

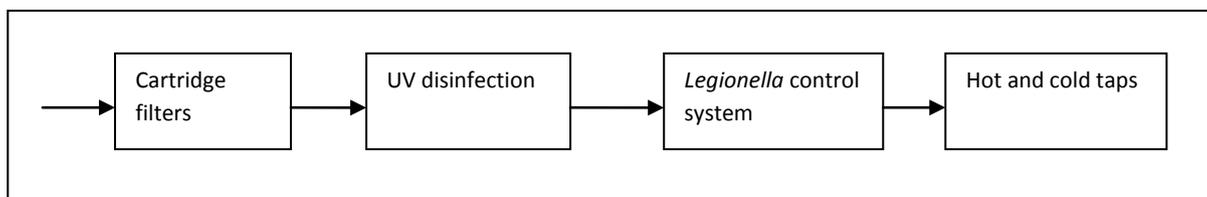


PRIVATE WATER SUPPLIES – CASE STUDY (2011/08)

Unsatisfactory water quality as a consequence of using an unapproved treatment system

This case study relates to a private supply serving a residential outdoor centre for up to 50 people (including children). The source is a borehole. After abstraction water is pumped into a storage reservoir from where it is piped into the premises' loft and treated by a filter and UV disinfection. The water then passes through a Legionella control system (copper and silver ionisation) before entering the hot and cold distribution systems and all draw off points, including the kitchen tap.

Schematic of treatment processes



During the risk assessment the local authority identified that the design of the treatment system recognised that the effectiveness of UV disinfection relies on the turbidity of the water being <1NTU. Turbidity management was being achieved by pre-treatment (twin cartridge filters). In addition, the need for regular checks and maintenance was well catered for by the availability of a back-up filter, and monitoring of the UV lamp intensity linked to an alarm in the manager's office to alert him to a problem. However, it was noted that disinfected water then passed through a Legionella control system comprising copper and silver ionisation in contravention of Regulation 5. Products containing (or generating) silver ions are not approved for use in drinking water because there is insufficient toxicological information on silver to enable the Health Protection Agency to advise on a safe level. Although the manufacturers know that to gain approval of their products for drinking water they must carry out the necessary toxicological studies and submit this information to the Inspectorate, they have not done so. Accordingly no silver based treatment system can be approved for continuous use in drinking water.



Copper/silver ionising system

Sampling by the local authority to inform the risk assessment had identified elevated turbidity levels in the treated water with a mean of 2.0NTU and a maximum of 7.2NTU. Initially the local authority had considered these unsatisfactory results might be indicative of fluctuations in raw water quality not being controlled adequately by filtration. The owner had been advised by their contractor to consider replacing the cartridge filters with sand filters and a quotation for such improvements had been obtained and was in the order of £10,000. However, following identification of the breach of Regulation 5 by the local authority, the Legionella control system was isolated from the water supply and this action resulted in an immediate improvement in treated water turbidity results (fell below 1NTU). At this stage both the local authority and the owner of the supply realised that the cause of the elevated turbidity had been the deterioration of the silver and copper electrodes in the Legionella control system.



By complying with Regulation 5, water quality was restored and the owner did not need to make expensive improvements to filtration, instead it was necessary only to replace the old cartridge filters for new ones, installing these in series and in transparent housing. These minor improvements minimised the likelihood of heterotrophic bacterial growth in standing water and facilitated visual inspection and effective maintenance (in accordance with best practice for Legionella control in cold water systems published by the Health and Safety Executive).



Filter arrangements showing spent stained cartridge filters (bottom right)

Once aware, the owner was able to rectify matters simply at minimal cost. All local authorities are recommended to actively check for the use of unapproved treatment systems when investigating sample failures or carrying out risk assessments.

