



Drinking Water Quality Regulator
for Scotland

Incident Summary

Carsphairn WTW
Treatment Failure
5th September 2022

DWQR Inspector:
Moira Malcolm

Event No. 12862

Event Category: Significant

On 1st September 2022 Carsphairn Water Treatment Works (WTW) underwent a planned membrane replacement operation. On 5th September the Intelligent Control Centre (ICC) called out a low final chlorine alarm, but the operator that attended site found chlorine levels to be low but above the Emergency Action Levels (EAL).

The following day a scheduled combined permeate (CP) microbiology sample (taken on the 5th) was reported to have >100 coliforms and >100 E. coli and this was escalated to the Emergency Planning team. The WTW was shut down and a 'Boil Water' notice issued to all consumers while tankering was arranged. The Clear Water Tank (CWT) was subsequently taken offline and the CWT and network flushed with tankered water.

The membrane contractor found a broken tube in one of the membranes which was replaced on the 7th. A second microbiology sample failure on the 8th caused the CWT to be drained, refilled and sampled.

The Boil Water notice was lifted on 9th with the network using tankered water and the plant continued running to waste until the 13th when further sampling had passed and the Public Health Team approved the return of the membrane plant and CWT to service.

In addition to the two microbiology failures there were two *Cryptosporidium* detections on 5th and 6th September from the WTW; and nine failures in distribution on the 7th for manganese, iron and turbidity.



The incident was caused by the broken membrane tube from the new membrane stack installed four days previously (known as a 'juvenile failure'). Scottish Water's investigation into the incident has identified that more monitoring – both bench tests and online – could have identified the issue one day earlier, but the site did not have the capability to perform this due to limitations in connectivity and EAL settings.

The microbiological failures and breakthrough of *Cryptosporidium* oocysts were caused by the failure in membrane integrity, while the distribution failures were likely caused by the flushing and tankering actions which disturbed pipeline deposits within the network.

The event has been categorised as significant. Scottish Water has identified eleven 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.



