



## Managing engine room residues

### 1- COLLECTION

Bunkers theoretically produce residue at a rate of 1 per cent of consumption. This rule of thumb is used in ports by shipping inspectors to cross check reports made by deck officers and is based on interpretation 8.1 of rule 17.1 of Marpol 73/78 (calculation of slop tank volume = 0.01 of consumption x number of days)

There are purification residues and settling residues in slop tanks in addition to leakages of smaller or greater dimensions. Of course these residues come as a mixture of bunkers, water and sediment and not just as bunkers alone.

### 2- DISPOSAL

The residues and mixtures can be « disposed of » in several ways. It all depends on where they come from in the engine room as they will then be regarded as bunker residues or bilge waste water.

- bilge waste water is pumped out from the bilge spaces of the machine room and collected and separated by a bilge separator called the 15 ppm separator; if the fluid produced by the separator has a ppm reading of less than 15 ppm the fluid can be pumped overboard, otherwise its back to square one.
- bunker residues and the bilges already treated by the 15 ppm separator can be sent ashore (very rare) in a barge or else they can be burned or transferred to a cargo tank (only on board oil tankers and provided this is allowed by Marpol). It is worth noting that contrary to a household incinerator that only burns paper and that only needs a match to set it alight, 300 litres of diesel will be needed to burn 800 litres of residue. The consumption/profitability ratio is hardly the best.

### 3- DISPOSAL TO SHORE

Officially, vessels should empty their slop tanks and settling tanks when they call in port. There is even a European Directive that institutes fines for vessels that do not comply even though their tanks are very full. Unfortunately, according to Marpol 73/78 rule 12, not all ports have deballasting stations and even when they do, they are hard to operate and ports tend to put the onus on the next port of call for discharging these residues ashore. The same provisions existed for oil tankers when the Mediterranean was declared a Special Zone where vessels were not allowed to change their ballast waters but where nothing was done to assist tankers that went on to take on a load in Algeria after discharging a cargo in Fos. Mind you, fines do exist.

Whenever vessels can manage to discharge their engine room residues, there is often some physical obstacle. The sludge tanks are often located beneath the engine room and even though the pumps can handle them the engine room is very often at the very rear of the vessel deep down in the hull. The disposal barges always prefer to come alongside the parallel body where the hull plating is flat. Unfortunately, the pumping system will not be able to produce enough pressure to pump the residues all the way to the top of the parallel body because the head of pressure required is far too much. So then what happens ? Most captains put up with this once and then pretend to discharge their slops but no-one ever asks for a barge again because the operation is too complicated, it is too hard to secure the service because it is an expensive service for the company and is to no avail anyway.

#### **4- OIL RECORD BOOK & INSPECTIONS**

Fluids that have been collected, settled, filtered, separated, burned, discharged ashore or transferred to the slop tanks have to be recorded carefully in the Chief Engineer's most important logbook, called the ORB (the Oil Record Book, part one). Chief Engineers now spend half an hour a day filling in the ORB which, when you consider they're on a 3 month tour of duty, means that they will spend an entire week just filling in the ORB. Entries have to be coded: residue collection, tank by tank, operating times for the 15 ppm separator, the incinerator with the quantities before and after operation and shutdowns, bunkers, etc then on each line he has to indicate the time and the ship's position. Special care has to be given to details such as the level gauges of the tanks and that the quantities reported before and after match with the theoretical use made of the machines and that what the separator produces is not be less than the figure that the shipping inspectors will come up with when they do their calculations. Filtering and burning quantities must be compliant with the capacities of the separator and the incinerator.

But the fact is that engineers sometimes have to « top up » their quantities because the bunkers they get are good quality ( a big relief for them) and consequently produce less residue than usual. But when bunkers are of unusually poor quality, the problem is reversed and the incinerator has to do « overtime » to cope with the problem. Should they have to fiddle and fudge the figures just to ensure they are compliant with the figures the shipping inspectors come up with ?

#### **5- ENGINEERS (CONFIDENCE)**

The slightest mistake, or you forget something and it can be curtains for the captain. So either you trust your Chief Engineer one hundred per cent, or you know him well and you both sit down from time to time to see just how this ORB is supposed to be filled in.

Failing that, you check the lot every day and especially making sure you know exactly what has been going on in the engine room every day. Its just as easy to do the job and forget to log it than to log it without doing the job. Just get it into your heads: you can't expect the Captain to be attending to the 15 ppm separator at start up and shut down, now can you ? He really needs to trust his Chief Engineer one hundred per cent. Added to that (and the separator is not a small item) they need to speak the same language and be on the same wavelength. So it's vital for the Captain to issue standing orders for this job which will take a little of the onus off him.

Should vessels simply refuse to dump residues (even when they're lower than 15 ppm ?) when reaching sensitive coastlines or special sea areas ?

Does the Captain really have to be the only person on board to have the key to the padlock that's on the separator. And then what do you do if there's a real emergency such as a flood in the engine room.

It's really a never ending story and delays tend to pile up. On a vessel that's burning 80 tonnes of bunkers a day, the amount of residues should theoretically be of the order of 800 litres a day. Then you have to heat the 800 litres, settle them, then settle them again and put them through the separator again. Then the residues will have to be heated, settled again and then burned by the incinerator which, if you've got a good one, will handle 80 litres per hour. Meaning that the incinerator will be « on » 10 hours a day and you just can't leave it unattended, so time really is of the essence, isn't it ? Not just that, the settling will never be all that good so there's still water in the residues and not only does water have a hard time burning, it really doesn't help to keep the flame alive in the incinerator either ! So you have to keep a beady eye on the incinerator at all times. Oh drat, I forget to tell you that that's only part of the job you do down in the engine room, there's the maintenance to do on a load of engines and devices and you're always short staffed.

Don't forget, you start all over again the next day and so it goes, the routine. You fire up the 15 ppm every day and every day it works fine until one day it doesn't work as well as it should. But you don't realise immediately that something's gone wrong.

## **6- TROUBLES / DAMAGES**

Incinerators don't last all that long. After a while, the inner linings deteriorate and have to be repaired because temperatures inside are high and you have to burn paper as well as plastic. The flame detectors have to be very reliable because as soon as the residues reach the furnace it takes for ever to clean before firing up again and these residues aren't all that fluid at low temperatures, if you see what I mean.

The 15 ppm, just like the incinerator, also has a tendency to die on you and then again maybe it does that more often than most others. Earlier on, I said that it might just be a good idea to shut the separator down when reaching sensitive coastlines and special sea areas, which just goes to show that seafarers, be they engineers or not only trust their separator up to a point. When the oil detector gets it wrong and there's more than 15 ppm in the discharge and it does happen regularly, you're not going to see much from the engine room but if you're topsides you will spot the telltale signs in the ship's wake but by then of course it's just too late, chum. And even then, you'll only get to see if the weather's good and providing the wind is blowing at the « right » speed otherwise you won't be sure about what really is in the ship's wake

Mind you, there are separators for which you can test the sensor with preset samples that calibrate for 0 and 15 ppm which is what you really should be doing as often as you can. Don't forget to take a sample when the sensor says it's less than 15 ppm and you've been dumping it overboard and send it for testing to a lab ashore so that you can get a certificate to show to the shipping inspector from port state control when he comes on board for the yearly inspection. But then you take a hard look at your sample from the 15 ppm that's been certified to be producing less than 15 ppm by the sensor and what your eyes tell you is that you've been discharging much more than 15 ppm. Even when I had a good sensor and the separator was joyfully discharging what in all good faith I thought to be less than 15 ppm actually turned out to be between 40 and 50 ppm in the results I got from the lab. And no, this is not a rare occurrence, it is more than standard practice and what's more ,getting in under the 15 ppm mark is rare, believe me.

Your trusty 15 ppm separator uses cartridge filters that you have to change regularly otherwise you end up with discharges that are dirtier than the residues. So you change the filters, then what do you do with them ?

Well guess what, they invented self-washing cartridges which is just as well because that way you can have clean filters more often. It costs the company much less, too. Problem is that the filters are washed on board and the washing waters are pumped into the slop tank so that the sludge from the filters ends up sooner or later back in the same filter. So as they say, it's a never ending story.

On some vessels, owner/operators fit a second settling tank so that once the slops have been settled in the waste oil tank, they are settled again in another settling tank before being treated by the 15 ppm separator to make sure that you only feed the separator water that is as clean as possible and that the separator doesn't have to handle too much oily residue, that way it will last longer. Some owner/operators even decide to fit two separators in series so that the second one only gets feed from the first separator that is supposed to be near clean and at any rate less than 15 ppm.

To top it all, these machines were produced and then tested in labs but how can anyone be sure how they're going to operate when the ship is rolling, very hot and temperatures are all

over the place not to mention the vibrations that can get humongous and then there's the quality of the residues they have to cope with (fuel oils, lube oils, grease and chemicals). They aren't exactly being operated in what you'd call very reliable operating conditions.

## 7- NO FUTURE

Vessels only serve to burn fuels that no other industries would touch with a barge pole. But if we had better bunkers, there'd be less residue and we'd all have a better time on board not to mention getting a handle on pollution.

When you're sailing you have time to chat with the crew. So who can tell me why youngsters (meaning those that hope and want to stay in the business) prefer to stick to the engine room instead of becoming a deck officer ?

There's one fundamental reason for this: they're scared, scared of being pinched for inadvertently polluting the sea and ending up in jail after ruining the family and making them homeless, scared of being treated worse than child rapists, scared of being taken for the scum of the earth and the profession by politicians, magistrates, paparazzi and public opinion, scared of meeting the neighbour out at sea or the pleasure boat which he hopes won't stoop to dumping waste just behind the tanker he's working on and that might have to take the rap for it. It takes a Captain an entire lifetime to earn one million euro (the amount you get fined) and you have to work like mad to get your master's ticket. Would you feel like it ?

Seafarers aren't all angels. There are more baddies ashore than at sea. Even then are those who are really responsible for pollution those whose separators don't work and who end up polluting the sea inadvertently or are they those who don't fit their vessels with separators. The big thing, clearly, is that the waste has to be discharged ashore. Why aren't port authorities and states held liable for vessels that pollute the sea shortly after setting sail ? Is it because it's far easier to take a stool pigeon to the cleaners than the government ? That's why we're now coming across boats that are taking advantage of the presence of a tanker to dump their own waste overboard because there's no-one to stop them. Strangely enough, the baddies, who do it on purpose, never make the headlines; all you hear about are the bona fide Captains who really thought they were doing a good job, who trusted their ships and their crew.

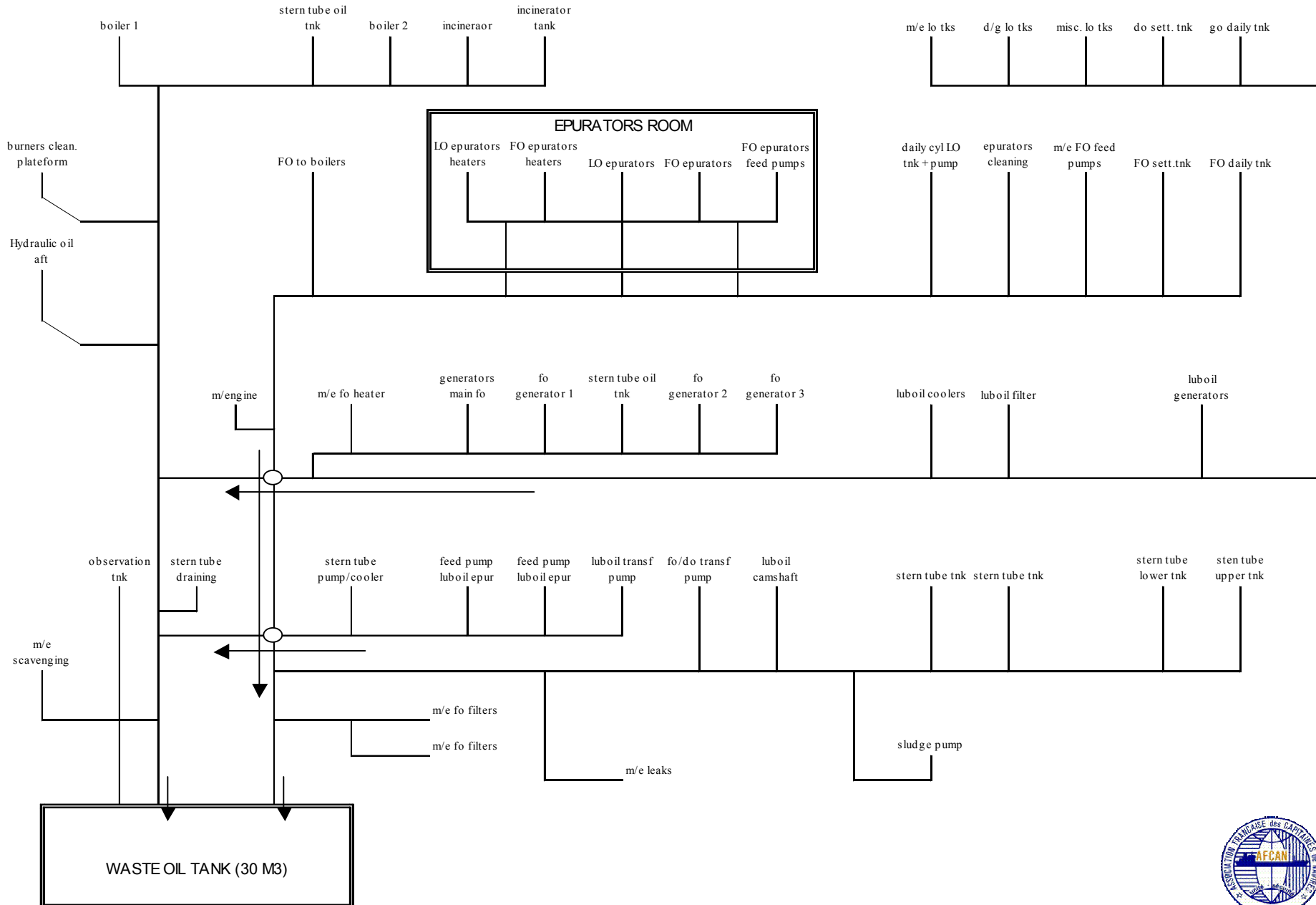
The fact is that they often get caught for spilling a few litres or dozens of litres of oily water when you consider that they have to manage tonnes of oily waste on board. Polluters don't waste their time dumping 50 litres, they go the whole hog and chuck 20 tonnes overboard. But these quantities never make the headlines either. Judges and prosecutors consider that pollution can only be deliberate and nothing but deliberate and that there's no such thing as a breakdown and as no one can ever prove anything, the judge gets the upper hand because he doesn't need proof to examine an accusation. According to the law of the sea, there's no such thing as presumption of innocence. And what will happen when Marpol VI finally comes into force and bans incineration for some classes of oily waste ? Will ports finally build deballasting stations or will the powers that be keep on pretending that tankers can hang on to their wastes indefinitely.

It's scary for the youngster who's starting out on a job that should be the way it always has been, namely one of the best jobs in the world and that some have turned into one of the worst of them all. And they have a point.

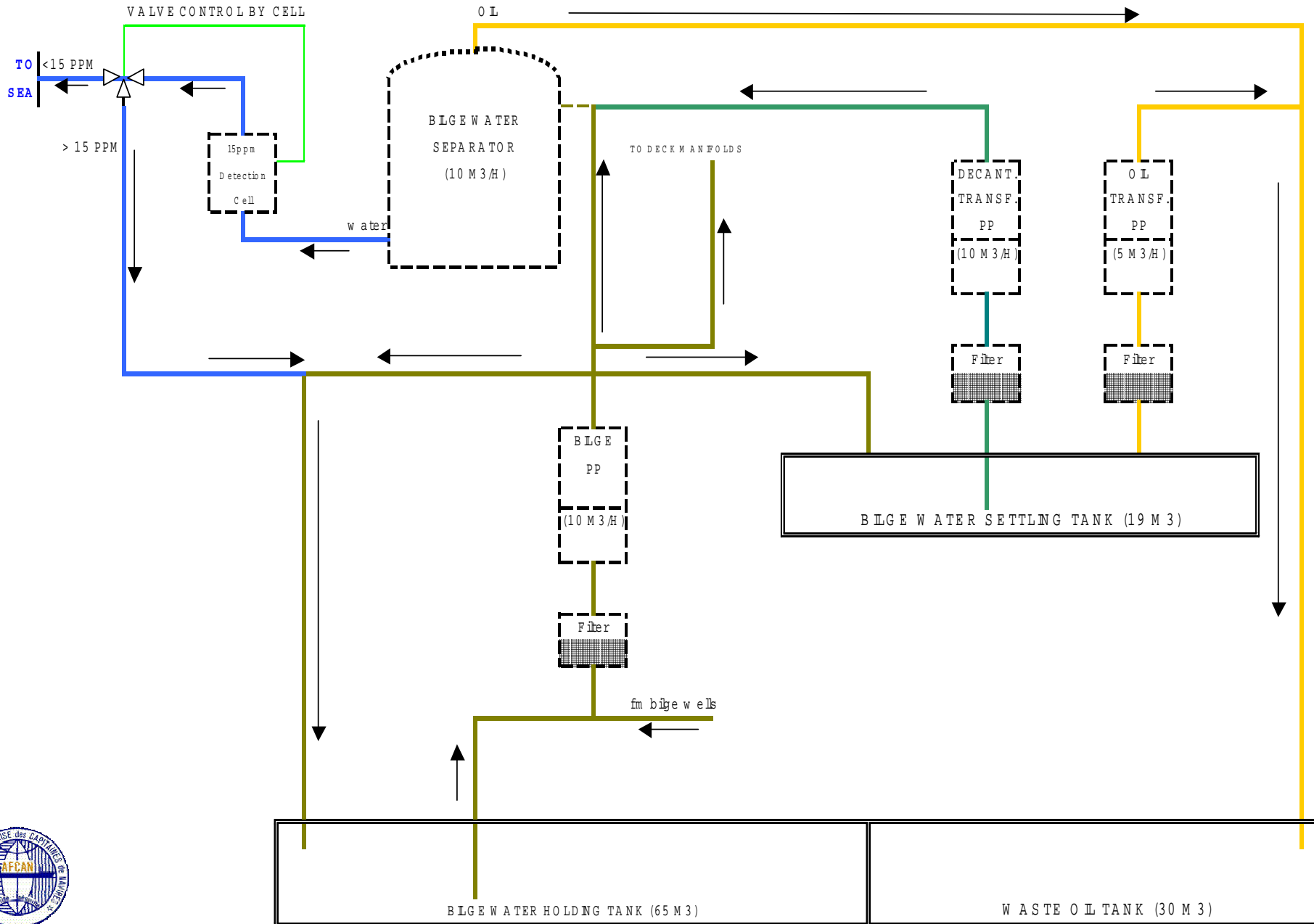
# Engine Room Residues

- **Collection of Oil Residues**
- **Disposal of Bilges & Oil Residues**
- **Oil Record Book**
- **Human Factor**
- **Materials**
- **Conclusion**

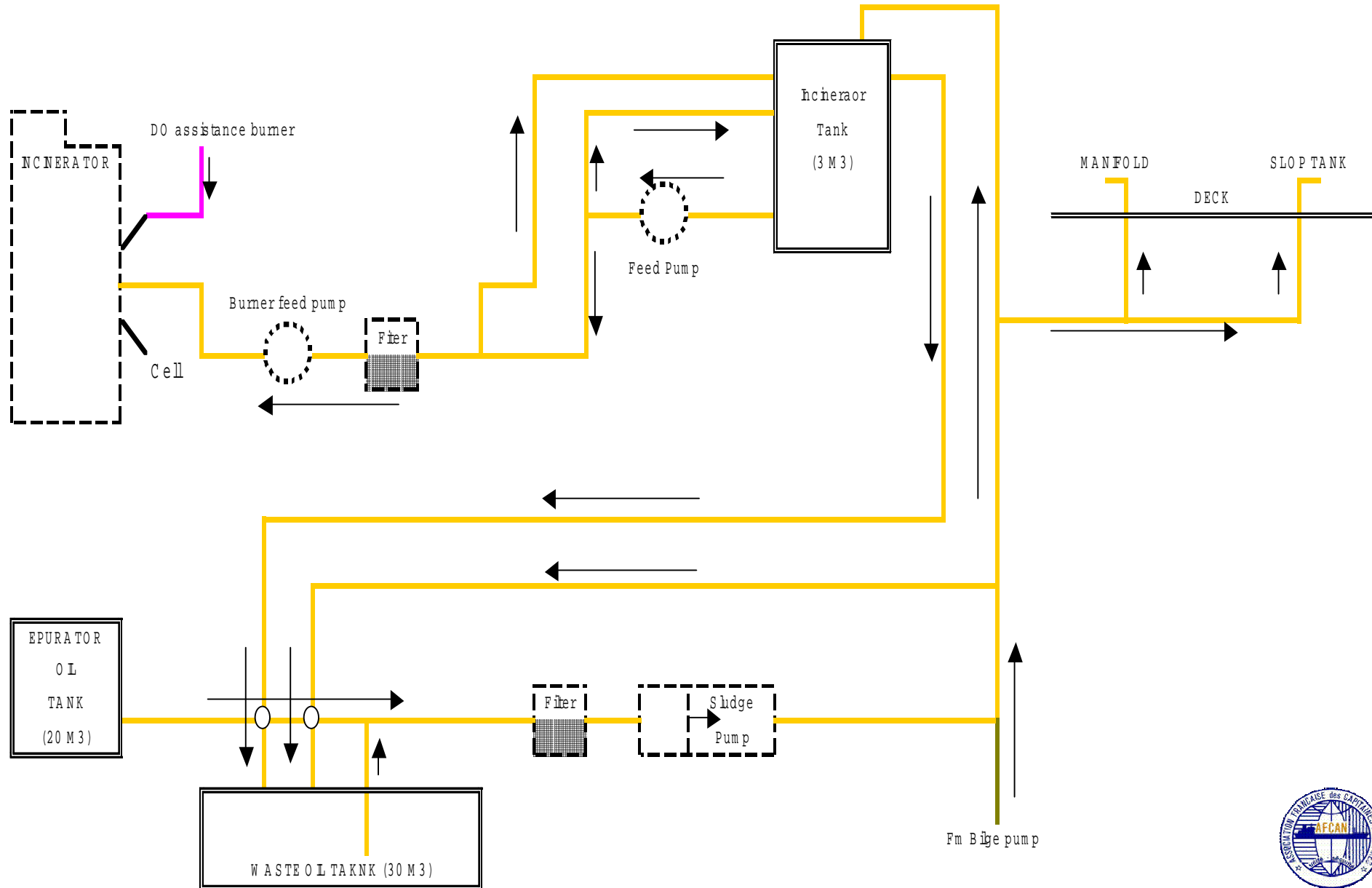
# FO/GO/LO - DRAINS & PURGES



# B L G E W A T E R S Y S T E M - 15ppm E P U R A T O R



# WASTE OIL SYSTEM - INCINERATOR





# SHORE DISPOSAL

- All the ports are not equipped to receive sludges and residues from ships
- Mooring of sludge barges – pumps and pipes to reach middle of ships

RÉPUBLIQUE FRANÇAISE

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MINISTÈRE CHARGÉ DE LA MARINE MARCHANDE

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**REGISTRE  
DES  
HYDROCARBURES N° 1**

*OIL RECORD BOOK PART. I*

**Tranche des machines**  
*Machinery space operations*

(tous navires)  
*(all ships)*



# **OIL RECORD BOOK**

## **part I**

- (A) BALLASTING OR CLEANING OF OIL FUEL TANKS**
- **DISCHARGE OF DIRTY BALLAST OR CLEANING WATER FROM OIL FUEL TANKS REFERRED TO UNDER SECTION (A)**
  - **COLLECTION AND DISPOSAL OF OIL RESIDUES (SLUDGE)**
  - **NON-AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES**
  - **AUTOMATIC DISCHARGE OVERBOARD OR DISPOSAL OTHERWISE OF BILGE WATER WHICH HAS ACCUMULATED IN MACHINERY SPACES**
  - **CONDITION OF OIL DISCHARGE MONITORING AND CONTROL SYSTEM**
  - **ACCIDENTAL OR OTHER EXCEPTIONAL DISCHARGES OF OIL**
  - **BUNKERING OF FUEL OR BULK LUBRICATING OIL**
  - **ADDITIONAL OPERATIONAL PROCEDURES AND GENERAL REMARKS**



# OIL RECORD BOOK

## (C) COLLECTION AND DISPOSAL OF OIL RESIDUES (SLUDGE)

### 11. Collection of residues.

Quantities of oil residues (sludge) retained on board at the end of a voyage, but not more frequently than once a week. When ships are on short voyages, the quantity should be recorded weekly:

- .1 separated sludge (sludge resulting from purification of fuel and lubricating oils) and other residues, if applicable:
  - - identity of tank(s)
  - - capacity of tank(s) .....m<sup>3</sup>
  - - total quantity of retention.....m<sup>3</sup>
- .2 other residues (such as oils residues resulting from drainages, leakages, exhausted oil, etc., in the machinery spaces), if applicable due to tank arrangement in addition to .1:
  - - identity of tank(s)
  - - capacity of tank(s) .....m<sup>3</sup>
  - - total quantity of retention.....m<sup>3</sup>

### 12. Methods of disposal of residue.

State quantity of oil residues disposed of the tank(s) emptied and the quantity of contents retained:

- .1 to reception facilities (identify port);
- .2 transferred to another (other) tank(s) [indicate tank(s)s and the total content of tank(s)];
- .3 incinerated (indicate total time of operation);
- .4 other method (state which).





# HUMAN FACTORS

- Same language and understanding
- Daily work
- Could become a routine job
- Permanent survey
- To burn 800 litres of residues needs to consume 300 litres of diesel oil
- Incinerators & separators are not easy to start and to control – should be done by very good engineer



# TROUBLES – DAMAGES

## Incinerator

- Burner failure
- Quality of decantation
- Temperature in combustion room
- Internal covering damaged after few months of intensive use
- Filters and pump
- Electronical devices

# TROUBLES – DAMAGES

## 15ppm separator

- 15ppm cell
- Filters
- Environmental condition in Engine room
  - + roll
  - + temperature in engine room
  - + vibration

# CONCLUSION

- **Quality of bunkers**
- **Young officers prefer engine to deck**
- **Less responsibility**
- **All pollutions are considered as voluntarily made**
- **Only ships are responsible, never ports and states**



