Drinking Water Quality Regulator for Scotland

Incident Summary

Lintrathen WTW
Significant loss of control of treatment process
2nd October 2023

DWQR Inspector:
Andrew Kennedy

Event No. 13849

Event Category: Significant

On 2 October 2023 at 9:23 am, a loss of aluminium sulphate (alum) dosing occurred at Lintrathen Water Treatment Works (WTW) after both pumps failed. The pumps were restarted by the site operator, however the duty pump had changed from Pump A to Pump B and the operator was unaware that a valve on the dosing lines, which had recently been dualled, had been left in the closed position. As a result of Pump B running and the closed valve on the dosing line, alum was circulating in a closed loop and re-entering the dosing tank through a pressure release valve, with no chemical being dosed.

Whilst the operator was investigating the coagulation issues, there was an additional brief loss of polyelectrolyte (poly) dosing for circa 1 hour, which intensified the already high filtered turbidities. The loss of poly dosing was due to a build up of poly within the tank that inhibited the level probe from recording accurately. As a result, the next batch of poly was not transferred to the dosing tank as the probe did not sense that the low level had been reached. Having discovered the issue with the poly dosing issue at 14:10 pm, the poly batching probe was cleaned and poly dosing was restored.

Following the restoration of poly dosing, it was found that the water quality was not improving and investigations into the issue continued until the operator changed the alum duty pump back to Pump A at 15:45pm, which restored coagulant dosing and saw the treatment process begin to recover

During the event, individual turbidites breached the emergency action levels (EAL) of 0.32NTU for 9hrs, with the worst performing rapid gravity filter (RGF), filter no.5, peaking at 2.89NTU, whilst combined filtered turbidity was above EAL (0.25NTU) for 10hrs and above 1NTU for circa 5hrs, potentially reaching 2NTU (online monitor on SCADA scaled to 1NTU). Alongside the elevated filtered turbidities, filtered aluminium monitors for RGFs 1-3 and RGFs 4+5 peaked at 710µg/l and 720µg/l respectively, whilst combined aluminium was above EAL for 6.5hrs, peaking at 370µg/l. The treated water chlorine residual dropped from 1.3mg/l to 0.2mg/l and was below EAL for 6hrs, whilst the final water chlorine residual dropped below the operational target of 0.85mg/l to 0.41mg/l and took some 45hrs to recover to the target residual.

Additional samples were requested by Scottish Water's Public Health Team (PHT) at the time of the event, including a *Cryptosporidium spp*. sample and final water samples to be taken on the day, and final water and downstream service reservoir samples to be taken for 2 consecutive days following the event. There were no failures of regulatory standards from the samples that were taken.

It is clear from the information provided by Scottish Water that the deterioration of water quality occurred as a result of a loss of coagulant dosing due to a closed valve on the dosing line. The deterioration of water quality was exacerbated by a short loss of poly dosing, caused by the dosing tank running empty

The event has been categorised as significant. Scottish Water has identified seven actions which DWQR accepts are appropriate and will monitor to ensure they are completed prior to signing off the incident. DWQR made two additional recommendations.