

Laggan Bridge WTW *Cryptosporidium* detections December 2019

DWQR Inspector:
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Event No. 10764

Event Category: Significant

On 16 December 2019 Scientific Services reported that a *Cryptosporidium* sample taken from Laggan Bridge WTW on 13 December contained 15 oocysts. The cartridge filters on the operational boreholes were replaced and a resample undertaken, which was also positive for *Cryptosporidium*. Further samples were negative. The UV transmissivity and turbidity levels were checked and confirmed that the oocysts were deactivated, but the number of oocysts prompted further enquiry and an event raised to DWQR.

The incident was caused by a series of fundamental failings. All of which were entirely avoidable. Scottish Water defined the root cause of the incident to be the lack of maintenance of the cartridge filters. The cartridge filters should provide a substantial barrier to *Cryptosporidium* oocysts and the TOMS procedure stipulates their replacement every 6 weeks or where the differential pressure (DP) exceeds 1.0 Bar. However the filters had not been changed for 14 weeks and the DP alarms were set at 1.4 Bar. Despite sign-off from senior managers, site operators had received no training in the maintenance and replacement of filters, and task schedules did not list the requirement. No filter log books were provided to monitor filter performance. The DP alarms were set at manufacturer's levels and had not been adjusted to the level required by the WTW, thus giving no warning that the filters were not performing efficiently. On review of the DP log, the filters were operating outside the 1.0 Bar limit for several weeks. EALs had not been updated at the treatment works.

The quick nature of the borehole start-up and air in the system caused spikes in DP when the borehole pumps activate, which could result in a second pathway for any

Cryptosporidium oocysts to pass through the filters. The WTW has one combined filtered water turbidity monitor, despite all three boreholes having parallel treatment solutions. Data from the combined turbidity monitor shows that there is a turbidity spike on the start-up of Borehole A, but this is masked by the dilution effect of the three combined water sources. This dilution meant that the turbidity monitor did not breach alarm settings. The installation of individual turbidity monitors for each borehole was not included in the project to upgrade the treatment works. There had been heavy rain preceding the event and heavy machinery on site and recent groundworks in close proximity to the boreholes may have further disturbed ground conditions, encouraging surface ingress. There are livestock and a river near to the site. The poor condition of Borehole A casing was noted in an inspection report from 2017, however the potential for ingress was not fully documented in the Drinking Water Safety Plan, nor was it considered an issue that should have been included in the capital project. The site was being upgraded to deliver new treatment solutions to address the *Cryptosporidium* risk, with one borehole being upgraded at a time to ensure sufficiency of supply to consumers. During the construction, Scottish Water staff were operating the site and in control of water quality at all times.

Putting these factors together, I am of the opinion that the cause of this incident is fundamental failure in management as Scottish Water failed to oversee, implement and execute the necessary training in maintenance and corrective action in combination with a lack of documentation – both in process control and record keeping- to allow operators to adequately maintain the site and manage water quality.

The event has been categorised as Significant. Scottish Water has identified thirteen actions which DWQR accepts are appropriate and will monitor to ensure they are completed prior to signing off the incident. DWQR made three additional recommendations. DWQR has also started a programme of audits on the training provided for operators by Scottish Water and the verification systems Scottish Water has to ensure that operators are competent in their activities across Scotland.