Protecting your private water supply
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Introduction

Contamination from a variety of activities or places can occur at any point throughout a water supply system if it is not adequately protected, managed and/or maintained. This document provides some of the key measures that can be undertaken to prevent and remediate the main forms of contamination that pose a risk to a private water supply.

This document is divided up into the three main parts of a supply system;

- The water source (well, borehole, stream, spring etc.)
- Treatment systems (UV, filtration, etc.)
- Distribution network (pipes, valves, storage tanks, etc.)

Source

The source is where the water is derived from for your drinking water supply. It may be a surface water source (e.g. wells, springs or streams) or a groundwater source, where the water is pumped from deep underground (e.g. a borehole). Surface waters are considered to be at higher risk of contamination, especially with faecal bacteria since any pathogens will have had less time to die off compared with groundwater. Wells and springs although derived from groundwater, are very often influenced by surface water, and are considered surface water for the purposes of water quality risks.

- **Microbiological contamination**

Microbiological contamination from faecal material can lead to illness. The following is a list of examples of actions that will assist in preventing contamination of the source:

- Employ regular inspection and maintenance of septic tanks, at a frequency that is in accordance with the manufacturer's instructions.
- Installation of stock proof fencing to protect the water source from grazing animals, including rabbits and deer as well as domestic livestock.
- Prevent storage and/or the spreading of manure within 50 metres of the water source.
- Restrict the access of livestock from the vicinity of the source. This may be up to 50m depending on ground conditions, topography, presence of swallow holes etc.
- Eliminate or relocate storm water overflows away from the water source;
- Construct embankments, walls or ditches to prevent surface water entering spring collection chambers or borehole headworks.

- Raise the well head or borehole head-works to at least 0.5 metres above ground level to prevent surface water or spillages of contaminated material entering into the water source.
- Construct storage lagoons or tanks for untreated source water to allow settlement of sediment and organic matter ahead of any treatment.
- Design tanks, storage chambers and borehole head works to prevent access from all animals, including rodents, invertebrates etc. This document contains more specific advice about borehole design and protection.
- Cover and backfill or seal any abandoned boreholes or wells to prevent surface water contamination of the aquifer.
- Limit or control recreational use of the source water near the intake point (surface water supplies).
- Locate surface water intakes where they are least exposed to possible contamination from up-stream activities, such as surface water run-off, effluent discharge points, or other polluting activities.
- For rainwater harvesting systems, remove or avoid the use of roof-mounted aerials or overhanging trees in the water collection area. Birds should be discouraged from perching on roof collection areas as droppings will contain bacteria. Also consider installing mechanisms to divert the first flush of rainwater to a waste system. Approved materials (e.g. WRAS or permitted under Regulation 5) should be used to prevent the contamination of rainwater during runoff and collection.

- **Chemical contamination**

Some chemical contamination can lead potentially to illness or other long term health effects. Some of the following improvements at the water source will assist in preventing them from entering the water supply:

- Establish with the environmental regulator whether any discharges from licensed facilities, such as industrial premises exist in the catchment area.
- Limit or control recreational use of the source water to prevent contamination e.g. boat fuel spillages.
- Limit or control the use of pesticides, herbicides and fertilisers within the catchment.
- Construct facilities (e.g. bankside storage) to enable intakes to be closed if surface water is contaminated.
- Create a run to waste facility for borehole or spring chambers to prevent contaminated water (e.g. after pesticide or fertiliser spraying) entering into supply. NB. Any discharges to waste may need to be agreed with the environmental regulator.
- Locate surface water intakes where they are least exposed to possible contamination from up-stream activities, such as surface water run-off, effluent discharge points, or other polluting activities.
- All stored fuels or oils within a 50m radius of the source should be adequately bunded to prevent leaks from contaminating the supply.

- **Physical contamination**

Contamination by physical particles can lead to the water becoming unacceptable in appearance, taste or odour, and may act as a substrate for micro-organisms to live on and replicate. Some of the following improvements at the source can be effective in preventing them from entering the water supply:

- Install screens or filters for rainwater harvesting systems; protection of inlets and the setting up of a cleaning regime for any collection gutters will help prevent/reduce ingress of organic matter into the system.
- Construct storage lagoons or tanks for raw surface? water to allow settlement to occur.
- Regularly maintain treatment equipment e.g. cartridge filters need to be cleaned or replaced according to manufacturer's instructions.
- Install screens and covers on storage tanks to prevent ingress of particles, insects and other small animals etc.
- Regularly carry out visual checks, inspections and cleaning of storage tanks at suitable intervals to reduce sludge or sediment build-up.
- Consider using valves and/or level sensors to help prevent stagnation of water and ensure water turnover occurs.

Treatment Systems

Where the hazard is natural or persistent it may not be possible to eliminate the risk of contamination. In most cases some treatment will be required. Treatment should be designed around these risks, and its operation should be verified by monitoring (sampling and analysis), to ensure that it is effective. The following measures should be considered and applied where appropriate to help mitigate and control the risks associated with treatment:

- Consult with installers or suppliers to ensure that existing treatment has been optimised for the supply.
- Ensure that any new treatment system is designed specifically for the range of water quality and flows that are associated with the source of the supply.
- Replace filters, lamps and/or filter media according to manufacturer's instructions.
- Ensure that water is subjected to sufficient preliminary treatment to achieve turbidity readings of <1NTU before disinfection.
- Ensure that the availability and continuity of the supply of spare parts for key water treatment equipment e.g. UV bulbs are maintained in accordance with the manufacturer's instructions.
- Ensure any UV disinfection treatment is designed for drinking water. This leaflet describes this in more detail.
- Consider a multi-barrier approach for controlling the risk of microbiological contamination.
- Optimise any chemical dosing.

- Optimise treatment practices and procedures (e.g. backwashing, types/size of filters).
- Installation of in-situ monitoring and/or alarms for parameters e.g. turbidity or loss of power.
- Ensure that parts of the treatment cannot be bypassed accidentally.
- Ensure that any chlorine disinfection systems have a fail-safe system (e.g. automatic shutdowns on dose loss or over dosing).

Distribution network risks

Risks to the supply can arise from hazards posed to the distribution system integrity. These risks may be microbiological, chemical or physical and may cause long or short term health issues, or periods of insufficiency. The following measures can minimise these risks:

- Replace/refurbish corroded/leaking or deteriorating pipework.
- Inspect and maintain storage reservoirs at appropriate intervals to prevent leaks and ingress.
- Robust procedures for the installation of new pipework and repair of existing pipework.
- Ensure backflow protection is in place at points of risk, such as cattle troughs and industrial installations, etc. to prevent unwholesome water being back-syphoned into the supply.
- Ensure that materials and products in contact with the water conform to Regulation 5 of The Private Water Supplies Regulations.
- Ensure that treated water tanks are designed, installed and maintained to prevent ingress of contaminants through precipitation (rain/snow etc).
- Follow good hygiene practices when working on the system (e.g.hand washing and disinfection of tools).
- Replace lead pipework.
- Ensure that fuel or oil stored on-site is adequately stored and bunded.
- Use of barrier pipe in land that is known to be contaminated or at risk of being contaminated, or in areas where there is a risk of oil or solvent spillage.
- Flush/scour the mains to remove sediment and deposits.
- Implement a regular flushing programme for distribution network with low flows.
- Using valves, ball-valves, or level sensors to ensure that water within tanks is adequately "turned over" at all times (prevention of stagnation).
- Ensure that inlets and outlets to tanks are sited at opposite ends to reduce the possibility of stagnant areas of water and short circuiting.
- Where a supply originates from a public water supply, liaise with the local water company to arrange a water fittings inspection if one has not been recently undertaken.