

Environmental Protection Report

A GUIDE TO CHEMICAL SAMPLING PROCEDURES

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FC/92/001

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NRA

National Rivers Authority

South West Region

INTRODUCTION

As a Sampling Officer you undertake an important function within the organisation, as the accuracy of the results obtained is largely dependant on the way you take the sample. Being field based you are also constantly in the public eye, and as such should be beyond reproach at all times. Carry out your duties professionally and with respect for both property and farm stock.

Water quality monitoring provides information that is vital to many sections within our organisation. Outlined below are a number of areas in which the results obtained from the samples you take will be used.

1. To identify long term changes in water quality.
2. To determine present levels of harmful or potentially harmful pollutants.
3. To classify quality and identify where maintenance/improvement is necessary.
4. To provide information for central government including satisfying the requirements of EEC Directives.
5. To assess discharge consent compliance and to give warning of possible treatment plant malfunctions or breakdowns.

The following notes when read in conjunction with "A Guide to Sampling Bottles and Their Use", will provide general guidance on how to sample both efficiently and safely.

In order that a more detailed description can be obtained, the sampling of rivers and trade discharges will be discussed separately.

RIVER SAMPLING

Before leaving on a sampling run all officers must inform Control Room of the following.

1. Destination (route etc).
2. Check in times (lunch).
3. Estimated finishing time.

If you are going to finish late for any reason contact Control with revised finishing time. This is for your own protection, as should you have an accident someone can then come and look for you.

The aim in all sampling is to obtain as representative a sample as possible without compromising the Sampling Officer's personal safety. On arrival at the sampling point always take the trouble to check around the site noting any signs of pollution. These should be reported to the pollution department immediately, and noted in the observations section on the samplers log sheet. Remember as field staff you are the eyes and ears of the Authority, a few minutes observation could be the difference between a localised problem and a major pollution.



A sample wherever possible should be taken direct from the river, a bucket or sampling pole should only be used if access is difficult or dangerous. Samples should be taken facing upstream and in the main flow if this is practical. Should you have to use a bucket or jug, thoroughly rinse this with sample prior to filling bottles. In this instance unless a bacteriological sample is to be taken always fill suspended solids bottle first to avoid settlement of larger particles.

Temperature and dissolved oxygen readings must be taken at every site with the meters provided, and the readings recorded on the samplers logsheet (see Appendix 1). Make sure when labelling samples that the following have all been completed.

- (a) Correct bottles have been used.
- (b) Label is correct for both bottle and site.
- (c) All information on samplers log is filled in both accurately and legibly.

In summary when sampling from a river rely on your own judgement of the conditions at the time. If the river is in flood or the banks are steep and slippery, take the sample with a bucket or pole. Personal safety should be your first priority, wear a lifejacket at all times.

TRADE SAMPLES

SWW Discharges

Before entering any South West Water Sewage Treatment Works, the relevant area office should be notified by telephone. This also applies when leaving the premises. Some of the larger works are manned, in this instance signing in at the office will suffice.

Final effluent sampling points vary greatly depending on the type of works and the nature of the site. It is extremely important that all samples are obtained from the correct point. In many cases these are clearly marked, however plans of each works showing the sampling points are available from the audit technician.

Samples should be taken using a jug or sampling pole again making sure to avoid cross contamination by rinsing the receptacle first. Due to the nature of the samples being taken always use gloves and bactericidal wipes.

When sampling up and downstream of the discharge the same procedure as for rivers should be followed. Always take the downstream sample first. As a guide ten times the width will allow for adequate mixing. However consideration should be given to the nature of the watercourse and adjustments made accordingly. For example a fast flowing stream with a steep gradient will mix more rapidly than a wide slow flowing river. As with river sampling, up and downstream samples require dissolved oxygen and temperature readings to be taken. However, effluent samples need temperature only, again make sure bottles are correctly labelled and logsheets have been completed.

Non SWW Discharges

These should be sampled in the same way as SWW discharges. It is important to note however that many of these discharges serve only a small number of premises, for example a public house or a row of cottages and as such will often not be flowing. Again use your own judgement, do not wait around trying to obtain a sample from a discharge that only flows occasionally. As with SWW works maps showing discharge points are available from the audit technician.

Fish Farms

When sampling fish farms the same procedure as for SWW discharges should be adopted, except that a dissolved oxygen reading of the discharge is also needed. Many also require notice before sampling so always check first.

To avoid the risk of introducing diseases set procedures should be adopted before entering premises. A separate pair of wellingtons will be provided for fish farms only, these should be sprayed with disinfectant prior to sampling each fish farm.

When taking trade samples observe any site reporting in and out procedures, and wear a hard hat when required to do so. Exercise care at all times, you will often be on your own and it might be some time before anyone finds you. Access to sampling chambers can be difficult, raceways and riverbanks can get very slippery. Therefore be aware of the dangers at all times.

Sampling from a Boat

When sampling estuaries and reservoirs it is often necessary to use a boat, so that depth samples can be obtained. In this instance you will always be accompanied by at least one other person. They will be both a competent boat handler and trained in the operation of the sampling equipment used. Should you become involved in these programmes training will be given by the relevant technician.

In the guidelines already discussed I have tried to promote a general awareness of the risks involved in water sampling. It is vital however that you read the following Safe Systems of Work Guidelines and act upon them at all times.

Sample Hygiene

It is important that during sampling procedures hygiene methods are always adopted. Where possible contact with sampling equipment (e.g. bottles) should be kept to a minimum so as to avoid cross contamination. This is best achieved by the use of disposable gloves.

Particular care must be taken when taking microbiological samples (e.g. bacteriological). All bottles used for such purposes in addition to being clean must be sterile and stoppered. This stopper must not be removed until immediately prior to use and all care must be taken to avoid unnecessary

contact with the stopper by hand. Contact with the neck of the bottle should be avoided at all times. During the sampling process the bottle should always be held by the base and should be filled by plunging the bottle into the water neck downwards to a depth of about 0.3m (where possible/relevant) below the surface. The bottle should then be tilted so that the neck points slightly upwards, faces the current and proceeds to fill.

By adopting the majority of the above policies i.e. physical contact with bottles kept to minimum and avoid touching the neck of the bottle, then the risk of cross contamination or indeed any form of contamination should be avoided.

In the guidelines already discussed, we have tried to promote a general awareness of the risks involved in water sampling. It is vital however that you read the following Safe Systems of Work Guidelines and act upon them at all times.

[EP.FC]NM_140192_JLM_SAMPLING_PROCEDURES.WP

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

SAFE SYSTEM OF WORK

FRESHWATER INVESTIGATION TEAM

REFERENCE: SA5

ACTIVITY	HAZARDS
Working alongside a deep or fast moving river, or a deep bank site	Drowning Exposure Personal injury

THE FOLLOWING INSTRUCTIONS MUST BE COMPLIED WITH:

- 1. MINIMUM NUMBER OF STAFF:**
1 or 2 as necessary depending on river conditions
- 2. PROTECTING CLOTHING AND SAFETY EQUIPMENT:**
Life Jackets
Helmet (if falling is a possible hazard)
Appropriate Footwear
- 3. SURVIVAL EQUIPMENT:**
Throwing line (where 2 operators or more involved)
- 4. COMMUNICATIONS PROCEDURE:**
Report back procedure at start and finish of exercise. Telephone Communications Room at start and finish of the exercise. Communications Room telephone numbers Exeter (0392) 442009.
- 5. OTHER PRECAUTIONS TO BE TAKEN:**
Select as safe a site as possible to enable task to be carried out.
- 6. IN AN EMERGENCY**
Inform emergency services (999), Communication Room and immediate superior as soon as possible.

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

SAFE SYSTEM OF WORK

REFERENCE: SA6

ACTIVITY

HAZARDS

Working from the shore (Estuaries and Coastal Waters)

Drowning
Being stranded
Personal injury
Exposure in cold weather

THE FOLLOWING INSTRUCTIONS MUST BE COMPLIED WITH:

All staff taking part in such surveys must be familiar with the sheet "Working in remote locations". Ref SA2.

1. MINIMUM NUMBER OF OPERATORS:

1 or 2 depending on local conditions. Major surveys will involve a survey team with team leader.

2. PROTECTIVE CLOTHING AND SAFETY EQUIPMENT:

Warm, waterproof outer jackets
Thigh boots - studded
Stakes and ropes where necessary for line to be established to work point
Can of water and towel for washing
Thin gloves

3. SURVIVAL EQUIPMENT:

Life jackets (when in proximity of deep water)
First aid kit on site
Throwing line
Whistle

4. COMMUNICATIONS PROCEDURE:

Team should have made office aware of each location point, time of start and finish of each survey. If working outside normal hours the Communications Room should be informed of the location and estimated time of completion of the survey. Confirm with base or Communications Room if outside working hours, when the survey is complete. Team leader will check each member at start and finish.

Communication telephone no. Exeter (0392) 442009.

5. OTHER PRECAUTIONS TO BE TAKEN:

6. IN AN EMERGENCY

Inform Emergency Services (999), Communications Room and immediate superior as soon as possible.

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

SAFE SYSTEM OF WORK

REFERENCE SA2

Report-Back Procedure

Personnel working alone, whether out in the field, or at installations are instructed not to carry out activities, or work in situations, that are clearly hazardous. However, there are other activities and situations which do not normally present special hazards to individuals working alone, e.g. carrying out "safe" activities at remote unmanned sites. In these circumstances unforeseen accidents can occur, for example, by falling and becoming incapacitated, and "report-back" arrangements to a Communications Room have been set up to offer protection.

Please familiarise yourself with the standard procedure set out below and use it in single manning situations where potential hazards exist. If you have any queries please refer them to your immediate superior.

It is important to remember that you have a responsibility for your own safety, so please make full use of this procedure for your own protection.

Report-Back System for Single Manned Operations

All persons undertaking field work by themselves will operate the following report back system using either two way radio or vodaphone where provided or the PSTN telephone system.

1. Operations Undertaken During Normal Working Hours
i.e. Monday-Friday, 0830 - 1630 hours excluding public holidays.
 - 1.1 Before leaving your base, advise the local office/communications room of your destination and expected time or return.
 - 1.2 If you are away for more than four hours or if you consider that your activities are potentially hazardous, arrange a suitable report back system, at convenient time intervals, with the control room. ENSURE THAT REPORT BACK CALLS ARE NEVER OVERDUE.
 - 1.3 Report immediately to the office on return to base or on completion of the hazardous activity, as appropriate.
 - 1.4 If you continue work outside the above hours, arrange with the office to extend the system by implementing (2) below.

1.5 If an agreed report back call is 30 minutes overdue then the following procedure should be adopted.

1.5.1 If a two way radio or vodaphone system is being used then attempts should be made to raise the user.

1.5.2 If a telephone system is being used then a senior officer in the section must be advised of failure to receive a report.

If no senior officer is available then the Health and Safety Adviser should be contacted. After checking the normal office contact point the senior officer should make arrangements to initiate a search.

2. Operations Undertaken Outside Normal Working Hours

2.1 The Communications Room will monitor report back arrangements out of normal working hours.

2.2 Continuing work commenced during normal working hours, arrange for the local switchboard to pass the monitoring role to the Communications Room at 16.30 hours.

2.3 Starting and finishing outside normal working hours make arrangements as in 1.1 to 1.3 above, with the Communications Room.

2.4 Ensure your spouse, near relative, etc. knows of your whereabouts and expected time of return and advise them to contact the Communications Room if your non-arrival at home is cause for concern. The Communications Room will then initiate 2.6 below.

2.5 Report immediately to Communications Room on returning home or on completion of the hazardous activity, as appropriate.

2.6 If an agreed report back call is more than 30 minutes overdue the following action should be taken by Communications Room.

2.6.1 If two way radio or vodaphone is available, attempt should be made to raise the user.

2.6.2 If telephone is being used then a senior officer in the section should be notified. If no senior officer can be raised then the Health and Safety Adviser should be contacted.

After checking office and home by telephone, arrangements should be made by the senior officer to initiate a search.

Communications Room will have an up-to-date list of home addresses and telephone numbers of senior staff.

Communications Room telephone numbers Exeter (0392) 442009.

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

ENVIRONMENTAL PROTECTION

SAFE SYSTEM OF WORK

REFERENCE SA8

ACTIVITY	HAZARDS
Short stop tasks in the public highway	Traffic

THE FOLLOWING INSTRUCTIONS MUST BE COMPLIED WITH:

1. MINIMUM NUMBER OF OPERATORS

Daytime - 1
Nighttime - 2

2. PROTECTIVE CLOTHING AND SAFETY EQUIPMENT

- (a) Use vehicle and hazard warning lights or authority vehicle with rotating beam lamp if available.
- (b) High visibility reflective jackets.
- (c) As appropriate
 - (i) Fold away barriers with keep left/right signs, plus other warning signs and cones as necessary.
 - (ii) Amber flashing lights for night work.

3. SURVIVAL EQUIPMENT

4. COMMUNICATIONS PROCEDURE

Office booking-out procedure during day.

Report back procedure with Communications Room outside office.
Communications Room telephone numbers Exeter (0392) 442009.

5. SKILLS, KNOWLEDGE AND TRAINING REQUIRED

Make a detailed assessment of the potential hazards associated with each specific location e.g. consider type of road and traffic conditions.

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

SAFE SYSTEMS OF WORK SA 13

ACTIVITY

Sampling from a deep water river bank site.

HAZARDS

Drowning
Exposure in cold weather

THE FOLLOWING INSTRUCTIONS MUST BE COMPLIED WITH

1. MINIMUM NUMBER OF OPERATORS

1 or 2 as necessary depending on river conditions.

2. PROTECTIVE CLOTHING AND SAFETY EQUIPMENT

Life Jackets
Safety Helmets
Helmet (if falling is a possible hazard)
Appropriate Footwear

3. SURVIVAL EQUIPMENT

Throwing line (where 2 operators or more involved)

4. COMMUNICATIONS PROCEDURE

Report back procedure at start and finish of exercise using
Communications Room. Communication Room number Exeter (0392) 442009.

5. SKILLS, KNOWLEDGE AND TRAINING REQUIRED

Training in river sampling procedure.

6. OTHER PRECAUTIONS TO BE TAKEN

Select as safe a site as possible to enable task to be carried out.
Ensure harness is properly secured, at both ends.

7. IN AN EMERGENCY

Inform emergency services (999), Communications Room and immediate
superior as soon as possible.

Communications Room : Exeter 444000 (or 4443900), Linkline 0800 37 8500
0392 70593/70594/442009.

SECTION 3 (H)

GENERAL HYGIENE PRECAUTIONS

Staff should carry supplies to antiseptic tissues to clean their hands at mealtimes and at the end of the working day, if other washing facilities are likely to be not available.

Foot and Mouth Regulations, when in force, should be rigidly adhered to, and boots and equipment disinfected as necessary.

Any cuts or grazes should be promptly attended to, and more serious injuries entered in the Accident Book as soon as is practicable.

The recommendations of safe system of work Ref SA3 should be followed at all times.

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

SAFE SYSTEM OF WORK

FRESHWATER INVESTIGATION TEAM

REFERENCE: SA14

ACTIVITY

HAZARDS

Sampling from boats (Inland Waters)

Drowning
Manual handling
Exposure in cold weather

THE FOLLOWING INSTRUCTIONS MUST BE COMPLIED WITH:

1. MINIMUM NUMBER OF STAFF: 2
2. PROTECTING CLOTHING AND SAFETY EQUIPMENT:
Waterproof and windproof jackets and overtrousers.
Rubber boots - not studded/
3. SURVIVAL EQUIPMENT:
Life Jackets
Safety line
Throwing line
4. COMMUNICATIONS PROCEDURE:
Report back procedure at start and finish of exercise. Telephone
Communications Room at start and finish of the exercise. Communications
Room telephone numbers Exeter (0392) 442009.
5. OTHER PRECAUTIONS TO BE TAKEN:
Avoid sudden movements
Do not use small boats in spate conditions
Equipment etc., will be loaded and secured when moored
Do not overload the boat
6. IN AN EMERGENCY
Inform emergency services (999), Communication Room and immediate
superior as soon as possible.

2. Carry out radio check and inform Control Room of area of operation and relevant times of departure and return. Exeter (03992) 442009.
3. If sampling/inspecting at sewage treatment works or water treatment works - notify site Superintendent or comply with relevant access agreement.
4. Sample bottles to be carried in containers provided.
NOTE: Samples bottles not to be carried in pockets or other parts of clothing.
5. Put on approved life jacket or buoyancy aid.
6. Put on approved life line if applicable.
7. Sampling/Inspecting officer to continuously monitor weather, river levels, tidal movement and currents. If there is any deterioration which could affect the personal safety of the Sampling/Inspecting Officer, then the task must be aborted.
8. Upon returning to the vehicle, the Control Room must be informed of safe return.
9. On a major survey the Team Leader will:-
 - a) Brief staff
 - b) Carry complete spare set of equipment
 - c) Check each Sampling/Inspecting Officer at start and finish of survey.

The foregoing safe system of work must be read in conjunction with the Water Industry Health and Safety Advisory Broadsheet Nos:-

3.1, 3.10, 3.23.

APPENDIX 1

RESULT CODES/MEANINGS

- a. Time - use 24 hour clock
- b. Temperature/DO% - Take readings with meter, for DO use percentage saturation only.
- c. Weather temperature -
- | | |
|---|-----------|
| 1 | very cold |
| 2 | cold |
| 3 | mild |
| 4 | warm |
| 5 | hot |
| 6 | very hot |
- d. Weather precipitation -
- | | |
|----|-----------------------------|
| 1 | dry |
| 2 | showery |
| 3 | occasional heavy rain |
| 4 | light rain |
| 5 | rain |
| 6 | heavy rain in past 24 hours |
| 7 | sleet |
| 8 | hail |
| 9 | occasional snow |
| 10 | light snow |
| 11 | heavy snow |
| 12 | snow lying |
| 13 | frosty |
- e. Flow
- | | |
|---|---------|
| 0 | no flow |
| 1 | drought |
| 2 | low |
| 3 | normal |
| 4 | high |
| 5 | spate |
- f. Samplers Comments - Insert here any relevant observations you make whilst taking the sample.

NM/JLM
27 January 1992

[EP.FC]NM_270192_JLM_APPENDIX1.WP

22nd Jan 1992

** SAMPLER'S LOG **Sampler : R WALMSLEY
ROUTINE AUDITRun Id.: ST01 / 27-JAN-92 / 1
(Last Mod.: 22-JAN-92 14:32 hrs.)

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Seq. 10 Spt. P05E/P/10 BELLBOOK VALLEY TROUT FARM SS8970020200

Purpose : RA ROUTINE AUDIT

Bottle Types: GEN SSLDS

** TIME ** ARGs: S182

* TAKEN * Tot. No. of Bottles : 2

* * Insitu Res.: TEMP D.O.% WEATH TEMP WEATH PREC FLOW

* A * B B C D E

Sampler's Comments : F

Seq. 20 Spt. R05E022 U/S BELLROCK VALLEY TROUT FARM SS8970020200

Purpose : RA ROUTINE AUDIT

Bottle Types: GEN SSLDS

** TIME ** ARGs: S182

* TAKEN * Tot. No. of Bottles : 2

* * Insitu Res.: TEMP D.O.% WEATH TEMP WEATH PREC FLOW

* * B B C D E

Sampler's Comments :

Seq. 30 Spt. R05E023 D/S BELLROCK VALLEY TROUT FARM SS8970020200

Purpose : RA ROUTINE AUDIT

Bottle Types: GEN SSLDS

** TIME ** ARGs: S182

* TAKEN * Tot. No. of Bottles : 2

* * Insitu Res.: TEMP D.O.% WEATH TEMP WEATH PREC FLOW

* * B B C D E

Sampler's Comments :

Seq. 40 Spt. P05E/P/61 RAINBOW VALLEY FISH FARM - EFF SS9310021700

Purpose : RA ROUTINE AUDIT

Bottle Types: GEN SSLDS

** TIME ** ARGs: S182

* TAKEN * Tot. No. of Bottles : 2

* * Insitu Res.: TEMP D.O.% WEATH TEMP WEATH PREC FLOW

* * B B C D E

Sampler's Comments :

Seq. 50 Spt. R05E032 RIVER EXE U/S RAINBOW VALLEY SS9210021700

Purpose : RA ROUTINE AUDIT

Bottle Types: GEN SSLDS

** TIME ** ARGs: S182

* TAKEN * Tot. No. of Bottles : 2

* * Insitu Res.: TEMP D.O.% WEATH TEMP WEATH PREC FLOW

* * B B C D E

Sampler's Comments :