

Incident Assessment

Picketlaw WTW
Aluminium Failure
15th December 2014

DWQR Inspector:
Moira Malcolm

Event No. 6634

Event Category: Significant

Summary of Incident

On 15th December 2014 at 15:26 the pre-lime dosing pump at Picketlaw WTW jammed causing the pH at the coagulation stage of the works to spike. The operator was dispatched to the site and reset the pre-lime pump. With the pump reset the coagulation pH quickly dropped then recovered. A bench test was taken showing the aluminium to be at an acceptable level of 30µg/l and the operator left site, monitoring progress remotely via the Intelligent Control Centre (ICC). However due to the low pH a quantity of poorly coagulated water passed through the works and the filtered water aluminium rose above 200µg/l at 17:52, peaking at 600µg/l by 18:15. This elevated level dropped quickly and the aluminium returned to acceptable levels within 45 minutes. Due to the elevated aluminium concentration, the operator returned to site and took aluminium samples from High Borland Service Reservoir Outlet. An on-site bench sample taken at 20:20 gave a reading of 220µg/l, with subsequent lab tests revealing this to be 295µg/l. A second bench sample at 23:00 gave a reading of 0µg/l and a further lab sample the following morning (at 10:20) gave a value of 43µg/l. The treated water chlorine residual remained steady throughout the event. No sampling was undertaken at consumer's taps.

DWQR Assessment of Cause of Incident

The cause of the incident was the failure of the coagulated water pre-lime dosing pump. After a routine changeover between the two pumps the stroke controller on the functioning pump jammed at 100% stroke which caused the coagulation pH to rise. The pump is designed to react to the pH of the water so when the pump was reset by the operator it then adapted to the high pH by reducing the lime input and causing the pH to drop. Whilst this was occurring, the alum pump (which is not reactive to pH) continued to pump a metered dose of aluminium sulphate into the water. The low pH resulted in poorly coagulated water with a high aluminium content passing through the works, ultimately causing the failure at High Borland Service Reservoir Outlet of 295µg/l.

DWQR Assessment of Actions Taken by Scottish Water

DWQR is disappointed that Scottish Water failed to assess the likely impact that changes to coagulated pH could have on the process and ultimately the quality of water supplied to consumers. Several issues were noted and are pertinent:

1. The operator returned to site at 19:20 following the high filtered water aluminium alarms, however samples at the Service Reservoir were not taken until 20:20. There is no online final water aluminium

monitor, so it is not possible to ascertain if the sample taken at 20:20 represented the peak of the event or whether this had already passed.

2. No samples were taken at consumer's taps so it is not possible to say if the sample taken at the service reservoir was replicated in consumer's homes. During an incident of this nature, DWQR would expect Scottish Water to obtain samples from consumers' taps in order to provide an indication of the quality of water received.

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 two recommendations and will be monitoring to ensure all are completed prior to signing off the incident.

