



Drinking Water Quality Regulator
for Scotland

Incident Assessment

Milngavie WTW
Aluminium Failure
10th August 2015

DWQR Inspector:
Moira Malcolm

Event No. 7084

Event Category: Significant

Summary of Incident

On 10th August an alarm alerted site operatives to an airlock on the conditioned water pH meter. The operator bled the airlock, however the lack of flow on the instrument caused the monitor to fluctuate on restart. This caused a fluctuation in lime dosing which is linked to this monitor, increasing the lime dosing to 100% for approximately 30 minutes. The operator also noted increased turbidity in the conditioned pH sample line, so cleaned and standardised the probe using the laboratory handheld pH probe. At this point the lime dosing was believed to have returned to normal and the process to be in recovery. The aluminium monitors continued to alarm and Scottish Water staff returned to site to investigate. The handheld pH probe was found to be faulty, which resulted in the conditioned pH monitor being off-set incorrectly by 0.4 pH units. An overdose of lime was added for a period of 14 hours until a second handheld probe was employed which revealed the fault. The lime overdose caused instability within the works and resulted in partially treated water with elevated levels of aluminium leaving the works for a period of 12 hours. Water from Balmore WTW was diverted to the downstream service reservoir to reduce impact on consumers, but 402,000 direct feed consumers were affected, although no failures were noted at consumers' taps.

DWQR Assessment of Cause of Incident

The event was initiated by the airlock to the conditioned water pH monitor, however the cause of the incident was the standardisation method using the faulty handheld pH probe, which resulted in the lime overdose and stopped the works returning to normal quickly.

DWQR Assessment of Actions Taken by Scottish Water

DWQR is satisfied that Scottish Water acted promptly in response to the initial alarm and escalated the incident to the appropriate staff during investigation and resolution of the problem. It is disappointing that the failure of the works to recover from what initially appeared to be a short-lived disruption of lime dosing was not acted upon sooner. The event was allowed to continue despite the two aluminium monitors downstream of the conditioned water stage (where the issue arose); at the filtered water and final water stages, the readings given by these monitors were overlooked during the initial investigations in favour of the conditioned water pH monitor and handheld probe. If the severity of these results in combination with the short-lived duration of the earlier lime dosing issue had been taken into consideration sooner the faulty probe may have been noticed earlier and reduced the timescale and severity of the event.



The handheld pH probe has a nominal life of 12 months, and this probe had been in service for 11 months. The probe is calibrated using standard high/low buffer solutions but the probe takes much longer to reach equilibrium in the low conductivity process water. This raises questions as to the training of operators in the difference between the conductivity of the process water and that during calibration.

A prompt, suitable and sufficient sampling programme was put in place to accurately capture the impact of the event both on storage points and at consumers' taps, including those served by direct feed from the WTW.

The event has been categorised as Significant. Scottish Water has identified a number of actions and DWQR accepts that these are appropriate. Additionally, DWQR has made one recommendation following this incident and will be monitoring to ensure both it and the actions are completed prior to signing off the incident.

