Drinking Water Quality Regulator for Scotland

Incident Summary

Bayhead WTW and Clachan SR Ammonia failure 22 November 2016

DWQR Inspector:
Moira Malcolm

Event No. 8123

Event Category: Significant

On 7th November 2016 a routine ammonium sample taken on 1st November at Clachan service reservoir (SR) served by Bayhead WTW on North Uist was reported as being higher than expected, but within regulatory limits. The operator reduced the pump speed and ammonium concentrations returned to expected levels. On the 12th November, a sample taken from the same SR on 9th November was reported to be outwith the PCV for ammonium, subsequent operational samples taken from Bayhead WTW on 15th and 16th November had satisfactory levels of ammonium. A further bench test for ammonium carried out at Bayhead WTW on 21st November had elevated levels of ammonium and the operator changed the ammonium dosing control from automatic to fixed.

The process scientist and Operations team leader attended site on 22nd November to investigate the issues relating to ammonium dosing. Bench testing carried out showed the ammonium levels in the final water to be very high, this was confirmed some days later by laboratory test results. At this point the operator realised that whilst attempting to optimise the process on the 21st of November, he had wrongly inputted the ammonium pump speed when implementing fixed dosing control and it was overdosing by a rate of four times the normal dose. This was rectified and further reactive action was taken (sampling and dropping the levels in both the CWT and SR). Ammonium levels then reduced to below the PCV and returned to normal over a period of three days. During this incident customers received water which exceeded the PCV for ammonium during two periods of time, initially on 9th November, though the period of time this extended for is unknown as no additional samples were taken until 15th November, and then again between 21st and 24th of November. Of the 14 samples taken during these periods 7 exceeded the PCV for ammonium.

The ammonium PCV exceedances which occurred from 21st November until 24th November were caused by operator error, when the wrong figure was inputted into the HMI to calculate the dose rate for ammonium. When this error was discovered, it was quickly rectified. Scottish Water investigated the initial increase in pump speed, but the reason for this has not been fully explained. It is assumed that operator error may also be to blame.

The operator error was compounded by poor visibility for the ammonium dosing. There is no online ammonium monitor and the 'global override' function on the HMI for ammonium does not show

which aspect of the dosing system is failing; therefore when dosing goes awry, the operators cannot easily tell what is happening. In addition there is no SCADA system on site at Bayhead: the only online monitoring that can trended is situated at Benbecula WTW approximately one hour's drive away.

The event has been categorised as significant. Scottish Water has identified eight 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.