

Loch Calder WTW Disinfection Failure July 2021

DWQR Inspector:
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Event No. 11886

Event Category: Significant

On 21st July 2021 the standby operator responded to a call from ICC (Intelligence Control Centre) for a Loch Calder WTW plant shutdown on low chlorine. Their attempt to restart the plant failed and the issue was escalated. The chlorine skid at Loch Calder WTW was undergoing commissioning and due to this only one sodium hypochlorite pump was operable, though a critical spare pump was available. The commissioning engineer identified a failed flow switch and flow was reinstated. At this time the Chlorine Contact Tank (CCT) and buffer tanks were spiked with hypochlorite, however this caused a further plant shutdown on high chlorine (as the spiked residual passed through the post CCT chlorine meter). The standby operator attended site and restarted the works.

That evening Loch Calder WTW experienced a third shutdown, this time for 'low low pre contact tank freechlorine residual'. The standby operator discussed the previous issues regarding the flow switch with an operational colleague and restarted the plant. All visual checks and SCADA (Supervisory Control and Data Acquisition) trends showed the chlorine system to be working, but the standby operator noted that there was no flow to the pre contact chlorine monitor. The operator reinstated the flow however the monitor did not show any flow and subsequent bench tests taken at 01:00 on 22nd July revealed that there was no chlorine dosing, and that this had been the case since the restart at 23:45.

The standby operator stopped and bled the chlorine pumps and the interstage pumps were stopped to prevent forward flow. The operator escalated the issue and continued to



investigate the problem, concentrating on the earlier flow switch issue. However despite detailed checks no resolution could be found, so with distribution Service Reservoirs running low the decision was taken to restart forward flow and spike the buffer tanks with hypochlorite to provide some chlorine residual into supply whilst further checks were made. An hour later the problem was still unresolved, so the plant was shut down again. ESD staff and the Operational team leader arrived on site and identified plastic debris in the non-return valve (NRV) on the chlorine dosing pump which had jammed the valve. This was removed which reinstated chlorine dosing and the plant was restarted. Over the course of the incident undisinfected water entered supply for 3 hours 22 minutes.

Scottish Water's investigation reported that the root cause of the incident was plastic debris found in the chlorine dosing pump NRV which prevented dosing. Scottish Water were not able to identify the source of the debris. The earlier autoshutdown was caused by a failed flow switch.

Loch Calder WTW has a new chlorine dosing skid which has experienced a number of issues during its prolonged commissioning. Resolving a previously identified issue with the chlorine skid was the reason the second chlorine dosing pump was unavailable for use. If auto changeover to the standby pump had been available (as during normal operation) this would have prevented this incident.

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

