European Maritime Safety Agency

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Collecting evidence on oil pollution

Techniques of sampling and analysis

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Reason for oil pollution monitoring

- **Find oil spill**
- **Response to oil pollution**
- **Find suspect polluter**

  It is necessary to use Air surveillance, AIS, or Satellite monitoring
- **Effective Prosecution of offenders**

  It is necessary to collect evidence

Air surveillance findings

Patches of FO on the sea surface

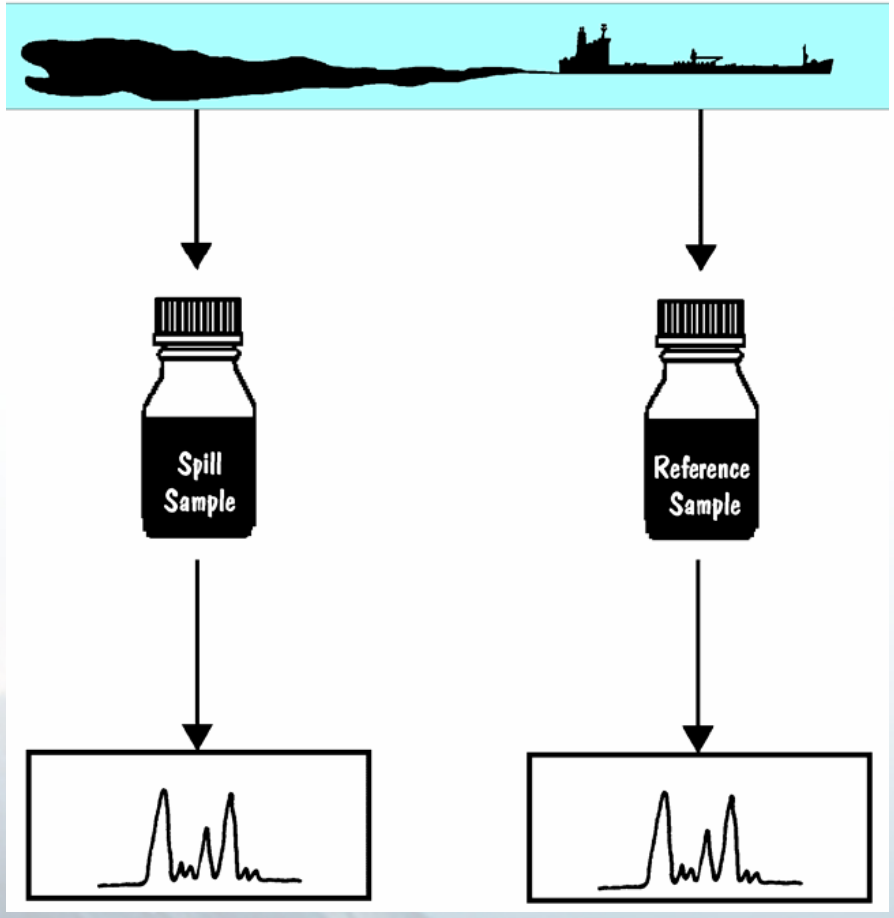
Evidence collected during air surveillance mission should be provided by observers to the responsible authorities:

- Standard Pollution Observation Log
- Pollution Observation Report on Polluters and Combatable Spills
- SLAR/IR/UV imagery in type and hard copy
- Photography
- Video tape
- Type recording or transcript of any radio contact
- Signed official reports or statement
- Any other helpful evidence

The best evidence

- Fingerprint

Each oil has its characteristic "fingerprint" (*biomarkers, PAH-pattern etc.*), which makes traceability to the contamination source possible in principle.



Methods to provide fingerprint evidence

- The NORDTEST Method for Oil Spill Identification

  NORDTEST is approved by HELCOM and Bonn Agreement as a appropriate method useful for oil identification which can be used as evidential proof in the court.

- The EUROCRUDE system of oil fingerprinting

  EUROCRUD provide results able to uniquely identify the perpetrator and be sustainable in legal proceedings.

  Developed for crude oil identification and can also be used to fingerprint bilge discharges as well refined products.

What is needed to achieve appropriate result

- Oil samples collected at sea (spill sample) and on board of suspect vessel (reference sample)
- Laboratory of International Standard
- Hardware application – gas chromatograph and mass spectrometer
- Suitable software
- Qualified laboratory staff
- Easily understandable definite report

Purpose of Laboratory analysis

- The main purpose of analysis is to determine the nature and the type of the products, detailed hydrocarbon composition of the samples, and whether samples came from the same source. The samples are analyzed by gas chromatography with a flame ionization detector (GC-FID) and by gas chromatography coupled with mass spectrometry (GC-MS). In result hydrocarbon distribution patterns of unknown oils can be recognized.

HELCOL Oil sampling kits

Case with equipment for sampling on board ships

Case with equipment for sampling of oil spills

The new oil spill sampling kit developed by SINTEF

The equipment is easy to use, and user-friendly.

There are Instructions (sampling procedures) enclosed for:

sampling of thin oil films (sheen) at sea
sampling and handling of thick oil /emulsion at sea
sampling and handling of high viscous oils, globules and tar balls
sampling of oil on beaches
sampling from oil contaminated birds/ animals

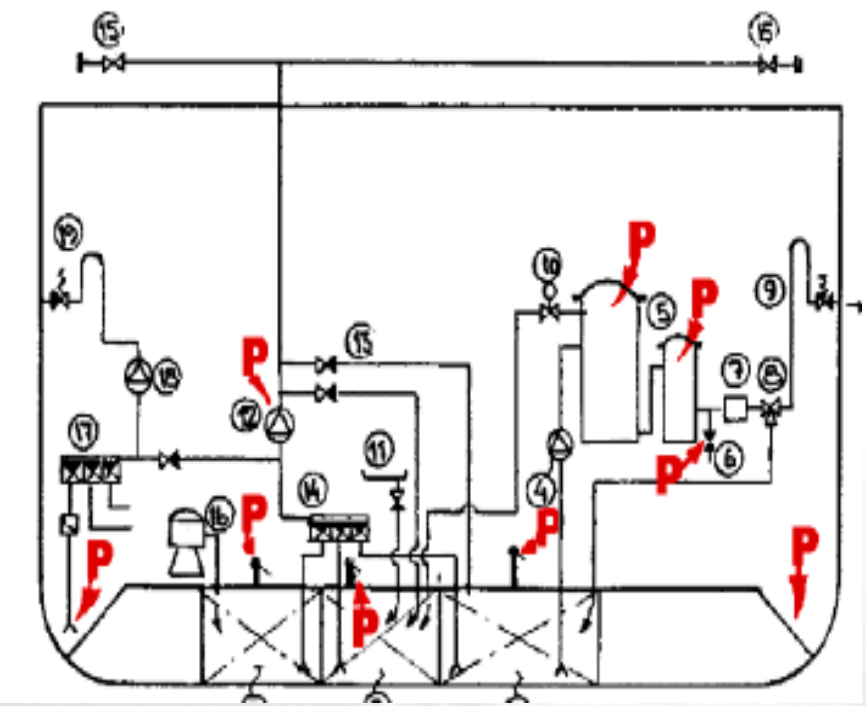
Oil Spill Sampling Kit approved by AMSA

Collection of samples from the water surface

- Try to concentrate the oil fraction in the sample container by skinning the oil from water.
- Do not fill container completely.
- Take the sample from the thickest part of the slick.
- In highly contaminated waters (harbours), take blind samples.
- When oil spill combating action lasts for several days, take oil samples every day for documentation of weathering and possible addition spills from other sources.
- When other suspicious slick occur and their appearance differs, or if slicks are observed a long distance from the expected sit, take samples as required in order to ascertain whether more than one spill has occurred in the area.

Additional knowledge required

P = Recommended sampling site for suspected illegal spill



Machinery Systems for Bilge Water and Oil Residues on Modern Vessel

Guidelines for Oil Pollution Sampling

- **IMO**
  OIL POLLUTION MANUAL
  Section VI - Guidelines for Sampling and Identification of Oil Spills
- **BONN AGREEMENT**
- **HELCOM MANUAL** (Oil Sampling)
- **MCA** (Maritime and Coastguard Agency)
  ADVICE TO LOCAL AUTHORITIES ON THE COLLECTION AND HANDLING OF OIL SAMPLES

The guidelines are intended to provide guidance to governments, including those of developing countries, on the techniques, equipment and strategies for sampling oil to identify unknown sources of spilled oil. The emphasis is on the details of the field work required to collect the samples.

Different check lists to be used

- When collecting of samples from the water surface
- When collecting of samples from the beaches
- When obtaining samples from oiled animals
- When taking samples in cargo systems of oil tankers
- When taking samples in machinery spaces of ships

Collecting samples on the beach

Tar balls found on the beach after storm

General approach when collecting and providing samples in order to determine the source of the spill:

- Samples should be taken in to containers of glass, teflon or stainless steel.
- At list 1ml of oil should be sampled but no sample should be considered too small.
- If contamination of the samples is suspected, the blind samples should be taken.
- The minimum three parallel samples should be taken from the same location.
- The sampling container should be properly labelled with all relevant information before sealing.
- A sampling log book should be kept.
- The samples should be taken and handled under supervision of authorised personnel.
- Stored samples should be kept under lock in darkness at max. temperatures of +4˚C.
- Samples should be taken to an authorised laboratory without delay.
- During transportation damage to the samples mast to be avoided.
- Regulation for transport of flammable materials should be followed.
- Samples should be handled as if they were legal evidence.

SAMPLES FOR BONN AGREEMENT STATES
Oil Pollution Sample – Standard Label

OIL POLLUTION SAMPLE – STANDARD LABEL

- ID No. Date/Time Location) Name and Address of
- (Grid Ref) person taking sample
- .....
- **For continuity of evidence: Please complete clearly**
- **Sample passed to:**
- Date Name Address Signature
- .....
- .....
- .....
- .....

The other not conventional – modern methods of collecting samples at sea

Using parachutes with absorbent material during surveillance mission.

Using helicopter to take oil spill samples from water surface.

Isto é tudo

Obrigado

Boas tardes !