TG n°2 Oil spill waste analysis for treatment

For each type of treatment or disposal option, analysis will be required to check the compatibility of the waste with the requirements of the process and with the environmental legislation for atmospheric or water releases.

The most frequent analyses conducted to assist in the choice of a treatment or disposal options are:

- Total Hydrocarbon Content (THC): for example when sand contains more than 20% of oil it is possible to recover this oil by washing, as much as 5% of oil concentration is acceptable for composting in biopile treatment but less than 1 to 2% is required for land farming and less than 0,5% of oil is often requested for use as incoming raw material in cement kiln,
- PAHs (Polycyclic Aromatic Hydrocarbons),
- water content and dry matter,
- sand content and grain size,
- organic matter,
- Net Calorific Value,
- chlorine and halogen content are important entry criteria for re-use of oil as energy source in cement kilns,
- sulphur content,
- metals (Nickel, Vanadium), and
- BTEX.

For detailed guidelines on sampling, refer to the IMO, 1998. *Guidelines for sampling and identification of oil spills, Manual on oil pollution, Section VI*, 38 p.

TAKING OIL SAMPLES FOR ANALYSIS

DATA
Substrates: loose or hard sediment
Pollution: all types
Pollutant: fluid to highly viscous

EQUIPMENT NEEDED

Protective clothing for responders:

- oil-resistant gloves (nitrile or neoprene).

Sampling equipment:

- surface pollutant: stainless steel spoons and spatulas or a shovel, sorbent (sheet), polyurethane sponge, Teflon film,
- pollutant in sediment: shovel or core sampler,
- labels, water resistant felt pen, paper towels, plastic bag for rubbish.

Storage equipment:

- wide-neck glass bottle, with capsules and Teflon or High Density Polyethylene (HDPE) seals,

or

- glass bottles with metal cap or lined on the inside with aluminium foil,
- box and aluminium foil.

DESCRIPTION/PRINCIPLE

For an ordinary analysis of the physical characteristics of the pollutant or oil waste (oil identification, water content, sand content, Total Hydrocarbon Content…), complying with the following recommendations should be sufficient.

In order to determine the three physical characteristics:

- samples of approximately **500 ml** would be required;
- for oil identification by high resolution Gas Chromatography and Mass Spectrometry - GC/MS, the minimum amount of pure pollutant required is **10 grams**, approximately **100gr** are needed if it is not pure oil.

When sampling and storing a pollutant, only use inert and non-contaminating materials such as glass, Teflon, High-Density PolyEthylene (HDPE), stainless steel and aluminium; otherwise the sample will be unusable. Prefer brown glass bottles that can protect the sample from photo-oxidation.

Never ever use plastic but HDPE.

If no inert recipients are available, wrap the sample in aluminium foil and transfer to an adequate recipient. If you are using glass bottles with plastic or metal caps, always remember to insert a sheet of aluminium foil between the cap and bottle neck so as to isolate the sample.

Recipients and utensils must be clean.

Use containers that are suited to the samples you are taking: flask, glass bottle for samples for loose sediment, aluminium sheet or box for pebbles, etc.

Samples have to be shipped as soon as possible and if possible reach the laboratory within 8 days.

Samples have to be kept at positive but cold temperatures (between 0 and 10°C).

Samples will have to be identified by a data sheet such as the one on the following page. You are advised to fix two labels, one on the glass bottle and the other on the plastic bag.

ADMINISTRATIVE AND LEGAL SAMPLING
Recommendations for samples required for administrative and judicial purpose (e.g. groundings from unknown origin) will be : ↳ apply the above recommendation for content and sampling procedure; ↳ send the samples to the appropriate and certified laboratories that have the skills and the equipment to carry out the analysis (e.g. high resolution gas chromatography and mass spectrometry) and meet legal requirement of the country; ↳ ask laboratories to outline method and standards procedures applied; ↳ check country administrative requirements (often samples will have to be in triplicate, taken by a court appointed expert and sent to the certified laboratories).

Each sample of waste should be identified. A label will be stuck on each sample container. The table below provides an example of waste sample label.

GENERAL INFORMATION
Name of sampler:
Position / Organisation:
Phone number:
E-mail:
Address:
Date of shipment:
SAMPLE INFORMATION
Origin (name of place where sample was taken):
Date of sampling:
Time of sampling:
Observations (viscosity, colour, type of site: beach, rocks, harbour):
Nature (type of pollutant, sediment, pebbles):
Sample number:

Table 3: Example of waste sample label