

## Turret WTW, Perthshire Exceedence of the pH Standard 01 February 2010

DWQR Inspector:  
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### Summary of Incident

Turret WTW is located in Perthshire, but supplies a large part of Stirling and Falkirk as well. At the time of the incident, the works was undergoing a major upgrade to the treatment process. Three days before the incident, a new chlorine contact tank was commissioned, however it was found that this caused problems with the automatic pH control system that regulates the dosing of lime. This was taken out of automatic mode so that the lime was dosed proportionally to the flow of water. On the night of the incident, the lime dosing could not keep pace with changes in flow and began to overdose. At the same time, the new post contact tank pH monitor, that would have given an early warning of problems, froze and gave a false reading suggesting there was no problem. Once the clear water tank had filled with high pH water, the final water high pH alarm was triggered and an operator attended site. He visited a number of times through the night to adjust the lime dose, however this took a while to have an effect and the pH leaving the treatment works remained above the 9.5 upper standard for 12 hours. Once the manual dosing changes made by the operator began to take effect, the pH rapidly dropped to normal levels.

### DWQR Assessment of Cause of Incident

In DWQR's opinion, this incident was entirely avoidable. It was unfortunate that the commissioning of the new chlorine contact tank made it difficult to use the automatic dosing function; it is not possible to say whether improvements to the commissioning process would have foreseen this. However, the necessity to run the lime plant on flow proportional dosing should have triggered additional monitoring of the dosing system and the pH. The works has a microwave telemetry system, which enables operators to monitor works performance remotely, including water quality trends. This had recently failed over the previous weekend, preventing staff from doing this and identifying that measures to reduce the pH had not been effective. The whole incident could possibly have been prevented had the new post contact tank pH monitor not also failed due to an air locked line. Again, this suggests that an improved commissioning process may have prevented the problem.

### DWQR Assessment of Actions Taken by Scottish Water

The Scottish Water operator acted appropriately by attempting to reduce the lime dose manually, however the assumption was made that this had been successful. Given that the operator was called out a number of times that night by the final water pH monitor, he might have checked the post contact tank pH monitor and had he done so discovered that its signal had frozen. Once he had been called back to the site repeatedly and realised that his efforts to reduce the pH had not been effective, he might reasonably have been expected to contact his standby team leader – although the team leader had been informed initially about the problem, he was not telephoned again that evening. DWQR notes that communication to operational staff of the importance of prompt escalation has been identified as an action by Scottish Water.

Scottish Water appears to have been fortunate in this incident that there was such a large dilution factor, as there is no evidence of any high pH water reaching consumers and having had an adverse impact on quality. Although this had the potential to have been a major incident, no consumer complaints were received and it

is likely that there was no significant effect on water quality in the distribution system. Given the scale of the area supplied by this works and the length of time for which the water was potentially non-compliant, Scottish Water's sample survey consisting of five samples, two of which were taken more than 2 days after the end of the incident is inadequate. In any water quality incident it is important to be able to establish the extent and severity of the effect on consumers and, if there was no effect, be able to prove this. Scottish Water must improve its processes and procedures for ensuring that sufficient data is collected in a timely manner.

Scottish Water has identified the following actions that need to be taken in response to the incident:

Action Number	Action Description	Action Complete By
1	Investigate and rectify issue with new pH analysers	Complete
2	Identify a sample location that provides a representative sample for pH	Complete
3	Ensure a robust interim method for monitoring pH is in place until a permanent solution can be implemented	Complete
4	Complete work to fully commission new lime dosing system	Complete
5	Remind staff of the importance of escalating issues promptly to managers	Complete
6	Ensure microwave telemetry system is fully operational at the works	Complete
7	Purchase laptop to improve ease of remote system monitoring	Complete

DWQR has made the following additional recommendations to Scottish Water:

Recommendation Number:	Recommendation Description:	To be Complete by:
DWQR 1	Establish a process by which new monitors are tested and commissioned on live water treatment works to ensure they operate correctly.	16/08/2010
DWQR 2	Establish or Review operational guidance and procedures that cover additional process monitoring in situations where a treatment process or dosing system is required to operate with reduced functionality on a temporary basis.	Complete
DWQR 3	Review corporate procedures for sampling in response to incidents and consider whether they are appropriate and adequate, reporting to DWQR.	Complete
DWQR 4	Ensure any risks identified by incident are fully incorporated within the Drinking Water Safety Plan for the site.	To be incorporated in plan once produced

Once these actions are complete, DWQR will issue a letter to Scottish Water signing off the incident.