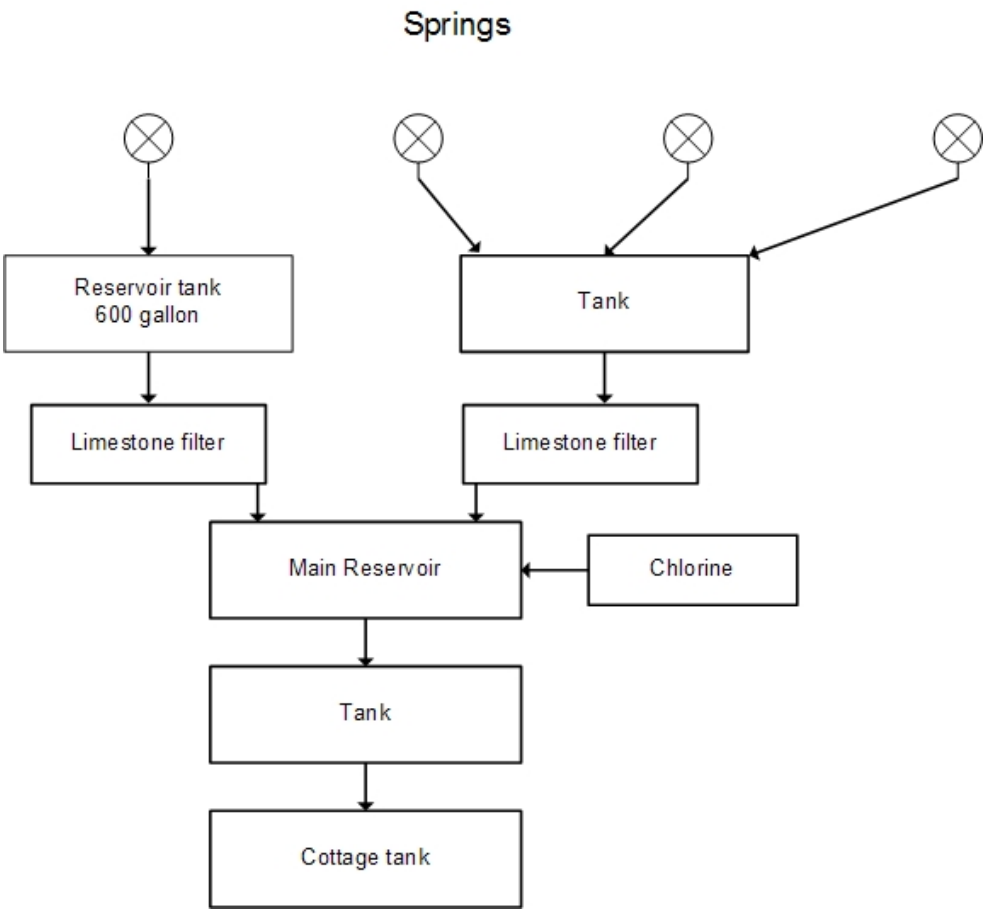
PRIVATE WATER SUPPLIES – CASE STUDY 2014/01

Verifying that improvement have been made to a village supply

This case study relates to a Regulation 9 spring supply feeding a village with a resident population of 200 and a temporary population of 499 attending private parties. The source comprises a number of springs and collection chambers which range in construction and condition. Most of the collection feed into a main reservoir via a brick built chamber and a raised limestone filter bed.

Figure 13: Diagram of water supply



A sample taken in October 2013 contained coliforms, *Clostridium perfringens* and a pH lower than the regulatory minimum. In response, the local authority served a Regulation 18 Notice in November 2013 requiring users to boil the water, and carried out a risk assessment visit in December 2013 which led to a revised Notice being issued in March 2014. During the risk assessment it was established that the automated chlorine dosing system had been broken for six months. Manual dosing was being undertaken during this time, but the chemical being dosed was not approved for use. The dose should have been varied depending on the volume of water in the reservoir, however,

the equipment reading the water level was also broken, as was the pH meter. No maintenance or testing records were being kept to show the work being carried out to keep the supply safe and sufficient. The improvements required in the Notice therefore included:

- Installation of automated chlorine dosing linked to flow rates and pH levels, including a standby arrangement should one dosing unit fail.
- Routine chlorine monitoring at the outlet of the reservoir and throughout the distribution system.
- Installation of pH correction and monitoring equipment.
- Abandonment of high risk, sedimented springs.

Additional improvements were identified as necessary in the medium term such as covering of the reservoir to prevent ingress, ensuring an adequate contact time for disinfection, and rationalising of springs in use. This reflects a proportionate approach to the regulations, with high and very high risks being addressed in the first instance, but with actions for addressing medium risks being documented so they can be planned for the future.

Together with the local authority, the Inspectorate visited the supply in August 2014 to assess the work undertaken to comply with the Notice. The chlorine dosing system was found to be working correctly, and pH correction was now being undertaken via an automatically controlled dosing system.

Figure 14a: Rudimentary arrangement for chlorine mixing (perspex sheet)

Figure 14b: Improved chlorine measurement and monitoring

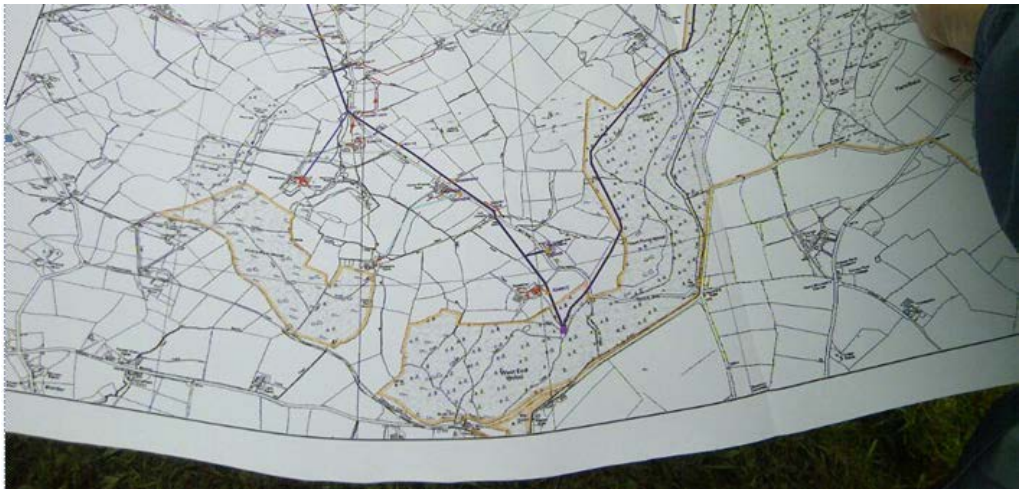
Figure 14a shows rudimentary attempts to improve mixing of the chlorine in the reservoir via a perspex sheet hung in the flow of the chlorinated water as the point where it enters the contact tank via a weir. The improved monitoring and instrumentation can be seen in Figure 14b.

Although the system has been improved, further advice was able to be given regarding the chemical mixing, location of instrumentation and contact tank mixing arrangements.

The supply owners produced a detailed plan of the distribution system (Figure 15) and a log book to demonstrate that they were taking on-site chlorine readings at a range of representative points to verify that the residual disinfectant was persisting to the end of the network. The distribution map really supported the Inspectorate's confidence in the ongoing management of this supply – showing details of where the underground pipework was located for any potential repair and maintenance work, together with the diameter of the pipes throughout the network. For many private water supplies, maps of the assets are not available. Where this is the case it will show as

a very high risk when captured in the risk assessment tool. Underground assets are not straightforward to locate, but opportunities should not be lost to capture information to put together a picture of the supply system over time. For example, when any mains repair takes place, a record should be made about where it was located, the size and material of the pipe, and its condition. In addition, the location of valves and hydrants are good clues as to the location and probable orientation of pipework.

Figure 15: Plan of the supply system



This case study shows the benefit to owners and operators of the regulatory risk assessment process. Local authorities have a to improve supplies where a risk to health is identified. The risk assessment tool produced by the Inspectorate allows potential hazards to be identified ensuring illness outbreaks are prevented, and the risk assessment process ensures that improvements can be verified.

This case also highlights that despite water treatment being in place, deficiencies in the control, operation and monitoring can make a supply unsafe.