Drinking Water Quality Regulator for Scotland

Incident Summary

Kyle of Lochalsh WTW
pH failure
February 2017

DWQR Inspector:
Moira Malcolm

Event No. 8293

Event Category: Significant

In late January 2017 a ball valve was commissioned to replace the ageing butterfly valve controlling the pH blend through the remineralisation (remin) vessel at Kyle of Lochalsh WTW. After installation, on 29th January a high final water turbidity alarm was generated due to low levels of media being carried forward from the remin tank to the CWT. The media was topped up and the treated water pH became very difficult to control resulting in high treated and high final water pH. Over the next few days the valve failed to control pH and so it was set to manual with frequent monitoring and manual adjustments until the a full valve control exercise could be implemented. After a series of adjustments and investigations, the blend valve was eventually optimised on 13th February.

Over the two weeks of the incident, two samples were taken at consumer's taps. One of which included analysis for pH and turbidity. These samples, and those taken from the compliance sample points at the treatment works and service reservoirs were compliant for pH and turbidity.

The root cause of the incident was that replacement ball valve was insufficiently commissioned: the control changes required by the valve were not fully taken into account and the media used in the remin vessel – akdolit - is highly reactive and was not being topped up regularly. Therefore the remin tank was functioning with very little active media during commissioning of the new ball valve, giving an incomplete picture of the operational requirements the control changes the valve would need to function effectively.

Scottish Water's investigation has found that the remin tank is undersized by 50-60%, making pH control difficult due to the high flow rate, which is significantly higher than that recommended for the media.

The remin tank and valve are also working to achieve a very high pH (>9.5) due to subsequent MSP dosing for plumbosolvency (which brings the pH down). Therefore there is no margin for error if there is an issue with dosing control of either pH or MSP. It is noted that Kyle of Lochalsh WTW is one of the few sites in Scotland which is not optimised for plumbosolvency.

An added complication was that the online final water pH probe was faulty, so incorrect readings were being used throughout the incident to monitor pH.

Finally, and crucially, there is no treated water pH monitor after the MSP dose point at Kyle of Lochalsh WTW to give online treated pH before entering the CWT. This lack of monitor hindered the management of the incident

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 two additional recommendations.