

Incident Summary

South Uist WTW Disinfection Failure 4th January 2021

DWQR Inspector:
Moira Malcolm

Event No. 11456

Event Category: Significant

On 4th January 2021 Scottish Water's Intelligent Control Centre (ICC) received alarms from Stoneybridge WTW for low chlorine, and shortly afterwards informed the standby operator of a 'plant shutdown' alarm. On attendance the operator refilled the sodium hypochlorite ("hypo") day tank which was low, reset the hypo dosing system (with a positive flow registering on the flow switch) and informed the escalation team leader. The site usually takes about 45 minutes to restart, however when this had elapsed the chlorine residuals were still low, so the standby operator re-shut the works. All systems were checked and the works again restarted, however after another half hour chlorine levels did not appear to be rising so the works was shut down for a third time. One hour later the works was restarted and a drop test was conducted on the duty hypo dosing pump, which revealed that contrary to the flow switch positive reading it was not dosing. The standby pump was activated and with dosing resumed the chlorine residual began to rise. Operators increased raw water flow and added sodium hypochlorite to the Clear Water Tank (CWT) to boost the chlorine residual. A further dosing interruption occurred several hours later which was thought to be due to air in the system caused by the previous issues. Throughout the event chlorine dosing was intermittent for 3 hours 15 minutes, with inadequately disinfected water passing through the WTW for a total of 114 minutes. Reactive sampling from the works final sample point and at service reservoirs were negative for bacterial contamination. One iron failure was recorded from South Lochboisdale Service Reservoir 1.

Scottish Water's investigation noted a number of issues that contributed to the cause of this incident: 1. The dosing pumps on the hypochlorite day tank are mounted higher than the base of the tank, which is usually kept more than 50% full. However due to demand and local bursts the level dropped which may have allowed air into the system and caused the hypo dosing pumps to airlock. 2. The flow switches were reading a positive flow despite no dosing occurring. This was due to air in the system. When a drop test was performed this was noted and the fault rectified. The drop test was not part of the TOMS (Treatment Operation and Maintenance Strategy) procedure. 3. The alarm for the hypochlorite day tank level was set at 50 litres, however issues with air ingress arise when the tank drops below 100L. The alarm is also only connected locally and would not have alerted the ICC. Scottish Water also noted that historically the day tank used to use a higher strength hypochlorite solution which made the day tank last longer, however efforts to optimise the dosing system led to a reduction in concentration to allow for better control. This incident indicates that since this optimisation process the knock-on effects of the day tank dropping lower (and associated alarm set point) have not been addressed.

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 zero additional recommendations.



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