

Pateshill WTW Failure of pH Conditioning 18 February 2012

DWQR Inspector:
Matt Bower

Summary of Incident

During the afternoon of 18 February, The programmable logic controller (PLC) that operates the treatment works failed due to a power issue. Scottish Water staff quickly attended and reset the plant. Unfortunately, a blockage had formed that prevented carrier water from diluting the dosed lime slurry, meaning that a concentrated amount of lime was entering the treatment stream. As a consequence, the final water pH increased rapidly to 11.5, well outside the acceptable range. In response to this the operator reduced the rate at which lime was being added, and while this had a temporary affect in reducing pH, it did not resolve the true cause of the problem.

Approximately two hours later final water pH was high again and an alarm brought operators back to the site. Shortly afterwards, the root cause of the problem, the carrier water blockage, was discovered and removed. This enabled the pH of the water to return to normal over the course of the following day.

The high pH affected the measurement of chlorine at the works, however staff realised this and used hand held analysers to demonstrate that disinfection had not been significantly compromised. The elevated pH also had the potential to raise aluminium concentrations in the water, and this does appear to have happened to some extent. Although sampling was insufficient to provide the necessary certainty, it is likely that there was a marginal breach of the PCV for aluminium.

DWQR Assessment of Cause of Incident

The cause of the incident was the blockage in the carrier water system that dilutes the lime slurry before it is added to the treatment process. This was not immediately obvious to operators and took some time to resolve, although it was spotted eventually. All alarms operated correctly and operators responded promptly. Scottish Water has correctly identified that alarmed flow detection switches on the carrier water system and improved visibility of lime usage would have alerted operators to the real cause of the problem much sooner. The installation of loading valves on the lime dosing may also have helped, and this has also been done.

DWQR Assessment of Actions Taken by Scottish Water

Once the issue with the elevated pH was discovered it took some time for staff to discover and rectify the true cause, which was a blockage in the carrier water system. The problem should have been more apparent to operators, and Scottish Water has taken steps to address this. Once the blockage was identified it was dealt with swiftly.

Scottish Water appears to have adopted a highly minimalistic approach to formal sampling during this incident, although operational staff did undertake bench testing of certain quality parameters. Following the incident on 18 February, the first laboratory sample for pH or aluminium from either the treatment works or the supply zone appears to have been taken on 20 February, and there is no indication that this is anything other than routinely scheduled sampling. The sample taken from the supply zone on 20 February in Bathgate

does show an elevated pH of 9.1, and aluminium of 85 µg/l, however as this was taken nearly 2 days after the incident, it is unlikely to reflect to full impact on water quality supplied to consumers.

Once again, Scottish Water’s approach to incident sampling has fallen short of expectations, and therefore features as a DWQR recommendation. It is acknowledged that since the incident occurred, Scottish Water has agreed to review its approach to sampling during water quality events and it is hoped that this will improve the situation significantly.

Action Number	Action Description	Completion Date
1	Remove obstruction on carrier water dosing line	Complete
2	Fit flow detection switch to carrier water system and connect to SCADA system	Complete
3	Fit drop test tube to lime dosing pump	Complete
4	Share learning points with Treatment Operators with regard to chlorine measurement and selective electrodes	Complete
5	Update drinking water safety plan	Complete
6	Circulate report and share learning points with Water Operations Regional Managers	Complete

Additionally, DWQR has made one recommendation following this incident:

Recommendation Number	Recommendation	Completion Date
DWQR 1	Review procedures and training to ensure that sufficient water quality sampling takes place during events in order to adequately establish the quality of water supplied to consumers and any risk to which consumers were exposed.	Complete