Monitoring the quality of private water supplies in the UK

Informative Paper

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Contents

Purpose

For historical reasons, in the UK the legislation differs for public supplies (i.e. from a statutory water company) and private supplies (where not supplied directly by a statutory or licensed water undertaker). Updating the private water supply regulations lagged behind those for public supplies and the responsibility for monitoring water quality differs. This Policy Position Statement outlines the legislative background to monitoring private water supplies and key issues associated with private water supplies.

CIWEM's position

1. Whilst water from most private water supplies (PWS) is wholesome, however this is less certain than with public supplies. Visitors should be aware of which premises are not supplied by a statutory water company. At present the use of private water supplies is not easily recognised, except for public premises in Scotland where notices should be displayed. Regulating authorities are required to locate and monitor private supplies used by the public and provide guidance to all owners, users and visitors who are concerned about water quality.

2. Comprehensive guidance for the management and protection of private water supplies is now available from Drinking Water Inspectorate (DWI) (England and Wales), DWI (Northern Ireland) and technical manual and self-assessment form prepared by the Scottish Government, in collaboration with other UK jurisdictions.

3. The cost of treatment, especially to single dwellings and small supplies, maybe a hindrance to bringing the water quality of private supplies up to the level of compliance seen in public supplies. Many owners and their families have not experienced illnesses linked to the water supply and can see no reason to assess the risk of contamination or to pay for water quality testing and subsequently installing treatment equipment. Owners should be better informed of the risks and made aware of grants available to install treatment.

4. Advice to owners of private supplies to help them obtain and operate equipment for treating or testing water at a reasonable cost should be more readily available from non-commercial bodies such as the local authority.

5. CIWEM support the ambition of the UK Water Regulators to improve the water quality of private water supplies and the role that PWS owners, local authorities and regulators have to play.

6. Source protection is very important for private supplies as well as public supplies. In many instances treatment associated with PWS is often inadequate or absent and the monitoring frequency is very unlikely to detect deterioration before it is too late to prevent ill health. A proper assessment of the risk of contamination is essential, followed up with action to mitigate any unacceptable risks. This should either be done by a trained person or the owner, with clear guidance from the regulatory authority. The risk assessment should include the intrinsic nature of the source, the likelihood of pollution and the suitability of all materials in contact with water between the source and the point of use.

Context

General

For historical reasons, the legislation differs in the UK for public supplies (i.e. from a statutory water company) and private supplies (where not supplied directly by a statutory or licensed water undertaker). As a consequence there are two sets of Regulations, one covering the public supplies and one covering private supplies. Slightly differing Regulations were written for the four countries of England and Wales, Scotland and N. Ireland. Mineral waters and bottled waters are excluded as they are covered by other Regulations.

A private water supply may be less than 1 m^3/d or serving a single household. At the other end of the scale it can serve many dwellings or commercial premises and provide wholesome water to 1000 people or more. The raw water may be obtained from a variety of sources, including boreholes, wells, springs, rivers or lakes. In many cases treatment is minimal or non-existent. The monitoring requirements vary according to the size of the supply.

In England and Wales about 1% of the population have private water supplies to their homes. Most private supplies are situated in the more remote, rural parts of the country. In Northern Ireland it is estimated that less than 1% of water comes from private supplies. In Scotland around 3% of the population relies on private supplies for their drinking water.

Legislation

Private water supplies throughout the UK are regulated through the key legislation. The implementation of UK Regulations were originally brought about to ensure compliance with the EU Drinking Water Directive in 1998.

The Water Industry Act 1991, the primary national legislation, defines the powers and responsibilities of local authorities in relation to private water supplies and the definition of a relevant person(s).

Standards for drinking water in the UK were originally transposed from a European Directive, the European Council Directive 98/83/EC (the 'Drinking Water Directive'). None of the above has been altered as a result of the UK leaving the EU. The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019, which came into force on Exit Day, ensure that all relevant drinking water legislation continues to operate effectively in the UK.

Local authorities act as the regulators for private water supplies in the UK. The Private Water Supplies Regulations place a duty on local authorities to conduct a risk assessment of each private water supply within their area and to undertake monitoring to determine compliance with drinking water standards (except those to single dwellings unless requested).

A summary of the Regulations in UK is provided below, the main objective of all Regulations is to ensure the provision of clean, safe drinking water and to deliver significant health benefits to those using private water supplies.

The Private Water Supplies (England) (Amendment) Regulations 2018 SI No. 707
The Private Water Supplies (England) Regulations 2016 SI No. 618
The Private Water Supplies (Wales) Regulations 2017 SI No. 1041
The Private Water Supplies (Northern Ireland) Regulations 2017 SI No. 211
The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 SI No. 282

In Northern Ireland, a unit within the Northern Ireland Environment Agency (NIEA), the Drinking Water Inspectorate for Northern Ireland, regulate supplies that serve more than one property or are used for commercial food production. The DWI in England and Wales and the Drinking Water Quality Regulator (DWQR) in Scotland have an advisory role in relation to private water supplies. This includes the provision of technical advice and support to Local Authorities, on all aspects of drinking water quality.

Private water supplies are categorised as two main types and the exact specification is detailed in each Regulation and associated guidance. It should be noted that the risk assessment and sampling requirements vary depending on the categorisation of the private water supply. In general, small supplies require less onerous assessments however the exact requirements are detailed in the associated guidance documents.

Key Issues

Public Health

Some UK homes rely on a private supply. A very high proportion of UK residents and visitors may be exposed to water from private supplies when on holiday or engaged in everyday activities such as going to a restaurant in the countryside or buying food from a local market. Without effective regulation of private supplies, much of the population could be exposed to the risk inherent in consuming unwholesome water at some time each year.

UK Water Regulators publish annual reports regarding the quality of private water supplies. These reports also provide valuable information on case studies, issues arising and learning points. The information in the table below is taken from these reports, available on the relevant websites.

Country	2019 PWS Compliance	Commentary
England	96.6%	The commonly failing parameters are reported as *E.coli* or Enterococci, coliforms, pH, nitrate and manganese.
Northern Ireland	99.29%	Of these failures, 45% of non-compliant PWS showed microbiological contraventions, 48% chemical contraventions and 8% had both microbiological and chemical contraventions.
Scotland	90.2% - Regulated 84.3% - Type B	The most commonly failing parameters are reported as E.coli, coliforms, pH and colour.
Wales	93.8 %	The commonly failing parameters are reported as *E.coli*, coliforms, pH, nitrate and manganese.

Risk Assessment

Risk assessment plays a vital role in assuring the safety of all PWS and identifying any improvements that are required. Risk assessments should consider all possible factors that could affect the safety of the supply under all conditions. It should be noted that sampling only verifies water quality at the time and location of sampling, providing a 'snap shot' of the quality.

Extensive guidance and information is provided by the UK Water Regulators, on the completion of risk assessments. Comprehensive online tools and templates are provided as well as specific guidance on key matters.

Regulations place a duty on local authorities to carry out risk assessments on all large or Regulated supplies. Each supply must be risk assessed once every five years. Additionally, local authorities must provide, on request, advice and assistance on risk assessments to those responsible for smaller or Type B supplies. These risk assessments should determine whether the supply poses a potential risk to health and, if so, the action required to safeguard health in the short term and improve the supply in the longer term.

Source protection

The vulnerability of the source to pollution will not be apparent to owners unless they have been trained in such matters. Risk assessment by an independent, trained surveyor is clearly preferable, but expensive for a single householder where the cost is not borne by the local authority. The owner of a source may be more concerned about the potential cost of improving his supply than the risk of illness. Where self-assessment is an option, the owner must be given adequate guidance and advice.

Materials of construction

The materials acceptable for use in public water supplies and within buildings are governed by Regulations and advisory schemes. These do not extend to the collection and conveyance of raw water from a private supply or to premises not connected to a public water supply. There is a potential for contamination through corrosion or leaching from inappropriate materials which is best evaluated whilst undertaking a risk assessment of the supply. Any assessment of the suitability of must take into account the source water quality such as the pH. Inappropriate materials may lead to adverse microbial or chemical contamination as well as taste and odour in the drinking water.

Maintaining treatment processes and disinfection of water

Where equipment has been installed it is important to know that it is operating effectively. Dosing systems that have run out of disinfectant or a UV unit with fouled surfaces or aged lamps will not provide the protection expected. Filter and Granular activated carbon (GAC) contactors will not work efficiently when run beyond their design life, and worse, may increase the microbiological contamination.

Owners should be made aware of the maintenance requirements when installing treatment equipment and this must be passed on to a new owner when the property changes hands.

Discussion

Water from private supplies, as with water supplied by pipe from a statutory undertaker must be wholesome, in that:

- it must conform to the standards set out in the relevant national legislation;
- comprehensive risk assessments should be completed to assure the safety of the PWS, conforming to the WHO Water Safety Plan Methodology
- it must be treated in a manner appropriate to the water source; and
- processes and materials used in its treatment and conveyance must be suitable.

Water quality testing of private supplies is less frequent, but must be completed in accordance with the National Regulations. They are not as comprehensively monitored as public supplies. This is justified as a risk-based approach to keep the cost of monitoring within reasonable bounds and to ensure that the risk is adequately managed. Local authorities are charged with carrying out a risk assessment of every private supply every five years. Experience in Scotland indicates that each risk assessment takes approximately one day. This is not required for supplies to a single dwelling unless the owner or occupier requests one. The costs can be recovered from the person requesting the assessment or sampling in accordance with the fees set out in the Regulations.

Traditionally, owners of remote properties have relied on a 'pure' water source, typically a spring or shallow well, without any treatment. Where this was not possible, some form of simple filtration has rendered the water clear with an acceptable taste. Despite appearances, clarity, odour and taste are insufficient to judge the wholesomeness of the supply. Simple chlorine dosing or a silver impregnated ceramic filter are commonly used to disinfect water, but chlorine-resistant Cryptosporidium have been found in supplies where chlorine is the only disinfectant. Domestic point of use technologies such as UV irradiation could be considered as these are available and reasonably priced on the market.

Whilst an untreated supply may be satisfactory for much of the time, it can become easily polluted. One of the most common causes of pollution is high rainfall events which either flood an underground source with surface water or introduce contaminants through run-off from surrounding fields. Owners may not be aware of this and so it may be missing from the risk assessment.

Obtaining any type of equipment for treating or testing water is not easy, and rarely cheap, for a small home owner with no knowledge of the subject. CIWEM see this as an impediment to widespread installation of treatment in privately owned supplies.

Links to further resources

Drinking Water Inspectorate for England and Wales DWI, https://www.dwi.gov.uk/

Drinking Water Quality Regulator for Scotland DWQR, https://dwqr.scot/

Northern Ireland Environment Agency NIEA for guidance and links to the current regulations. https://www.daera-ni.gov.uk/topics/water/drinking-water

Scottish Executive (2006) Private Water Supplies: Technical Manual, ISBN: 0-7559-5151-4 Published by the Scottish Executive.

Camm, R., Ferrere, P., Hall, T., and G. Stanfield. (2008). UV Inactivation of Cryptosporidium. UK Water Industry Research (UKWIR) Report 08/DW/06/20. UKWIR, Queen's Gate, London.