



Chemical and microbiological sampling of water

Operational instruction 19_09

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This document is for staff at capability level 2 and above for Data and Information Management in the Environmental monitoring technical development framework.



Document
details

What's it about? This document describes how to sample controlled waters, discharges and associated material for chemical and microbiological analysis.



Related
documents

Who does it apply to? All staff taking samples for water quality monitoring.



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1 Introduction

Contents

This chapter includes the following topics:

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Purpose

This chapter describes the scope of why we monitor, and highlights any additional protocols that maybe needed. Also supplies the links to any equipment that might be needed.

! Important Everything in this operational instruction is ‘must do’ for chemical and microbiological monitoring.

Scope

This document forms part of the National Monitoring Procedures Manual ([NMPM spreadsheet](#) and [quick guide](#)).

The NMPM contains all of the methods that Environment Agency use for sampling the environment. The operational instructions set out the national standards that must be used by all monitoring teams.

You must read and follow this document and any other from the NMPM which are relevant to your sampling.

You may need to refer to other documents for specialised sampling techniques.

Additional protocols relevant to sampling

Occasionally you will need to refer to standard sampling methods held by other organisations. Where this is the case, the NMPM makes reference to the appropriate document. **Health and safety** documents particularly relevant to sampling appear in the NMPM, but for more detailed instructions refer to existing health and safety manuals. The NMPM is not a substitute for this information.

Definitions

For the purposes of this operational instruction, the definitions given in ISO 6107 Part 1 and 2 apply.

The [Glossary of terms](#) includes all the definitions.

Equipment

The [Equipment list](#) holds details of all the equipment requirements.

See the [National laboratory service's bottles database](#) for advice on bottle types.

2 Health and safety

Contents

This chapter includes the following topics:

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Health and safety at work and COSHH

All samplers must comply with the duties and responsibilities required by the Health and Safety at Work Act, 1974, including:

- those provisions under Control of Substances Hazardous to Health (COSHH), 1989;
- and all other mandatory regulations.

Before they begin work, sampling staff must:

- have received health and safety training;
- be aware of the health and safety considerations associated with this type of work.

! Important It is very important to be aware of the potential dangers of lone working, the chemicals you may come into contact with and any specific risks related to the site you are visiting.

Safety equipment

The sampler must have adequate protection, including protective clothing.

They must use personal protective equipment (PPE) and other safety equipment while they are sampling. They must wear suitable gloves, as a protection against chemical and bacteriological hazards while they are taking or handling samples.

For using lifejackets or buoyancy aid, see [600_06 Lifejackets and buoyancy aids](#).

3 Sampling method

Contents

This chapter contains the following topics :

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3.1 Pre-sampling quality checks

Selecting equipment

The table below describes how to check that the equipment you need is available.

Step	Action
1	Check that you have all the bottles you need in advance. All bottles types can be ordered from the National Laboratory Service (NLS). Please email the NLS helpdesk to place your order.
2	Select the sampling equipment from the Equipment list . For general sampling, you can only use the equipment on this list, manufactured according to agreed specifications. Make sure that the equipment is available. Carry out the checks listed in Checking equipment , below.

Checking equipment

The table below lists the checks you must make.

Equipment	What to check
Sampling equipment	Check for deep scratches, signs of wear and tear, and any container handles with insecure fittings. Replace if badly damaged.
Funnels	Check for deep scratches, signs of wear and tear and general cleanliness
Rope and chain extension handles	Check for signs of wear and tear, general deterioration and insecure extension fittings.
Crates and sample carriers	Check that sufficient numbers are available for daily use. Inspect them for damage or signs of deterioration. Ensure that storage is secure.
Filters and filter equipment	Ensure that there is sufficient quantity for a day's sampling. For re-usable filter equipment, inspect for signs of deterioration and replace as necessary.
Bottles	Check the condition of the bottles and caps. Discard any damaged ones so that other samplers do not select them. Ensure that the bottles are capped, to reduce contamination, and that they are stored securely.
Field instruments	Check that the calibration date is not exceeded. Do not use them if it is. Follow the manufacturer's instructions for storage.
Test kits	Check that test kits needed for the daily schedule are available for use. Ensure that the manufacturer's instructions or Operational Instructions are available for use. Check that the 'use by' date has not expired. Replace them, if it has.
Site Profile(s)	Site specific information (where applicable) including information such as contact details, keys required, directions, photograph.
Preservatives	Check that the 'use by' date has not expired on the bottle. Replace it, if it has. Send back to the NLS for recycling. Ensure that there is a sufficient quantity of bottles for a day's use. Store them separately from the sample bottles.
Fridge	Place ALL microbiological samples you have taken into a fridge for transport to the depot. Check that the temperature of the fridge is between 2 and 8°C.
Storing samples in fridges	It is good practice to store all unpreserved samples in a fridge.

Sample labels and documents

Ensure that there are enough for a day's use.
If the labels are pre-printed, check with the schedule to ensure that none are missing. If needed re-order more from the National Planning and Scheduling Service (NPSS) on 711 8282.

If there is a problem

Do not use any equipment that is damaged.
Any equipment marked with a 'use by' date should be replaced before this date has been exceeded.
Store sampling equipment in such a way that it is maintained in as clean a condition as possible.
Report any shortages, loss, damage or broken equipment immediately to your supervisor, so that replacements can be arranged.

Vehicles

The vehicle used to carry samples must be thoroughly cleaned once a month and **this includes the inside of the fridge**. Daily good housekeeping helps to prevent contamination.

3.2 Sampling sites

Actions

Follow planned routes, where appropriate.
Ensure that you are able to identify the exact location of each sampling site in the daily sampling schedule.

3.3 Arrival on site

Actions

The table below describes what to do when you arrive at the site.

Step	Action
1	Park the vehicle safely. Lock it, if you are leaving it unattended.
2	If the site procedures require it, identify yourself to the site management by following the instructions in the site profile.
3	Remove all the equipment needed for sampling at that site, using the crates or sample carriers provided.

3.4 Avoiding contamination

Rules

It is essential to avoid contamination during sampling.

Consider all the possible sources of contamination, included in this section, and apply the correct control, when needed.

Sources

Check for the following:

- residue from earlier samples remaining on sampling containers, funnels, scoops, spatulas and other equipment,
 - contamination from the sampling site during sampling,
 - residual water in or on ropes, chains or extension handles,
 - contamination on funnels from preserved samples,
 - contamination of bottle caps or tops, by dust or water,
 - contamination of the barrels of syringes and through the filter medium,
 - contamination from hands, fingers, gloves and general handling.
-

Controlling contaminants

When needed, complete the following actions:

- thoroughly rinse the equipment, following the description in [Before you start](#),
 - take care to avoid disturbance at the sampling site;
See [2.5 Water body sampling](#), , and [2.6 Effluent and discharge sampling](#),
 - wipe and dry ropes, chains or extension handles between sampling and before storage;
 - rinse the funnel inside and out after sub-sampling preserved samples;
 - store bottle caps and tops securely to avoid contamination;
See [2.7 Taking the sample](#).
 - rinse the barrel and the [filter](#) medium before use;
 - avoid touching the sample itself with fingers, hands or gloves.
This is particularly important during microbiology sampling, where you must make no contact with the interior or the rim of the bottle or the cap.
 - Dissolved and total metal bottles and caps (not including mercury samples) should be rinsed either with the sample or for filtered samples some filtrate which should then be discarded before filling the bottles.
-

Contaminated samples

In all cases, if you see, know or suspect contamination has occurred, in any of the ways described above, discard the sample and repeat the sampling.

3.5 Waterbody sampling

Selecting a new place to sample

If you need to select a new sampling site you might be sampling from the bankside, a beach or a fixed structure, including a bridge, a pontoon or a harbour wall.

When you select the place on the structure to take the sample from, ensure that:

- there is sufficient depth of water to submerge the sampling container without disturbing the bed; unless, of course, sediment samples are required,
- when it is submerged, the container will not disturb bottom deposits,
- there is sufficient clearance over the side of the bank or structure, when suspending the container, to avoid dislodging potentially contaminating material,
- when sampling on the upstream side of a bridge or similar structure, that the container does not move out of sight.

For example: carried under the bridge by the current.

All other sampling points are nationally and regionally agreed and have set locations.

Sampling in tidal waters

Sampling in tidal waters may require a specific tidal height for you to obtain sufficient water safely.

Make sure that you select the correct tide time for each differing location if needed.

Consider if an alternative method would be safer, such as by boat.

Safety guidelines for bridges

When you are sampling from a bridge over a navigable stream, there is a risk of boats approaching.

When you arrive on site have a quick look over the bridge to make sure that there is water beneath and that you are able to sample prior to passing sampling container over.

Take care not to cause injury to others.

People in boats may not see the line suspending the sampling device, or other equipment, until a collision occurs.

You must attach warning pennants to the line to alert river traffic.

You must also take care not to lower sampling devices on to passing boats.

In-water sampling

You must fill bottles directly from the body of water to be sampled.

This rule applies in all cases, in particular when sampling may be a source of contamination or a loss of determinand, such as pesticides or oils.

Use the same technique, at the discretion of the sampler, when you are [Sub-sampling into bottles](#),

Take care to avoid sample contamination by either disturbance of the bed or the bank of the watercourse.

Take care with banks that have under cuts and make sure that you have a safe entry and egress route. Also have a look were an extra exit route could be if needed.

A wading stick may aid in entry and exiting the water.

Sampling from a boat

When sampling from a boat, take care to avoid contamination of the sample with disturbed deposits and any discharges from the boat.

Take care to avoid entanglement of deployed kit with boat propellers or mooring lines.

Sampling at depth

If you need to take samples from depth, then mark the lines at a minimum of metre intervals.

If you need a near bottom water sample, then take extra care to avoid touching the bottom. You can achieve this by establishing the water depth first and then laying the sub-surface sampler out to a point 50 cm above the bottom sediments.

3.6 Effluent and discharge sampling

Choosing the sampling point

If taking a sample from an unconsented discharge, where possible make sure it is at a location which ensures that it is truly representative of the discharge.

For example: A sampling position in a pipe or channel must be far enough downstream of the last inflow to ensure that the mixing of the two streams is essentially complete.

The sampling location can vary with the tidal state in tidal waters, so it is important to know the tide at the time of sampling to establish the correct location.

Timing of sampling is also important for some intermittent discharges.

For example: Some industrial sites may stop operations during holiday or maintenance periods.

If you are taking a sample from a consented sampling point make sure that you are in the correct location and at the correct part of the process.

Sampling at outfalls

Whenever possible, take samples from regions of high turbulence and good mixing, such as the centre of the discharge.

Use extension arms rather than hands (even when gloved) to support the container when taking the sample. This allows you to maintain a safer distance from fumes, vapours, aerosols and splashes.

Sampling in channels

Collect the sample away from the walls of the pipes and channels in which the liquid stream is flowing. This avoids contamination of the sample with deposits and growths from the sides.

Sampling at manholes or chambers

Ensure that you take measures to avoid contamination of the sample when you lift the cover, by disturbing deposits from the cover.

Also take care to prevent contamination of the sample from the chamber walls and any bottom deposits.

Remember: Manholes and similar confined spaces are dangerous. You must not enter them.

Sampling from taps and valves

Samples collected from taps and valves require special care because the water may be at a high temperature and/or pressure.

In some circumstances, sediment may collect in a tap or valve. It is good practice to allow the water to flow to waste for a short while before you take the sample.

3.7 Taking the sample

Contents

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Before you start

Before you use the sampling container to take the sample, thoroughly rinse the equipment, using a sufficient amount of the body of water that you are about to sample.

Dispose of the rinse water downstream of the site or in a way that does not contaminate or disturb the site to be sampled.

Note: Your disposal of rinse water or excess bulk sample must not itself be a source of pollution.

Direct sampling

When to use direct sampling

Direct sampling is the preferred method to reduce the risk of contamination and to ensure a representative sample.

However, do not use direct sampling with bottles containing preservatives.

Use dynamic risk assessment when using direct sampling. Only use direct sampling when you consider it to be safe and non-hazardous.

In receiving waters

To direct sample in receiving waters, follow the steps in the table below.

Step	Action
1	After entering the water to be sampled, face upstream into the flow of the water.
2	Remove the cap of the bottle. Hold the cap in one hand.
3	Plunge the neck of the open bottle under the surface of the water so that the bottle is submerged. Tilt the neck of the bottle so that it points slightly upwards towards the surface and allow the bottle to fill. In static waters, move the bottle away in a forward motion.
4	When full, remove the bottle from the water and replace the cap securely.
5	Return to shore and label the bottle as described in 2.8 Filtering samples

Thick surface layers or film

To direct sample in thick surface layers or film, follow the steps in the table below.

Step	Action
1	Facing upstream or up current, lay the bottle horizontal to the surface and slightly below so that half the mouth of the bottle is submerged. Allow it to fill. This method allows the bottle to fill and include the surface layer.
2	In static waters, submerge the bottle, as described in step 1 and move it away in a forward motion. To do this, you may have to wade through the water.
3	Remove the bottle from the water before the surface layer in the bottle is displaced.

Discharges

To carry out a direct sample of a discharge, follow the steps in the table below.

Care: Do not take samples manually, directly into the bottle, from discharges, even when wearing gloves. This practice is unsafe.

Step	Action
1	Using an extension arm, extend the bottle into midstream of the discharge. Allow it to fill. If an extension arm is not available, always use a sampling container to take the sample and fill the bottle as described in Indirect sampling .
2	Remove when the bottle is full and cap it securely.

Indirect sampling

Sampling vessels

For many applications, it is sufficient to immerse an open-mouthed vessel just below the surface to collect the sample.

The vessel you use could be a bucket or a can. It is often simply described as the sampling 'can' or 'vessel'.

You can fill the sampling vessel:

- by manually holding it below the water surface;
- supporting it with a pole;
- lowering it on a rope.

Vessels for large volumes

To achieve the analytical detection limits required, you may be collecting large volumes of a sample. In addition, many analytical techniques require an exclusive sample, as specific pre-treatments are frequently needed.

To help you collect different volumes of sample, you can use a range of vessels, from 250 ml to 3 litres. The only practical limit to the volume you use is your own strength and any health and safety issues related to manual handling.

Excluding surface layer

When the sample must not include the surface layer, the [sampling vessels](#), described above, are not suitable.

Use a small-mouthed container. Lower the sampling vessel about 30 cm below the surface before you take the sample

If you cannot enter the water, use a vessel on a pole. These poles are often telescopic and may be up to three metres long. The length of the pole limits the maximum size of the sampling vessel that it may support.

Sampling from a bridge

If the riverbank is considered safe (for example, not 'undercut'), you can sample from the bank. However, you might sample the river more safely from a structure, such as a bridge.

Use a sampling pole or lower the sampling vessel on a rope.

Ropes, wires and chains

We have successfully used flexible wire, covered in polytetrafluoroethene (PTFE) and polyethylene non-porous 'lay flat' rope.

You can use a small length of stainless steel chain to connect the rope to the sampling vessel, either by binding or a stainless steel cleat. The purpose of this chain is primarily to aid the submersion of the vessel but it also helps to prevent contamination from earlier samples because it does not absorb liquid and is more easily rinsed than the rope itself.

Materials for vessels

The open-mouth vessel used to be either plastic or metal. This often meant that the person doing the sampling had to carry both types because:

- metals can leach out of a metal sampling vessel;
- plastic vessels may leach compounds, which would interfere with organic analysis.

We now use food grade stainless steel. The constituent metals do not easily leach from stainless steel, even in acid waters at pH 4, and there is no effect on organic analysis.

Whichever material you use, carry out trials to show that the sampling equipment does not compromise the sample.

Potential problems

The construction of the sampling device has compromised the sample

It is possible to sample directly into the sample bottle either:

- By hand described in [sampling vessels](#).
- or by using a 'cage' which contains the bottle.

Sample points of varying quality are visited during the same sampling run

It is often necessary to carry different sets of equipment to use in different qualities of water.

In extreme cases, or if you are measuring trace levels, you may require one set of sampling equipment per site.

Sampling by increments

When to use

Fill the sample vessel by increments:

- in conditions of low flow;
 - where the source of water is difficult to access;
 - when you need a large volume of sample that is to be shared with the discharger.
-

Definition: increments

To fill a vessel by increments, take small individual portions, using a smaller sampling container.

Bipartite sampling

If you are carrying out bipartite sampling, follow the procedure detailed in the [15_04 Formal sampling of the aquatic environment](#).

Sub-sampling into bottles

Action

The table below describes how to take sub-samples.

Step	Action
1	Sub-divide the bulk sample into the types of bottles required by the sampling schedule.
2	When you remove the bottle caps or tops, before you begin the sub-sampling, handle them so that you avoid contamination or loss.
3	Take care that the nature of the sample does not change during sub-sampling.
4	Agitate the sample to prevent suspended solids settling. Exception: Samples taken for dissolved oxygen analysis.
5	After sub-division, replace the bottle caps or tops securely to prevent leakage, loss or contamination of the sub-sample.

Samples needing preservatives in the field

Bottle list

Sometimes you will have to preserve some types of sub-sample in the field. This is because certain determinands can rapidly change, react or adsorb onto the container.

To prevent any change in the determinand, the NLS supplies bottles that contain a preservative. The bottles that have preservatives are identified on the [National laboratory service's bottles database](#) and on the National Code Set's [bottle list](#). All bottles that require there to be a preservative in arrive from the NLS already containing any preservative that may be needed.

Hazardous chemicals

Some preservatives are hazardous and care must be taken with their handling and storage. Direct sampling from the river into the bottle is not permitted and you must take care not to contaminate the inside or outside surfaces of any funnel with the preservative. You must rinse the funnel both inside and out with a small quantity of the sample before using it again.

For safe use of preservatives in the field, refer to [Taking a water sample GRA](#).

Sampling for dissolved oxygen

Reference

When you are determining dissolved oxygen either by sub-sampling from the sample container or by instrumentation, refer to ;

[528_06 Taking field measurements: using a multi-parameter meter](#)

Sampling for chlorophyll a

Actions

Collect freshwater / seawater samples from:

- a pumped supply;
- the surface.

Use a bucket or a sub-surface sampler, for sampling from specified depths.

Some Water Framework Directive (WFD) samples maybe filtered on site. This instruction does not cover this. Refer to separate [monitoring in lakes guidance](#) when carrying out WFD work in transitional and coastal waters.

Most freshwater sites take the sample and submit to the NLS in a green 1 litre pet and then this is filtered in the lab. However this is currently under review and further guidance will be issued if any changes are to be implemented.

If sampling for marine chlorophyll, refer to [007_07 collection and handling of marine chlorophyll samples](#).

Sampling for microbiology

Actions

Collect freshwater / seawater samples from:

- bathing waters
- shellfish waters

Use sterile bottles always and make sure that the seals have not been broken.

The microbiological nature or concentration of some bacteria deteriorate or change soon after sampling. To prevent this, cool these samples as soon after collection as possible in a fridge. **These samples must be placed in a fridge for transport to the depot.**

Refer to the current [Bathing Water Monitoring and Reporting, operational instruction](#).

When submitting microbiological samples for analysis make sure that the bottles contain time and date on the lid. If the sample is taken before 10.00 am place an orange sticker on the shoulder of the bottle so the NLS can identify samples that need registering and analysing first.

Filtering samples

Preparing

This section describes how to filter water samples in the field either using disposable encapsulated filters or manual filter assembly.

All syringes and filters must be rinsed first prior to filling the sample bottle. See [filtering](#) for instructions on rinsing.

Dissolved and total metal bottles and caps (not including mercury samples) must be rinsed either with the sample or for filtered samples some filtrate; this must then be discarded before filling the bottles. In turbid samples the sample water before filtering can be used.

Do not use these procedures when you are recovering and saving the suspended material or particulates.

Encapsulated filters

When you use encapsulated filters, remove the pre-packed filter unit from the packaging when you are ready to start.

Use a clean syringe at each sampling point. Remove a fresh syringe from its packaging when you are ready to start.

Before you start filtering pass 10 ml of sample through the filter and syringe then discard safely. Then continue to fill your filtered metals etc bottle.

Assembling manual filters

The steps in the table below describe how to assemble a manual filter.

Step	Action
1	Remove a filter disc, in the specified pore size, from the packaging. Place it on the mesh of the filter holder, taking care not to contaminate or damage the filter disc. Use tweezers to help you manipulate the filter discs.
2	Fit the two sections of the filter assembly together securely. Make sure that the filter disc is not damaged during the process.
3	If the filter becomes saturated or blocked Disconnect the filter assembly from the syringe. Dismantle the assembly and remove the filter disc, avoiding contamination of the filter assembly, your hands and the surrounding area. Place a new filter disc in the holder and re-assemble the unit.

Taking a sample for total and dissolved metals

To take samples for both total and dissolved metals you can use a bulk sample. The metal bottles and caps (apart for mercury bottles) require rinsing before the bottles are filled.

You must fill the total metal sample bottle from the bulk sample first. It is important to do this as soon as possible after filling the bulk sample so that the suspended solids have not had a chance to settle.

Before filtering for the dissolved metal sample you can allow the suspended solids in the bulk sample to settle.

Filtering the sample

Rinsing the syringe

The steps in the table below describe how to rinse syringes when taking water samples.

Step	Action
1	Fill the barrel of the syringe with 10 ml of the bulk sample and then shake to rinse out the whole barrel.
2	Run it to waste, away from the bulk sample, other bottles and the equipment.
3	Repeat this procedure twice to ensure the syringe is thoroughly rinsed.

Rinsing the filter

The steps in the table below describe how to rinse filters when taking acid water samples.

Step	Action
1	Fill the syringe from the bulk sample.
2	Attach the inlet of the filter unit or assembly to the syringe.
3	Holding the assembly vertically so that the entire filter is rinsed, pass approximately 10 ml of sample to rinse and wet the filter. Run this filtrate to waste, away from other bottles and equipment.

After filtering

Actions

Discard all used filter equipment.
Store them separately, away from clean equipment to avoid contamination.
Dispose of filters and syringes as rubbish but try to arrange recycling, if possible.

Sample forms and labels

There are two types of Optical Character Recognition (OCR) forms used for submitting samples to the NLS.

Routine pre-planned forms

Ad hoc forms for samples that cannot be pre-planned or scheduled.

Completing a pre-planned OCR form

Guidelines for completing the form

Do not use photocopies of the pre-planned OCR form. Each form has a unique PRN that allows us to register it with the NLS and ensures sample continuity. Using a photocopy will create duplicate records, resulting in the sample not being analysed.

For accuracy, please print in **Block capital letters** using a **Black pen** and write **Inside the boxes**. Avoid contact with the edge of the box. Check boxes must be clearly marked with a cross inside the box. Appendix 1 – Ad hoc OCR form.

Completing the form

See Appendix 1 for an example of the pre-planned OCR form, and instructions on how to complete it:

Checklist

Use the checklist below to ensure you have completed the pre-planned OCR form correctly.

No	Check
2	Attach the complete label to the bottles.
3	Record any field measurements/observations in the appropriate boxes and keep your own separate record of the readings in case of query.
4	Have you filled in the form using block capital letters and a black pen and within the boxes?
5	Have you corrected any errors in marking the form been corrected as described above?
6	Leave in-situ result boxes blank if there are no results to enter. Do not enter a result as N.

7	<p>If any pre-scheduled labels are lost, do not put ad-hoc labels on the bottles.</p> <p>If possible, just write the relevant PRN number and bottle code (GEN, MET, and so on) on a blank label and stick it on the appropriate bottle. Failing this, write the PRN and code on the bottle using a permanent marker pen (or one that will not wash off).</p>
8	<p>Do not send extra bottles. If extra analysis is required at a prescheduled sampling site, samplers must complete an ad-hoc form for the additional analysis.</p>

Microbiological labelling

The following **MUST** be followed for every bathing and shellfish water sample:

- if you take a sample before 10.00 am you must put an orange sticker on the shoulder of the bottle and notify the [NLS helpdesk](#). Contact the helpdesk for more stickers.
- Label the bottle lid with the time and date of the sample, put the , sample point location and sample point number using a permanent marker on the side of the bottle (before the bottle comes into contact with any water), this helps the registration team at the NLS to register the samples quickly and smoothly.

If a pre-programmed sample is not taken due to health and safety reasons, staff sickness, let the [NLS helpdesk](#) know that they will be receiving fewer samples than expected,

Completing ad-hoc OCR forms

When to use ad hocs

Ad hoc samples should only be taken for:

- emergency call-outs,
- pollution incidents,
- samples requiring a rapid response.

Refer to the instructions below to fill out the form.

The NLS routinely monitor the number of ad hoc samples. The permitted number is governed by the Service Level Agreement between Regions and the NLS.

Formal samples

This instruction must be use in conjunction with the [15_04 Formal Sampling of the aquatic environment](#).

Formal samples **must** be correctly sealed and tagged, and placed in a completed, signed and sealed Evidence bag if a Section 9 Statement of Witness will be required from the laboratory.

The completed OCR form must be placed with the sample registration documentation. Please do not place OCR forms in the pouch of the Evidence bag and were possible please keep paper work separate, clean and flat. The bag must be completed, signed, sealed and left **clearly** visible and accessible for the courier to sign, prior to delivery to NLS Starcross.

For formal samples taken **outside normal working hours** (such as at weekends and Bank Holidays), make contact with the [NLS helpdesk](#) via the [Incidents Communications Service](#) (ICS). The NLS will arrange for receipt of the sample and organise emergency analysis if required.

It is **your** responsibility to organise the courier to collect the sample and transport it to the laboratory as quickly as possible. Using the normal courier service or make other arrangements if necessary.

3.8 Field measurements

Calibrated equipment and instruments

Only trained staff shall conduct field measurements using calibrated equipment and instrumentation. You must record this data immediately in the appropriate space on the sample registration document and in the sampler's log, worksheet or on the label.

You must follow the standard Environment Agency methods listed below for measuring temperature, dissolved oxygen, pH or conductivity:

- [528_06 Taking field measurements: using a multi-parameter meter](#)
- [529_06 Taking field measurements : using a thermometer](#)
- [530_06 Taking field measurements : using a dissolved oxygen meter](#)
- [531_06 Taking field measurements : using a pH meter](#)
- [113_07 Taking field measurements : using a conductivity meter](#)

If you are measuring any other determinand you must follow specific regional guidance.

Test kits

If using test kit please refer to the manufacturers instructions and ensure that all reagents with the kit are in date.

3.9 Sample traceability

Sample registration document

All samples must have a sample registration document so the NLS knows which analysis to carry out on each sample.

Bottle check

Before leaving the site, check that all the bottles have been filled.
Record any reason for incomplete sampling in the sampler's log or worksheet.

3.10 Transport and delivery of samples

Storing in a vehicle

Store equipment and sub-samples in the vehicle:

- in a safe and secure manner,
 - and in a way that prevents cross contamination between heavily contaminated sub-samples and equipment.
-

Cooling sub-samples

As soon as possible after sampling samples must be cooled to prevent deterioration of unpreserved sub-samples.

During transit use fridges for microbiology samples.

Aim to keep samples below 8° C, especially in warm conditions. Loosely cover the samples in bubble wrap if needed. Do not leave vehicles in full sun. Move the samples to the depot fridge as soon as possible.

Micro-biological samples

After collection and labelling, place ALL microbiological samples you have taken into a fridge for transport to the depot (EMS/NLS Temperature Project 2009). There is no change to the submission of non-microbiological samples.

Keep them at between 2 and 8° C.

Any arrangements to transport the samples to the NLS must ensure that spillage does not occur.

All microbiological samples must be sent to the NLS in red crates.

Sample analysis must **commence** no more than 24 hrs after the sample is taken in the field, as specified within the current Bathing Water Directive.

Access and security

When a sampler is delivering sub-samples directly to the laboratory, they shall be provided with all the necessary keys and access codes to obtain access and instructions for leaving samples and paperwork.

Storing sub-samples

Storing sub-samples at the NLS is subject to the requirements of the United Kingdom Accreditation Service (UKAS) and registered to ISO 17025.

3.11 Storage at depots

Security

Storage facilities shall be securely locked when unattended.
Access to the storage site, and any keys required, shall only be available to Environment Agency staff and authorised couriers.

Storing sub-samples and bottles

Storage of sub-samples, bottles, chemical reagents and equipment must be arranged to prevent contamination, loss or damage.

Refrigerating sub-samples

Store all unpreserved samples in a fridge/cold store

- Storage temperatures should be between 2-8° C.

Storing sample registration documents

Leave completed OCR forms in an obvious place and clearly labelled to allow the courier to find them and the courier will be able to sign any formal samples that may have been left.

Security and traceability checks

The sampler is responsible for the security and traceability of the sub-samples and the sample registration documents stored at the depot.

Check that sub-samples and labels are undamaged before storage.

Check that they are stored in the designated place.

Record and report all lost, damaged, broken or incorrectly labelled sub-samples.

Check that the sample registration documents are completed before storage in the designated place.

Replace damaged or illegible documents.

Depot housekeeping

Depots should be uncluttered with enough space to store all the required items of kit, bottles, crates and equipment.

Fridges should be big enough to handle all the samples collected. Samples should not be stored outside a fridge.

Fridges should be kept at the correct temperature and are calibrated and you have records of this.

Paperwork, OCR forms and transfer record logs, are kept flat and dry in a designated place.

Consider putting up a whiteboard so you can leave messages and communicate to the courier driver.

Items for collection by the courier are in designated places that are clearly labelled. This can include zones marked on the floor, labelled shelves and fridges.

Where fridges are used for other sample storage clearly label and mark off these areas.

Transfer record logs are filed and stored each day.

All team members play their part in maintaining the depot housekeeping rules.

Have regular clear out and tidy up days.

Minimise the storage of newly ordered items on the floor

Items no longer used removed from the depot for reuse, recycling or disposal.

Consider removing infrequently used items or storing them elsewhere.

Fridge checks

Check the temperature of all vehicle and depot fridges daily if dropping off microbiological samples for collection. See Appendix 4 for a record sheet to copy and attached to each depot / van fridge.

The NLS is planning to provide a new thermometer for all depot fridges and the ability to audit and replace them on a regular basis. This has been added to the NLS SLA for 2010/11.

EMS / NLS will set up an annual audit system to check on the progress of the fridge checks by re-running the testing that was carried out last summer using RFID tags.

3.12 Maintaining equipment

Action

Check all equipment.

Make sure that any necessary maintenance is carried out.

Report any loss, damage or poor performance of equipment, including poor or suspect calibration, to the supervisor.

4 Related documents

Links

Refer to the documents below and any other relevant documents in the NSPM.

- [528_06 Taking field measurements: using a multi-parameter meter](#)
- [529_06 Taking field measurements : using a thermometer](#)
- [530_06 Taking field measurements : using a dissolved oxygen meter](#)
- [531_06 Taking field measurements : using a pH meter](#)
- [113_07 Taking field measurements : using a conductivity meter](#)
- [23_09 Glossary of terms](#)
- [24_09 Equipment list](#)

Other related documents:

- [Health & safety procedures](#)
 - [81_07 Generic risk assessment - taking a sample from water](#)
 - [37_04 Generic risk assessment – fieldwork](#)
 - [426_05 Generic risk assessment - working in or near water](#)
 - [32_04 Generic risk assessment - boat work](#)
 - [33_04 Generic risk assessment – cleaning and disinfecting of equipment](#)
 - [767_06 Safe management of boat work](#)
 - [MSO4210 Personal protective equipment](#)
 - [32_05 Welfare facilities for field workers](#)
 - [Dynamic risk assessment e-learning package](#)
-

Appendix 1 – pre-planned OCR form

Guide to sample registration using pre-planned OCR forms

(O)PTICAL (C)HARACTER (R)ECOGNITION

For accuracy please print in **Block capital letters** using a **Black pen** and write **Inside the boxes** avoid contact with the edge of the box. Check boxes must be clearly marked with a cross inside the box

SAMPLER NO. SAMPLER NAME, DATE, TIME

All these **must** be filled in for each sample (even if it just a site visit).

SAMPLERS COMMENTS

Any comments entered will be passed through to WIMS, but **will not** be read by the analyst.

FIELD DETERMINANDS

These are used to record field measurements.

For example: temp of -2.1 would be entered with the minus sign in the 2nd box to the left of the decimal point, followed by the 2 and then the 1 entered after the decimal point. Follow the same convention for < or > values.

Only enter measurements for pre programmed dets. DO NOT enter your own

NOTES TO THE LABORATORY

Please contact the lab to notify of hazards or any special requests. Do not rely on this text box.

FLOW READINGS

Follow form details of how to complete.

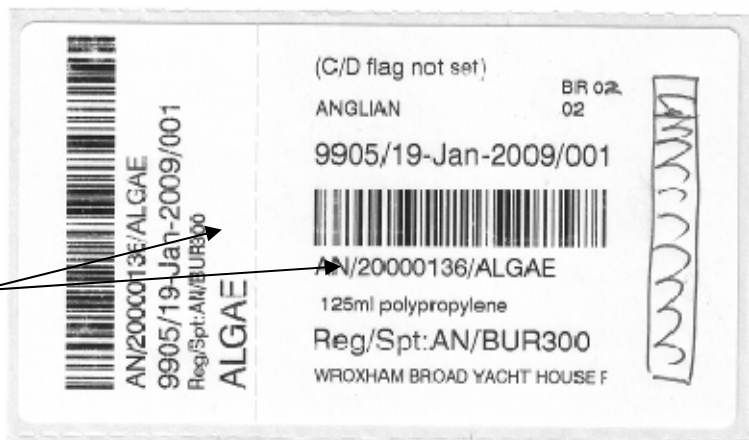
ERROR (S) ON FORM

Put a cross in this box if there are any errors on the form.

BAR CODE LABELS

The labels are provided on a separate sheet Samplers must **not** split prescheduled labels Each label comprises of a bar code also represented numerically.

Apply whole (both parts) label to bottle



Completion of the form

Please use the quick guide overleaf to ensure that you have completed the Planned OCR form correctly.

Correction of errors

Character Box: Put a cross from corner to corner and ensure that the contents of the box does not look like a character then write the correct entry above the box.

If you correct any errors please mark the 'error (s) on from' box with a X.

Appendix 2 – ad hoc OCR form

This is an Optical Character Recognition form, which is read by machine. Write in BLOCK CAPITALS only, using a BLACK BALLPOINT PEN. Only write in the text boxes, and avoid contact with the edge of the box. Text cannot be entered for any of these boxes by the NLS and interpretation can lead to errors. Remember that although you know the Area and Site names well, the staff at NLS may not.

These five must be filled in for every sample (even if it is just a site visit >>>

Sample point code
Site identification number

Material
What the sample is made of (see look up). Use the default for the site (check on WIMS)

Purpose
Why you have taken (see look up)

Sampler's code
Your ID number. Write this on the bottle labels as well.

Date & Time
These have to be ddmmyy and hhmm

Sampler's comments

Free text, notes on sample conditions, sample location (if miscellaneous). These comments **will not** be read by the analyst. These comments **will appear** on the public register.

Field determinands

Use this to record your field measurements, and also to record the presence or absence of Oil & Grease. Leave blank if no reading was taken. If you need to enter a minus, a "<" or a ">" for the measurement then write your reading in the boxes (note the decimal place), then write the appropriate sign in the next available box to the left of your reading. Keep your own record of these readings in case of query.

Additional field readings

Use these boxes for up to six more field dets. Record the four digit det code and the actual result (note the decimal place). The '26' is the method code.

Additional det/methods

You can request up to four more analyses by writing in the four digit det code + the two digit method code (see look up). You must use correct method code or will get no results. Always use the leading zeroes (for example 0085)

PRN

This is automatically generated number for the form. Write this on the bottle labels.

Project code

Use if charging, otherwise leave blank for SLA.

Grid reference (NGR)

This is particularly important for miscellaneous sample points (MISC).

Standards suites

These are the sets of analyses that are most commonly used.

Request the suite by marking X in the box. (see look up for bottle requirements)

Additional suites

You can request up to six more analytical suites by writing in the suite codes (see look up)

Notes to the laboratory

Use this to tell the analysts about any particular issues or hazards with the sample.

* Do not use this to request analysis.
* Do not use it as the sole source of H&S information; this **MUST** be on the bottles.

Form's bar code

Do not cover this when sticking your labels on

Bottle labels (x5)

Stick half of the pre-printed bottle label here. The other half must be stuck to the bottle. If you need to take more than five bottles for an ad-hoc sample you must use two forms

Bottle code (x5)

Write the bottle code that goes with the label. You **MUST** use the correct bottle and write its code otherwise you will get NO analysis results

Errors on form?

If you've made a mistake on the form, mark X in this box so that the form is checked manually

Label for the form

Stick this part to the adhoc form

Label for the bottle

Write your Sampler ID and the PRN of the ad-hoc form on to this label, and then stick this part to the bottle.

Appendix 3 – additional codes needed to complete ad hoc OCR form

Purpose	
Code	Description
UF	Pollution incidents - formal sample unplanned
UI	Pollution incidents - unplanned
II	IPPC/IPC investigation
WI	Waste investigation

Suites		
Code	Description	Bottle/s required
ALCK	Alcohols and Ketones	SOLV2
BACTI	Microbiology - Basic	BACTC
CARB	Carbamates	CARBA
EFFB	Effluent - Basic	GEN
EFFF	Effluent – Formal	GEN
FKILL	Unknown Fish Kill	GEN, MET, GCMS
HERBP	Phenoxy Acid Herbicides	HERBP
HSOLV	Halogenated Solvents	SOLV
MET	Metals Total	MET
METD	Metals Dissolved	METD
NUTS	Nutrients - Freshwater	GEN
OSPILL	Oil Spill	OILIR, OILQ
OTIN	Organo Tins	TBT
PAH	Poly-Aromatic Hydrocarbons	PAH
PESTC	Pesticides Chlorinated	PESTC
PESTP	Pesticides Phosphorus	PESTP
PHEN	Phenolic Compounds	PHEN
PYRET	Pyrethroids	PYRET
RIVB	River – Basic	GEN
RIVF	River – Formal	GEN
RTA	Firewater & Road Traffic Accidents	GEN
TRIAZ	Triazines	PESTP
URONS	Urons	URON

Field observations		
Code	Result	Description
0664	0	No oil or grease present
	1	Oil or grease present
6841	0	No phenolic odour present
	1	Phenolic odour present
7668	0	No flow/discharge
	1	Sampling point inaccessible (flooded)
	2	Incllement weather (frozen)
	3	Any other reason, see comments

Additional determinand/method		
Det	Method	Description
0111	21	Ammonia
0119	25	Ammonia (unionised)
0085	21	Biochemical Oxygen Demand – BOD
0108	21	Cadmium (total)
0092	21	Chemical Oxygen Demand – COD
6450	21	Copper (dissolved)
0050	21	Lead (total)
1066	21	Oils/Hydrocarbons
0135	21	Suspended Solids – SS
6455	21	Zinc (total)

Material	
Code	Description
1AZZ	Borehole gas
1ZZZ	Any gas
2AZZ	River / running surface
2CZZ	Surface drainage
2EZZ	Groundwater
2FZZ	Canal water
2GZZ	Pond / lake / reservoir
2HZZ	Estuarine water
2IZZ	Sea water
2MZZ	Mine water
2ZZZ	Any water
3ZZZ	Any non-aqueous liquid
4AZZ	Final sewage effluent
4BZZ	Crude sewage
4CZZ	Storm sewer overflow
4ZZZ	Any sewage
5ZZZ	Any trade discharge
6ZZZ	Any leachate
8ZZZ	Any solid/sediment – unspecified
9ZZZ	Any biota

Bottles	
Code	Description
BACTC	1l clear PET sterile
CARBA	1l glass - PTFE liner
GCMS	1l glass - PTFE liner
GEN	1l clear PET
HERBP	1l glass - PTFE liner
MET	125ml polypropylene
METD	125ml polypropylene
OILIR	1l glass - PTFE liner
OILQ	1l glass - PTFE liner
PAH	1l glass - PTFE liner
PESTC	1l glass - PTFE liner
PESTP	1l glass - PTFE liner
PHEN	250ml glass-clear stopper +pre
PYRET	1l glass - PTFE liner
SOLV	250ml clear PET
SOLV2	250ml clear PET
TBT	1l glass - PTFE liner
URON	250 ml PET / 1l glass - PTFE liner

Methods	
Code	Description
21	Low
22	High
23	Saline
26	Field

