



guardians of drinking water quality

DRINKING WATER INSPECTORATE
Zone 2/F4, Ashdown House
123 Victoria Street, London, SW1E 6DE

Direct Line: 020 7944 5933
Enquiries: 020 7944 5956
Facsimile: 020 7944 5969

E-mail: michael.rouse@defra.gov.uk
DWI Website: <http://www.dwi.gov.uk>

DWI Information Letter 3/2002

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To: Board Level Contacts in Water Service Companies and Water Companies in England and Wales

Dear Sir or Madam

CRYPTOSPORIDIUM IN WATER SUPPLIES: GUIDANCE ON LOW-PRESSURE MEMBRANE INTEGRITY MONITORING

Purpose

1. The purpose of the letter is to provide guidance on the criteria that should be used in preparing proposals for integrity testing of membrane systems installed under the provisions of the requirements of the Water Supply (Water Quality)(Amendment) Regulations 1999 (the Regulations) for the removal of *Cryptosporidium* oocysts from drinking water supplies.
2. The suitability of the membrane integrity monitoring system should be considered as part of the commissioning of membrane systems being installed under the agreed improvement programmes for *Cryptosporidium* removal.

Introduction

3. The Regulations require that, where there is a significant risk for *Cryptosporidium* as defined in the Regulations, a water undertaker uses a process for treating the water to secure compliance with the Regulations and monitors the effectiveness of that process. Under the associated guidance to the Regulations, treatment that is capable of continuously removing or retaining particles greater than one micron diameter will not require compliance monitoring provided the process is subject to continuous monitoring and shutdown or turn out on failure.
4. Appropriate approved membrane filtration will meet this specification. However an adequate level of integrity monitoring has to be incorporated into the process design in order to demonstrate that the required criteria are met fully.

5. At the end of January 2001, the Inspectorate appointed consultants to carry out an initial assessment of procedures being proposed, or already in place, for the integrity monitoring of low-pressure membrane systems. The Inspectorate is minded to accept the findings of the study, which will feed into a longer term and more detailed study that is being carried out in association with the American Water Works Association Research Foundation. This study is due for completion early in 2003 and the findings will be made available to the industry when the final report is published.

Provision of generic guidance

6. At this stage, with currently known membrane integrity technology and the lack of common operational practice, it is not possible to set out complete generic guidelines for integrity test procedures.
7. In the absence of operationally proven integrity test regimes water companies should employ the current 'best available technology' to meet the Inspectorate's requirement of continuous removal of particles greater than one micron diameter. The Inspectorate considers a log removal approach to be invalid in terms of meeting the specific requirements of the Regulations. This is because log removal is empirical and based on tests carried out at a range that is outside the requirements of the treatment standard.
8. The five key aspects for achieving an integral membrane system are:
 - o type of integrity test (for example Pressure Decay Test, Diffusive Airflow Test, or conductivity in the case of reverse osmosis membranes);
 - o integrity test criteria and settings (pressures, alarm settings etc);
 - o frequency of integrity test (daily, weekly etc);
 - o performance requirements (ie meeting the continuous removal of particles greater than one micron diameter); and
 - o management of process and information (data management, shutdown procedure etc)

These points are covered in more detail in Annex 1, along with guidance on the type of information that should be included in membrane integrity testing proposals.

9. A pragmatic approach needs to be adopted for the selection of the membrane integrity test, the test criteria and frequency of testing. The selection of the test criteria and frequency of testing should be based on the risks, economics, plant size and the practicalities of the type of test. A daily test frequency would be consistent with the requirements of the continuous regulatory sampling. Intermittent monitoring at an appropriate frequency, based on system design and risk of failure, may be more suitable if an acceptable level of risk can be demonstrated. However this would need to be agreed with the Inspectorate before being adopted.

10. The Inspectorate accepts that the process of integrity monitoring testing will evolve as more membrane systems are installed for Cryptosporidium removal. Further research may be needed in some areas, for example, on the feasibility of using a higher starting pressure for pressure decay tests to enable smaller diameter breaches to be detected, and to improve the sensitivity of the measurement. The Inspectorate will also take account of the advice given in the American Standards for Testing Materials standard practice for integrity testing of membrane systems, when this is published. Further guidance will, therefore, be given in the light of better knowledge.
11. Some water companies have assumed that membrane approval includes approval of the associated membrane integrity testing system. This is not the case. Membrane manufacturers and system suppliers need to work with the industry to develop suitable membrane integrity tests appropriate for the Regulations and companies must satisfy themselves accordingly.

Proposals for membrane integrity monitoring systems

12. Proposals for membrane integrity testing have to be submitted to the Inspectorate for each installation so that the Inspectorate can satisfy itself that they are consistent with current best practice. Such proposals should also form part of the commissioning process. Accordingly compliance monitoring should continue at those sites where it is currently in place until it can be demonstrated that the process is meeting the regulatory requirements.

Other matters

13. The Inspectorate would like to thank the membrane suppliers and water companies that provided an input into the study. Those parts of the report that are not considered to be 'commercial in confidence' will be made available to the industry and will appear on the Inspectorate's web site.

Enquiries

14. Any enquiries about this letter should be addressed to or David Drury (020 7944 5976) or Claire Jackson (020 7944 5977).
15. Copies of this letters are being sent to Pamela Taylor, Chief Executive, Water UK; Rodney Anderson, Water Supply and Regulation Division, Department for Environment Food & Rural Affairs; Bob Macey, Environment Division, The National Assembly for Wales; Tim Hooton, Water Services Unit, Scottish Executive; Randal Scott, Drinking Water Inspectorate for Northern Ireland; and Rowena Tye, Office of Water Services.
16. Please acknowledge safe receipt of this letter using the enclosed slip and envelope.

Yours faithfully,

M J Rouse
Chief Inspector