Annex 3

Capacities for handling liquid oily wastes from ships

Content

1 INTRODUCTION

Being a party to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL) and bordering on the Mediterranean Sea, a special area in terms of Annex I of MARPOL, Croatia has an obligation to provide facilities for reception and treatment of dirty ballast and tank washing water from oil tankers visiting its oil loading terminals and repair ports, as well as to provide adequate reception facilities for other oily residues and mixtures from all ships visiting its ports. Being also engaged into the process of accession to the EU and a signatory to the Paris MOU on port State control, Croatia has transposed into its national legal system the provisions of the MARPOL Convention as well as of the EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues and the guidelines on port State control.

Therefore Croatia has in place a Regulatory framework which addresses the obligations and requirements of ships related to notification, reporting and delivery of ship generated waste, as well as obligations and requirements which ports have to comply with regarding the collection of such wastes. To mention but a few, ships are required to notify the port prior to arrival on quantities of both solid and liquid wastes they have for delivery, and ships of certain categories have to keep oil record book (as well as garbage record book) and to have a garbage management plan. On the other hand public ports must have waste management plan, and provide port reception facilities for different types of waste. Marinas along the Croatian coast and on islands also have to provide reception facilities for different categories of wastes. National regulations in the field of environment protection address the requirements which companies engaged in waste collection, handling, treatment and disposal have to comply with.

Monitoring, control and enforcement of compliance with these regulations shall be ensured on the maritime side by Harbour Masters' Offices and to a lesser extent by Port Authorities (although in this particular case the duties and responsibilities of the port authority are not sufficiently explicitly defined), and on the environmental side by inspection services of the Ministry of Environmental Protection, Physical Planning and Construction and by municipal inspections.

Cost recovery regime for services related to the collection of ship generated wastes shall be outlined in port waste management plans and in concession agreements which various specialised companies have with relevant Port Authorities and other legal entities (e.g. state ferry operators, and certain shipping companies).

Regional cooperation with other countries in the Adriatic region and outside it exists at present mainly through cooperation in the field of Port State Control within the framework of the Paris MOU.

Certain components of the current system need improving in order to address some of the weaknesses and to harmonize the practices followed by different ports within the country, and it refers in particular to the control and monitoring of waste stream from the ship to its final disposal, and to the cost of services provided to the ships. These and other necessary improvements are addressed elsewhere in the Study.

During its visits to major Croatian ports and by examining documentation provided by the Ministry of Sea, Transport and Infrastructure on one hand and on the other by the Ministry of Environmental Protection, Physical Planning and Construction and other relevant national agencies, the Consultant's Team of Experts compiled sufficient evidence that all ports (visited by the Team of Experts) that are opened to international traffic indeed regularly provide visiting ships with relevant services, namely collection of ship generated liquid oily wastes.

It was also found out that, although all Croatian ports and Port Authorities pursuant to the legal regime follow the same pattern to resolving the issue of port reception facilities, there are differences regarding its implementation and the practices and the system are not harmonized.

The characteristics of the current system and the practices of the Croatian ports and Port Authorities can be outlined as follows:

- Ports and Port Authorities are not directly engaged in collection of oily wastes from ships and the services are provided by private sector (registered concessionaires);
- Fixed reception facilities in ports do not exist and the collection of oily wastes is carried out by mobile units (tank trucks and/or vessels);
- Treatment and disposal of oily wastes occur outside the ports' boundaries;
- Most of the providers of services (except a single company) do not have their own proper oily waste treatment plants and rely on third parties for the treatment of collected oily liquids.

More detailed information on current practices for collection, handling, transport, storage and treatment of liquid oily wastes from ships in Croatian ports, as described to the Consultant, are given in Section 3.

Finally, it is noted that according to the views expressed during interviews by Harbour Masters or their inspectors responsible for the enforcement of implementation of applicable rules in ports (Port State Control), no apparent problems related to the service for collection of ship generated liquid oily wastes in ports under their jurisdiction could be singled out, regardless of the fact that Harbour Masters and their officers made certain suggestions aimed at improving the services.

As a conclusion, it can be stated that despite the fact that it was found that there was a national system of port reception facilities for ship generated liquid oily wastes in Croatian ports, a certain number of problems in its functioning has also been identified, indicating that there was a room for its improvement.

2 VOLUME OF SHIP GENERATED OILY WASTES

It is emphasised that, with a few exceptions, private companies involved in collection and processing of oily wastes from ships were reluctant to provide details of technical processes used, quantities of oil collected and disposed off, and in particular, the costs of their services and revenue.

Therefore the figures regarding quantities of liquid oily wastes collected from ships in Croatian ports might not be complete and do not necessarily represent accurate values despite the Consultant's efforts to minimise the margin of error.

Table 1 shows volumes of liquid oily wastes collected in years 2006, 2007 and 2008 in major Croatian ports by authorized concessionaires in accordance with their concession agreements with the relevant (State) Port Authorities. These quantities **do not** include liquid oily wastes collected by the same companies from ferries and other ships belonging to "Jadrolinija", the major passenger ferry operator in Croatia with which most of the companies providing port reception facilities have separate contracts.

Table 1 Quantities of liquid oily wastes collected in major Croatian ports (State Port Authorities) in years 2006, 2007 and 2008 (summary)

PORT	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Rijeka*	849.60	549.00	460.00	1.50	10.19	7.80
Zadar	328.40	309.40	369.00	9.72	3.47	9.87
Šibenik	165.82	240.60	107.86	-	6.05	1.37
Split	1718.20	931.39	996.10	84.17	96.65	78.98
Ploče**	300.00	90.00	40.00	-	-	-
Dubrovnik	121.50	93.40	102.40	2.00	2.52	7.35
TOTAL	**3483.52**	**2213.79**	**2075.36**	**97.39**	**118.88**	**105.37**

* A major contractor in Rijeka did not provide actual quantities. The figures entered in the table include an estimate (min 300 m^3/year) which was made by the manager of the same company and which is not necessarily correct.

** Quantities for Ploče are only approximate quantities for all oily water mixtures (including used/waste oil) which were indicated by the contractor (Pomorski Servis – Luka Ploče). The contractor could not provide more precise figures.

It is noted that the major concessionaire in Split reported collecting in 2006 in the area of the Port of Split Authority a quantity of bilge waters which was almost double compared to the quantities collected in the same area in 2007 and 2008 respectively. At the time of writing this document a clear explanation of this anomaly was not available.

According to the reports received from concessionaires offering oily waste collection services, but also according to the information received from Port

Authorities and Harbour Master's Offices, during the three years under consideration there were no requests for delivery/ collection of either **sludge** and/or **slops** from any type of ships visiting Croatian ports managed by the State Port Authorities.

In order to obtain a more realistic picture of the volumes of liquid oily wastes received on shore from ships entering Croatian ports, it is necessary to add at least the volumes of oil/oily waters delivered by the ferries and other passenger ships operated by "Jadrolinija" which covers more than 90% of local passenger traffic in the country. The figures reproduced in Table 2 were reported by 3 companies which have contracts with "Jadrolinija" for liquid oily waste collection.

Table 2 Quantities collected from JADROLINIJA

PORT	OILY WATERS [m^3]		
	2006	**2007**	**2008**
Rijeka	113.00	170.07	96.80
Rijeka and small northern ports (approx. values)	500.00	500.00	500.00
Zadar	178.80	258.45	381.40
Šibenik	139.12	143.55	32.00
Split	679.21	757.13	946.80
Dubrovnik	128.50	78.05	93.35
TOTAL	**1738.63**	**1907.25**	**2050.35**

In addition to the quantities of oily wastes collected in Croatian ports opened for international traffic and managed and operated by the State Port Authorities, an effort was made to assess the quantities of liquid oily wastes delivered and collected in smaller Croatian ports, which are managed and operated by County Port Authorities and which cater for mainly domestic traffic and smaller vessels. Replies received from County Port Authorities were incomplete, not consistent and in many cases not precise enough, and therefore the accuracy of the summary results presented in Table 2 should be considered as not completely reliable.

Table 3 Quantities of liquid oily wastes collected in some of the other Croatian ports (County Port Aithorities) in years 2006, 2007 and 2008 (summary)

COUNTY PORT AUTHORITY	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Pula	-	4.14	-	-	17.61	-
Poreč	0.10	0.15	0.13	1.00	1.30	1.50
Rabac	-	-	-	0.35	0.40	0.56
Rovinj	-	-	-	3.00	3.50	
Umag/Novigrad	-	-	-	3.70	3.20	3.60
Bakar/Kraljevica (4 small ports)	-	-	-	-	-	-
Cres	-	-	-	5.00	6.00	7.00
Mali Lošinj	-	-	-	4.00	4.00	4.00
Novi Vinodolski (3 small ports)	-	-	-	-	-	-
Šibenik-Knin County	-	-	-	-	-	-
TOTAL	**0.10**	**4.29**	**0.13**	**17.05**	**36.01**	**16.66**

NOTE: Replies from 14 out of 21 County Port Authorities were received. County Port Authorities of Split-Dalmatia County, Dubrovnik County (15 local ports and 1 county port), Korčula and Vela Luka also replied but did not provide information on the quantities of oily liquid waste collected in their respective areas.

Like in case of major ports there were no reports of delivery (or requests for delivery) and collection of **slops** and **sludges** in either county or local ports managed by County Port Authorities.

Some 55 marinas that are registered in Croatia are all equipped with containers for collection of liquid oily wastes and garbage, however the evidence of quantities of liquid waste collected from such reception facilities in three recent years could not be obtained. Private companies engaged in collection of oily wastes in ports also collect oily waters delivered by the visitors to reception facilities in marinas however they could not provide information on quantities of collected oily wastes in marinas.

The only information received (from Harbour Master's Office in Rijeka) referred to the year 2007, when a total of 226.41 m3 of oily waters were collected from 40 reception facilities (total capacity 62.6 m3) in marinas. However it did not include the information to which marinas exactly these data referred to.

Summary of Section 2

Taking into consideration that data provided and collected by the Consultant were sometimes incomplete and neither completely precise nor accurate, and that some of the key actors were reluctant to provide data even if they had them, only approximate values for the total quantities (volumes) of liquid oily wastes delivered by ships and collected in Croatian ports could be estimated.

Moreover descriptions of liquid oily wastes used by different sources are not consistent and therefore only total quantities of all liquid oily wastes could be considered reliable.

The figures below are therefore based on relatively accurate data received from major concessionaires or contractors, some approximate data provided also by the same concessionaires or contractors, partial replies received from County Port Authorities and the only information available (for 2007) on volumes of oil received in marinas:

- Ships in main ports, without local ferries (all oily liquids)
- Local ferries in main and smaller (county and local) ports (all oily liquids)
- Other users of smaller (county and local) ports (all oily liquids)
- Users of marinas (oily waters)

Table 4 Summary of volumes of liquid oily waste received in Croatian ports 2006-2007

	2006	**2007**	**2008**
All ships in main ports under (State) Port Authorities (bilge waters + used oil)	3580.91	2332.67	2180.73
"Jadrolinija" ferries in all ports (oily waters)	1738.63	1907.25	2050.35
All vessels in county and local ports under County Port Authorities (all oily liquid wastes)	17.15	40.30	16.79
Marinas (all oily liquid wastes)	-	226.41	-
TOTAL	**5336.69**	**4506.63**	**4247.87**

If these figures are increased by 10% in order to accommodate all quantities of oily liquid wastes that might have been collected and not reported, and rounded it can be said that total volumes of ship generated liquid oily wastes delivered to port reception facilities in all Croatian ports (including main ports opened for international traffic, county ports, and small local ports, as well as marinas) varies in the last three years between **5500 and 4500 m^3** per year and shows a certain decrease.

The major quantities are generated by ships of all types calling in main Croatian ports and by local passenger ferries, both categories participating with similar quantities in the last two years.

On the other hand, it can be estimated that quantities delivered in smaller (county and local) ports are negligible, while information on volumes delivered in marinas is too scarce to draw any reliable conclusion although some 5% of the total oily liquid waste could be attributed to this source.

3 CURRENT SITUATION REGARDING PORT RECEPTION FACILITIES FOR LIQUID OILY WASTES FROM SHIPS

As already mentioned, there are no fixed oil/oily water reception facilities in Croatian ports.

The only exception is the oil terminal of INA Refinery Rijeka in Bakar, which has a fixed installation for reception of ship generated oily wastes. This facility is used by tankers calling at the terminal, and could be also used by vessels delivering oily wastes collected from ships at anchor.

Discussions with the representatives of (State) Port Authorities revealed that, with the exception of the Port of Ploče Authority which has ready plans but at present no funds for the development of a (fixed) port reception, storage or treatment facilities, at present there were no other plans for construction of (fixed) port reception facilities in any other Croatian port.

Port reception facility of INA Refinery Rijeka

The Refinery terminal in Bakar provides a fixed reception and treatment facility for dirty ballast, tank washings and other oily residues that serves not only those tankers engaged in its operation but also barges operated by the waste oils collection companies contracted by the Port Authority of Rijeka. It is apparent that this facility ensures so far the treatment and disposal of waste oils collected in the wider area of the port of Rijeka.

The facility provides two tanks of 2.000 m^3 capacity each, in which almost any kind of waste oils could be received, provided that their quality meets the following specifications:

Table 5 Specifications of waste oils and oily water mixtures received for treatment by INA Refinery Rijeka

Parameter	Permissible levels/concentrations
Sediments	<10%
pH (in water phase)	6.5-9.5
COD (in water phase)	<400 mg/l
Pb	<5 mg/l
As	<500 mg/l
Si	<10 mg/l
Na	<30 mg/l
Fe	<30 mg/l
N	<30 mg/l
Organic chloride substances	<60mg/l

Treatment is effected through primary settling, recovery of separated oil through surface skimming (to the refinery slop-system). Oily water is treated on a WWTP, consisting of mechanical, chemical and biological section.

Oil recovered from the separation and treatment process is sent to the oil refinery slop tank used to hold drainage and other waste oils produced in the oil storage tanks.

Sludge produced from the API oily water separator is treated in a decanter/centrifuge unit, while the oily sediments are exported.

Liquid cargo terminal Ploče

It is known that in the liquid cargo (oil) terminal in the port of Ploče there was also a fixed reception facility for oily wastes collection and primary treatment, however according to the information received from the representative of the Port of Ploče Authority this facility was some time ago converted for use as an additional storage facility for oil products, and at present it is not used in its primary function any more. According to the same source tankers unloading in Ploče liquid cargo terminal are not allowed to discharge any liquid oily wastes while in the port.

NOTE: This basic information needs to be confirmed and complemented, however at the time of finalizing the present Annex the Port of Ploče still did not provide the Consultant with the requested details of contact persons in the two companies operating oil and liquid cargo terminals. As soon as these become available a more precise description of the current state of affairs in the liquid cargo terminal in Ploče and a more realistic information concerning the realization of the future plans will be inserted in the present document.

3.1 Current practices in collection and treatment of liquid oily wastes

Collection of waste oil and oily bilge water in all Croatian ports opened for international traffic, but also in local and county ports, is provided by private contractors using mobile units, i.e. dedicated tank trucks (road tankers) when the ships are at berth inside the port.

In addition, collection of liquid oily waste from ships at anchorage in the ports of Rijeka and Split is also available upon request. In Rijeka the service is provided by a private company with a self propelled barge of approximately 30 m^3 tank capacity on board and another vessel of some 10 m3 tank capacity, while in Split another private company offers similar service with a small vessels of limited, up to 4.5 m^3 per voyage, capacity.

Since none of the ports or Port Authorities directly provides for the removal from ships of liquid oily wastes, including in particular waste oil and oily bilge water, the services related to the collection, handling, treatment and disposal of liquid oily wastes are provided by a limited number of specialized companies which are licensed and registered for such activities. In order to be authorized to collect waste from ships in ports, companies offering these services are required to have Concession Agreements (Contracts) with relevant Port Authorities.

Pleasure craft ports (marinas) in Croatia are equipped with small (0.5-2 m^3) receptacles (containers) where the users can dispose of oily liquid wastes from their yachts and boats.

The concessionaires collect liquid oily wastes upon request by the ships' masters or, in most cases, by the ships' agents. The payment of services is made by the ship agent (on behalf of the ship) directly to the provider of service, in accordance with the tariffs agreed and published by the (State) Port Authority.

It was however discovered that in most cases Port Authorities did not publish on their websites or printed documents current tariffs for the collection of different types of liquid wasted, and even when these were available the categories of liquid oily waste were not clearly defined. It means that liquid oily waste (and respective tariffs) were not divided either in line with the categories that appear on the standard notification form for ship generated waste currently in use in Croatia (bilge waters, sludge and specified other types) or in line with standard categories recognized by IMO and recently included (2008) in the "Standard format of the advance notification form for waste delivery to port reception facilities" (oily bilge water, sludge, tank washings, scale and sludge from tank cleaning, specified other types of oily waste). On the other hand the published tariffs do not specify that the cost of collection of **all these types of waste** is equal, thus leaving the possibility to the concessionaires to create their prices independently.

As a consequence, the monitoring and control of exact quantities of oily wastes of different types is not possible and it is reflected in inconsistent reporting by the concessionaires of the quantities of liquid oily wastes actually collected.

Moreover, none of the Port authorities was able to provide the Consultant with the record of quantities collected by different concessionaires in the areas managed by them, despite the fact that all port waste management plans, as well as concession agreements, require that the concessionaires report such quantities both quarterly and annually as the basis for payment of the variable part of the concession.

Finally, even when the concessionaires produced certain records as a basis for calculating the variable part of the concession it appeared that there was no independent control by the Port Authorities of the quantities actually delivered by ships and collected by concessionaires.

Particular attention will be paid in the proposal for the improvement of the current system to better formulating the reporting obligations of the concessionaires and obligations of Port Authorities to monitor and control the volumes of waste collected in parts.

In fact, strict control and monitoring by the Port Authorities of delivered and collected quantities of liquid oily wastes will be considered as the first step in an overall control of the path (stream) of liquid oily waste from its collection from ship to its final disposal.

At present there are 8 (eight) specialized private companies which are involved in collection, handling, treatment and disposal of ship generated liquid (oily) wastes in Croatian ports. However, providing port reception facilities for ship generated liquid oily waste is not a primary activity of any of these companies but rather a supplementary one.

In accordance with the Croatian waste related legislation, which considers "waste oil" and relevant liquid oily wastes as a category of "hazardous waste", 7 of the above mentioned 8 companies are registered and properly licensed, by the Ministry of Environmental Protection, Physical Planning and Construction, for "carrying out activities of hazardous waste management". Six companies include 'hazardous waste management' among their main registered activities.

These 6 companies have concession agreements (contracts) with the relevant (State) Port Authorities and special contracts/agreements with other partners (including county and local ports and County Port Authorities, marinas, shipyards, specific ferry and shipping companies, etc.) for providing collection, handling, treatment and disposal of liquid oily wastes.

Four out of these six companies are based in or near Rijeka, one in Zadar and one in Split although several among them had been granted concessions and offer their services in ports managed and operated by more than one (State) Port Authority (see the list below).

"INA Refinery Rijeka", which is primarily engaged in crude oil distillation and refining, provides against payment services related to storage, recovery, treatment and disposal of "hazardous waste" to several of the above mentioned companies based in and around Rijeka. These companies heavily rely upon the complex treatment plant (mechanical, chemical, biological) of the Refinery for treatment of oily waters and other liquid oily wastes collected from ships as well as from other sources (clients including industries, oil storage facilities, hotels, etc.).

It is important to note that all companies which use Refinery's waste treatment plant deliver to the Refinery only oil contaminated water (water phase) after primary separation of oil and water, which has been carried out at their own facilities. Oil recovered in this way is sold by these companies to cement factories and possibly other facilities that could use such oils.

Finally, Port of Ploče Authority has granted a single privileged ("preferential") concession to a company (Pomorski servis – Luka Ploče d.o.o.) which is not registered for 'hazardous waste management' and actually only collects waste oil/oily water from ships inside the port and stores it within the port area. Collected oil and oily waters are then periodically removed and taken for treatment by one of the 6 companies mentioned above.

During Phase I of the project the Team of Experts visited and interviewed the representatives of the following companies providing services related to collection and management of waste oil, oily water and oily waste:

- CIAN d.o.o. (Split)
- DEZINSEKCIJA d.o.o. (Rijeka)
- ECOOPERATIVA d.o.o. (Matulji – near Rijeka)
- INA-INDUSTRIJA NAFTE d.d. - Refinery Rijeka (Urinj – near Rijeka)
- IND-EKO d.o.o (Rijeka)
- POMORSKI SERVIS – LUKA PLOČE d.o.o. (Ploče)
- RIJEKA TANK d.o.o. (Rijeka)

The Team of Experts also met the manageress of the company CIKLON d.o.o. (Zadar), who explained that at present her company does not possess any equipment for collection of liquid oily wastes and only acts as an intermediary between the ships that require oily waste collection services and one of the companies that are currently the concessionaires of the Port of Zadar Authority. For this reason "Ciklon" d.o.o. has not been included in the list above.

The Team of Experts did not meet the representatives of the company ADRIATIC BLIZNA d.o.o. (Trogir), which has a concession for collecting oil and oily wastes in the port of Split, however it is understood that at present this company is not involved in the collection of oily (bilge) waters and only collects used oil from some ships. This company has also not been included in the list above.

Table 6 Companies providing port reception facilities and concession agreements with relevant Port Authorities, for operating in major Croatian ports

Port Authority ⇨ / **⇩ Concession**	**Pula**	**Rijeka**	**Zadar**	**Šibenik**	**Split**	**Ploče**	**Dubrovnik**
Adriatic Blizna							
Cian							
Dezinsekcija							
Ecooperativa							
Ind-Eko							
Pomorski servis						*	
Rijeka Tank							

* Transport and treatment provided by either "Cian" (Split) or one of the companies from Rijeka, which are subcontracted by "Pomorski servis – Luka Ploče" d.o.o.

The following is a summary description of companies visited during the mission and in particular of their activities related to collection and management of waste oil and oil/water mixtures from ships.

CIAN d.o.o. (Split)

The core activities of the company are pest control, disinfection, plant protection, destruction of unwanted vegetation as well as environment protection related activities. The latter include in particular collection and treatment of hazardous wastes, including waste oil and oil/water mixtures from ships, but also oil spill response and accidental pollution control and response activities, tank cleaning and related activities.

"Cian" has a valid licence to carry out activities related to hazardous waste management" for various categories of "waste oils", issued by the Ministry of Environmental Protection, Physical Planning and Construction.

"Cian" regularly collects waste oil and oil/water mixtures from ships in ports of Zadar, Šibenik, Split, and Dubrovnik, for which it has concessions, and on a case-to-case basis from the port of Ploče where it is sub-contracted by the concessionaire. The company has a contract with "Jadrolinija" (the major passenger ferry operator in Croatia) for collection of liquid oily wastes from its

ferries, as well as with a number of marinas, shipyards in the central part of the Adriatic coast.

Liquid oily wastes are collected by dedicated tank trucks (road tankers) owned by the company. Upon request the company offers collection of liquid oily wastes from ships at anchor in the port of Split, using one of its small pollution response vessels with 4.5 m^3 tank capacity on board. Liquids collected by tank trucks and by boats are transported to Solin, near Split, for treatment.

In Solin "Cian" owns a modern and well maintained waste treatment plant (called the "Centre for collection, storage and treatment of oily materials"), the only such facility in the southern part of the Croatian coast. The Centre collects liquid oil and oily wastes as well as solid oily material. Treatment of solid or semi solid material comprises treatment of oily mud and sludge (solidification), compacting and packaging of oily filters, rags and similar products for export.

Liquid wastes are collected at the Centre and stored in 7 tanks, two of which are provided with heating coils. Collected liquids are analysed in the Centre's laboratory, transferred into treatment plant's tanks, heated as necessary, and further transferred to decanters/separators. Poly-electrolytes are added as necessary. The solid phase (mud) is transferred to the solidification unit where it is treated with quick lime, thus producing completely inert material. The liquid phase passes through a series of separators which separate oil from water. Emulsion breakers are added to the oily water as necessary and the procedure is repeated until the criteria for discharge into the sewage system are satisfied. This part of the process is automated and the oil and suspended matters are controlled by monitors. After the treatment water is collected in retention tanks and subsequently released into the sewage system, while oil is collected in oil tanks and sold to either cement works or similar plants.

The treatment capacity of the Centre is 3000 tonnes/year (based on 40 hours work/week). It can be increased by working in 2 or 3 shifts, or by installing an additional separator.

Table 7 Quantities collected by "Cian" in ports for which it has concessions

CIAN	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Zadar	328.40	309.40	369.00	9.72	3.47	9.87
Šibenik	165.82	240.60	107.86	-	4.75	0.90
Split	1718.20	930.49	996.10	84.17	60.20	78.98
Dubrovnik	121.50	93.40	102.40	2.00	2.52	7.35
TOTAL	**2333.92**	**1573.89**	**1575.36**	**95.89**	**70.94**	**97.10**

In addition to the liquid oily wastes collected under the concession agreements with the 4 (State) Port Authorities, the company also has a separate contract with "Jadrolinija" for collection of oily waters from their ferries and other vessels in the central and southern parts of the Croatian coast. Liquid oily waste collected under this contract is reported only as "oily waters" and different types of these liquids are not divided by type.

Table 8: Quantities collected by "Cian" from the ferries and ships of "Jadrolinija"

CIAN	OILY WATERS [m^3]		
	2006	2007	2008
Zadar	178.80	258.45	381.40
Šibenik	139.12	143.55	32.00
Split	679.21	757.13	946.80
Dubrovnik	128.50	78.05	93.35
TOTAL	**1125.63**	**1237.18**	**1453.55**

DEZINSEKCIJA d.o.o. (Rijeka)

The main activities of the company are protection of sea and inland waters from pollution i.e. oil pollution prevention (including collection and treatment of oil and oil/water mixtures from ships), preparedness and response, plants and forests protection, disinfection, odour control, decontamination, rodents and insects (pest) control on board ships and on land.

"Dezinsekcija" has a valid "licence to carry out activities related to collection, transport and temporary storage of hazardous waste" for various categories of "waste oils", issued by the Ministry of Environmental Protection, Physical Planning and Construction.

The company, which is based in Rijeka, has two dedicated vacuum trucks (of 5 and 9 m^3 capacity respectively) which are used for collection of oil and oil/water mixtures from ships, and owns or manages a fleet of several coastal/harbour anti-pollution vessels. Some of the pollution response vessels owned by the company can be used for collection of oily wastes from ships at anchor (3 vessels with approximately 10 m^3 tank capacity on board and a self-propelled barge of 30 m^3 tank capacity).

"Dezinsekcija" has concession agreements (contracts) for collection of waste oil and oil/water mixtures with the Port Authorities of Rijeka, Pula and Zadar and a contract with "Jadrolinija" (the major passenger ferry operator in Croatia) for collection of liquid oily wastes from its ferries. It also provides this type of service in other ports in Istria managed and operated by Port Authorities of Poreč, Rabac, Rovinj, Umag-Novigrad. These were established by the County of Istria, and cover also 4 industrial ports in the region. If so requested "Dezinsekcija" provides collection of liquid ship generated waste on north Adriatic islands, in ports managed by County Port Authorities.

The company does not have its own oily waste treatment facility and relies upon the treatment services provided by INA-INDUSTRIJA NAFTE d.d. - Refinery Rijeka.

Table 9 Quantities collected by "Dezinsekcija" in ports for which it has concessions

DEZINSEKCIJA	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Pula	None reported					
Rijeka	226.60	31.50	2.00	-	10.19	-
Zadar	None reported					
TOTAL	**226.60**	**31.50**	**2.00**	**-**	**10.19**	**-**

"Dezinsekcija" also has a separate contract with "Jadrolinija" for collection of oily waters from their ferries and other vessels in the northern part of the Croatian coast. Liquid oily waste collected under this contract is reported only as "oily waters" although "Dezinsekcija" separately reports bilge waters and waste oil, however the quantities of the latter are negligible and a total volume is presented as "oily waters". It should be noted that "Dezinsekcija" did not report any quantities of liquid oily waste collected from the area of Pula (County) Port Authority.

Table 10: Quantities collected by "Dezinsekcija" from the ferries and ships of "Jadrolinija"

DEZINSEKCIJA	OILY WATERS [m^3]		
	2006	2007	2008
Pula	-	-	-
Rijeka	113.00	170.07	96.8
TOTAL	**113.00**	**170.07**	**96.8**

ECOOPERATIVA d.o.o. (Matulji – near Rijeka)

The company offers waste collection, handling and disposal, including that of "hazardous wastes" and in particular of waste oil and oily wastes. It is based in Matulji, near Rijeka and it has a branch office in Split. Majority owner of the company is an Austrian waste treatment and disposal company.

"Ecooperativa" has a valid "licence to carry out activities related to hazardous waste management" for various categories of "waste oils", issued by the Ministry of Environmental Protection, Physical Planning and Construction.

"Ecooperativa" has a concession agreement with the Port of Rijeka Authority, but according to the company management, in 2007, 2008 and 2009 it was rarely or never engaged to collect liquid oily waste from ships. It had only one request for collecting sewage in 2007.

The company does not have its own oily waste treatment facility and relies upon the treatment services provided by INA-INDUSTRIJA NAFTE d.d. - Refinery Rijeka.

Table 11 Quantities collected by "Ecooperativa" in ports for which it has concessions

ECOOPERATIVA	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Rijeka	-	15.00	-	1.50	-	-
TOTAL	**-**	**15.00**	**-**	**1.50**	**-**	**-**

INA-INDUSTRIJA NAFTE d.d. - Refinery Rijeka (Urinj/Bakar – near Rijeka)

INA Refinery in Urinj near Rijeka is a middle-size refinery processing 3-3.5 million tonnes of crude oil annually. The refinery is connected by a sea line (7.2 km long, 20" diameter) to the JANAF oil terminal in Omišalj, on the island of Krk, and has its own port (oil terminal), docks and facilities for unloading and loading goods, crude oil and refined petroleum products in Bakar. Refinery's oil terminal has a fixed reception facility (see the paragraph on *Port reception facility of INA Refinery Rijeka)* and ships berthing at the terminal can discharge liquid oily wastes directly into the fixed installation on land. The Refinery operates a treatment system for mechanical, chemical and biological treatment of waste waters, with quality monitoring.

The Refinery has a valid "licence to carry out activities related to collection, transport, temporary storage, treatment, recovery and/or disposal of hazardous waste" for various categories of "waste oils", issued by the Ministry of Environmental Protection, Physical Planning and Construction.

The Refinery offers the treatment of oil/water mixtures in its treatment unit to various companies which collect waste oil and oily waters from ships. Slops from ships may also be accepted for treatment. The treatment is offered against payment. Oil recovered from the mixtures is sent to the refinery slop system, while water phase is discharged into the sea after the (biological) treatment. In order to protect its own installations from contamination with harmful substances refinery practices a strict control of mixtures entering the process. The samples of any oil/water mixture are analysed in the Refinery lab prior to allowing such liquids to enter the treatment system, which is granted only if certain parameters within the acceptable limits.

Oily water mixtures delivered to the Refinery for treatment are normally only oil contaminated waters (water phase), since the companies who collect liquid oily wastes from ships separate oil and water prior to delivering the oily waters to the Refinery.

Table 12 Quantities received for treatment by the Refinery from vessels at the terminal

INA – REFINERY RIJEKA	SLOPS, OILY WATERS, ETC. FROM SHIPS [m^3]*	
	2007	2008
Rijeka	291,60	347,30
TOTAL	**291,60**	**347,30**

***** These quantities might include liquid oily waste collected from ships at anchor by a company providing this kind of service. The percentage of oily liquids of such origin could not be determined.

IND-EKO d.o.o (Rijeka)

The company is specializing in industrial cleaning services, trenchless pipe rehabilitation, waste management, soil rehabilitation, environmental accident emergency response and environmental consulting.

It is based in Rijeka, and has an operational unit (including a treatment plant) near the INA Refinery Rijeka in Urinj.

"Ind-Eko" has a valid "licence to carry out activities related to hazardous waste management" for various categories of "waste oils", issued by the Ministry of Environmental Protection, Physical Planning and Construction.

The company has concession agreements (contracts) for collection of waste oil and oil/water mixtures with the Port Authorities of Rijeka and Split, and a contract with "Jadrolinija" (the major passenger ferry operator in Croatia) for collection of liquid oily wastes from its ferries in Rijeka, Jablanac, Lošinj, Valbiska, Merag (small ports/ferry landings in the northern Adriatic). The company management also indicated that they are providing oily waste collection services in Zadar, Šibenik and Ploče, although this claim was not supported by the relevant concession agreements.

"Ind-Eko" owns a fleet of tank trucks and vacuum trucks, which are also used for collection and transportation of liquid oily wastes.

The company also owns a mobile waste water treatment plant which is based on the process of electrolysis (REFOX process) and which uses "sacrificial" iron and aluminium electrodes to separate contaminants from water. It is equipped with analytical instruments for the control of treated water and with the final automatic pH value control.

The company management informed the Team of Experts that, despite having its own treatment plant in the area of the Refinery in Urinj, the company still pays the same fees for entering the liquid wastes into the Refinery as the companies using Refinery's treatment facilities.

Table 13 Quantities collected by "Ind-Eko" in ports for which it has concessions

IND EKO	BILGE WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Rijeka	Data not provided					
Split	Data not provided					
TOTAL*	unknown	unknown	unknown	unknown	unknown	unknown

* Although the exact figures could not be obtained, during the discussion with the managers of the company they indicated that as a rough estimate "Ind-Eko" annually collects between 300 and 500 m3 of liquid oily wastes from ships.

Under a separate contract which "Ind-Eko" has with "Jadrolinija", relatively significant quantities of "oily waters" are collected from their ferries and other ships in a number of small ports and ferry landings in the northern Adriatic. The company did not provide exact figures for volumes collected in recent years, but according to the General Manager of the companies these are in the range of 500 m^3 per year.

Table 14 Quantities collected by "Ind-Eko" from the ferries and ships of "Jadrolinija"

IND EKO	OILY WATERS [m^3]		
	2006	2007	2008
County Port Authorities (around Rijeka) *Approximate quantities*	500	500	500
TOTAL	**500**	**500**	**500**

POMORSKI SERVIS – LUKA PLOČE d.o.o. (Ploče)

The company is so called "preferential" (privileged) concessionaire of the Port of Ploče Authority for various services in the port, including collection of garbage and liquid oily wastes, and it has an open-ended concession agreement (contract) without the expiry date.

"Pomorski servis" is not licensed for hazardous waste collection, transport, temporary storage, treatment, recovery and/or disposal and management. Its activities include collection of oil/water mixtures from ships inside the port and storage of such liquids within the port.

The company has a tank truck (road tanker) of 10 m^3 capacity in addition to some 20 tanks of 1 m^3 and two of 3 m^3 capacity, as well as a railway tank car of 30 m^3 capacity which serves as temporary storage for collected liquid oily waste.

Once the storage capacities are full "Pomorski Servis" uses the services of either "Cian" or one of the companies from Rijeka to transport the collected oil/water mixture to the treatment facilities.

The port development plan includes a plan for construction of tank washing/oily waste storage and treatment plant, which would include a space for washing of tanks, a 500 m^3 storage tank for oily waters, a 100 m^3 tank for separated oil and a space for (compacted) solid waste (garbage). Necessary building permits had been ensured but the financial construction for financing this project has not been defined as yet.

Table 15 Quantities collected by "Pomorski Servis – Luka Ploče" in Ploče

POMORSKI SERVIS – LP	OILY WATERS [m^3]			USED / WASTE OIL [m^3]		
	2006	2007	2008	2006	2007	2008
Ploče	300.00	90.00	40.00	Included in "oily waters"		
TOTAL	**300.00**	**90.00**	**40.00**	**Included in "oily waters"**		

RIJEKA TANK d.o.o. (Rijeka)

In addition to collection, transport and disposal of waste oil, emulsions and oil/water mixtures and hazardous waste treatment, the company is providing industrial cleaning services, tank cleaning, geological and hydrological investigation of underground contamination and their decontamination, cleaning of sewage and pipe systems, CCTV control and trenchless pipe rehabilitation, corrosion protection, oil and HNS emergency response on land and fresh waters.

The company owns a fleet of tank trucks and vacuum trucks, as well as 5 mobile treatment units. It also has 2 storage tanks in Martinkovac (the outskirts of Rijeka) of 200 m^3 and 500 m^3 capacity respectively.

The company is based in Rijeka, and has branch offices in Šibenik, Županja (north eastern Croatia) and Zagreb.

"Rijeka Tank" has concession agreements with Port Authorities of Pula, Rijeka and Zadar. In Pula nad Zadar it collects and transports for treatment liquid oily wastes generated on offshore rigs of INAGIP. If so requested the company also provides liquid waste transport and disposal services to "Pomorski Servis – Luka Ploče" for oily waste collected in the port of Ploče.

"Rijeka Tank" has a valid "licence to carry out activities related to hazardous waste management" for various categories of "waste oils" issued by the Ministry of Environmental Protection, Physical Planning and Construction.

The company's mobile oily water treatment units, comprise decanters, vertical centrifuges, dissolved air flotation (DAF) units, and coalescers. The capacity of decanters is 5 m^3/h, while DAF units have 10m^3/h capacity. All pumpable oil is sold to cement works. Products of solidification could also be used in cement works, but at present these are disposed of in landfills. The effluent from the unit operating in Urinj (within Refinery Rijeka) is discharged into the refinery sewage system. "Rijeka Tank" is paying INA the cost of the compulsory analyses.

Table 16 Quantities collected by "Rijeka Tank" in ports for which it has concessions

RIJEKA TANK	BILGE WATERS [m³]			USED / WASTE OIL [m³]		
	2006	2007	2008	2006	2007	2008
Pula	None reported					
Rijeka	323.00	202.00	158.00	-	-	7.80
Zadar	None reported					
TOTAL	**323.00**	**202.00**	**158.00**	**-**	**-**	**7.80**

Summary of Section 3

Total quantities of oily liquid wastes (of different types) that ships visiting Croatian ports delivered in recent years to the existing port reception facilities are of limited volume, considering the volume of traffic (see also Section 2).

This can be explained by the nature of traffic which is characterised by multiple entries of limited number of ships into Croatian ports after generally short voyages, mostly within the Adriatic Sea.

As the result, the existing reception facilities as outlined above are considered to have adequate capacities that meet the needs of the ships using them without causing undue delay to these ships.

However, the existence at present of only one proper treatment plant for waste oil/oily waters treatment (in Split), in addition to the complex refinery treatment plant for internal use of INA Refinery Rijeka, which also treats oily residues and oil/water mixtures from a number of private companies registered for collection and handling of oily wastes, is the matter of major concern.

From the information obtained in discussion with one of the top managers of the INA group, which has incidentally been recently taken over by the Hungarian MOL group, it appears that the new management plans to implement a new 'supply management system' covering 5 refineries controlled by MOL (2 in Croatia, 2 in Hungary and 1 in Italy). This system, as explained, which adjusts the production in a group of refineries in accordance with market demand and supply of specific refined products, envisages temporarily closing down some of the refineries included in the system for shorter or longer periods (up to a several months). In case that Rijeka Refinery is temporarily closed down for a certain period of time, its waste treatment plant would also not operate, thus creating a major problem for companies operating port reception facilities in the northern part of the Croatian coast (from the Slovenian border to Zadar) and relying on Refinery's capacities for final treatment and disposal of oil contaminated waters might become too risky for the desired reliability of the future national system of port reception facilities.

The recommendation is therefore to ensure the reliability of the operation of the national system of port reception facilities by constructing another oily waste treatment plant, similar to the one operating in Split, in the northern part of the Croatian coast (in the area of Rijeka) which should relieve the current reliance of

the providers of port reception facilities upon treatment facilities in INA Refinery Rijeka.

The practice of collecting liquid oily wastes from ships by mobile units (tank trucks, and in certain ports barges or other vessels with sufficient tank capacity) has proven to be adequate and should be continued.

However the future system should introduce much stricter monitoring, control and reporting by both Port Authorities and their concessionaires of the volumes of liquid oily wastes delivered and collected, which should provide the means of controlling the fate of such wastes delivered by ships, from the collection point in the port (or at anchorage) to their final disposal on land.