

South Moorhouse WTW Aluminium Failure 10th December 2014

DWQR Inspector:
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Event No. 6630

Event Category: Significant

Summary of Incident

On 10th December 2014 at 16:04 the Intelligent Control Centre (ICC) received an alarm from South Moorhouse WTW for final water low pH. Further alarms received over the next 30 minutes prompted the standby operator to be called out to site to investigate. On arrival at site the operator discovered that the automatic control system was faulty and not controlling the site processes. At this point, to protect water quality, the works was shut down, the inlet to the clear water tank (CWT) closed and the water passing through the works diverted to waste. After manual resets failed, specialist engineers were dispatched to site to investigate and resolve the control system failure. This was completed at 23:40 and after scrutiny of the telemetry data and satisfactory bench tests, the WTW was returned to service at 00:20 on 11th December. Two samples were taken the following day to confirm that the water entering the supply had been protected from the event and did not breach any prescribed concentrations and values (PCV). These samples were not fast-tracked, so it was not until the 16th December that the analysis results revealed elevated aluminium levels of 212µg/l leaving the WTW and 408µg/l at a consumer's tap, both of which breach the PCV of 200µg/l. Resamples taken at consumer's taps the following day on 17th December were within regulatory limits.

DWQR Assessment of Cause of Incident

The sequence of events which triggered this water quality incident began with water ingress at the CWT inlet valve which shorted a component on the PLC automatic control system and triggered the disruption of the process control of the works. This disruption caused the automatic lime dosing to stop, however aluminium dosing of the water continued, causing sub-optimal coagulation conditions and ultimately resulting in elevated aluminium levels in the treated water.

However the cause of the incident was restarting the works while the water was still outwith regulatory limits. The decision to restart the works was prompted by the use of an unrepresentative sampling point. The treated water sample point was used to take bench tests to validate the telemetry readings that the water was within PCV limits and could be returned to service, however the water passing through the works was being diverted to waste before this sample point.

DWQR Assessment of Actions Taken by Scottish Water

DWQR are of the opinion that Scottish Water initially responded appropriately to the event and took the necessary steps to contain the situation, however the DWQR are critical of Scottish Water's decision to restart the works as this was based on erroneous data and assumptions, and further investigation should have been completed prior to restarting the works. Several issues were noted and are pertinent:



1. The works was restarted because all the telemetry readings and bench samples of treated water, bar one aluminium monitor (at the filtered water sampling point), showed that the water had returned to 'normal' and the faults had been rectified. It was assumed that the aberrant aluminium monitor was faulty, however if bench tests had been taken from this sample point they would have confirmed that the water was still high in aluminium and that the works should not yet be restarted. This was also compounded by the lack of online final water aluminium monitoring to contradict the bench samples.
2. The *Cryptosporidium* rig was out of service during the time of the incident. It had been reported as broken on 18th November but the repair was not completed until 15th December, almost 1 month later. As a result no *Cryptosporidium* sampling was undertaken during the event.
3. Perfunctory sampling was undertaken following the event, with only one sample taken at a consumer's tap and one at the WTW outlet a full 10 hours after the works were restarted. These samples were then not fast-tracked at the lab, so it was another three days before it was known that the regulatory breach had occurred. With sampling as inadequate as this, it is not possible to say how badly consumers were affected: either by duration; population; or severity. This is completely unacceptable and especially disappointing as DWQR has discussed similar issues around incident sampling on numerous occasions in the past. Scottish Water must urgently address this deficiency in its operational procedures or be subject to Direction on this matter.
4. The SCADA system only allows for data backup for one month. The final outcome of the incident was reported by Scottish Water to DWQR on 9 February, therefore the data was by then unavailable for interrogation. Despite the time taken to investigate and report the outcome to DWQR, the PCV failure was known to Scottish Water on 16 December. If the SCADA results had been analysed and backed up at this time, the data would not have been lost and a full picture of the event would be available for scrutiny.

The event has been categorised as Significant. Scottish Water has identified several actions and DWQR accepts that these are appropriate. Additionally, DWQR has made two recommendations and will be monitoring to ensure both these and the actions are completed prior to signing off the incident.

