

Burncrooks WTW Aluminium Failure 3rd December 2014

DWQR Inspector:
Moira Malcolm

Event No. 6597

Event Category: Significant

Summary of Incident

On 3rd December 2014 from 05:43 – 06:39 a series of high filtered water turbidity alarms were received at the Intelligent Control Centre (ICC) for Burncrooks WTW. An operator was dispatched to the site at 06:39 who noted increased aluminium levels in the treated water and immediately isolated the process. The plant was isolated from the outgoing water and water from another WTW was utilised to supplement the supply. The contaminated water from the plant was diverted to waste. The process was monitored while remedial action was carried out and aluminium levels returned to within the prescribed concentration or value (PCV). The works was then brought back into service at 15:30. During this period on line monitoring showed the PCV failure with aluminium levels confirmed by lab tests peaking at 280µg/l (exceeding the maximum PVC of 200µg/l) entered the final water supply to consumers. No microbiological failures were recorded and no customer complaints were received during the incident.

DWQR Assessment of Cause of Incident

The cause of the incident was a block in the coagulation aid (poly) batching system which failed to pass powder into the system, batching only water. This caused the blankets to rise in the clarifiers until the flocculated water (high in aluminium content) passed into the rapid gravity filters (RGF) and thus remained in the system causing turbidity breakthrough.

This was compounded by the sampling point for turbidity being situated low down in the clarified water channel which meant that it was slow to detect the issue. As a result the ICC operator did not react to the initial RGF high turbidity alarms as at this time the high turbidity was not reflected in the clarified turbidity monitor.

DWQR Assessment of Actions Taken by Scottish Water

The ICC operator did not have a true picture of water quality due to the poor position of the clarified water turbidity sample point and this impacted on the timeliness of diagnosis of a deterioration in water quality. Once the ICC operator responded to the unfolding event, Scottish Water subsequently took the necessary steps to contain and resolve the situation. Several issues were noted and are pertinent:

1. It is estimated that the poly batching plant failed at approximately 21:15 on 2nd December as this is the point that the clarifier blankets begin to rise. High turbidity alarms at the RGFs began at 05:43 on 3rd December. Scottish Water has acknowledged that an alarm linked to the blanket level would provide a useful early warning system for this issue and this should be implemented.

2. The ICC operator did not react to the initial turbidity alarms because the clarified turbidity and coagulation pH were stable at this time. As identified by Scottish Water the sampling point for this is situated low down in the clarified water channel and provided unrepresentative information for the ICC operator. If this sampling point was repositioned it would be more representative to allow for a quicker response.

3. The standby operator acted in a timeous manner to take bench samples, accurately assess the situation and shut down the plant.

4. The inlet to the clear water tank was reopened when the aluminium level had dropped to back within the PCV monitored in SCADA ($198.65\mu\text{g/l}$) and was on a downward trend. It should be noted that the formal sample taken where the water entered the distribution network to consumers was $280\mu\text{g/l}$ at the peak of the incident, however this dropped quickly and was recorded at $28\mu\text{g/l}$ the following day.

5. No failures were recorded from customer's taps. However on the day of the incident no times were recorded for when these samples were taken, so it is not possible to ascertain if these samples were representative of the event.

DWQR has designated the event as Significant.

Scottish Water identified two actions as a result of this incident which DWQR considers to be appropriate and DWQR identified a further one action. All of these actions shall be monitored by DWQR.

