handled at a 2.000 m^3/hour pumping rate
Jetty 3	16.0	Up to 120.000 t.dw tankers, where crude oil and other oil products are handled at a maximum 3.000 m^3/hour rate

In accordance with the data related with the last three years' period, 430 oil tankers call at the terminal annually to discharge or receive oil products. In 2002, more than 1.590.000 met. tons of jet fuel, gas oil, fuel oil, gasoline and MTBE were handled from the terminal. On average, as demonstrated in the diagram below, 70% percent of the incoming tankers, are engaged in oil products loading operations, representing those tankers that would potentially need to deliver dirty ballast or tank washings produced during the passage to the terminal.

In addition, the average daily quantity of oil products discharged from the terminal is more that 4.000 tons, exceeding the 1.000 tons margin, set from MARPOL 73/78, Annex I Regulations for those oil terminals that are required to provide facilities for dirty ballast and tank washings.

According to the data maintained by the company, only a few oil tankers are non-SBT tankers (in 2002 there was only one request from a tanker to deliver dirty ballast and tank washings) thus eliminating the need of the terminal and its authorized contractors to collect, al least, oil contaminated dirty ballast.



C. Estimations of oily wastestreams' volumes & Recommendations

There are no fixed or other type of facilities available for dirty ballast, tank washings or other oily wastes from ships, operated by the terminal. Waste Oils Company Ltd. is the authorized contractor to collect, upon request, oily wastes from the incoming tankers. For arriving SBT tankers and those that have completed even part of the ballast voyage from the last port of discharge outside the Mediterranean sea, there is no doubt that no reception facilities for dirty ballast are required, in particular when the ballast voyage was more than 72 hours or alternatively more than 1.200 n. miles.

In the case of non-SBT tankers, coming to the terminal having completed a ballast voyage within the Mediterranean sea, there is a clear need to deliver dirty ballast, however there might be some exceptions from this principle. The oily wastes reception means that are normally allocated by the Waste Oils Company Ltd. to the terminal include two barges of 250 and 1000 cub. meters capacity respectively.

Waste Oils Company Ltd. constitutes the Valletta based, integrated oily wastes (from land based and marine sources) reception and recycling facility in Malta. 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.

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

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

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced Daily Volume (m^3/day)	-	32.8	1.7	1.3
Average Annual Volume (m^3/year)	-	12,000	642.5	464.1
Maximum volume per ship/arrival (m^3)	-	3,600	25.0	7.5

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 between 50.000 and 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.

The navigable, reception facilities provided by the authorized contractors of Oil Tanking Malta are considered as being sufficient to meet the needs of tankers that normally call to the terminal. Collection is not performed during cargo handling operations but favourably immediately following their completion for safety reasons.

The maximum volume of tank washings, as estimated above, does not actually constitute a problem for the holding capacity of the barges provided by the contractors of Oil Tanking Malta, since the terminal is predominantly engaged in discharging small lots of oil products (on average less than 20.000 tons). Tank washings concentrated in slop tank/s of those incoming tankers seem to be less than 600 tons per arrival.

The implementation of the 2000/59/EC Directive in Oil Tanking Malta terminal in specific, will not alter the above estimated figures, nor the current, adequate, provision of reception facilities for oily wastes. Finally, it should be noted that a well designed plant to treat drainage from the storage area of Oil Tanking installations has been operating consisting of two parallel coalescer separators (volume of the sump well is 1.000 cub. meters) followed by a sand and charcoal filter through which separated water containing less than 5 ppm of oil, is discharged at sea. Oil recovered is stored in a 15 cub. meters tank before it is pumped back to the storage tanks if this option is possible, otherwise it's managed as hazardous waste and disposed of accordingly.

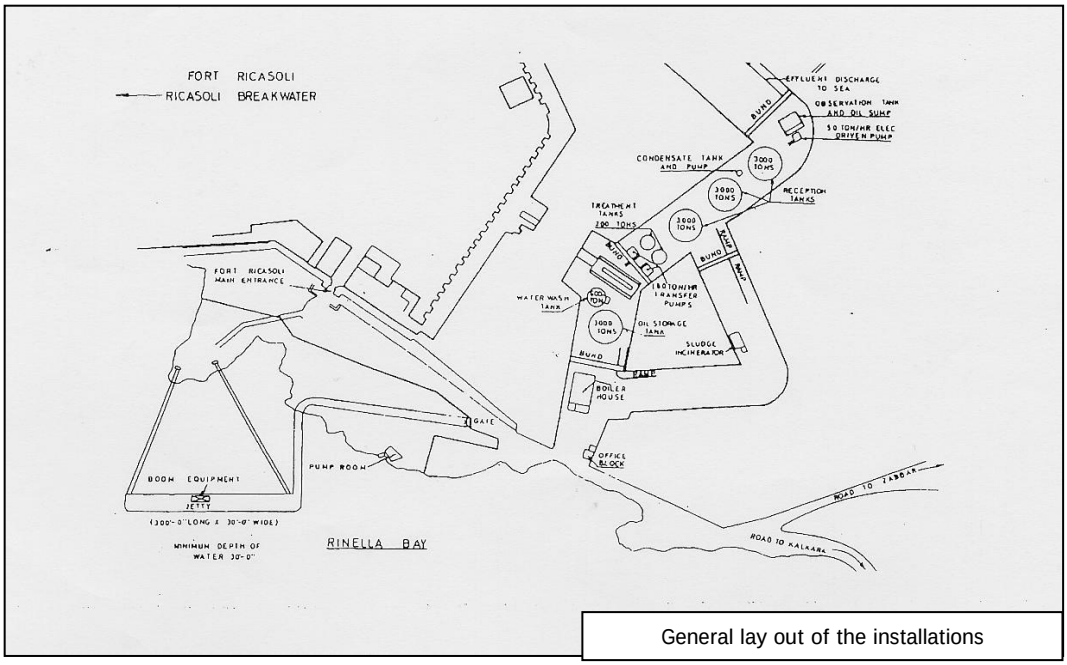
A. General Information

–	**Facility**	Tank Cleaning Facility, Port of Valletta
–	**Operator**	Malta Drydocks

B. Type and operation of the facility

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.,

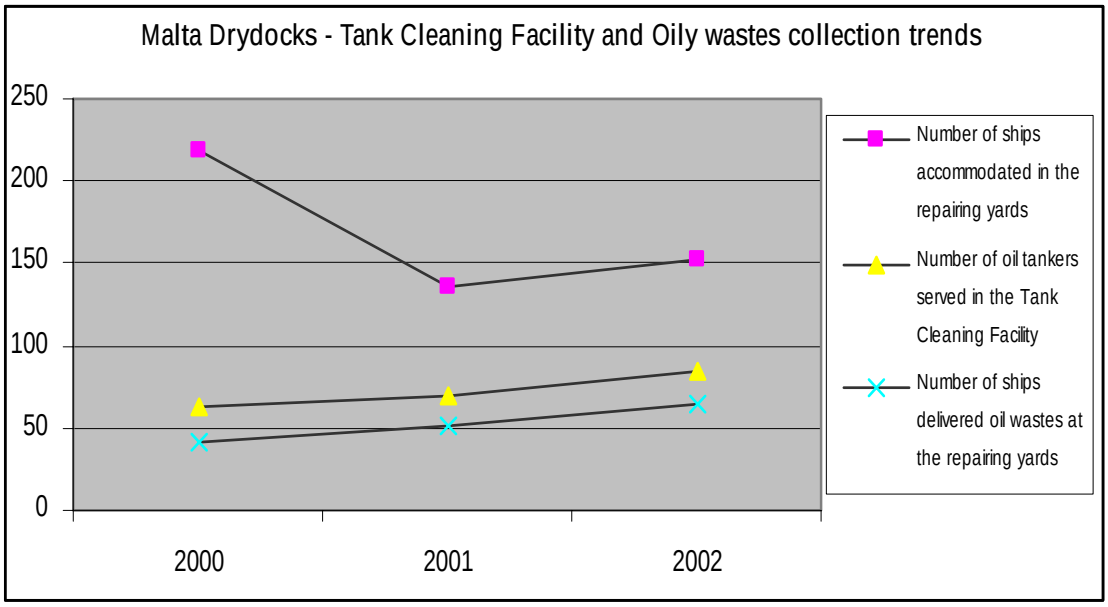
it also represents a properly equipped reception facility for almost all kinds of liquid oily wastes such as dirty ballast, tank washings, oily bilge water except of chemicals - contaminated mixtures, etc., aimed to serve not only the needs of ships entering the Malta Drydocks but also of those calling to the port of Valletta and Malta in general. A lay out of the facility is provided below:



General lay out of the installations

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 ship-repairing and other works, apparently ensuring the adequacy of reception facilities for Malta Dry Docks.

The standardized outline of the Tank Cleaning Facility operational details is provided in the following table:

Activity C – Collection and treatment of oily ballast water from tankers

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

Name, Address and other contact details of Operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
Malta Drydocks Joe Meli P.O. Box 581 Valletta 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

MOROCCO

MOROCCO

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 (by the 10 countries of this project) 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 Activity A of 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)

Quantity of goods	2000			Type of cargo		
	Total	Unloaded	Loaded	Liquid Bulk	Dry bulk	Containers, Ro- Ro and other cargoes
	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**					
	Commer-cial 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.

SYRIA

SYRIA

- Introduction

Crude oil and other petroleum products represent an important share of cargoes carried by sea from/to the dedicated terminals and commercial ports of Syria. The contribution 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 according to the MED-TRANS data base, Banias is ranked as the 9th most important port in the Mediterranean in terms of the gross weight of cargoes handled in 2000. The general maritime transport and cargo handling at the ports of the country is illustrated 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

Crude oil and oil products component $(10^3$ tons)

Crude Oil	Petroleum Products
14.000	4.200

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.

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					

A. General Information

- **Terminal** Banias
- **Port Authority** Syrian Company for Oil Transport

B. Type and operation of the port

The oil terminal of Banias is located at 35° 14' N and 35° 60' E and in combination with the local fuel oil fired power plant (20% of the country's installed capacity) and the Banias petroleum refinery constitutes a strong industrial and power supply base of the coastal region. The Banias oil terminal is operated by the Syrian Company for Oil Transport (SCOT) and is situated some 25 kms north of the Tartous oil terminal.

More than 56% of the maritime transport of Syria is concentrated at the Banias oil terminal.

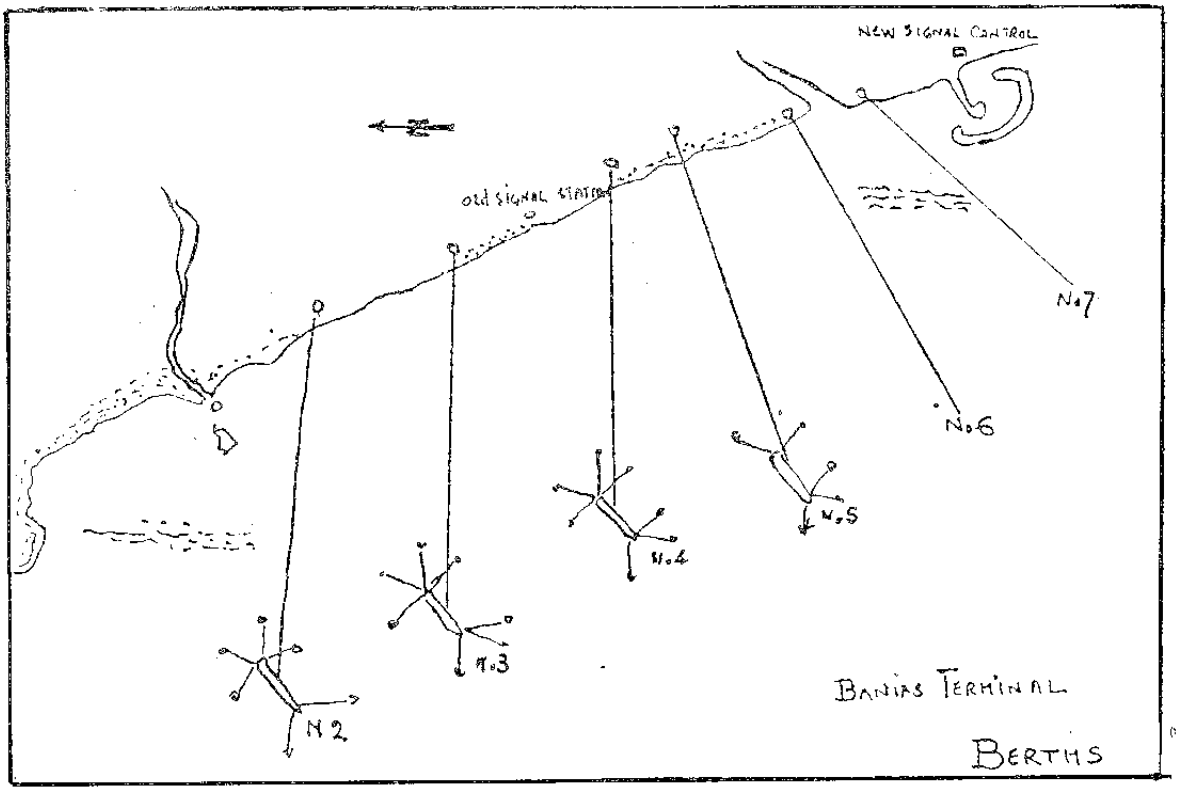
The terminal has a storage capacity of about 786.000 tons providing 6 berths in the form of multiple buoy moorings able to accommodate tankers up to 130.000 t.dw size. Two of the berths are used for the export of about 12 million tons of crude oil per year and the other for the import or export of 2.5 million tons of refined products (1994 data).

MBMs	Actual Depth (m)	Remarks
2 – 3	15.5 - 15.8	Loading and discharge of crude oil through two 20" hoses
4 - 7	9.8 – 12.8	Loading and discharge of various products including fuel oil, jet fuel, LPG, and other petroleum, vacuum gas oil, gasoline and other white products by means of double or single 12" and/or 8" hoses.

Terminal regulations prohibit the discharge of dirty ballast from incoming oil tankers supporting the engagement of SBT tankers in oil loading operations, thus, eliminating the need to provide facilities for collecting dirty ballast from pre-MARPOL tankers.

Regardless of the abovementioned, terminal regulation, the application of revised 13 G Regulation of Annex I of MARPOL 73/78, will limit the potential need of discharge of dirty ballast due to the progressive phase out of non SBT crude oil and product carriers.

The lay out of the basin where the six MBMs of the Banias terminal are located is provided below:



C. Existing receptions facilities for oily wastes

There are no reception facilities available either for dirty ballast, tank washings and slops or other oily mixtures for tankers normally calling at the terminal.

D. Estimations of wastes to be received at the port from incoming ships

In the absence of any input provided by the tankers that called at the terminal during the project, the estimations were made on the assumption that 60 oil tankers of the nominal, maximum, allowable deadweight are engaged annually in loading operations without need to discharge dirty ballast but wash water and residues from tank cleaning operations accumulated in slop tanks (3% of the maximum allowable deadweight). The volumes estimated, are not expected to change in the near future.

Terminal: Banias
Country: Syria

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

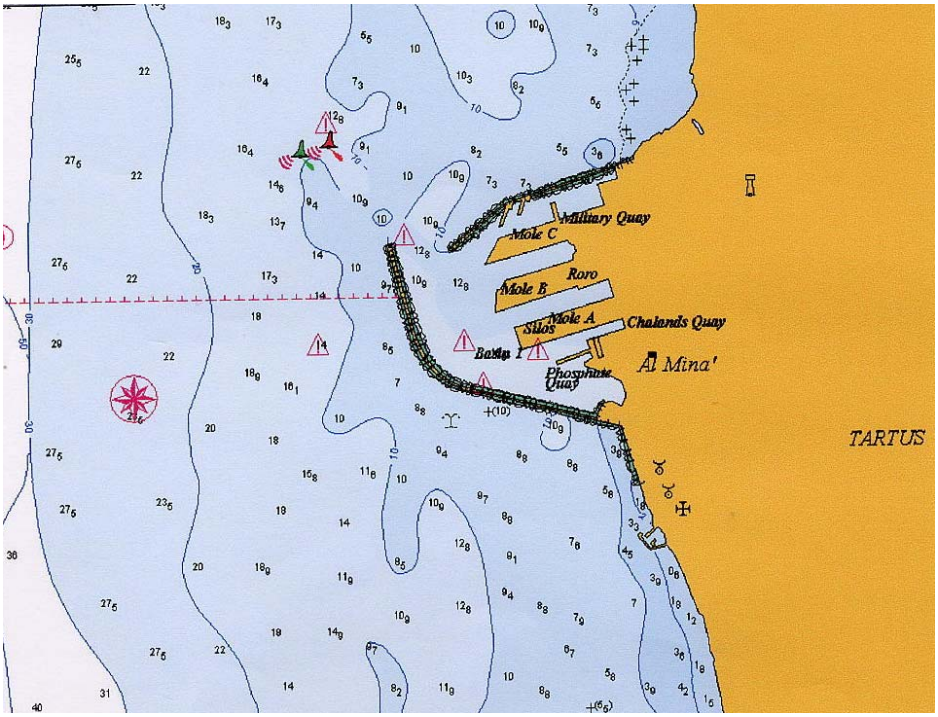
Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	641.0	1.0	5.2
Average annual volume (m^3/year)	-	234,000	365.0	1,900
Maximum volume to be received per ship/arrival (m^3)	-	3,900	40.0	64.8

A. General Information

- **Terminal** Tartous Oil Terminal
- **Port Authority** Syrian Crude Oil Transportation Co. (SCOTRACO)

B. Type and operation of the port

The Tartous Oil terminal is operated by the Syrian Crude Oil Transportation Company (SCOTRACO) and is mainly engaged in handling and exporting of locally produced crude oil enabled by a land-based tank farm (20 tanks situated 2 kms far from the terminal).



The terminal consists of the North and South Multiple Buoy Moorings located at 34° 58′ N and 35° 53′ E, both able to accommodate tankers up to 120.000 t.dw. On average, 4 million tons of crude oil are loaded in the incoming oil tankers. The berthing features of the two MBMs are summarized below:

Oil terminals	Actual Depth (m)	Allowable length (m)	Maximum rate (tons/hour)
North	23.0	280	5.000
South	9.8 – 12.8	280	4.000

The oil terminal of Tartous receives annually, approximately 110 crude oil tankers, exclusively SBT tankers thus preventing the need to provide facilities for collecting oil contaminated ballast which could be as much as 36.000 tons per arrival. Specifically, in 2001, 100 oil tankers called to receive 3.5 million tons of crude oil while in 2002, 126 tankers called to receive 4 million tons.

D. Estimations of wastes to be received at the terminal

Estimations for the potential volume of tank washings and other oily mixtures produced from tankers engaged in the operation of the terminal are provided below, while estimations for the respective volume of garbage are provided, as an integral wastestream, in those dealing with the commercial port of Tartous.

Basic assumption for the estimations of tank washings and oily residues' volumes, was that 50% of the incoming tankers can load on top of the accumulated slops which represent up to 3% of the deadweight capacity. The volumes estimated are not expected to change due to the relatively constant traffic of the terminal both in terms of the number of ships calls and tonnage of exported crude oil.

Terminal: Tartous
Country: Syria

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

Oily wastes	Dirty ballast	Tank washings	Oily bilge water	Oil residues (sludge) and other waste oils
Reduced daily volume (m^3/day)	-	452.0	1.6	3.4
Average annual volume (m^3/year)	-	164,980	611.0	1,255
Maximum volume to be received per ship/arrival (m^3)	-	3,600	50.0	68.4

E. Identification of needs for both Banias and Tartous terminals and recommendations

An inter – terminal strategy between the oil terminals of Banias and Tartous was considered as the basis of the recommendations that are delineated below in relation with the provision of joint adequate facilities for receiving and treating tank washings, oily bilge water and oil residues from tankers.

This approach implies that the abovementioned oily wastes could be collected in both these terminals to be subsequently treated in a Banias based treatment plant. Basically, the proximity of the Banias and Tartous terminals and the anticipated substantial cost reduction from the installation and operation of a central facility serving the concerted but separate wastes collection process, weighted to the consideration and analysis of this approach.

The terminal in Banias is expected to receive, approximately 60 % of the whole annual wastestream (164.980 cub. meters of tank washings and 236.265 cub. meters of oily wastes in general, respectively) and also due to the existence and operation of the local refinery could reasonably host the central treatment plant. A flexible collection system suitable to serve the more frequent traffic of Banias terminal but also the needs of Tartous terminal could be provided by one, 3.400 tdw barge, able to receive the maximum, anticipated volumes of tank washings and other oily wastes from tankers.

The recommended size of this barge fits also with potentially larger volumes of dirty ballast, that occasionally it's likely to be discharged from tankers calling to receive crude oil or other products until 2015, when the phase out of category C single hull tankers would have been finalized. Another smaller barge of 150 tdw. could effect the reception of, exclusively, oil residues and oily bilge water.

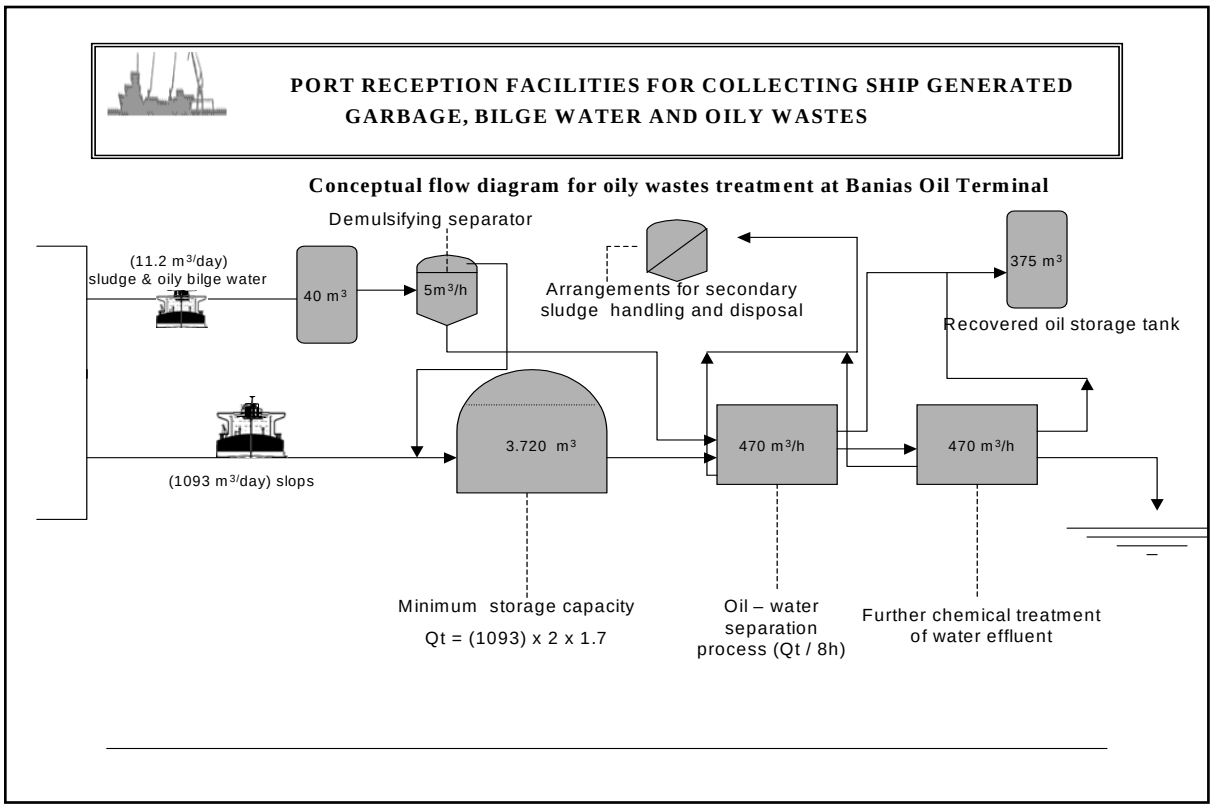
It should be noted that since oily bilge water and sludge is likely to contain apart from free oil (oil is basically present as droplets 20 microns of larger having little or no water associated with it), also:

- 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),

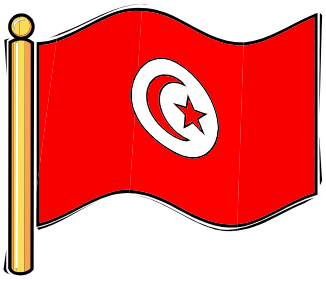
a separate collection and pre-treatment stage for these mixtures is recommended, so that oil skimmed is directed to the slops collection tank/s to enable better oil recovery while effluent water is directed to the primary mechanical separation unit/s for further treatment.

A rough, function and flow diagram for the reception and treatment of oily wastes collected from both Banias and Tartous terminals is presented below:



A design/engineering study certainly needs to provide the necessary, berthing infrastructure of the abovementioned barges and the associated piping to the site of the treatment facility, including instrumentation and equipment as well as cost estimates.

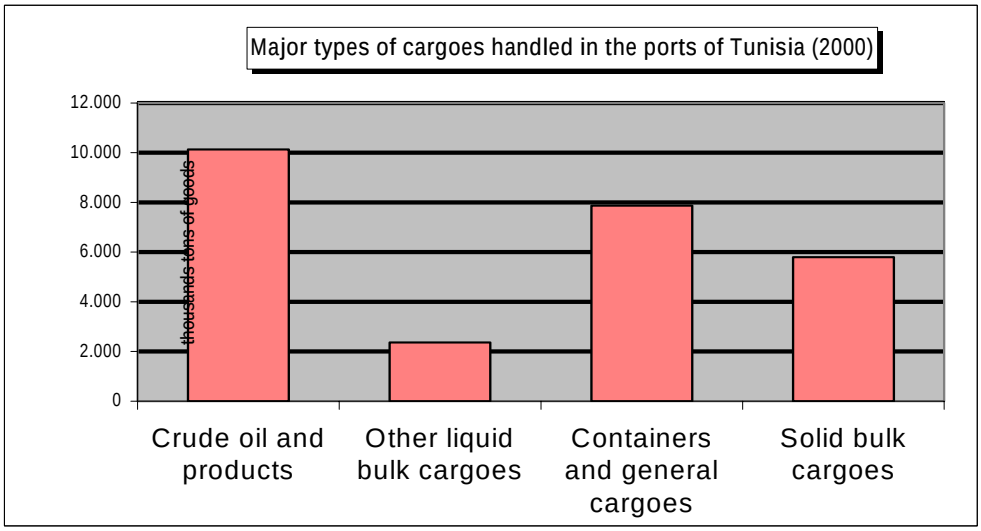
TUNISIA



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 in the Mediterranean area (from all the countries involved in the project). An average annual growth of about 5% in the 1998 – 2000 period demonstrates the potential for further port productivity and increase of traffic flows in the future. The contribution of petroleum related products in the total handling of cargoes at the ports of the country accounts for approximately 40% (2000 data), as illustrated below:



The oil terminals of the country that are discussed herein, are these of La Skhira, Bizerte and Menzel Bourguiba complex and Zarzis.

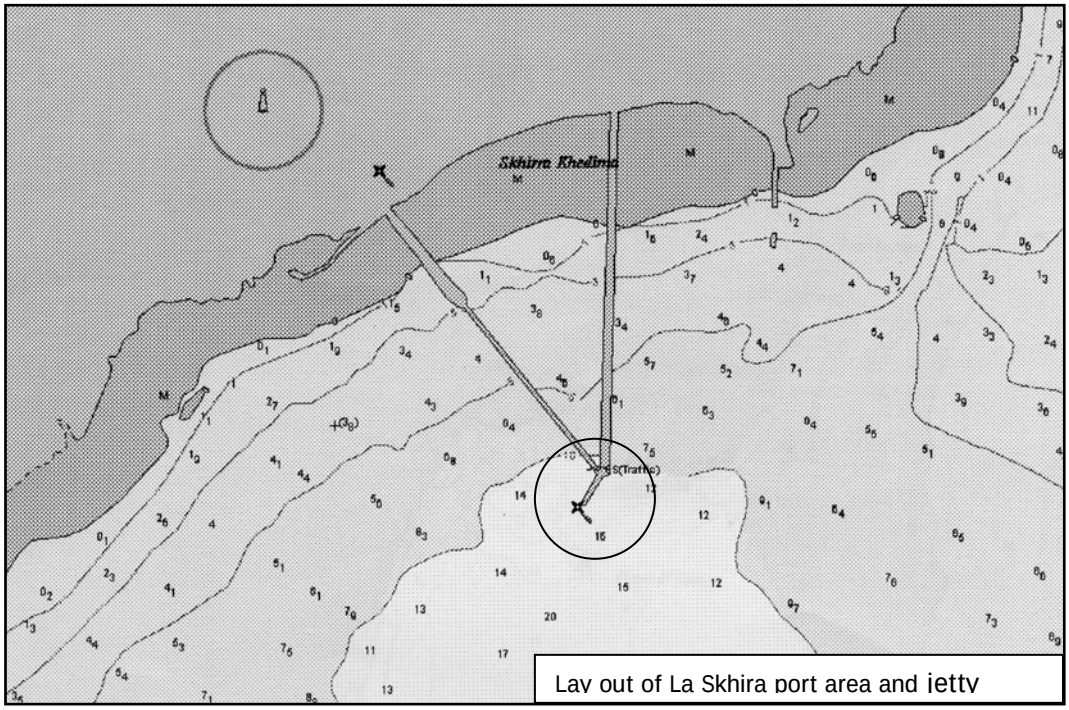
Ports & Terminals involved in the project	Port	Oil Terminal					
		Crude oil		Oil Products		Fuel Oil fired power plant	Other facility
		Loading terminal	Unloading terminal	Loading terminal	Unloading terminal		
La Skhira Oil Terminal		4			4		
Bizerte and Menzel Bourguiba	4	4		4	4		
Zarzis	4			4	4		

A. General Information

- **Oil Terminal** La Skhira
- **Operator** Compagnie des Transports par Pipe-Lines au Sahara (TRAPSA)

B. Type and operation of the terminal

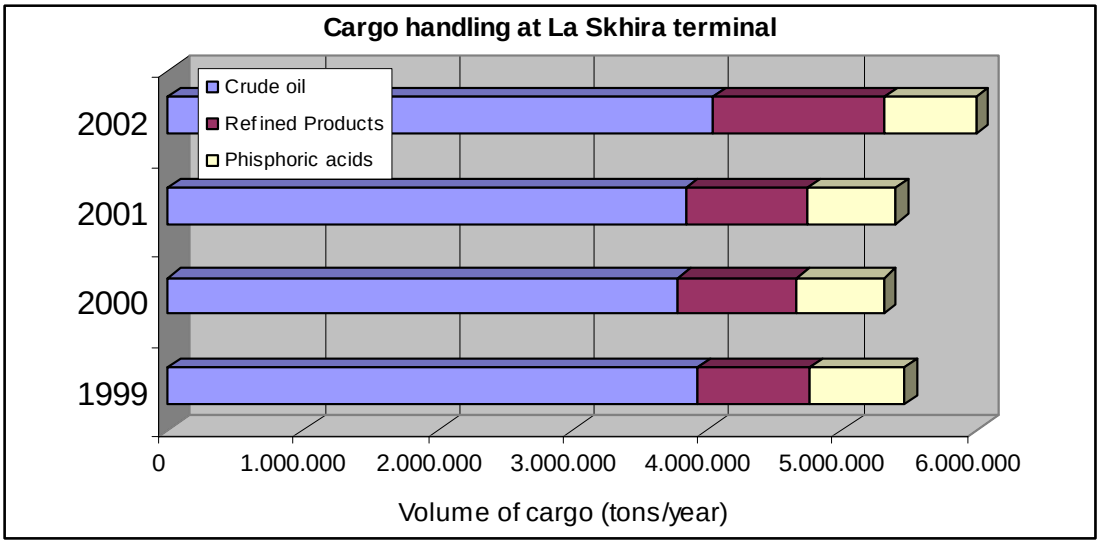
The oil terminal of La Skhira is situated 50 km north of Gabes. Since 1986, the terminal has been under the operation of the Compagnie des Transports par Pipe-Lines au Sahara (TRAPSA) and provides two berths at either side of a loading platform connected with a concrete jetty to the coastline. Up to 300 meters LOA and 160.000 t.dw tankers can be accommodated tied up to mooring lines abreast of the terminal where 12" hose connections at either side enable rates between 4.000 – 10.000 tons per hour.



Lay out of La Skhira port area and jetty

On average 240 ships call at the terminal annually, carrying more than 5.500.000 metric tons of crude oil, oil products and other liquid products. In 2001, about 3.842.000 metric tons of Tunisian and Algerian crude oil were exported while more than 780.000 tons of refined products were imported. Eleven tanks of 35.000 cubic meters each, constitute the TRAPSA's land based storage capacity.

The next diagram shows the fluctuation of crude oil, refined petroleum products and other liquid substances volumes imported and exported from the terminal:



C. Existing receptions facilities for dirty ballast and other oily wastes

A twin deballasting line of 24'', 16 bar m.w. pressure, separate from the cargo piping system, is provided for the collection of dirty ballast and tank washings from oil tankers. Reception of bilge oils and other oily residues produced in the machinery spaces of ships is enabled by means of a specialized connection placed at the pumps shell plating.

The whole service is free of charge and in the last 5 years there has been a dramatic decline of the number of oil tankers wishing to discharge dirty ballast at the terminal.

Only 1 – 2 tankers per month, mostly Tunisia flagged tankers which normally transport crude oil and other products to STIR refinery in Bizerte, discharge dirty ballast and tank washings.

The treatment facility consists of a system of open air lagoons of 60.000 cub. meters capacity used as initial reception, storage and settling tanks for dirty ballast and also other oily water mixtures. Separation of oil and water is achieved by gravity and the settling of water, due to the 3 meters depth of the lagoon, is improved as the height that the oil particles need to raise is reduced. The whole process has been designed to move the oil layer by the prevailing wind to the leeward side of the lagoon, preventing the contamination of the water column by oil and facilitating the treatment of effluent water which is discharged to a basin where further degradation of petroleum and other organic components takes place.

Treatment process results in an oil content of effluent water less than 10 ppm. Oil at the surface is skimmed with simple pumping to a steel tank of 20.000 cub. meters. Recovered oil stored in the tank is disposed of to STIR refinery through small tankers almost every two years. The treatment facility receives liquid waste from other land activities. Quantities of oily water mixtures may come also from other ports.

The standardized description of the existing facility is provided below:

Activity C – Collection and treatment of oily ballast water from tankers

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)	
LA SKHIRA TERMINAL	4			60.000		60.000		-	-	-	-	> 100		> 100		No chemicals contaminated wastes can be received

Reception facility Operator	Description of the facility	Method of treatment of oily wastes	Charging system	Other remarks
Compagnie des Transports par Pipe-Lines au Sahara (TRAPSA) Cpt. Jaballi Hafthallah Address 3050 La Skhira Tel: + 216 7429 5453 Fax: + 216 7429 5426	A twin deballasting line of 24'', 16 bar m.w. pressure, is provided for the collection of dirty ballast and tank washings from oil tankers at rates comparable of loading rates. Reception of bilge oils and other oily residues produced in the machinery spaces of ships is enabled by means of a specialized connection placed at the pumps shell plating.	Through a system of open air lagoons, separation of oil and water is achieved by gravity enhanced by the 3 meters height of the basin resulting at an oil content of effluent water less than 10 ppm.	Free of charge	

C. Estimation of oily wastestreams and recommendations

Terminal: La Skhira
Country: Tunisia

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)	1,232	876.0	1.8	9.3
Average annual volume (m^3/year)	449,680	319,740	666.0	3,402
Maximum volume to be received per ship/arrival (m^3)	48,000	12,800	25.0	75.6

In the immediate future, the progressive phase out of all pre MARPOL oil tankers that will take place from 2003 to 2007, will bring an even greater reduction of the need of La Skhira Terminal to receive dirty ballast. Theoretically speaking, dirty ballast from oil tankers larger than 20.000 t.dw will not be discharged to the terminal, unless these SBT tankers would need, for strictly navigation safety purposes in adverse weather conditions, to uptake water ballast in empty cargo tanks. It's estimated that only small oil tankers below 20.000 t.dw, in case that they are engaged in the operation of the terminal, would need to discharge dirty ballast from their own cargo tanks. It's also expected that new oil tankers of this size would have a considerable ballast segregation thus reducing further the need to discharge dirty ballast.

The assessment matrix is presented below:

Terminal: La Skhira
Country: Tunisia

Criteria for assessing the adequacy of existing reception facilities	*Comments*	Yes	No	N/A
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	*Free of charge*	4		
Existence of submitted reports of alleged inadequacy			4	
Existence of serious operational restrictions			4	
Environmental sound waste treatment			* 4	
Acceptable waste final disposal	*Oil recovered is sent to STIR Refinery to the distillation process*	4		
Environmentally sound waste management			* 4	

Less than Satisfactory	
Satisfactory	
Adequate	4

The overall assessment of the existing facility at the terminal, as shown above, is that it represents a well designed installation capable, to fully meet and exceed the needs of the tankers that normally call. It is obvious that a considerable level of oil and other contaminants' removal can be achieved such as 20 – 90 % of oil, 5 – 40 % of BOD, 10 – 80 % of suspended solids, etc. The design, however, of holding or equalization lagoons refers to a relatively old, technology as the primary stage treatment for dirty ballast or richer in oil mixtures produced from tanker operations (including also other oily water mixtures from other activities), basically due to the escape of light hydrocarbons in the atmosphere which are likely to endanger those engaged in monitoring the process, skimming the oil, operating the pumps, etc. (the discharge of other ship-generated oily wastes from other adjacent port areas and land-based oily wastes to the facility is likely to worsen the abovementioned conditions).

The anticipated considerable reduction of dirty ballast and other oily water mixtures in the future, dictates that the feasibility of using the existing 20.000 cub. meters tank instead of the open reception basin should be studied. If this scenario is valid, then another, small tank needs to be installed for temporary storing, oil recovered from the treatment process as well as all the necessary refurbishment of the existing tank and its associated piping to enable heating, enhanced settling, etc.

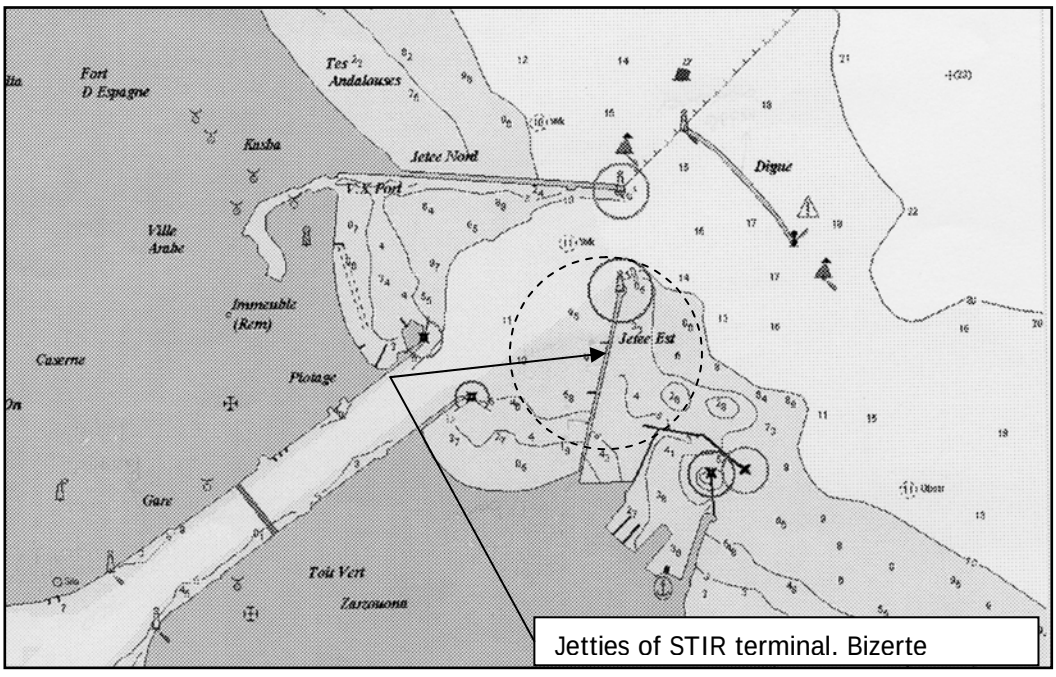
A. General Information

- **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)
Avant port		
Tanker berth A'	10.67	250
Tanker berth B'	8.2	150



Jetties of STIR terminal. Bizerte

C. 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 (which was not able to be surveyed during the mission) of the refinery which consists of:

- a separate de-ballasting line 1.500 meters long of (12'', 200 – 300 cub. meters/hour uptake capacity),
- a collection tank of 8.000 cub. meters,
- an API separator associated with four settling tanks, and
- a reverse osmosis installation to enable an acceptable water effluent quality before it's discharged at sea.

Oil tankers call normally to the terminal to load fuel oil, virgin naphtha for either domestic purposes of for export, are those that wish to discharge dirty ballast and tank washings (on average 1- 2 ships per year discharge 2 – 3.000 metric tons). The estimation of the volume of dirty ballast and other tank washings for those oil tankers that normally call at the STIR terminal was made on the basis of the annual loading of about 554.000 tons (figure taken from the 2001 data) of fuel oil and gas oil from the terminal to non-SBT oil tankers representing 30% of the total.

Terminal: Bizerte/STIR Terminal
Country: Tunisia

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

Oily wastes	Dirty ballast	Tank washings
Reduced daily volume (m^3/day)	197.2	170.0
Average annual volume (m^3/year)	71,905	62.400
Maximum volume to be received per ship/arrival (m^3)	18,000	4,800

In the absence of other information, it is estimated that the facility matches the needs of the incoming tankers in terms of the available reception capacity, provided that the treatment rate achieved, allows for the timely emptying of the 8.000 cub. meters tank and its subsequent allocation to those tankers that wish to deliver dirty ballast and slops. It was not intended to estimate here the potential volumes of bilge oil water and sludge retained onboard those tankers, but is was considered as more practical to incorporate them in those made for the port of Bizerte.

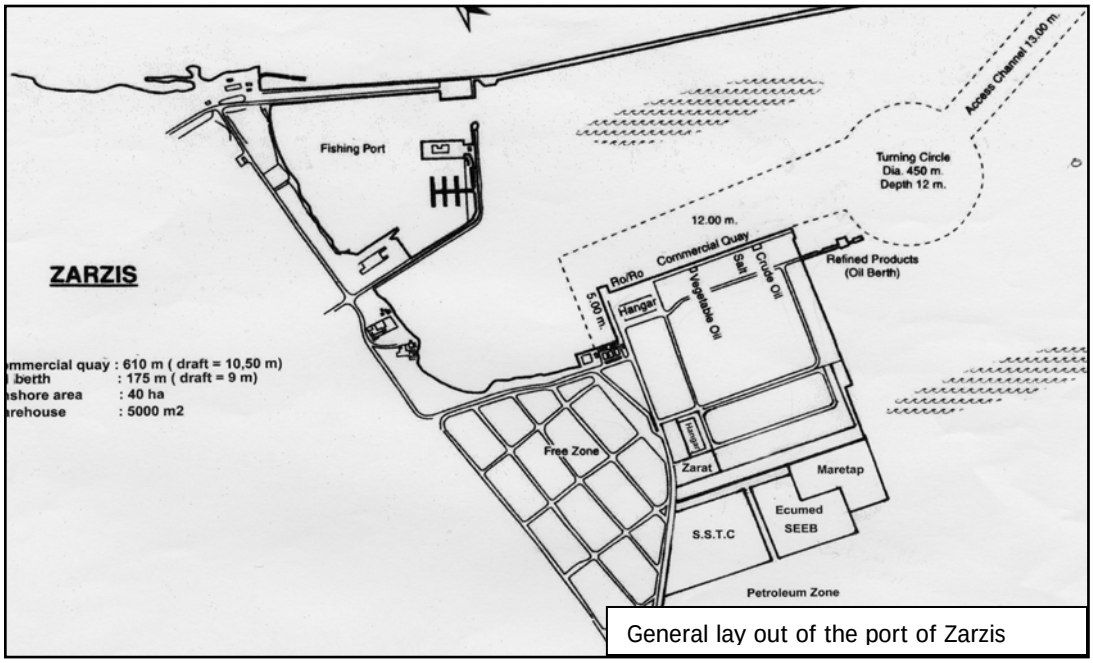
A. General Information

- **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 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 apart from its operation as an oil field supply base and commercial port, has been involved in the handling of crude oil and other petroleum products.

About 180.000 tons of crude oil were exported from the port. From the three oil companies that operate in the wider port area, it was concluded that only MARETAP Co. presents currently a case that needs to be examined with respect to the provision of reception facilities for dirty ballast.



General lay out of the port of Zarzis

Specifically, a minor at the time being, number of oil tankers 5-6 per year, of an average 20.000 t.dw. size, receive crude oil from the MARETAP storage facilities. Due to the absence of any available reception facilities for those tankers, their Masters are requested to reach the port with clean ballast only and not to discharge dirty ballast during routine, loading operations.

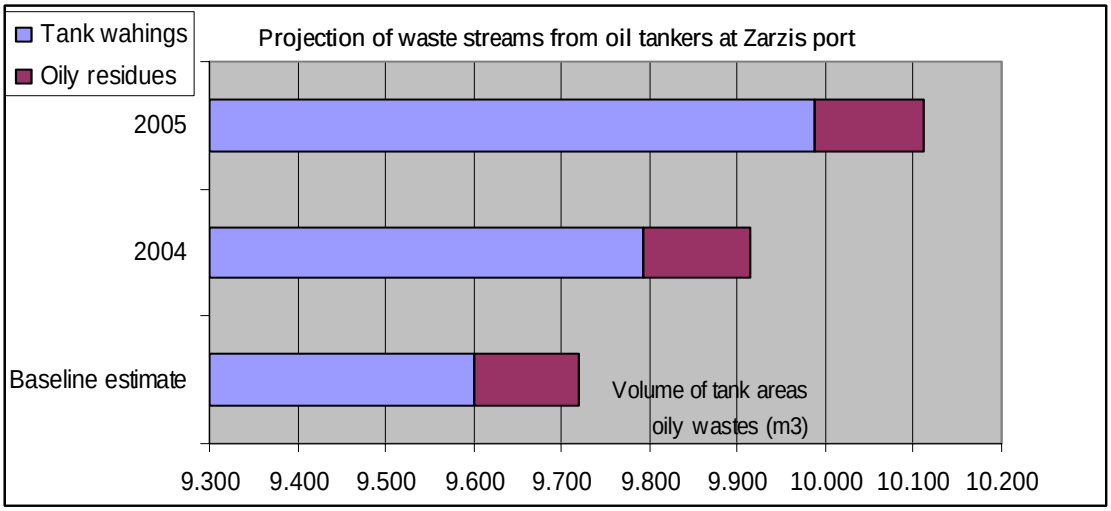
Since it was not possible to identify the percentage of SBT tankers that are engaged in the abovementioned operation, the oil retention procedures that can be carried out by these tankers, rely on the existence of a reception facility at their discharge terminal.

C. Estimations of dirty ballast and other oily wastes - Recommendations

To estimate the volumes of oily wastes produced from the oil tanker operations at the port it was assumed that only ships with clean ballast call at the petroleum berth and that a constant increase of 2% would exist in the near future (actually reflecting the average annual fluctuation of traffic in the 2000/2001 and 1999/2000 periods).

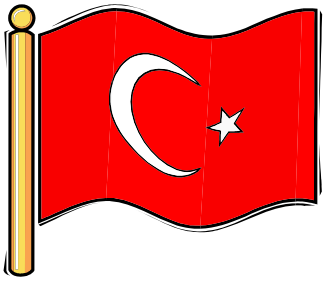
Port: Zarzis/Petroleum Quay
Country: Tunisia

Oily wastes	Dirty ballast	Tank washings
Reduced daily volume (m^3/day)	-	26.3
Average annual volume (m^3/year)	-	9,600
Maximum volume per ship/arrival (m^3)	-	1,600



Details on the oily wastes produced in the machinery spaces of all ships that normally call at the port are presented in the Report of the Activity A of the project. With respect to the reception and further management of tank washings, since the number of tankers' calls, at the time being, is very limited, it is not advisable that the port authority or the terminal operators proceed to provide a fixed facility taking advantage of the existing storage infrastructure of the latter, but to provide a floating separator – barge able to collect at least up to 2.000 cub. meters of oily mixtures which can be subsequently treated onboard or alternatively disposed to the La Skhira operated facility.

TURKEY

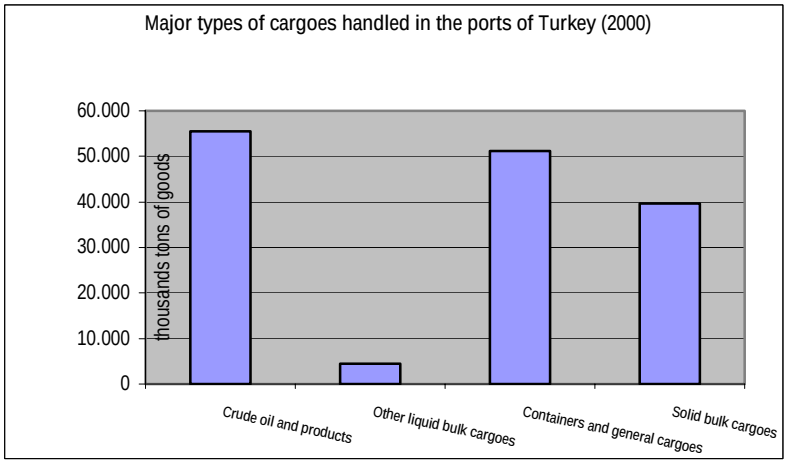


TURKEY

Crude oil and refined petroleum products transportation to and from the major terminals of Turkey accounts for about 40 % of the total volume of goods handled in the ports of the country. Turkey's contribution to the maritime transport of the Mediterranean area is almost one third of the overall contribution of all the countries involved in the project. The oil terminals in Aliaga, Nemrut Bay and Ceyhan ports, which present interest in relation to the needs of the incoming tankers to potentially deliver dirty ballast (being either crude oil terminals or oil products' discharging terminals with an average throughput of more than 1.000 metric tons per day), as well as their available facilities for dirty ballast and other oily wastes from tankers are basically discussed here:

Ports involved in the project	**Port**		**Oil Terminal**				
	Industrialized 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	
Nemrut Bay							
Ceyhan							
Aliaga							

In accordance with the MEDTRANS data, for the year 2000, more than 55 million tons of crude oil and refined products were discharged and loaded in the country's dedicated oil terminals and ports, out of the 150 million tons of cargoes totally handled, as illustrated below:



A. General Information

Terminal	Botas Oil Terminal (Port of Ceyhan)
Operator	Botas Petrol P. Co.

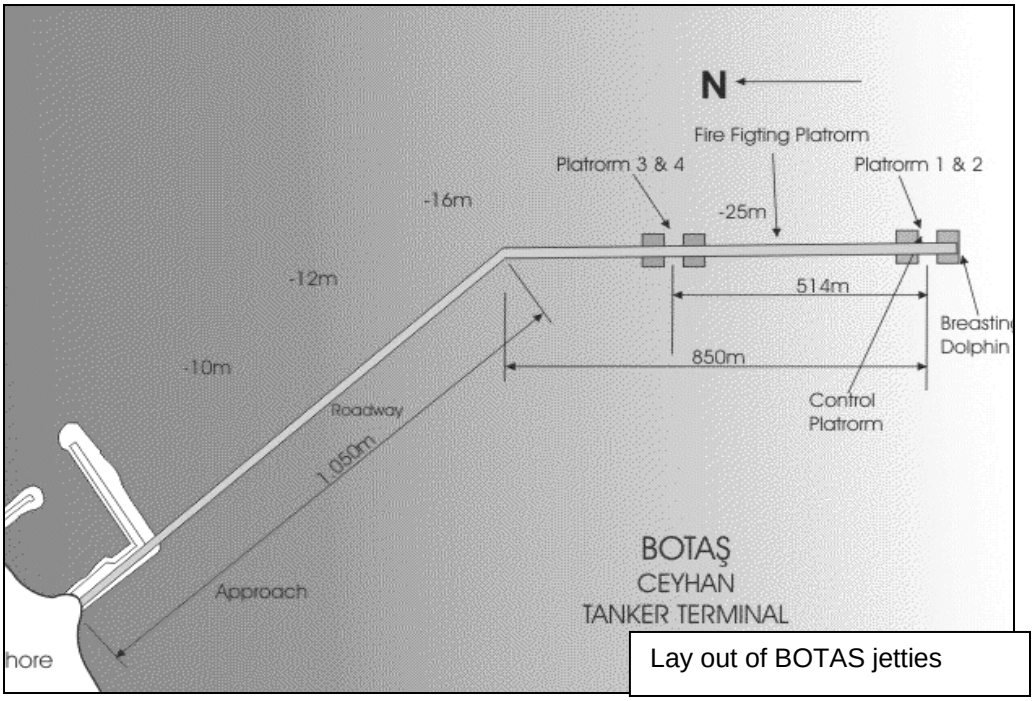
B. Type and operation of the terminal

Botas Oil Terminal is located at 36^0 51.9 N, 35^0 56.7 E, owned and operated by BOTAS Petrol Pipeline Corporation, the state owned oil and gas transportation and trade company of Turkey, under the jurisdiction of Ceyhan Port Authority.

A number of important current and forthcoming energy related projects are linked with the operation of the terminal including basically the transportation of crude oil produced in Kirkuk and other areas of Iraq through a pipeline system with a nominal capacity that exceeds the 70 million tons per year as well as the Baku – Ceyhan major project which is developed for the purpose of transporting crude oil produced in Azerbaijan to Ceyhan through a pipeline system 1.730 kms long with a nominal capacity of about 50 million tons per year.

The terminal provides four berths, able to accommodate tankers up to 300.000 t.dw (at berths 1 - 2) and up to 150.000 t.dw (at berths 3 - 4) as summarized below:

Berths	Maximum draught (m)	Max. LOA (m)	Maximum summer deadweight (t.dw)
1	25	355	300.000
2	25	355	300.000
3	20	300	150.000
4	19	300	150.000



Lay out of BOTAS jetties

On average 280 oil tankers call at the terminal annually, engaged in the handling of about 25 million tons of crude oil. A 17% reduction of the annual number of ships calls has been witnessed in the last three years.

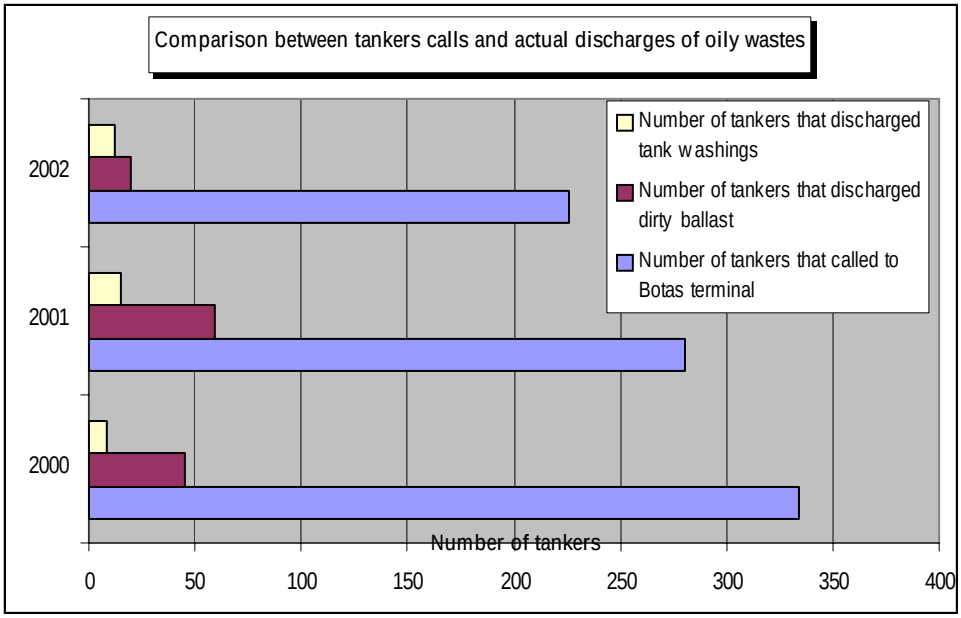
C. Existing reception facilities for dirty ballast and other oily wastes

The terminal is equipped with a well designed and efficient fixed ballast reception facility consisting of two 32" deballasting lines from the loading/discharging sites of jetties to the reception and storage tanks enabling discharging rates up to 4.000 cub. meters per hour. The total reception capacity is 95.000 cub. meters (2 tanks of 30.000 cub. meters and one tank of 35.000 cub. meters). The facility is provided exclusively to oil tankers engaged in the terminal operation.

Oil is separated from water through gravity within the storage and settling tanks enabling a 1.000 cub. meters/hour treatment rate and a water effluent practically free of oil (less than 2-3 ppm).

Ships that wish to deliver either oily wastes produced in tanks and ballast areas or the machinery spaces are charged $ US 0.25 per cub.meter received.

Sufficient information is provided to the incoming tankers on the ballasting/deballasting operations when alongside. On average, a 14% of the incoming tankers discharge dirty ballast at the facility while a 5% only wishes to discharge tank washings, as shown in the following diagram:



The standardized description of the available reception facility is provided below:

Activity C – Collection and treatment of oily ballast water from tankers

Terminal	**Type of Facility**			**Oily wastes received from the facility**												Operational restrictions
	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)	
BOTAS Terminal (Ceyhan Port)				95.000	4.000	95.000	4.000									

Reception facilities operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
BOTAS Petroleum Facilities District Management Tel : +90 322 613 5859 Fax : +90 322 613 1657	The facility consists of two 32" deballasting lines from the loading/discharging sites of jetties to the reception and storage tanks, the total capacity of which is 95.000 cub. meters (2 tanks of 30.000 cub. meters and one tank of 35.000 cub. meters).	Gravitational settling of water in the reception and storage tanks at a maximum rate of 1.000 cub. meters/hour	$ US 0.25 per each 1 cub. meter	Effluent water free of oil (oil level around 2-3 ppm) is finally discharged at sea.

The terminal maintains in a proper way data related with the identity of the incoming oil tankers regarding their structural and operational characteristics, their actual needs with respect to the carriage of dirty ballast or other residues and for this reason, estimations on potential oily wastestreams that could be delivered to the facilities of the terminals were not attempted.

The respective assessment matrix is presented below:

Terminal: Botas Oil Terminal
Country: Turkey

Criteria for assessing the adequacy of existing reception facilities	*Comments*	Yes	No	N/C
Spatial and time availability of wastes collection scheme				
Availability of sufficient information / Notification procedures				
Adequacy of capacity	*The nominal, storage capacity in relation with the high treatment rate exceeds even the most overestimated assumptions for dirty ballast discharge per tanker arrival*			
Reasonable cost of waste collection service				
Existence of submitted reports of alleged inadequacy				
Existence of serious operational restrictions				
Environmental sound waste treatment				
Acceptable waste final disposal				
Environmentally sound waste management				

Assessment of the provision of reception facilities for oily wastes at the terminal

Less than satisfactory	
Satisfactory	
Adequate	

A. General Information

Terminal	TUPRAS Oil Terminal (Aliaga port)
Operator	TUPRAS Izmir Refinery

B. Type and operation of the terminal

The TUPRAS oil terminal in Aliaga is associated with the operation of the second largest petroleum refinery in Turkey, operated by the Turkish Petroleum Refineries Corporation (TUPRAS). The refinery has a storage capacity of about 600.000 cub. meters for crude oil and 1.000.000 cub. meters of a diversified series of refined products. It's the only installation in the country which produces lubricated oil products with a capacity of approximately 300.000 tons per year. From north to south, the terminal consists of the following jetties:

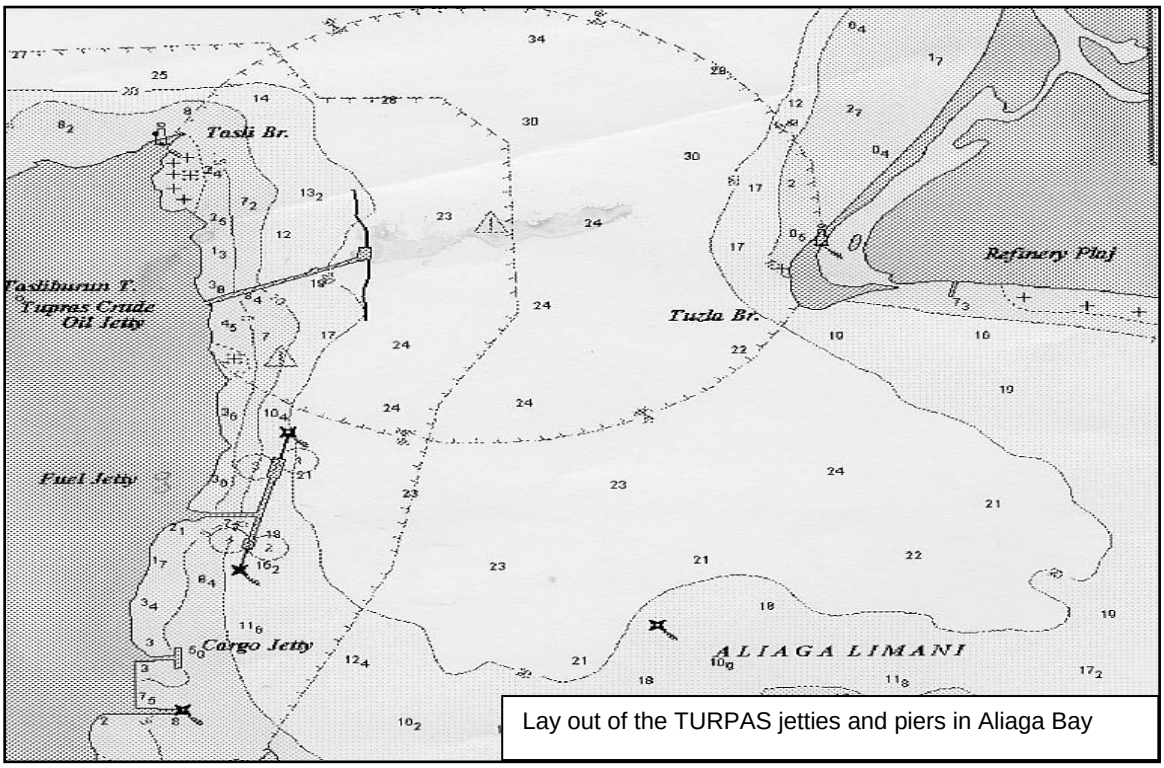
A VLCC jetty able to accommodate crude oil tankers (maximum 360 meters long and 250.000 t.dw), located at the northern edge of the area of the port, where crude oil is discharged from the incoming tankers. The annual crude oil unloading capacity of the terminal is about 10 million tons. A T- shaped jetty which provides four separate berths at which crude oil is discharged while refined white products and lubricating oils are unloaded from the refinery.

A cargo pier at which ships up to 3.000 t.dw are accommodated to load black and white products and also an LPG platform with two berths for up to 45.000 t.dw tankers.

The entire berthing capacity of the terminal is summarized below:

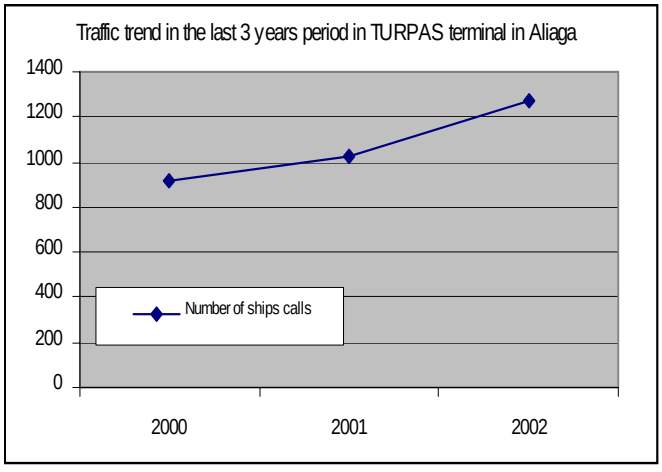
Name of Berth	**Depth (m)**	**Berth overall length (m)**	**Maximum size of ships accommodated**	
			LOA (m)	DWT (t.dw)
T Jetty No 1	16	317	285	150.000
T Jetty No 2	12	213	180	60.000
T Jetty No 3	8	317	100	5.000
T Jetty No 4	6	213	100	5.000
V.L.CC. Jetty	19,2	450	360	250.000
LPG Plat. Side 1	13	300	230	44.000
LPG Plat. Side 2	6,5	300	103	5.000
Cargo pier	6	100	95	3.000

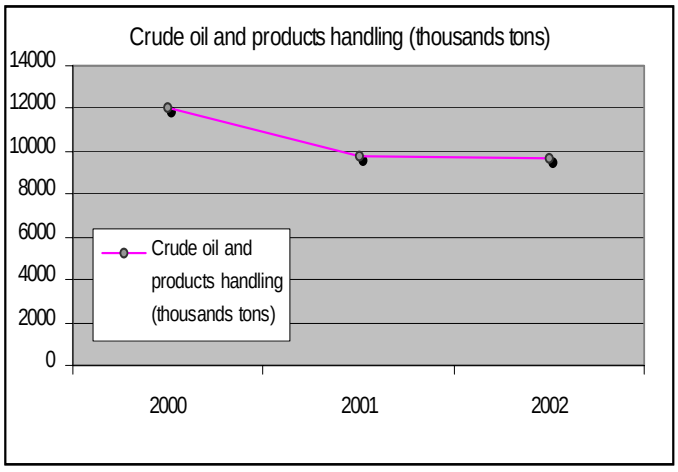
A general lay out of the TURPAS operated jetties and piers is illustrated below (apart from the LPG berths):



Lay out of the TURPAS jetties and piers in Aliaga Bay

The trends of traffic and cargo handling is shown below:





C. Existing reception facilities for dirty ballast and other oily wastes

The terminal provides at each available loading and discharge berthing site, appropriate piping and associated equipment for the delivery of both dirty ballast and tank washings from oil tankers. The deballasting line installed at the VLCC jetty is 16", at the cargo pier 4", the manifolds of No 1 – 2 berths and 3 – 4 of the T Jetty are 10" and 8" respectively and the main collection line 18" , all connected to two initial reception and storage tanks of 10.000 m^3 capacity each one, and in addition to an emergency pool at the sewage treatment plant.

Following the separation of oil and water, recovered oil is directed back to the distillation process and effluent water to the sewage treatment plant of the refinery where it's subject to chemical and biological treatment renders after which it can be discharged at sea maintaining a hydrocarbons level less than 5 ppm.

It should be noted that any quantity of bilge oil water and other oily wastes from the machinery spaces of tankers can be received at each jetty and berthing site. Ships can discharge to the tanks used for the drainage of hoses and loading arms from which oily water mixtures are sent through a dedicated line to the sewage treatment plant of the installations.

In accordance with the "Standard of Tariffs for Harbour Services" every ship wishing to discharge tank washings or slops should pay, as a refining service, a fee scaled, as presented below:

- Slops and tank washings

Ships between 0 – 1.000 grt $ US 100 (for every 100 gross tons). For ships between 1.001 grt and over, an additional $ US 30 charge for every 100 gross tons applies.

- Dirty ballast or oily bilge water $ US 60 per 1.000 gross tons

Activity C – Collection and treatment of oily ballast water from tankers

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)	
TUPRAS Terminal (Aliaga Port)				20.000	1.500	20.000	1.500	-	-			*		*		Chemical contaminated mixtures are not received

Reception facility operator	**Description of the facility**	**Method of treatment of oily wastes**	**Charging system**	**Other remarks**
TUPRAS Izmir Refinery, Mr. Murat Arbas Tel:+90 232 6161250 Fax: +90 232 616 2383	The terminal provides at each available loading and discharge berthing site, appropriate piping and associated equipment for the delivery of both dirty ballast and tank washings from oil tankers. The deballasting line installed at the VLCC jetty is 16", at the cargo pier 4", the manifolds of No 1 – 2 berths and 3 – 4 of the T Jetty are 10" and 8" respectively and the main collection line 18" , all connected to two initial reception and storage tanks of 10.000 m^3 capacity each one, and in addition to an emergency pool at the sewage treatment plant.	Gravitational settling and skimming of oil in the reception and storage tanks. Further treatment of effluent water in the sewage treatment plant of the refinery.	For tank washings and slops $ US 100 plus $ US 30 for every 100 gross tons. For dirty ballast or oily bilge water a charge of $ US 60 per 1.000 gross tons	* Bilge oil water and other oil residues from the machinery spaces can be delivered to tanks used to receive drainage from hoses and loading arms at each jetty and pier.

The respective assessment matrix for the available facilities in the terminal is presented below:

Terminal: Turpas Oil Terminal (Aliaga)
Country: Turkey

Criteria for assessing the adequacy of existing reception facilities	*Comments*	Yes	No	N/C
Spatial and time availability of wastes collection scheme				
Availability of sufficient information / Notification procedures				
Adequacy of capacity				
Reasonable cost of waste collection service				
Existence of submitted reports of alleged inadequacy				
Existence of serious operational restrictions				
Environmental sound waste treatment				
Acceptable waste final disposal				
Environmentally sound waste management				

Assessment of the provision of reception facilities for oily wastes at the terminal

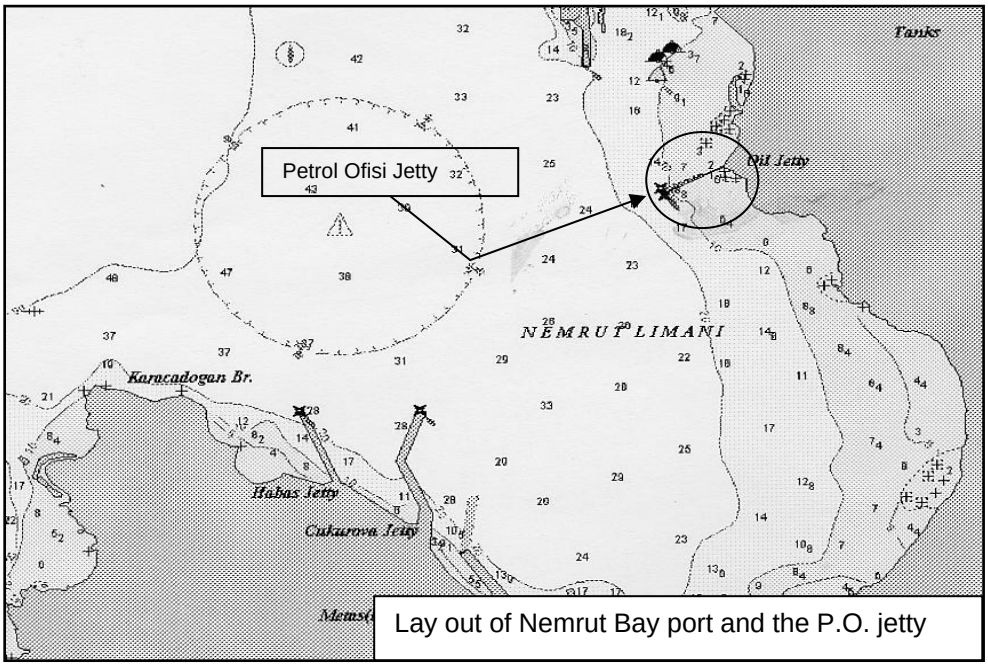
Less than Satisfactory	
Satisfactory	
Adequate	

A. General Information

Port	Industrialized Port of Nemrut Bay
Port Authority	TDI Aliaga and Nemrut Bay Liman
Oil Terminal	Petrol Ofisi Terminal

B. Type and operation of the terminal

The industrialized port of Nemrut Bay is situated at the southern side of the Aliaga area where a number of dedicated terminals operate both in the inner area (Petrol Ofisi terminal, PETKIM petrochemical complex) and the outer one (Habas, Ege Gubre, Limas, Nemtas and Cucurova companies).



Lay out of Nemrut Bay port and the P.O. jetty

The oil related terminal is operated by Petrol Ofisi, a major fuel oil distribution company, which provides an 100 meters long jetty for product tankers (max 23.000 t.dw) in which annually, 100 tankers load and 40 tankers discharge fuels, as shown in the following table:

Year	Number of ships calls	Oil products throughput *(met. Tonnes)*
2002	134	800.000
2001	20	140.000
2000	15	100.000

C. Existing reception facilities for dirty ballast and other oily wastes

Since the company is also engaged in managing a considerable fleet of oil product tankers for its own distribution purposes which in turn dominate the traffic at the terminal in Nemrut Bay, it was only attempted in this Report, to provide information with respect to the existing reception facilities for oily wastes used actually from the abovementioned fleet.

These facilities consist of a 14 inches separate, deballasting line to receive dirty ballast and other oily residues to be stored in a storage tank of 5.000 m^3 and treated by means of an API separator, 50 m^3/hour treatment capacity and a Dissolved Air Flotation unit for further oil recovery and better treatment of the waste water.

SUMMARY TABLE
OF THE
ANALYSIS OF RESULTS

Summary Table of Analysis

Port Terminal	Port		Oil terminal					Esimated average annual volume of cargo associated oily wastes (m^3/year)	Available Reception Facilities			Remarks - Proposals
	Commercial	Port with major ship-repairing or tank cleaning facility	Crude oil		Oil products		Fuel oil power plant or other facility		Type	Storage capacity (m^3)	Adequacy	
			Loading terminal	Unloading Terminal	Loading terminal	Unloading terminal						
Algiers									F + T + S	5.100	Ac	*Naftec S.p.a. Algier Refinery terminal*
Arzew & Bethioua complex									F + T	25.700	Ac	*SD2, SD3 Sonatrach RTC operated deballasting facilities*
Bejaia								54.000	F + T	2.500	Ac	
Skikda								41.600	F + T	15.000	Not operational	*A collection facility (holding capacity for tank washings and other oily water mixtures at least to 450 and 85 m^3 respectively and proper collection means) and a treatment plant with nominal rate 55 m^3/hour is proposed*
Larnaka								2.000	B	1.200	Ac	*Reception of tank washings is carried out by barges from almost any requested anchorage or berth while storage and treatment is performed in the Vassilikos waste oils treatment facility*
Moni								880	B	1.200		
Vassilikos								2.870	B	1.200		
Dhekelia								3.980	B	1.200		
Sidi Kerir									B + T + S	120.000	Ac	
Ashqelon									F + T	20.000	Ac	*The deballasting station serves only emergency cases for oil contaminated ballast, since SBT tankers are predominantly engaged in oil handling operations*
Haifa									F + T	7.000	Ac	
Tripoli								1.460				*A barge able to collect and store 100 cub. meters of mainly machinery spaces' oily water mixtures and a port based treatment facility (see Final Report of Activity A of the project) is proposed*
Zahrani O.T.								< 670				*The operation of the terminal has changed from a crude oil exporting to an oil products receiving facility. A barge at least 100 cub.meters capacity able to cope with the collection of only machinery spaces' oily water mixtures is proposed*
Jounieh												*The limited needs can be handled by the proposed facility in Beirut (see Final Report of Activity A)*
Marsaxlokk								12.000	B		Ac	*Dirty ballast and tank washings from tankers calling to Oil Tanking terminal in Malta Freeport are collected by privately operated barges.*
Valletta								31.200	F + T	3.000	Ac	*Tank Cleaning Facility operated by Malta Drydocks.*
Banias								234.000				*A combined collection system in Banias and Tartous with a central, Banias based treatment facility (minimum 3.720 m^3) is proposed.*
Tartous								165.000				

Bizerte & Menzel Bourguiba								134.300	F + T + S	8.000	Ac	
La Skhira									F + T	60.000	Ac	*The redundant reception capacity might change the available infrastructure for retaining and initially separating dirty ballast and other oily water misxtures*
Zarzis								9.600				*A barge able to receive and store 2.000 cub. meters, potentially operating as a floating separator to cope with the limited needs of the oil tanker operations at the port is proposed.*
Aliaga									F + T + S	20.000	Ac	*TURPAS Oil terminal and refinery, Aliaga.*
Ceyhan									F + T + S	95.000	Ac	*Botas Oil Terminal, Port of Ceyhan*
Nemrut Bay									F + T + S	5.000	Ac	*Petrol Ofisi Storage and Distribution Terminal*

Where

F means a fixed collection system linked with either offshore installations or jetties, its associated equipment including holding tanks

B means navigable means, self or non – propelled, separating or not the collected oily water mixtures

T means primary, gravity, or mechanical or thermal induced separation of oil water mixtures

S means secondary treatment to enable better oil recovery and water effluent treatment before discharge or final disposal

Ac means adequate facilities in terms of capacity

CONCLUSIONS & RECOMMENDATIONS

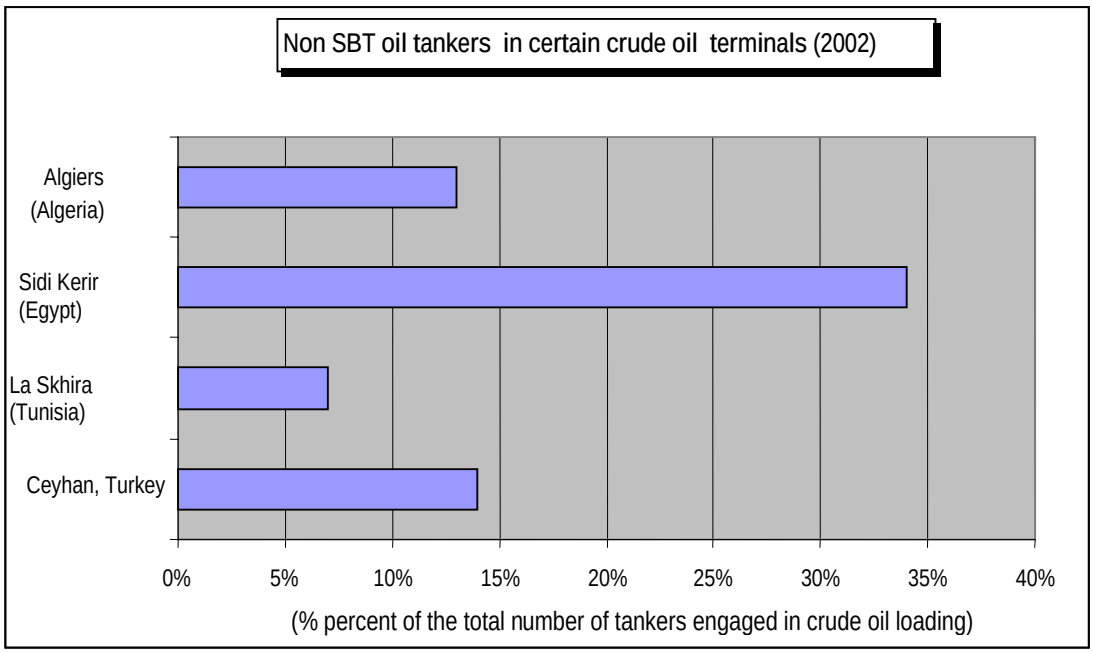
5. Conclusions and Recommendations

A. Introduction

An overview of the basic findings in the area of the project, along with a comprehensive set of recommendations aimed to provide guidance to the port authorities, terminal operators, etc. are presented here.

B. Drastic reduction of the need for dirty ballast discharges to Reception Facilities due to the effect of MARPOL Regulations

As it was already discussed, the amended 13G Regulation of Annex I of MARPOL 73/78 that entered into force on the 1st September 2002, will further reduce the need for potential discharges of dirty ballast from non SBT oil tankers in the Mediterranean Sea area. The percentage of non SBT tankers that used to call at certain crude oil terminals of the project is illustrated below while the average, was found to be less than 14%.



Category 1 (pre PL-SBT) oil tankers should be withdrawn until 2007, while oil tankers of 5.000 – 20.000 tdw., (Category 3) by the end of 2015 depending on their year of delivery. However, SBT tankers will not totally eliminate the need to wash cargo oil tanks or to carry occasionally dirty ballast. The following are some representative examples:

- All cargo tanks must be cleaned and gas freed before drydocking or repair work,

- Where product oil is to be carried, for which contamination with the oil previously carried is not allowed, cargo tanks should be effectively cleaned before loading, and

- When additional ballast is carried in cargo oil tanks, due to severe weather conditions, such ballast, have to be retained onboard, enroot within the Mediterranean Sea area, for final discharge to the available reception facilities. Due to the anticipated decline of the potential volume of dirty ballast, the next, most important – in terms of quantity – kind of oily wastes from tankers is that of tank washings collected in the designated slop tank/s.

C. Operational changes in a number of crude oil exporting and other oil terminals

A further but also significant reduction of the need for dirty ballast discharges occurs due to the change of a number of crude oil or black oil exporting terminals to oil products receiving terminals. At the same time, new terminals get involved in storage of small lots of crude oil and other products, operating as loading and unloading facilities.

For instance, Zahrani terminal and Tripoli Oil Installations in Lebanon do not currently unload crude oil from the TAPLINE facilities and Kirkurk oil field respectively, while Oil Tanking in Malta Freeport operates as a modern oil depot. In other cases, the operation of oil handling activities in crude oil terminals are expected to become more intensive such as in the Botas Oil Terminal at the port of Ceyhan where the existing throughput will increase from 25 to 75 million tons following the operation of the Baku – Ceyhan pipeline system.

D. New reception and treatment facilities

Three new reception and treatment facilities for tank washings and dirty ballast were identified as immediately, necessary to establish in the ports of Banias – Tartous, Skikda and Zarzis, each one to cope with the particular needs of the oil tankers that are normally involved in crude oil and other oil products handling.

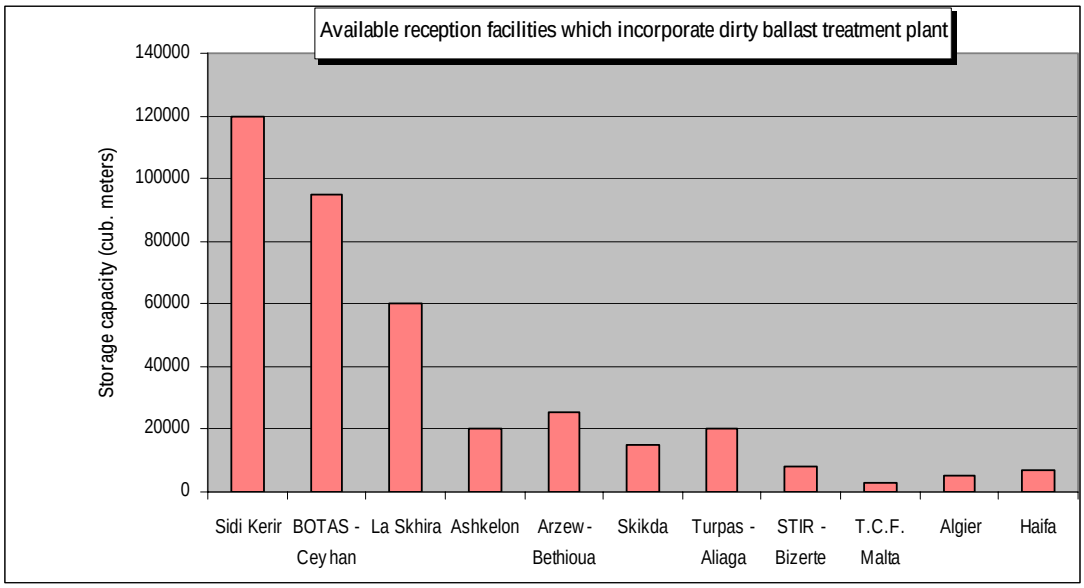
Port/Terminal	Average, annual volume for delivery (m^3/ year)	Proposed collection and treatment system
Banias, Tartous Syria	398.980	A combined collection system based on two appropriate barges for Banias and Tartous. Berthing infrastructure and a central storage (3.720 m^3) - treatment facility in Banias.
Skikda Algeria	41.600	Navigable and land based collection means and a storage (530 m^3) - treatment facility in Skikda
Zarzis, Tunisia	9.600	An oily water separating barge able to collect and store up to 2.000 m^3 of tank washings and other residues

Since, new, reception and treatment facilities are proposed to establish in the area of the project, it was attempted also to provide guidance on their integration with the Mediterranean Action Plan steering framework in the following paragraphs.

E. Available reception facilities in oil terminals

Taking into account the estimation of the wastestreams for each terminal, the available storage capacity and the nominal flow through rates of the available reception facilities, in conjunction with the overall assessment criteria described earlier in this Report, in general, the currently established facilities for dirty ballast and tank washings at almost all major crude oil terminals (at least those that allow non SBT oil tankers to call either in offshore installations or in jetties and dockside berths) meet the minimum needs of these ships. It should be noted that a ballast water treatment plant is incorporated in most of the cases in these facilities, able to produce an acceptable, water effluent for discharge at sea.

While in a number of cases, their original scheme was limited both in function and throughput, changes to the oil handling pattern, made the available facilities adequate to meet the new needs of tankers. A view of the available storage capacities for dirty ballast in certain oil terminals is presented below:



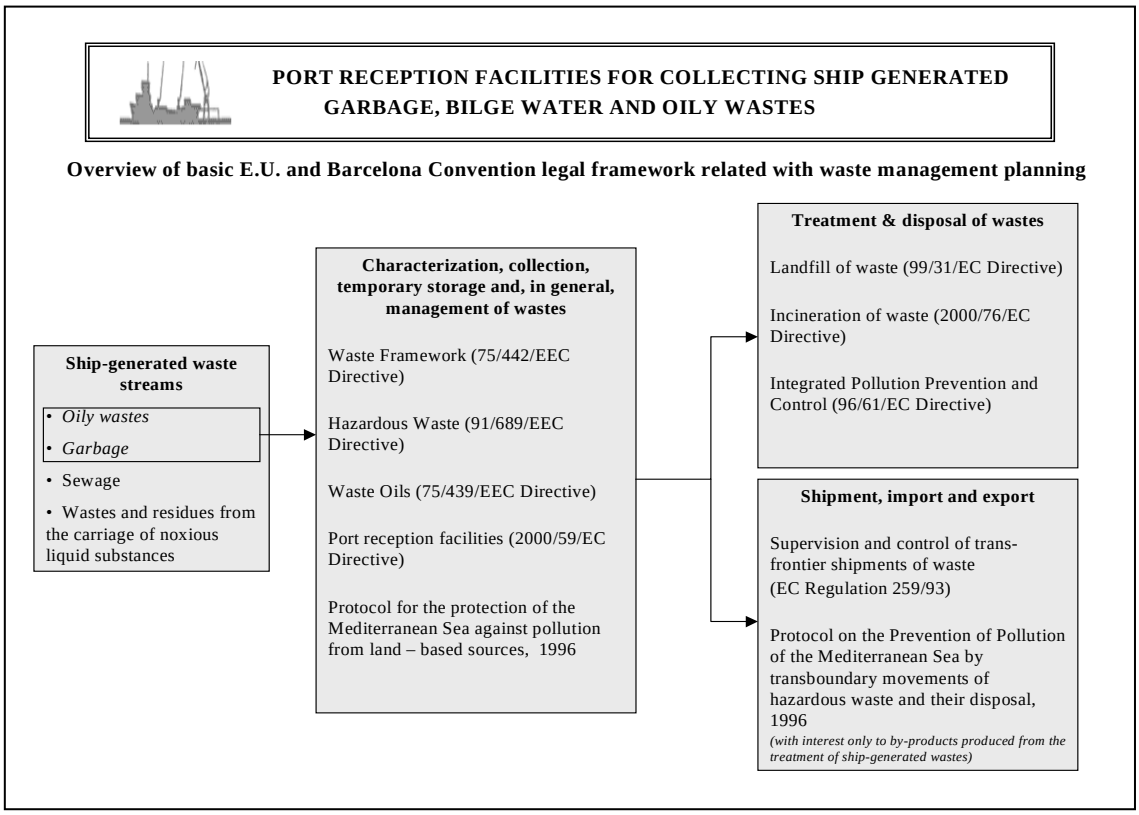
It should also be noted that in a number of cases the available treatment technology, basically for the effluent water was not found to be in consistency with those developments that at least ensure satisfactory control over the total load of pollutants discharged at sea.

F. Action – oriented waste management plans for ports

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).

The next diagram presents the basic legislation that requires or recommends some kind of waste management planning.



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 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.

G. 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 drawing up of an environmental impacts assessment for certain projects is already an institution for a few countries of the project or it is going to become soon in countries 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.

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.

H. 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.

K. 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

b) 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.

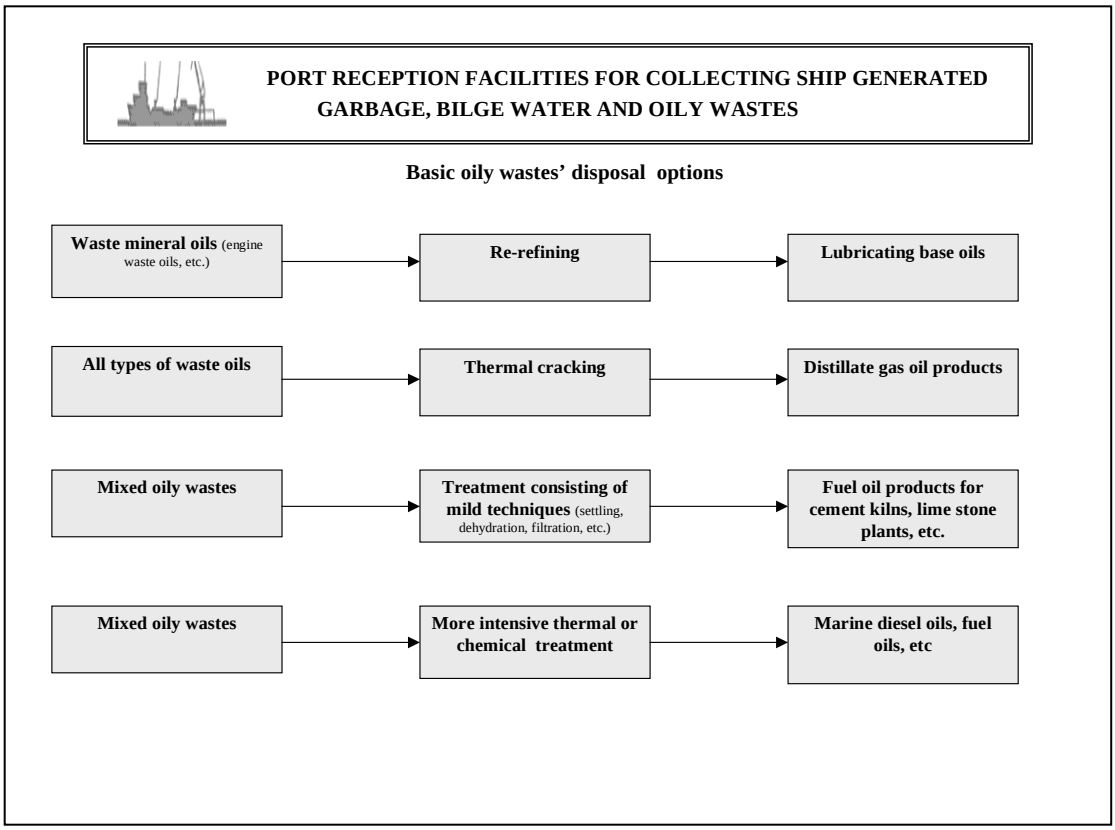
Unless wastewater reclamation is to take place, the basic, recommended principle that must be taken into account, is that the resultant effluent water should be subjected to such a treatment that discharges directly at sea or into an existing sewage network have the prescribed concentration limits for 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 C

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

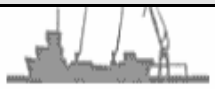
☐ Other disposal methods *(Please, specify)*

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**

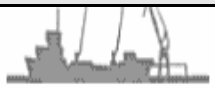
Name

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 ☐

QUESTIONNAIRE FOR OIL TERMINALS

- 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

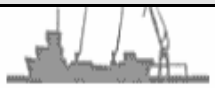
– **Does the terminal provide a reception facility for dirty ballast, oil tank washings and other oily wastes from oil tankers ?**

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.	

QUESTIONNAIRE FOR OIL TERMINALS

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							

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 4

VOLUNTARY QUESTIONNAIRE FOR MASTERS OF SHIPS CALLING AT THE PORTS OF THE PROJECT

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)

_____

_____

5. MASTER'S SIGNATURE ……

DATE ……