EMSA | OIL SPILL SAMPLING SCENARIOS

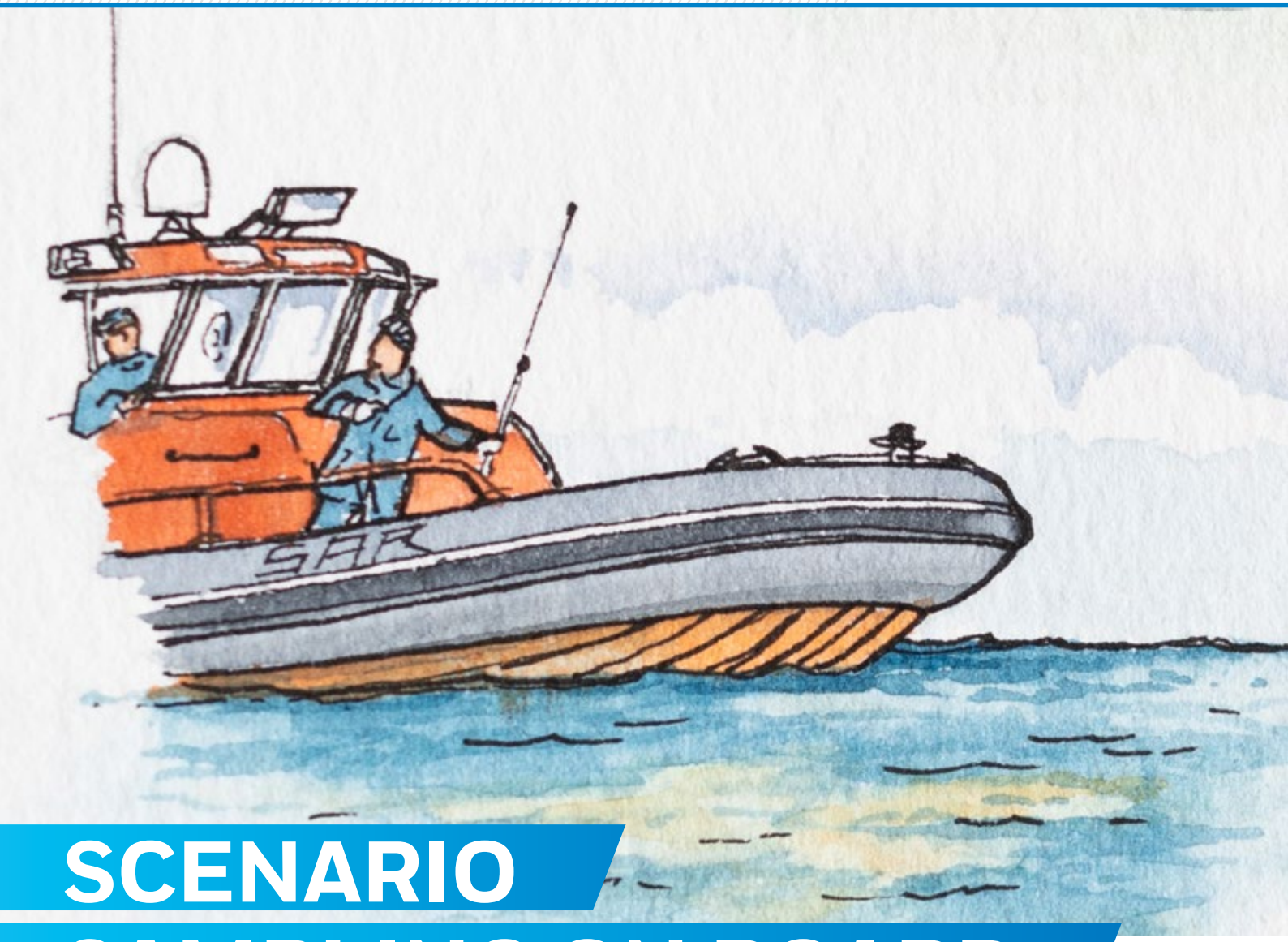
Developed under the CTG MPPR

OIL SPILL SAMPLING SCENARIOS

INTERDISCIPLINARY PRACTICAL GUIDELINES ON OIL SPILL SAMPLING IN EUROPE

Developed by experts from EU/EFTA countries under the framework of EMSA's Consultative Technical Group for Marine Pollution Preparedness and Response (CTG MPPR)

A special mention to Mr Juan Carlos Arbex Sánchez for the technical drawings



SCENARIO SAMPLING ON BOARD OF A SHIP

IMPORTANT NOTE

These scenarios are intended as a practical manual in the field. Please be sure to have familiarised yourself beforehand with the main text of the EMSA document "Interdisciplinary practical guidelines on oil spill sampling in Europe".

IMPORTANT NOTE

✓ **THE SAMPLING DESCRIBED IN THIS SCENARIO REQUIRES PRIOR SPECIALISED KNOWLEDGE AND PRACTICAL TRAINING – PLEASE DO NOT CARRY OUT THE SAMPLING WITH ONLY THE INFORMATION GIVEN BELOW!**

DEFINITION OF THE SCENARIO

This scenario describes the sampling techniques applicable if samples have to be taken from a suspected ship during an oil spill. There are different relevant areas of a ship for oil sampling, namely tanks, the engine room and bilge (including bilge pumps; oil/water separator, purifier etc.)

Engine control room

Oily water on the bilge

IMPORTANT NOTE

✓ **THE NATIONAL REGULATIONS REGARDING THE USE OF SAMPLES FROM SHIPS IN OIL POLLUTION CASES CAN VARY WIDELY. AT ALL TIMES, NATIONAL, REGIONAL AND INTERNATIONAL REGULATIONS HAVE TO BE CONSIDERED.**

✓ **SAMPLING ON BOARD SHIP MAY ONLY BE CARRIED OUT BY SPECIALLY TRAINED PERSONNEL AND, AT ALL TIMES. A RESPONSIBLE MEMBER OF THE CREW HAS TO BE PRESENT.**

SAMPLING PURPOSES

Several purposes for sampling might be intended, these include:

- Characterisation of the oil and/or identifying the type of oil on board the ship.
- Determination of the source(s) of an oil spill.
- Confirmation of vessel records (for example evidence that a specific oil product has been transferred to a specific tank).
- Providing evidence in criminal proceedings through the comparison of spill samples with samples of possible sources.

SAMPLING STRATEGIES

The sampling strategy for a case that is comparable with the given example could be:

- Decide on a sampling strategy before sampling starts. Make sure you have access to all necessary (oil) documentation and that you have checked them carefully (for example, check if any information on the vessel –records, documents, etc.- match the information previously gathered that made the vessel suspicious).
- Firstly, check the more typical points from where a suspected discharge can be carried out:
  Oily water separator (OWS), emergency discharge valves, clean water valves, etc.
- Check that the level of the bilge or other waste tanks are in line with the previous levels recorded at the Oil Record Book (ORB) in order to record if levels have varied substantially.

IMPORTANT NOTE

✓ **IT IS ADVISABLE TO TAKE MORE SAMPLES TO BE ON THE SAFE SIDE.**

✓ **REMEMBER! THERE IS NO SECOND CHANCE FOR SAMPLING.**

SAMPLING PLAN

Preparation for sampling – check of the following documents (where applicable):

General Documents

They give an overview of the system and the ship's track:

- IOPP certificate (which states the ship's compliance with the MARPOL convention) and its supplement
- Oil Record Book (ORB)
- Log Book
- Bell Book
- Engine Room Book
- Nautical charts
- Electronic Chart Display and Information Systems (ECDIS)

Specific Documents:

- Bilge piping plan (provides the configuration of all piping of the engine room; any difference between the plan and the actual conditions on board hint at committed infractions)
- Tank arrangement plan (position and capacity of ship's tanks).

The piping plan is used to locate all possible outlets (including the ballast water system) which should be subsequently checked for suitable sampling points. The tank arrangement plan should also be checked to identify the different possible tanks to sample. Additionally, the Oily Water Separator should be examined to identify if it has been - or is - malfunctioning. The records in the ORB should also be checked against its use. Furthermore, soundings of bilge tanks, sludge tanks and dirty oil tanks should be taken and the incinerator, if fitted, should also be checked in order to match its use with ORB records.

Discharges/outlets to sea

Emergency bilge pump valve

Purifier room

SAMPLING PLAN

Oily Water Separator

Three Way Valve (OWS)

Bilge well (at the background)

When deciding which tanks should be sampled, the information of the oil type of the oil spill in question can be of help. Although it should be noted the different types of oily waste can be mixed in illegal discharges. Also, detergents or other products may have been used, which can change the composition of the oil in a vessel's tanks.

When sampling from bilge, areas close to suction valves should be preferred.

Therefore, it is always preferable to sample all possible locations in question.

SAMPLING EQUIPMENT

Nitrile gloves

ETFE net

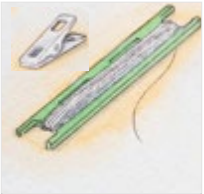
Stainless steel spatula, stainless steel scraper or PTFE scraper

Sampling pole (stainless steel or PTFE)

Sampling documentation and seals

Glass bottles with inert lining in the lid

[1]Sampling devise that fits inside the sounding pipes



Nylon cord and stainless steel clips

Transport container (insulated and cooled, if needed)

If available: camera for photo/video

[1]This is specialised equipment for sampling through sounding pipes, to be used only by well trained personnel

OVERVIEW OF POSSIBLE SAMPLING PROCEDURES TO USE IN THIS SCENARIO:

Depending on the oil type to be sampled, the following techniques should be used:

Liquid oil layers (top of bilge tank, inside piping, etc.):

- Sampling by ETFE net.
- Inside pipes, rub ETFE net on the internal sides to obtain samples.

Solid thick oil layers, lumps or mouse, emulsions and tar balls (top of bilge tanks, sludge tanks, purifier room, etc.):

- Sampling by ETFE net (as long as liquid material is present).
- Sampling with a metal sampler (sampling device) from tanks through sounding pipes.
- Scraping solid oil into a glass bottle with an inert lining in the lid by use of a spatula.

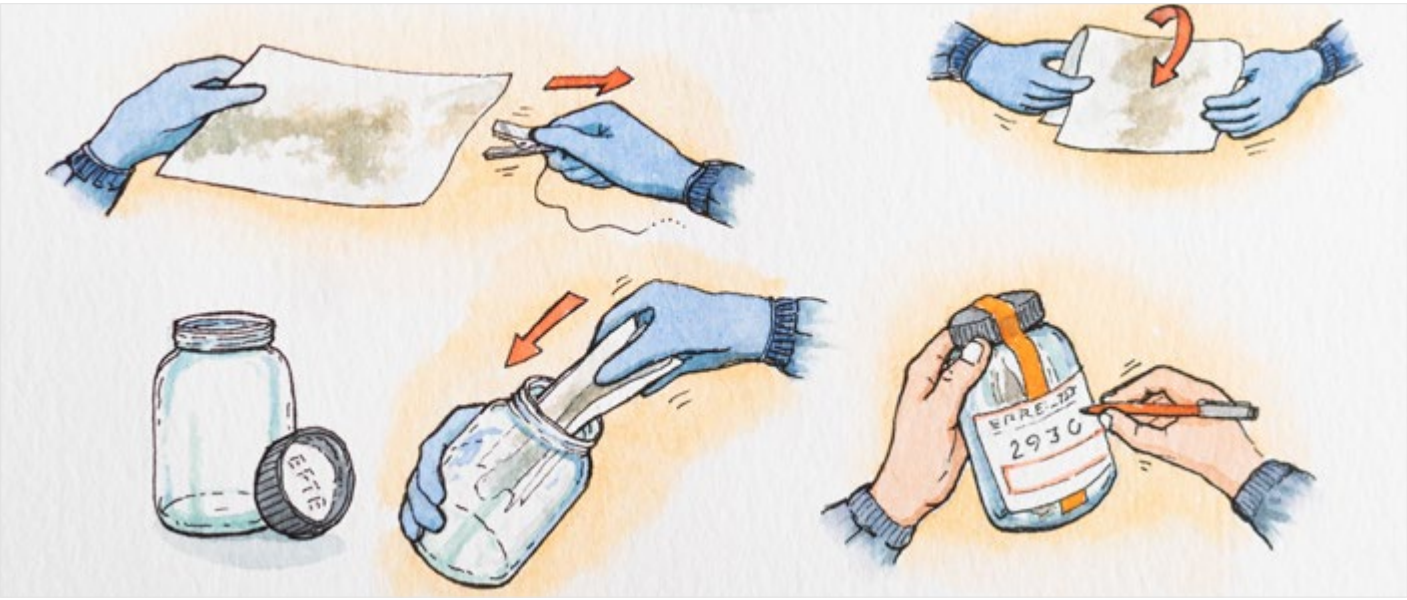
HOW AND WHERE TO SAMPLE (POSITION AND TECHNIQUE)

ETFE net

Sweep the oil layer on the surface with the ETFE net to collect oil. Store the ETFE net in the glass bottle with an inert lining in the lid.

Prevent parts of the net becoming trapped between the mouth of the bottle and the lid, to avoid leaking.

The net can be connected to a fishing rod or to another rod with stainless steel clips for easy access to the tank.



Stainless steel spatula, stainless steel scraper or PTFE scraper

Use a stainless steel spatula or alternative to scrape thick oil layers from hard substrates like for example pipes. Transfer the oil or the spatula with the oil to a glass bottle with an inert lining in the lid. Make sure not to scrape off material from the surface underlying the oil.

Use a stainless steel spatula directly to scrap solid oil into a glass bottle with an inert lining in the lid.

KEYPOINTS FOR GOOD SAMPLING PRACTICE

For all optional sample procedures, the practical basic principles of forensic oil sampling apply

1. Personal safety - explosion or fire: Consider whether there is a risk of explosion or fire. High risk can be expected with fresh spills of crude oil and light fuel oils (lighter than diesel). Whenever there is high risk of explosion or fire due to the presence of highly volatile compounds, additional regulations apply.

2. Personal safety – toxic fumes: Oil spills can produce toxic fumes; use a suitable respiratory protection. Whenever possible approach the spilled oil from the wind direction limiting personal exposure.

3. "Personal safety - Machinery space comes with risks of entrapment, electrical shock, or fall (among others). Check also if access is safe

4. Use disposable nitrile gloves for sampling. Change gloves at least for every new sample.

5. When using an ETFE net, put gloves on only directly before you touch the clean ETFE net and make sure to not touch anything else with the gloves to avoid contaminating the ETFE net.

6. While taking samples always work from the least contaminated to the most highly contaminated location to avoid cross contamination.

7. Required sample amount depends on sampling purpose (analyses for physical parameters - hundreds of millilitres up to litres; oil for forensic analyses – a few millilitres).

8. No spill is too small to be sampled. Even if you don't see oil on the ETFE net, it can be enough for analysis.

9. Always try to minimise the handling of the sample as much as possible to make sure that your handling of samples and equipment does not contaminate the samples. Look out for lids not to be contaminated during sampling and not to switch lids between samples.

10. Take care to not switch samples, label each sample at once after taking it.

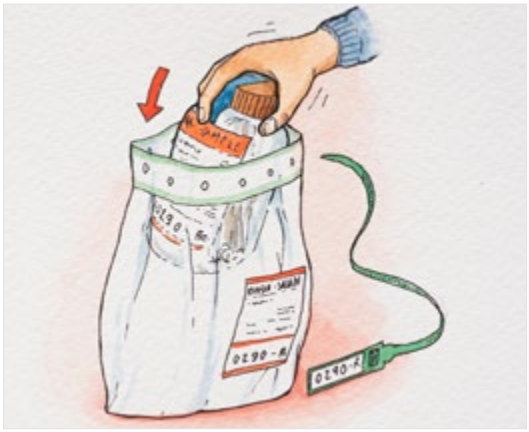
WHAT TO DO AFTER SAMPLING IS COMPLETED (SEAL, LABEL, TRANSPORT)

Sample documentation and labelling

- Carefully label all samples and fill in the required documents to maintain the chain of custody during transport and for the request for analysis.
- Check whether sampling has been properly completed according to the field checklist of table 1 of chapter 4 (main document: Interdisciplinary practical guidelines on oil spill sampling in Europe).
- At all times keep documents like the analysis request form and the chain of custody form together with the samples.

WHAT TO DO AFTER SAMPLING IS COMPLETED (SEAL, LABEL, TRANSPORT) (CONT.)

Transportation



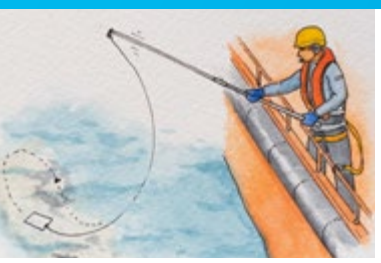
- Seal sample bottles and when appropriate, the transport box.
- Inform the laboratory ahead of delivery to prepare the controlled reception of samples.
- Transport samples to the laboratory directly after sampling. Keep samples in the dark and cooled (4°C) during transport.
- Make sure that the chain of custody is maintained by every responsible handler of the samples by ensuring the chain-of-custody forms are completed and signed.
- If you can, use a temperature logger in the transport box or cooler to prove proper transport conditions.
- Ensure that sample bottles are shatter-proof and are packed properly. If samples contain liquids, use absorbing material in the package to reduce the effects of leakage.
- Follow applicable regulations regarding the shipping of oil-containing samples.

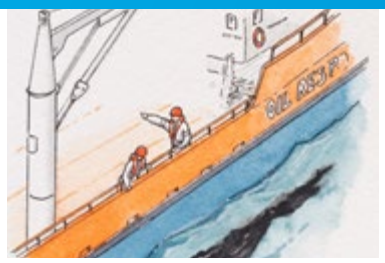
CAUTION

- ✓ SAMPLE ALL POSSIBLE TANKS, BILGES ETC. ON BOARD A SHIP!
- ✓ WHEN SAMPLING TANKS DIRECTLY, TAKE SAMPLES FROM DIFFERENT DEPTHS (INHOMOGENEITY OF THE CONTENT).
- ✓ TAKE MORE THAN ONE SAMPLE FROM A (LARGE) TANK, BILGE ETC. (INHOMOGENEITY OF THE CONTENT)

DON'T FORGET

- ✓ USE CLEAN NEW NITRILE GLOVES AND CLEAN TOOLS FOR EVERY SAMPLE.
- ✓ REMEMBER THAT THERE IS NO SECOND CHANCE FOR SAMPLING.
- ✓ IF IN DOUBT ABOUT DETAILS OF THE PROCEDURE, CHECK BACK TO THE MAIN TEXT OF THE OIL SPILL SAMPLING GUIDELINES.






ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the European Union's decentralised agencies. Based in Lisbon, the Agency's mission is to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships, as well as response to marine pollution from oil and gas installations. The overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

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