Drinking Water Quality Regulator for Scotland

Incident Summary

Burncrooks RSZ Elevated Manganese July 2021

DWQR Inspector:
Colette Robertson-Kellie

Event No. 11873

Event Category: Significant

A reservoir inspection in September 2020 identified leaks on the embankment of Jaw Reservoir, one of a series of reservoirs supplying Burncrooks WTW. Water from Greenside Reservoir is pumped to Cochno Reservoir, which then gravitates to Jaw Reservoir. Water from Jaw Reservoir is then pumped to Kilmannan Reservoir, which is pumped to Burncrooks Reservoir, which gravitates into Burncrooks WTW. To minimise damage until a repair could be carried out, the level of Jaw Reservoir was dropped. As a result, Jaw Reservoir levels were at a historically low level, and water had to be drawn from a deeper level in the reservoir than normal.

On the 3rd July 2021, a power failure caused Burncrooks WTW to shut down. The Kilmannan reservoir pumps supplying Burncrooks Reservoir, and the RESMIX at Burncrooks Reservoir (installed to mix the water in the reservoir, introduce oxygen to lower levels of the reservoir and destratify it, thereby reducing manganese levels in the raw water entering the treatment works) were also shut down by the power failure. The Standby Operator was called out, and the treatment works was restarted. However, there is no telemetry alarm linked to the RESMIX, so Operators were unaware that the RESMIX had failed until the next routine visit to the reservoir on the 8th July. A repair had to be made by Scottish Water's E&M team, and the RESMIX was returned to service on the 9th July.

On the 17th July, Scottish Water began to receive consumer contacts reporting discoloured water, with 53 received on the day. Colour and turbidity samples were requested by the

Team Leader, which were well within regulatory limits, and the Public Health Team arranged sampling of the affected areas. Analytical data shows that the manganese standard of 50 µg/l was breached in all samples taken, with a maximum recorded value of 297.2 µg/l.

There is no dedicated manganese removal treatment stage at the treatment works, so Scottish Water manually monitored manganese levels across the supply system (there is no online manganese monitoring at the site). Jar tests were carried out to check whether increasing pH would precipitate manganese for removal on the filters at the site, but these tests showed that this would not be successful. Flushing of the network was minimal as Scottish Water was concerned that the situation would be made worse, and there was a high demand on the network at the time of the incident because of warm weather. In total there were 220 consumer contacts

The root cause of the manganese failures and consumer complaints for discoloured water was a lack of treatment processes at Burncrooks WTW to remove naturally occurring manganese from the raw water. This was exacerbated by reservoir levels being dropped at Jaw Reservoir to minimise damage to the reservoir, embankment, and by the RESMIX being out of operation for six days. High consumer demand and significant fluctuations in flow in the network will have caused disturbance of manganese deposits in the network.

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