

Skerries WTW Disinfection Failure 3rd March 2019

DWQR Inspector:
William Byers

Event No. 10044

Event Category: Significant

On 3rd March, the standby treatment operator was called out at 2300hrs to attend a final water low chlorine alarm from the works. The chlorine dosing equipment was found to be operating normally but bench tests carried out noted an elevated colour in the combined permeate off the secondary membrane stage, Reverse Osmosis (RO) unit. Following escalation of the situation to the Public Health Team, the clear water tank was partially drained and samples were arranged to be taken from the treated and final water. Final water chlorine levels had then recovered to above 0.4mg/l, the minimum operating level.

In the days prior to this event, a Contractor had been working to install arrangements for a second RO unit and new, larger pumps to feed the enlarged RO capacity. On 26th February, the first pump was commissioned on the live plant and this caused a pressure surge through the RO unit but also appeared to affect the primary Nano Filtration (NF) stage. The following day, the second pump was commissioned and again, a large pressure surge occurred through the system. With the disinfection call out and elevated colours experienced, the Contractor was called back to site to check both membrane stages. The NF and the RO membranes had been due to be replaced in July as part of the normal maintenance cycle and as a precautionary measure, the NF membranes were replaced on 7th March. No faults however were found on the RO unit. Water quality improved following this action but only for a short time.

On 16th March a low final water chlorine alarm again required the attendance of the standby operator. The chlorine dose set point was increased to effect a recovery but with the final water showing a still reduced chlorine level, additional chlorous was manually added to the Lime contact tank and the dosing set point increased to 1.8 mg/l. Monitoring of the processes over subsequent days showed a varying but unsatisfactory level of chlorine in the final water and on 21st March the RO membrane was replaced and the second unit

installed. Over the course of the event, the poorer performance of the filters and the increased level of chlorine being applied resulted in increased levels of Trihalomethanes (THM) in the supply. There were however no failures of the standard for Total THM in samples from consumers taps or in final water. A single failure of the standard for iron occurred in one Final water sample (238 µg/l) from the works taken on 18th March, which was attributed to a scouring of the pipework during the work to drain-down the clear water tank. Following the work on the RO stage of the process, there was a marked improvement in the quality of the produced water, restoring the supply to normal.

It is clear from the evidence submitted by Scottish Water that the efficiency of the membrane filtration units at the works were adversely affected by pressure surges caused by commissioning of the new RO stage pumps. Both pumps were commissioned on the maximum setting before being corrected to the required setting. The damage to the filters resulted in poorer quality water being produced, increasing the chlorine demand of the water and impairing the disinfection process. 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 two additional recommendations.