



# SAMPLING AND ANALYSIS

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# OUTLINE

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- Responsibilities of OSC
  - Evidence Plan
  - Sample Gathering
  - Photo Evidence
  - Analytical Methods & Identification System
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# RESPONSIBILITIES OF OSC

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- Evidence Plan
  - Samples
  - Photographs
  - Report
  - Give Evidence
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# PROVIDING SUBSTANCE IS POLLUTANT

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- Match sample from polluted area with sample from source (ship)
  - One (1) match tends to indicate
  - Objective: TO PROVE
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# EVIDENCE GATHERING PLAN

## Plan Components

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- Purpose
  - Location
  - Procedures
  - Photos
  - Laboratory
  - Documentation
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# PURPOSE OF PLAN

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- Cost Recovery
  - Civil Penalty
  - Criminal Penalty
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# LOCATION FOR SAMPLING

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- Suspected source (ship/shore/pipeline)
  - Sample from unpolluted or clear water
  - Sample(s) from polluted area/waters
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# SAMPLING PROCEDURES

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- How to take samples
  - Labeling
  - Proper sampling equipment
  - Clean jars
  - Proper sealing
  - Transferring (continuity of evidence)
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# SAMPLING EQUIPMENT

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- A good standard sampling kit should be available to authorities who may be requested to collect samples
  - The content of the sampling kit should be in compliance with the national requirements for evidence to court gathering and should facilitate the work of the sample collector
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# REQUIREMENTS TO LABORATORY

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- Make sure the lab has the equipment to conduct required tests
  - Procedures for proper analysis
  - Ensure analysis will provide you with the information you need for a court case
  - Results should be able to link suspected source to spill
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# APPROPRIATE DOCUMENTATION (to accompany each sample)

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- Notes, sketches, photos, videos
  - Well marked (Location, date, time, object)
  - If possible use reference objects for location
  - For photos or video use a reference person next to the sample site (Possible witness)
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# KEY COMPONENTS OF SAMPLE TAKING

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- Possible source(s) (ship or facility)
  - Water upstream from source
  - Polluted area(s)
  - Other possible source(s)
  - Other considerations (cargo, bunker, lub oil etc.)
  - Previous or earlier spills or organic materials
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# PROCEDURES FOR TAKING AND TRANSFERRING

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- Avoid sample contamination
  - Sample volume (10 –100 ml)
  - Sample Containers (250 ml glass bottle with wide opening (5 cm) and polyethylene screw cap)
  - Avoid plastic sample containers
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# PROCEDURES FOR TAKING AND TRANSFERRING (Cont'..)

- Sealing of containers (numbering of bottle and lid identical)
- Custody of samples (Chain of Custody)
- Sample information: Sample No.; DTG; Details on location; Wind; Temperature of air and water; How was the sample taken; Description of sample (type of oil); Collectors details; Witness; Signature of Collector (all info with water-resistant ink on a water-repellent reporting form)

# GOOD PHOTO EVIDENCE

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- Photographs collaborate visual observations and can add a higher level of veracity to a written report
  - Choice of cameras (automatic with Single Lens Reflex (SLR))
  - Choice of film (35 mm; 25 ASA slide)
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# PHOTO DOCUMENTATION

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- Maintain an accurate log of photographs
  - Each photo to be supported by log including: No.; DTG; Location; Subject; Camera settings.
  - Sketch map with details on each shot
  - Identification of each film roll
  - Photographer's details
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# ANALYTICAL METHODS IDENTIFICATION SYSTEMS

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- Reference: The NORDTEST oil spill identification system is a procedure for identifying waterborne oils.
  - (Nordtest Method – NT CHEM 001)
  - Recommended identification system in use in most European Countries)
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# ANALYTICAL METHODS IDENTIFICATION SYSTEMS

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- 1. Gas chromatography (GC) – using a non-polar column and a flame-ionisation detector (FID) to illustrate boiling range and quantitative distribution of hydrocarbons in the oil sample
  - 2. Using same GC separation technique and a mass spectrometer (MS) as a detector, to analyse special selected compounds for a more detailed description of the oil sample
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# ANALYTICAL METHODS IDENTIFICATION SYSTEMS

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- All data from the two methods are used to compare spill samples with samples taken from suspected sources.
  - Significant difference will illustrate NON-IDENTITY
  - If the significant difference is NOT caused by analytical inaccuracy or weathering of the oil, it can be concluded that IDENTITY exists.
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