REPUBLIC OF THE MARSHALL ISLANDS

OFFICE OF THE MARITIME ADMINISTRATOR

Marine Guideline

No. 2-13-2

Rev. 8/09

TO: **ALL SHIPOWNERS, OPERATORS, MASTERS AND OFFICERS OF MERCHANT SHIPS, AND RECOGNIZED ORGANIZATIONS**

SUBJECT: **Guidelines for the Design of Systems to Handle Oily Wastes in Machinery Spaces of Ships, Incorporating Guidance Notes for an Integrated Bilge Water Treatment System (IBTS).**

References:
- **(a) MARPOL Annex I**
- **(b) MEPC.1/Circ.642, dated 12 November 2008**
- **(c) MEPC.1/Circ.676, dated 31 July 2009**
- **(d) MI Marine Notice 2-013-3**
- **(e) Resolution MEPC.117(52)**
- **(f) Resolution MEPC.107(49)**

PURPOSE:

The purpose of this Marine Guideline is to provide shipowners, ship operators, Masters and officers of Marshall Islands (MI) flagged ships and authorized Recognized Organizations (ROs) with guidance on the implementation of the revised MARPOL Annex I requirements on board ships registered under the MI flag, which came into force on 1 January 2007 and those which are expected to enter into force on 1 January 2011.

The revisions to MARPOL Annex I contain certain regulations and unified interpretations related to equipment for the storage, handling and disposal of oily residues (sludge) and engine-room oily bilge water.

The Guideline supersedes the original issue of 10/06 and reflects the changes due to reference (c) as shown in the section on "Background."

APPLICABILITY:

The provisions of MARPOL Annex I apply to all ships except where expressly provided (see MI Marine Notice 2-013-3).

BACKGROUND:

The International Maritime Organization's (IMO) Marine Environment Protection Committee (MEPC) developed the "Guidelines for Systems for Handling Oily Wastes in Machinery Spaces of Ships" which were revised and appended to MEPC.1/Circ.511 and developed as guidance for Administrations, shipowners and shipbuilders for consideration in achieving an efficient and effective system for the handling of oily bilge water and oily residues (sludge) for ships, the keels of which were laid on or after 1 January 1992 and, where practicable, ships then in service.

MEPC.1/Circ.511 has now been superseded and replaced by the 2008 Revised Guidelines, MEPC.1/Circ.642, set out in the Annex.

The current MARPOL Annex I draft amendments to regulation 12, which are expected to enter into force on 1 January 2011, propose a new paragraph 2 to read as follows and includes a reference in 2.2 to the fitting of drains for the collection of settled water:

2 Oil residues (sludge) may be disposed of directly from the oil residue (sludge) tank(s) through the standard discharge connection referred to in regulation 13, or any other approved means of disposal. The tank(s):

.1 shall be provided with a designated pump for disposal that is capable of taking suction from the oil residue (sludge) tank(s);

.2 shall have no discharge connections to bilge system, oily bilge water holding tanks, tank top or oily water separators other than the tank(s) may be fitted with drains, with manually operated self-closing valves, for the collection of settled water or an alternative arrangement, provided such arrangement does not connect directly to the bilge piping system.

The 2008 Revised Guidelines, MEPC.1/Circ.642, have been reviewed and revised yet again by MEPC.1/Circ.676, which is consequential to the amendment to regulation 12.2.2 of MARPOL Annex I. The revision to section 11.4 of the 2008 Revised Guidelines is also contained in the Annex to this Marine Guideline.

For further prevention of oil pollution from machinery spaces of ships, MEPC was of the view that a considerable reduction of the generation of oily bilge water produced in machinery spaces can be achieved and, in this respect, approved the concept of an Integrated Bilge Water Treatment System (IBTS) which incorporates the means to reduce the amount of oily bilge water and process the oily bilge water and oil residue (sludge) in a holistic manner.

The Maritime Administrator recognized the need to disseminate the concept of IBTS developed by MEPC 54 and has included the Guidance Notes for IBTS as set out in the appendix to the annexed 2008 Revised Guidelines.

ANNEX

2008 REVISED GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTES IN MACHINERY SPACES OF SHIPS INCORPORATING GUIDANCE NOTES FOR AN INTEGRATED BILGE WATER TREATMENT SYSTEM (IBTS)

1 MARPOL Annex I contains certain regulations and unified interpretations related to equipment for the storage, handling and disposal of oily residues and engine-room oily bilge water.

2 In the continuous review by the Marine Environment Protection Committee (MEPC) of appropriate technology for fulfilment of the Convention requirements, substantial information has been collected which is valuable in the design, approval and surveying of installations in engine-rooms for systems handling oily bilge water, and oily residues (sludge), but this does not form part of the Convention regulations or the related interpretations.

3 The MEPC decided that this information is, nevertheless, of substantial value to Administrations, shipowners and shipbuilders and, accordingly, decided that dissemination of the information should be in the format of MEPC circular.

4 The information contained in these Guidelines should be regarded as guidance in achieving an efficient and effective system for the handling of oily bilge water and oily residues (sludge) for new buildings and, where applicable and reasonable, for ships which are in service. The information should be considered in conjunction with specific conditions and circumstances, shipowners' and shipbuilders' practices, classification society rules, Administration requirements, etc., applicable to specific ships.

5 Definitions for the purpose of the Guidelines

5.1 Oily waste means oil residues (sludge) and oily bilge water.

5.2 Oil residue (sludge) means the residual waste oil products such as those resulting from the purification of fuel or lubricating oil from the main or auxiliary machinery or separated waste oil from bilge water separators, oil filtering equipment or oil collected in drip trays, and waste hydraulic and lubricating oils.

5.3 Oil residue (sludge) tanks are the tanks which hold oil residue (sludge) directly from which oil residue (sludge) may be disposed through the standard discharge connection or any other approved means of disposal.

5.4 Oily bilge water holding tanks are tanks collecting oily bilge water prior to its discharge, transfer or disposal.

5.5 Regulation referred to in these Guidelines are those contained in MARPOL Annex I adopted by resolution MEPC.117(52).

5.6 Oil residue (sludge) incineration systems are systems providing incineration of oil residue (sludge) generated on board seagoing ships. Oil residue (sludge) incineration systems could be:

- main and auxiliary steam boilers with appropriate oil residue (sludge) processing systems;
- heaters of thermal fluid systems with appropriate oil residue (sludge) processing systems;
- incinerators with appropriate oil residue (sludge) processing systems designed for sludge incineration; or
- inert gas systems with appropriate oil residue (sludge) processing systems.

Oil residue (sludge) incineration systems shall conform to regulation 16 in MARPOL Annex VI.

5.7 Oil residue (sludge) drain tanks are:

.1 tanks intended to receive separated sludge from purifiers and other oil residue (sludge) drains;

.2 tanks without any means for disposal as listed in items 3.2 and 4 in the Supplement to the IOPP Certificate, and drains; and

.3 tanks with suction connection for a sludge collecting pump only capable of discharging to the oil residue (sludge) tank (s) listed in item 3.1 in the Supplement to the IOPP Certificate.

5.8 Sludge collecting pumps are pumps capable of taking suction from any residue (sludge) producing equipment or tank, other than an oil residue (sludge) tank(s), and discharging only to oil residue (sludge) tank(s).

5.9 Separated sludge is sludge resulting from purification of fuel and lubricating oil.

6 Collection and storage of oil residue (sludge) and oily bilge water

6.1 An oil residue (sludge) tank or tanks are mandatory under regulation 12 in the revised MARPOL Annex I.

6.2 An oily bilge water holding tank is arranged to receive the daily generation of bilge water before this water is discharged ashore or discharged through the 15 ppm bilge separator overboard. An oily bilge water holding tank is not mandatory, but will enable ships to operate safely during port visits, during operation in special areas and coastal waters and during periods of maintenance of the 15 ppm bilge separator.

6.3 An oily bilge water holding tank will also provide additional safeguards in the purification of oily bilge water should quick-separating detergents be used for cleaning purposes (see Marshall Islands Marine Guideline 2-13-1).

6.4 Oily bilge water holding tanks shall, if fitted, be noted in the Supplement to the IOPP Certificate.

7 Arrangements for oil residue (sludge) and oily water tanks

7.1 Tanks for the purposes mentioned above should be arranged to satisfy the intended service of the ship.

7.2 Oil residue (sludge) tanks may be separate and independent but may also be combined, as suitable, depending on the size and the service of the ship.

7.3 The merits of arranging an independent tank for the collection of separated sludge should be considered, having regard to the smaller tank volume that needs to have cleaning and heating arrangements and the reduced space requirement for tank capacity that should preferably be arranged above the tank top.

7.4 If an oily bilge water holding tank is arranged, it should be separate and independent from other tanks for the collection of oil residue (sludge).

7.5 Ships operating with heavy fuel oil of a relative density greater than 0.94 at 15°C should be provided with an oily bilge water holding tank of adequate capacity and fitted with heating facilities to preheat the oily mixture prior to the discharge of the tank's contents into the sea through 15 ppm equipment.

8 Size of oily residue (sludge) and oily bilge water tanks

8.1 Tanks for collection of oily waste from various functions in the engine-room should have adequate capacity, having regard to the intended type of service of the ship. The information given below will provide guidance in this respect, but all other aspects applicable to the specific vessel trading pattern and time in port should additionally be taken into account.

8.2 The recommended capacity for oil residue (sludge) tanks is specified in the interpretations to regulation 12.

8.3 Oily bilge water holding tanks, if fitted, should have a capacity that provides to the ship the flexibility of operation in ports, coastal waters and special areas, without the need to discharge de-oiled water overboard. The operational merit of not having to operate the 15 ppm bilge water separator frequently should also be considered. The recommended capacity of oily bilge water holding tanks should be as follows:

Main engine rating (kW)	capacity (m^3)
up to 1,000	*4*
Above 1,000 up to 20,000	*P/250*
Above 20,000	*40+P/500*

where, P = main engine rating in kW.

For ships adopting IBTS, the capacity oily bilge water holding tanks may be reduced.

9 Pumping, piping and discharge systems in machinery spaces

9.1 On board ships, the propulsion systems of which are operated by heavy fuel oil, the following guidelines are provided for the piping system comprising the plant components for the treatment and storage of oily bilge water, oil residue (sludge), drain and leakage oil and exhausted oil.

9.2 The effluent from the 15 ppm equipment should be capable of being recycled to the oily bilge or oily bilge water holding tank.

9.3 If an integral pump is fitted, the discharge should not bypass the 15 ppm equipment.

9.4 The discharge piping system of the 15 ppm equipment should be completely separate from the bilge pumping and ballast water system except the recycling line referred to in paragraph 9.2.

9.5 Discharge piping systems fitted to secure the safety of the ship in emergency situations, such as fire or flooding, should efficiently and promptly tackle such emergencies and therefore should be available at all times in order to comply with the provisions of SOLAS regulation II-1/21. Accordingly, the bilge overboard discharges should not be blanked off and operational at all times.

9.6 The ship's discharge pipeline for oily residue (sludge) to the standard discharge connection should not be connected to any system other than supplying those means of disposal to be listed in the IOPP supplement.

9.7 The separated dirty water and exhausted control water of fuel oil purifiers should be discharged into a particular tank for this purpose in order to minimize the influx to the oil residue (sludge) drain tank for separated sludge. This particular tank should be located above the double bottom for the purpose of facilitating its drain without the need for a drain pump. If dirty water and exhausted control water from purifiers is not discharged to a particular tank, and in lieu of this to a oil residue (sludge) drain tank for separated sludge, the tank should be located above the double bottom for the purpose of the aforementioned draining facilities.

9.8 Piping to and from sludge tanks shall have no direct connection overboard, other than the standard discharge connection required by regulation 13.

10 Systems for separated sludge

10.1 Tanks for separated sludge and their pipework

Tanks for separated sludge, their pipework and pumps should be designed as follows:

10.1.1 Size of tanks: see paragraph 8.

10.1.2 Tank heating systems

Tanks for separated sludge should be equipped with tank heating systems. The heating pipes should be arranged such that, seen from the heating inlet, they are arranged in a way of the boundaries and then, across the whole bottom area, sufficiently high to avoid being covered totally by sediments in

the tank. The tank heating system should be designed such as to enable heating of the oil sludge up to 60°C. The suction line from the sludge tank to the pump should be provided with heat tracing.

10.1.3 Oil residue (sludge) drain tank

The tank for separated sludge or waste oils may be arranged as a separate oil residue 9sludge) drain tank.

10.1.4 Pipelines from the heavy fuel oil purifier to the tank

Whenever possible, the oil residue (sludge) tank should be located below the heavy fuel oil purifier. If this is not possible, the oil residue (sludge) holding tank should be situated close to the heavy fuel oil purifier in such a way that the discharge line to the tank can be installed at the maximum gradient. The pipelines should, wherever possible, be straight or fitted with large radius elbows.

10.1.5 Suction line from the oil residue (sludge) tank

The pump suction should be arranged so that path to the suction opening is as short as possible, or the oil residue (sludge) tank should be mounted or designed, so that the oil residue (sludge) moves down a slope towards the suction opening. The openings should be placed as wide as possible in the frames above the tank bottom in such a way that the oil sludge has free access to the suction line.

10.1.6 Oil residue (sludge) collecting pump and pressure lines

The pump should be suitable for use with high viscosity oil residue (sludge) e.g., "self priming displacement pump," with suitable means for protection against dry running. It should have a sufficient total head, and delivery rate to facilitate to transfer of the daily sludge production onboard.

10.1.7 Oil residue (sludge) discharge pump and pressure lines

The pump should be suitable for use with high viscosity oil sludge, e.g., "self-priming displacement pump," with suitable means for protection against dry running. It should have a sufficient total head, and be capable of discharging the tank within 4 to 8 hours.

The pressure side of the pump should only be connected to the standard connection on deck and to oil residue (sludge) tank(s) and to other sludge disposal means as listed in 3.2 in the Supplement to the IOPP Certificate.

10.1.8 Oil residue (sludge) tank design to facilitate cleaning

Access hole should be arranged so that all areas of the tank can be cleaned. An access hole should be sited on top of the tank to facilitate the use of a portable pump.

10.1.9 Steaming-out lines

The oil residue (sludge) tanks should be fitted with steaming-out lines for cleaning.

11 Example of an on-board system for oil residue (sludge) incineration

11.1 General

Oil residue (sludge) from oil residue (sludge) tanks may be incinerated in incineration systems onboard. Oil residue (sludge) tanks are not a means for disposal of oil residue (sludge), but for retention of oil residue (sludge) for disposal.

11.2 Oil residue (sludge) incineration systems

An oil residue (sludge) incinerator system is composed of:

.1 steam boiler or heater of thermal fluid systems or an incinerator;

.2 oil burner;

.3 oil sludge processing system; and

.4 service tanks for oil residue (sludge).

11.3 Oil residue (sludge) processing systems

The oil sludge processing system consists of:

.1 oil residue (sludge) tank intended as servicing the oil residue (sludge) sludge incinerating system;

.2 oil residue (sludge) preheating system;

.3 filter; and

.4 homogenization system.

11.4 Oil residue (sludge) service tank

The oil residue (sludge) service tank should be listed under item 3.1 in the Supplement of the IOPP Certificate, as it is provided with means for drainage of water (disposal) and subsequent disposal of the oil residue (sludge) in the oil residue (sludge) incineration system.

The oil residue (sludge) service tank should be provided in addition to the oil residue (sludge) tank for oil residue (sludge) and other waste oils. It should be equipped with suitable drainage facilities terminating as provided for in regulation 12, paragraph 2.2 of MARPOL Annex I. With a view to improving combustibility and calorific value, a fuel supply connection should be provided.

11.5 Homogenization system

The homogenization system should assure that the entire contents of the oil residue (sludge) service tank should be processed into a homogenous and combustible mixture. This system should be put into operation following adequate draining of the tank. A device for continuous indication and monitoring of the water content of the oil sludge should be provided.

Appendix

Guidance Notes for an Integrated Bilge Water Treatment System (IBTS)

1 Introduction

1.1 Oily bilge water is generated by the leakage of water and oil from the equipment and piping or maintenance works resulting from the routine operation in the machinery space of ships. Such leaked oil and water are usually mixed and collected on the tank top or bilge wells as oily bilge water.

1.2 Oily bilge water shall be treated in accordance with the requirements of the Convention. The operation of such treatment, including the operation and maintenance of bilge filtering equipment, is a heavy load for engineers onboard.

1.3 After the revision of the Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilge of Ships adopted by resolution MEPC.107(49), the capability of oily water separators has been improved. However, the treatment process of oily bilge water with the improved equipment and the engineers' load will be basically unchanged as the amount of oily bilge water generated in ships has not been reduced.

1.4 To promote the prevention of oil pollution from machinery spaces of ships and reduce the load of the engineers onboard, it is effective to minimize the amount of oily bilge water generated in machinery spaces.

1.5 MEPC 54 noted the design with the concept of Integrated Bilge Water Treatment System (IBTS) which provides the means to minimize the amount of oily bilge water and process the oily bilge water and oil residue (sludge) as a drastic solution to prevent oil pollution from machinery spaces of ships.

1.6 MEPC 54, in recognizing the need to disseminate the concept of IBTS, agreed to append the Guidance notes on IBTS to the revised Guidelines for systems for handling oily wastes in machinery spaces of ships.

1.7 The purpose of these Guidance notes is to provide shipowners and shipbuilders with information to help in the design of ships incorporating the concept of IBTS.

2 Concept of Integrated Bilge Water Treatment System (IBTS)

The Integrated Bilge Water Treatment System (IBTS) is a system to minimize the amount of oily bilge water generated in machinery spaces by treating the leaked water and oil separately. It also provides an integrated means to process the oily bilge water and oil residue (sludge).

3 Definitions for the purposes of the Guidance notes

3.1 "Clean drains" mean drains such as those resulting from the leakage of a*nd condensate from* equipment used for sea water, fresh water, steam, air conditioning, etc., which are not normally contaminated by oil.

3.2 "Oily drains" mean drains such as those resulting from the leakage of equipment used for oil and drains from equipment which under normal circumstances may contain oil.

3.3 "Oily bilge water" means water collected in the bilge wells or the tank top such as those resulting from the unexpected leakage from piping or the maintenance work in machinery spaces, which may be contaminated by oil.

3.4 "Oil residue (sludge)": refer to paragraph 5.2 of the revised Guidelines; includes oily drains.

3.5 "Bilge primary tank" means a pre-treatment unit for separation of oily bilge water.

3.6 "Clean water holding tank" means tanks which hold processed water from the oil filtering equipment.

4 Outline of IBTS

4.1 Collection of drains

.1 Oily drains are collected through the fixed drainage arrangements to oil residue (sludge) tanks.

.2 Clean drains are collected through the fixed drainage arrangements to clean drain tanks.

.3 Oily drains and clean drains shall be collected separately so as not to contaminate clean drains with oil.

4.2 Pre-treatment of oily bilge water

To avoid feeding excessive oil to oil filtering equipment, oily bilge water in the bilge wells is transferred to the bilge primary tank for pre-separation of oil. The high oil content water is transferred to sludge tanks and the low oil content water is transferred to the bilge water holding tank.

4.3 Discharge of oily bilge water

.1 Oily bilge water in the bilge water holding tank is discharged overboard through the oil filtering equipment in accordance with regulation 14 of the Convention.

.2 Clean water which has been processed through the oil filtering equipment may only be discharged through the 15 ppm bilge alarm combined with an automatic stopping device by means of a separate clean water pump.

4.4 Discharge of clean drains

Clean drains may be discharged overboard directly through the discharge arrangement, independent from the system for oily bilge water or oil.

4.5 **Treatment of oil residue (sludge)**

.1 Oil residue (sludge) may be collected in separate tanks designated for fuel oil residues and lubrication oil residues respectively.

.2 Water in oil residue (sludge) may be evaporated by heating in the oil residue (sludge) service tanks.

.3 Oil residue (sludge) may be incinerated by the sludge incineration system or disposed of to the reception facilities through the standard discharge connection.

4.6 **Re-generating fuel oil from sludge**

.1 Oil residue (sludge) may be used onboard as re-generated fuel. Oil residue (sludge) is collected in an oil residue (sludge) tank prior to processing (disposal) back into the fuel oil system as re-generated fuel oil.

.2 Oily drains should be recorded in the oil record book as any other oil residue (sludge) collection.

.3 Re-generation of fuel oil from oil residue (sludge) should be an approved means of disposal of oil residue (sludge) according to the Supplement to the IOPP Certificate.

.4 The re-generating process may include filtration, decanting or purification to remove unwanted heavy parts from the oil residue (sludge).

.5 The re-generated fuel oil when used in a SECA must comply with SECA fuel oil quality requirements.

.6 The re-generated fuel is fed back into the vessel's fuel oil system at a rate equal to or less than the average sludge production on board. This is in order not to change the emission level of the exhaust when using the fuel oil with added re-generated fuel oil compared to using fuel oil as delivered without prior sludge separation.

5 Additional installations of IBTS

In addition to the installations required by the Convention, the following installations are required to form part of the IBTS:

5.1 **Drainage system**

.1 Drip trays or coamings with sufficient depth should be provided under the equipment used for oil such as diesel engines, burners, pumps, heaters, coolers, filters and tanks to contain spillage of oil.

.2 Drip trays or coamings with sufficient depth should be provided under the equipment used for water such as pumps, heaters, coolers, filters, tanks, condensers and boilers to contain spillage of water.

.3 Independent drainage arrangements for oil and water to sludge tanks and the bilge water holding tank should also be provided. Any open water drains in the engine room falls under the definition of oily bilge water from engine-rooms. Such water shall be disposed ashore or via an oily water separator overboard.

.4 Independent drainage of clean water drains from equipment not normally containing oil should be to clean water tanks.

5.2 Pre-treatment unit for oil separation

Pre-treatment may take place in dedicated equipment or bilge primary tanks.

A bilge primary tank is a tank which separate oil from oily bilge water by gravity. It may make use of a cascade with drainage facilities for the oil on the top so as to enable primary separation of oily bilge water. Facilities to remove sediments should be provided.

Refer to the example of a bilge primary tank shown in Figure 1.

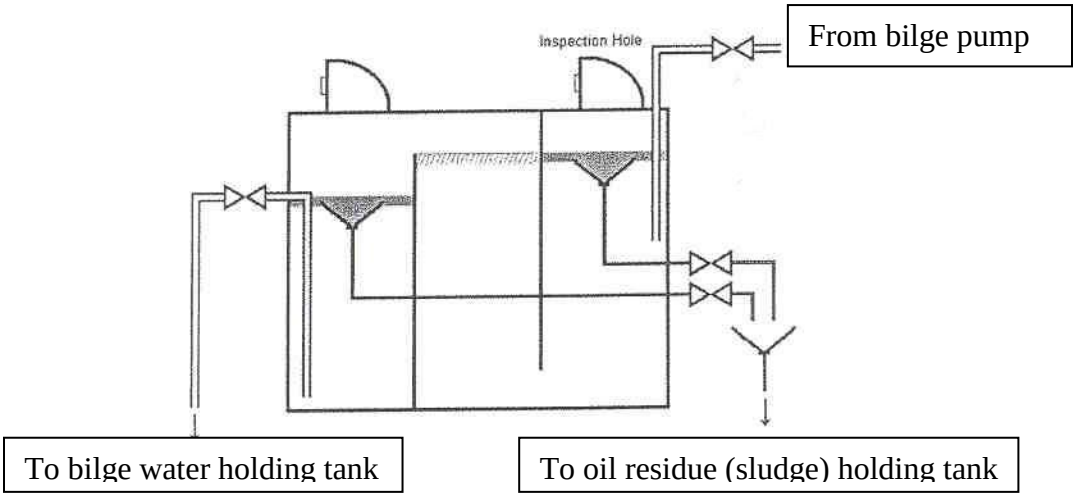

Figure 1 – Example of a bilge primary tank

5.3 Storage tanks

.1 Clean drain tank: Tank for the retention of clean drains.

.2 Oily bilge water holding tank: Tank for the retention of oily bilge water.

.3 Waste oil residue (sludge) tank: Tank for preparation of oil residue (sludge) for incineration.

5.4 **Discharge arrangement of clean drains**

The overboard discharge arrangement of clean drains should be independent from the system for oily bilge water. Cleaning of equipment having clean drains should take account of the proper handling of chemicals cleaning agents (e.g., emulsifiers) and wash water residue (including soot and sooty oil). The cleaning agent/wash water residue can foul an oil filtration system and should therefore be subject to separate collection and/or filtration (e.g., portable units).

5.5 **Exclusive pump for the oily water separator**

It is preferable that an exclusive pump be provided to transfer the pre-treated bilge water from the oily bilge water holding tank to the oily water separator so as not to mix the pre-treated bilge water with untreated oily bilge water.

5.6 **Heating arrangement**

.1 Heating arrangement for the bilge primary tank to facilitate separation of oil.

.2 Heating arrangement for the waste oil tank to vaporize water and facilitate incineration.

6 **Example of IBTS**

A typical flow diagram of IBTS is shown in Figure 2.

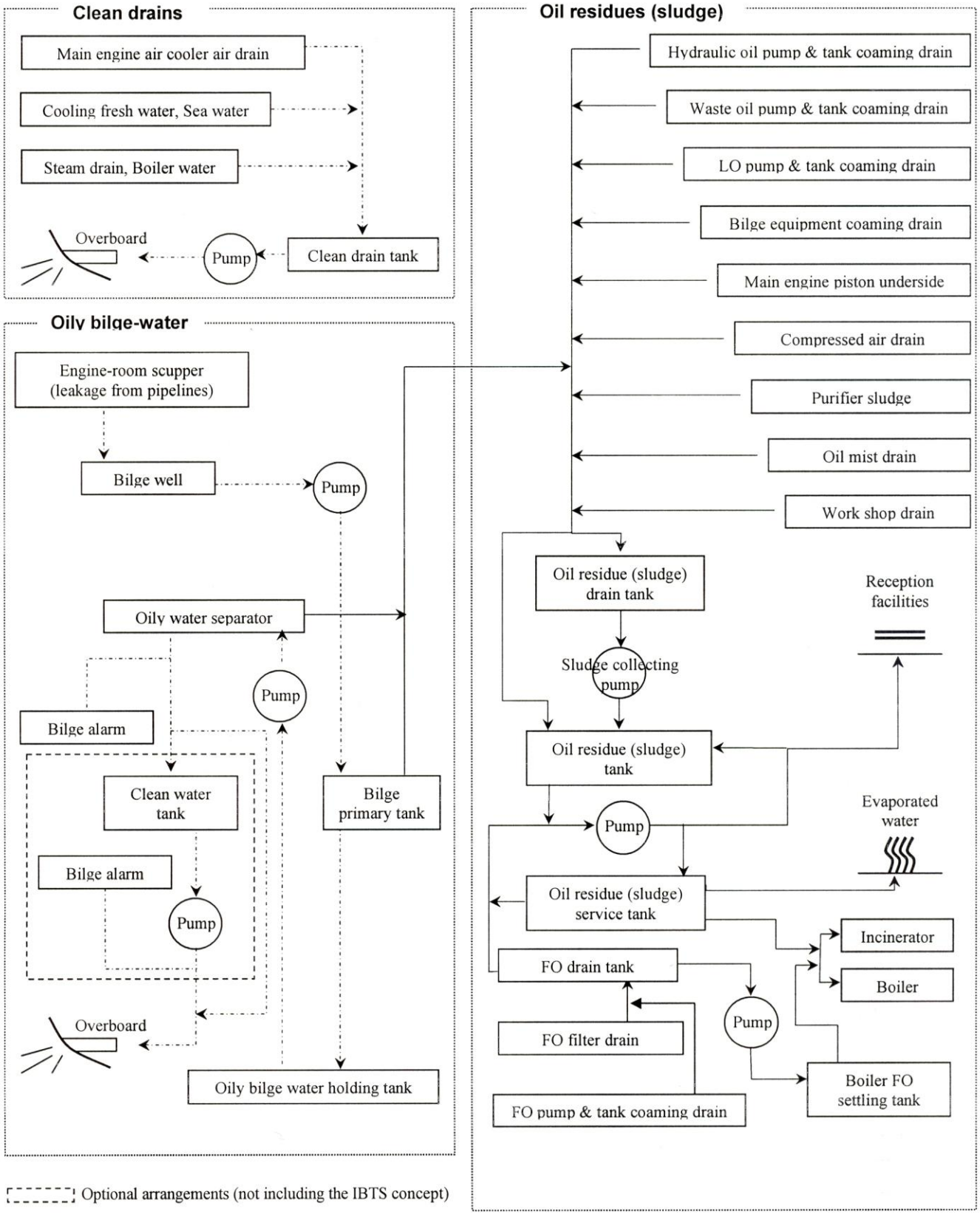

Figure 2 – Flow Diagram of Integrated Bilge Water Treatment System (IBTS)