

## GUIDELINES FOR THE COLLECTION OF OIL SAMPLES

### GENERAL CONSIDERATIONS

**CAUTION** Petroleum products are hydrocarbon-based materials derived from crude oil, natural gas and synthetic oils. Petroleum products are classified as dangerous goods and have to be properly handled. Many petroleum products (petrol is a good example) release vapours that will build up in confined areas. These vapours are potentially explosive and can cause health affects when inhaled, ingested or through skin contact.

Some general considerations:

- Protective gloves must be worn at all times. It is advisable for prevention of cross contamination and for health and safety reasons to wear two pairs of disposable gloves when taking samples. The outer pair of gloves is to be changed after each sample and the inner pair of gloves is to be changed any time they become soiled.
- Oil on skin should be removed as soon as possible by scrubbing with soap and warm water.
- sample as soon as possible, before the spilled material can be dispersed or degraded;
- For large spills or for a spill involving more than one substance, obtain several samples from different locations to ensure that the spilled substance is properly represented.
- Samples should, if possible, follow and show the course of the spill. Samples should be collected above and below the point source of the discharge, to demonstrate that the contamination did not originate from another source.
- Collect a sample from the discharge source, if known (e.g., tank, container, pipeline, truck, vessel) to allow the laboratory to match the source with other samples collected.
- When sampling from a boat or float aircraft, take the sample upstream from the engine to minimize the chance of contamination from oil.
- EPA officers should not take petroleum product samples from tanker trucks, storage tanks or retail outlets.

### OIL SAMPLES FOR ORGANIC ANALYSIS

The main sources from which oil samples may be collected are oils on water, from shorelines (oil on pebbles and stones, in sand or on debris), from contaminated wildlife and the pure oils from storage or dispensing devices.

- Collect oil samples with as little water as possible. This will help reduce chemical, physical or biological alterations of the oil when in prolonged contact with water between the time of sampling and analysis.
- Ensure that samples do not become cross contaminated with oils from collection tools or from other samples.
- Whenever possible, avoid collecting oil samples containing organic material such as marine vegetation, grass, bits of wood, etc.
- At no time should plastic material come in contact with oil.
- After sample collection, store in a cool and dark place in order to reduce evaporative changes or microbial degradation of oil samples.

Samples taken from the surface can be collected by hand or by using a sampling pole.

1. Remove the lid ensuring not to touch inside of lid or mouth of sample container; or use a bucket, ensuring you do not touch the inside of the bucket.
2. Grasp bottle or bucket at the base with one hand and plunge bottle mouth down into the water or effluent.
3. Position the mouth of the bottle or bucket into the current, away from the hand or sampling pole of the collector and the sampling platform or boat making sure that the hand or sampling pole is always downstream.
4. For bottles, tip the bottle slightly upwards to allow air to exit and the bottle to fill; or remove the lid of the sample container and fill from bucket (ensuring not to touch inside of lid or mouth of sample container).
5. Seal and label the bottle and place in cooler.

### SAMPLE CONTAINERS

Using the correct sample containers is important to reduce the possibility of contamination of the sample or sample degradation by light, oxidation, etc. and to ensure the right volume is collected for analysis. When sampling petroleum products, use 1 Litre amber glass bottles, with Teflon-lined lids whenever possible. For wide-mouth jars, use Teflon or heat-treated aluminium foil as a seal between jar and lid. If amber bottles are not available, clean glass bottles wrapped in a suitable medium such as alfoil to prevent light reaching sample will suffice.

### SAMPLE LABELING

Equipment for evidentiary sampling includes:

- labels specifically designed for legal purposes, e.g. “Evidence” labels. Ensure the sample has been sealed using proper techniques, such as tamper-evident seals. If possible, use manufactured pre-numbered seals. Record the unique numbers in your notebook and photograph the sample container with the number visible.
- tamper-evident seals or sealing tape with a signature across the opening
- lockable storage, if not always in the sampler’s possession. Lock the sample in a secure container, refrigerator, etc. or keep the sample in your possession or in view at all times until it can be secured. Limit the number of people handling the sample and ensure that only one person at a time has access to the sample.

The sampling bottles from the EPA Tasmania AST laboratories are analyte-specific but if required, additional information or instructions can be written on the sample submission form. Additionally, if using sample bottles not obtained from AST ensure you note on the sample bottle the type of analysis requested.

The label should contain:

- Client e.g. EPA – Incident Response
- Date of sampling
- Time of sampling
- Name of sampler
- Site

Importantly, each sample bottle should be given a unique identifier, e.g. Derwent\_NTBay\_SE Spill 001. Document the sample number in field notebook and photograph the sample labels for later reference.

## SAMPLE TRANSPORTATION

To get the best quality analytical results the correct handling of sample collection and its prompt delivery to the laboratory is crucial.

Samples should be kept cool while in transit if possible. Whenever possible EPA officers should transport their samples to the lab to ensure chain of custody, especially if the samples are to be used for evidentiary purposes. However where this is not possible, samples can be sent by the quickest, most direct route possible via registered mail, courier, bus, or air. If chain of custody needs to be maintained, containers etc. need to be security sealed and tamper-proof. Contact the lab beforehand to ensure that the lab knows to expect the samples.

Packing considerations:

- Sample containers/bottles must be securely closed and packed carefully in order to prevent leaking or breakage. Use evidence tape or security seals if samples are evidentiary.
- Add freezer packs if the sample needs to be kept cool. If you use ice, ensure that sample bottles are bagged (zip-lock bags are ideal) to keep the labels out of contact with the ice or ice water.
- Put the sample submission sheet into a plastic zip-lock bag and attach to the outside of the esky/container.
- Label the container with the destination and return address and complete the consignment note (if using a courier). AST eskies and containers have postal reply paid and address already attached.
- Keep contaminant samples separate from control samples to prevent sample contamination.

The lab requires a minimum oil layer of 3 mm in a 1L glass bottle to run the full range of analytical tests. Collecting this volume can be difficult when the spill forms a thin surface film or sheen.

- To concentrate the sample to the required thickness, tilt the lip of the sampling bottle just below the water surface and skim off the oily layer. If this yields too thin a layer, cap the bottle and invert it. Allow the oil to rise to the surface, and then loosen the cap just enough to let the aqueous under layer run out of the bottle. Tighten the cap, turn the bottle right side up and repeat the process until enough oil has been collected.
- In some cases, you may have to resort to collecting a sample using absorbent material. Place an absorbent pad on top of the oil film and slowly turn it in a circular motion to collect the oil layer. Transfer the pad to a clean AST glass soil jar and seal it. Include a piece of unused material in a separate jar for use as a blank.
- To clean the outside of the jar, wipe it with paper towels. Do not rinse or immerse the jar.
- Liquids in small dispersed pools, in globules or in difficult to reach areas may require sampling with a disposable glass pipette and bulb.
- For oil on a solid surface, gently sweep the surface with a piece of oil-absorbent material and place material into a sample jar. Include a piece of unused material in a separate jar for use as a blank.

## GUIDE FOR ESTIMATING THE SIZE OF AN OIL SLICK ON WATER

STANDARD TERM	APPEARANCE	OIL (L/km <sup>2</sup> )
BARELY VISIBLE	barely visible under most light conditions	44
SILVERY	visible as a silvery sheen on surface water	88
SLIGHTLY COLOURED	first traces of colour visible	175
BRIGHTLY COLOURED	bright bands of colour visible	330
DULL	colours begin to turn dull brown	1,170
DARK	much darker brown	2,337

**NOTE:** Each 2.54 cm (1 inch) thickness of oil equals 21.42 L/m<sup>2</sup> or approximately 30,500,000 L/km<sup>2</sup>.