

Coulter WTW
Loss of Control of Coagulation Process
29 July 2015

DWQR Inspector:
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Event No. 7048

Event Category: Significant

Summary of Incident

Heavy rainfall in the early hours of the 29th July 2015 caused a deterioration of raw water quality at Coulter WTW, which led to a lack of optimisation of the coagulation process for around nine hours. There is no final water aluminium monitor at Coulter WTW, so it is not clear what the maximum level of aluminium in the final water was, but extensive manual sampling across the different stages of the treatment works as well as sampling in the distribution system suggested that it did not breach regulatory standards. Final water on-line turbidity monitoring and *Cryptosporidium* sampling again showed that no standards were breached.

DWQR Assessment of Cause of Incident

The cause of the incident was a deterioration of raw water quality which was not detected early enough due to a lack of appropriate alarmed instrumentation.

DWQR Assessment of Actions Taken by Scottish Water

Scottish Water staff responded well to this incident. The ICC monitored the alarm for a short period of time before calling out the Operator, and after interrogating the SCADA system he followed internal procedures by alerting his managers and monitoring for *Cryptosporidium*. He carried out an inspection of alum dosing points and equipment, and then increased the alum dose to counteract the deterioration in raw water quality. Support was provided promptly from the Senior Operator and Process Scientist. Alum dosing was increased to regain control of coagulation, and sodium hypochlorite dosing was increased to maintain chlorine levels. An early attempt was made to reduce the alum dose as there had been concern over potential overdosing of alum; the reduction in dose was premature and caused aluminium levels to increase again slightly, but DWQR accepts that the reduction in dose was based on previous experience of the works and available data, and its effects were carefully monitored and responded to appropriately.

However, it is possible that the incident could have been prevented had there been an earlier indication of raw water deterioration from raw water colour, pH and turbidity monitors. There is no raw water colour monitor and the turbidity of only one of the two raw water streams is continuously monitored. Additionally, despite coagulation being pH dependent, no raw or flocculated water pH alarms were generated.

Final water aluminium levels were originally reported to DWQR as a 'probable' breach of the aluminium standard. It is recommended that an on-line aluminium monitor is installed to measure aluminium levels in the final water to ensure that final water quality is known at all times, particularly as this is a supply that can experience significant raw water quality variations.



Scottish Water has a procedure at Coulter WTW which specifies how operational staff should deal with raw water turbidity or colour alarms. However, a review of this procedure showed that the governance of the procedure was the responsibility of a department which no longer exists. Scottish Water then provided DWQR with an updated version of the procedure – the procedure from the works was version 1.0, dated August 2005, and the updated version was version 5.0, dated August 2015, suggesting that there had been a breakdown of document control. This is unacceptable, and a review of all procedures relating to water quality, their governance and document control should be carried out at Coulter WTW.

The event has been categorised as Significant. Scottish Water has identified a number of actions and DWQR accepts that these are appropriate and will be monitoring to ensure they are completed prior to signing off the incident.

