Drinking Water Quality Regulator for Scotland

Incident Assessment

Killin WTW – Aluminium Failure
11 January 2010

DWQR Inspector:
Matthew Bower

Summary of Incident

A high aluminium alarm alerted Scottish Water staff to an issue at Killin Water Treatment Works in Stirlingshire. On attending site they discovered that aluminium concentrations were higher than they should have been due to problems with the rapid gravity filtration process at the works. On-site equipment was used to check pH levels, and these were found to be consistent with the on-line monitor reading and within specification. It was assumed that a filter wash would resolve the issue, however a little later, when the pH was checked on a portable pH monitor it was found to be outside the operating range. Once this was corrected, final water aluminium concentrations returned to normal. Sample results initially reported to DWQR indicated that aluminium concentrations had exceeded 2mg/l, however Scottish Water has suggested that these readings may be inaccurate as samples were taken from an alternative sample tap due to freezing weather conditions and the on-line aluminium monitor at the works recorded a maximum of only 0.34mg/l.

DWQR Assessment of Cause of Incident

This is a straightforward incident, and although aluminium concentrations may not have reached those originally indicated by sampling, it does highlight issues with the suitability and calibration of pH monitoring equipment at the site. The pH of the water is critical when carrying out coagulation using aluminium salts, it is therefore vital that instrumentation used to measure and control pH is adequate for the task and appropriately maintained. Scottish Water's investigations have suggested that the conditioned water pH monitor had not been calibrated as frequently as it should have been, although it had been checked against the on-site comparator instrument. As the comparator was also reading incorrectly, the problem with pH was not spotted initially. A further issue with one of the site turbidity monitors may also have exacerbated the incident. The freezing of the works final water sample point meant that a different sample tap was used to monitor quality, and this may have provided misleading sample results.

DWQR accepts that at the time of this incident, Scottish Water's operational staff were under extreme pressure due to the persistent freezing weather conditions. Such circumstances make the accuracy of process monitoring and control equipment all the more important. The provision of appropriate equipment and its regular calibration is vital. Had the conditioned water pH monitor been more regularly calibrated and a more robust means of cross-checking monitor readings been available, this incident at least could have been resolved more quickly and possibly avoided completely.

DWQR Assessment of Actions Taken by Scottish Water

Once the process issue was correctly identified, Scottish Water regained control of the treatment process relatively quickly. Additional sampling was undertaken. At no time was public health at risk during the incident.

Scottish Water has identified a number of actions from this incident. DWQR accepts that these are appropriate and will be monitoring to ensure they are completed prior to signing off the incident.

Action Number	Action Description	Action Owner	Action Completion Date
1	Replace Nessleriser (comparator) with portable pH meter	Water Operations Team Leader	Complete
2	Install flow meter on final turbidity meter	Water Operations Team Leader	Complete
3	Ensure conditioned water pH meter and controlling pH meter calibration are carried out as per scheduling.	Water Operations Team Leader	Complete
4	Distribute copies of the report to other water Managers	Water Operations Manager - West	Complete
5	Replace conditioned water pH probe	Water Operations Team Leader	Complete
6	Toolbox talk on escalation procedures	Water Operations Team Leader	Complete
7	Review use of non-statutory sample tap when statutory sample tap is unavailable for a prolonged period	Process Scientist / Water Operations Team Leader	Complete
8	Review Drinking Water Safety Plan and amend as necessary	Asset Planning Team Leader	Complete

Additionally, DWQR has made a further recommendation following the incident:

Recommendation no.	Recommendation	Completion Date
DWQR 1	Investigate need for measures to prevent WTW final water sample tap from freezing	Scottish Water have investigated and consider that frost protection is adequate for normal Winter conditions