

Ringford WTW Turbidity failure December 2020

DWQR Inspector:
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Event No. 11432

Event Category: Significant

On 13 December high and very high final turbidity alarms from Ringford Water Treatment Works (WTW) were received by Scottish Water's Intelligent Control Centre (ICC) and relayed to the standby operator. The operator surmised that it was a nuisance alarm caused by the duty borehole pump starting up and informed ICC they would not attend. The ICC interpreted this as the turbidity monitor being faulty, so acknowledged and actioned the alarm (which meant it was no longer visible to ICC staff). Without this visibility no one was aware that turbidity continued to rise and flat lined on the monitor at 2NTU (nephelometric turbidity units) for 2 hours. Final turbidity was above the PCV (regulatory standard) for eight hours, then remained above the alarm level for a total of 30 hours – including another period above the PCV of 45 minutes at the changeover of the boreholes on 14 December. Further alarms were generated throughout this period but as ICC were under the impression that the monitor was faulty, they were not communicated to Operations.

On 14 December a scheduled sample was taken and was above the PCV for turbidity at 2.2NTU. This result was received by the Public Health Team on 15 December who reviewed the turbidity trends and escalated the results to Operations Team Manager, Team Leader and process science. Heavy rainfall was presumed to be the cause of the turbidity as none of these parties was aware that there were considerable groundworks being undertaken on site to provide a run to waste scheme which could be contributing to the turbidity ingress.

On 16 December further high and very high turbidity alarms were suppressed by ICC, before an alarm generated at 13:16 was passed to a site operator. The operator attended site later that day and noted no issues – there is no trend visibility on site and the operator was

unaware of the issues experienced over the preceding days. That evening a further turbidity spike sent the operator to site where Borehole 2 (which is prone to turbidity issues during heavy rain) was isolated. Borehole 1 was left in operation. Turbidity dropped, then rose again the following morning - Borehole 1 was also isolated and the site left running to waste while the extent of the incident was investigated and to clear the boreholes of any residual turbidity. It was only at this point that the extent and impact of the groundworks was realised. Sampling was instigated and a catchment investigation undertaken. Once turbidity dropped the WTW was returned to service on 21st December. The sampling response recorded manganese failures from Ringford WTW and Muirhead Service Reservoir (SR) (fed by Ringford) on 21, 22 and 30 December, with another failure for manganese on 13 January.

The root cause of the turbidity failure was elevated rainfall affecting the boreholes, with possible ingress from the run to waste groundwater contributing to this ingress. However the prolonged nature of the incident was caused by multiple failures in communication within Scottish Water:

- The initial call regarding the turbidity alarms at Ringford WTW between ICC and the standby operator receiving the call led to the misinterpretation by ICC that the alarm was faulty and was therefore dismissed. This led to no alarms being called out despite the turbidity being above alarm level for 30 hours. The lack of clarity in this call, and that it was not re-evaluated with Operations at any stage during this time is concerning – especially given the increased role ICC is taking on with regard to standby escalation.
- I am surprised that the Sustainable Land Management (SLM) team was not a mandatory stakeholder consultee in the early stages of planning the run to waste project. Given that Scottish Water employ specialists in catchment management that can provide expert advice in this area, this is a significant oversight.
- The lack of consultation between Capital Maintenance and South Operations is also surprising. The potential for the groundworks to affect water quality seems to not have been considered or communicated to Operations who then could have taken this into consideration in treatment control.
- Communications within operations, and the lack of visibility of turbidity trends on site led to different operators not realising the significance of alarms as they had no knowledge of the previous alarms or actions of their team.
- PHT informed Operations and Process Science on receipt of the failed sample result



and reviewed the trends, however ICC were not consulted or notified of the failure. By closing the loop the extent of the failure may have been noted at this stage and remedial action taken.

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

