

G The *Cryptosporidium* Regulations

- Following major outbreaks of water-related cryptosporidiosis in Torbay in 1995, and north London and Hertfordshire in 1997, new Regulations were introduced in 1999 to ensure drinking water was treated adequately to remove *Cryptosporidium* oocysts.
- These Regulations are now part of the Water Supply (Water Quality) Regulations 2000¹ (the new Regulations).

The Regulations

The Water Supply (Water Quality) (Amendment) Regulations 1999 (the 1999 Regulations) came into force on 30 June 1999. These have been incorporated as regulations 27, 28 and 29 in the new Regulations and came into force on 1 January 2001 in England and 1 January 2002 in Wales

The Regulations set a treatment standard of an average of less than one oocyst in 10 litres of water supplied from a treatment works. The standard does not take into account different species of *Cryptosporidium*, nor whether any oocysts detected are viable, i.e. alive and potentially able to cause infection.

It is an offence to contravene the standard, subject to a defence by the company that it took all reasonable steps and exercised all due diligence to avoid committing the offence.

The Regulations specify continuous sampling of not less than 40 litres per hour of treated water going into supply at all sites where there is a significant risk of the treatment standard being contravened. The Regulations also specify the conditions that have to be met for the collection and analysis of the samples taken, and the reporting of the results, and it is an offence, subject to the same defence as above, if these conditions are not met.

Implementing the Regulations

Water companies were required to carry out a risk assessment for each of their water treatment works by 30 September 1999. New works must be assessed before they can be brought into use. Guidance on the risk assessment was issued with the 1999 Regulations and can be found on the Inspectorate's web site.

The guidance identified factors that contribute towards the assessment of significant risk, i.e. the quality of the source water; the catchment; whether direct abstraction, or abstraction with storage of less than seven days from a river or stream, was involved; any evidence of rapid surface water connection to an aquifer used for groundwater abstraction; the type of treatment provided; and any past history of an unexplained outbreak of drinking-water-related cryptosporidiosis, where no specific action had been taken to prevent recurrence. All risk assessments were checked by the Inspectorate to establish whether there was a significant risk of contravening the standard.

The significant risk classification does not imply a contravention of the standard, but rather that there is potential for a significant number of *Cryptosporidium* oocysts to be present at times in the treated water.

For works identified as at significant risk, water companies must treat the water to ensure that the standard is met. They must also demonstrate compliance by continuously monitoring the water leaving the works and reporting the results of the daily analysis to the Inspectorate. All regulatory sample points were audited at least once during 2002.

The initial risk assessments identified 332 sites as being at significant risk. Of these, 158 sites were works treating surface waters and the remaining 174 sites were groundwater abstractions. Water companies may

1 The Water Supply (Water Quality) Regulations 2001 in Wales.

submit new risk assessments to the Inspectorate if they believe a site is no longer at significant risk, for example when a new treatment process has been installed and is operating successfully.

The treatment processes at sites of significant risk should be operated and maintained at an appropriate level to meet the standard. As an alternative to continuous monitoring, a water company may install a treatment process capable of continuously removing or retaining particles greater than one-micron diameter. The company then has to demonstrate to the Inspectorate the efficacy of the process.

In cases where suitable treatment cannot be installed, companies are either abandoning sites of significant risk, or are combining sources for treatment at another works with an appropriate level of treatment.

Improvement Programmes

Where a site has been identified as being at significant risk and the current treatment is considered to be inadequate, the Inspectorate agreed an improvement programme with the water company for appropriate treatment to be installed, or for the source to be abandoned or changed.

Until treatment is installed or other action taken, water companies are encouraged to monitor the treated water continuously and report these operational results to the Inspectorate. However, these data are not included in the regulatory results reported below.

At the beginning of 2002, 17 companies had 145 improvement programmes of work in place for the removal of *Cryptosporidium* oocysts. Sixty-one of the programmes were due for completion during 2002. Thirty-nine were completed on or close to schedule, 11 were delayed due to circumstances outside the company's control and 11 programmes were subject to review in respect of their risk assessments. A further six schemes carried over from preceding years were also completed during 2002. The Inspectorate is monitoring progress with delivery of the ongoing programmes.

One company also had 16 undertakings in place for *Cryptosporidium* removal schemes. Six of these schemes were due for completion during 2002 and two of these schemes were completed ahead of schedule. The other four schemes were delayed for reasons outside the company's control. Three of these schemes were completed by the end of the year and the fourth required a new undertaking to be submitted.

Analysis of Samples

The protocol issued with the 1999 Regulations sets out the requirements for the laboratory facilities and analytical method that must be used for compliance testing. Analysis can only be carried out at laboratories approved by the Inspectorate and these are subject to both announced and unannounced inspections. During 2002 each of the approved laboratories has had at least one announced and/or one unannounced audit.

Samples must be analysed within three days of being taken, unless there has been a significant increase in the turbidity of the water being sampled, or there is some other indication that the number of *Cryptosporidium* oocysts in the water may have increased. In this case, analysis must be completed within a day of the sample being taken.

Strict rules are laid down for all aspects of sampling and analysis. These rules ensure that suitable chains of evidence are available as testimony, if required, in a court of law. Full details of all the approved procedures are available on the Inspectorate's web site.

Sample Results in 2002

During 2002, 47,049 regulatory samples were taken from 149 sites. Very low numbers of oocysts were detected in 893 (1.88%) samples taken from 102 (68.5%) sites.

Most of the detections were in the range 0.01 – 0.10 oocysts per 10 litres. The regulatory standard was not contravened at any site during 2002. The Inspectorate is unaware of any outbreaks of cryptosporidiosis associated with the water supplied from those water treatment works identified as being at significant risk.

The monitoring results clearly demonstrate that treated drinking water is not a major source of exposure of the population to *Cryptosporidium* oocysts.

The treatment standard and continuous monitoring for *Cryptosporidium* that is in place in England and Wales is unique in the world. The large amount of data that is collected allows the Inspectorate and the water industry to demonstrate, confidently, that well-operated, conventional physical-barrier water treatment enables drinking water to meet the required treatment standard for *Cryptosporidium*.