Drinking Water Quality Regulator for Scotland

Incident Assessment

Kyle of Lochalsh WTW Ammonium Failure 5 January 2016

DWQR Inspector:
Moira Malcolm

Event No. 7419

Event Category: Significant

Summary of Incident

On 5th January 2016 the Intelligent Control Centre (ICC) alerted the standby operator at Kyle of Lochalsh WTW to a high post clear water tank ammonia alarm. The operator attended site and recalibrated the post chlorine contact tank monitor (pCCT-Cl). On the same day a sample was taken from Balmacara service reservoir which had elevated levels of ammonium above the regulatory limit.

Prior to this, the pCCT-Cl monitor had been drifting out of calibration for several weeks, and site operators had replaced the membrane end cap on the 18th December to recify this. However the monitor continued to fail to hold a calibration and the end cap was replaced again and the probe recalibrated on 31st December. Subsequently the monitor drifted out of calibration between this date and 5th January. This monitor can be used to trim the addition of chlorine for disinfection, and the system was kept in this mode during the event. The increased chlorine concentrations then caused the overdosing of ammonium sulphate. The ammonia monitor alarmed on 3rd January, however ICC did not know that the ammonia trend had been high for four days and deferred this until the second alarm was received on the 5th.

No other ammonium failures were noted in the zone and no customer contacts were received during the incident.

DWQR Assessment of Cause of Incident

The cause of the incident was a faulty chlorine monitor and subsequent deferral of the pCCT-Cl alarm by the ICC. This was compounded by the following:

1. As per procedure, following the end cap change on the pCCT-Cl probe, the mode of plant control should have been changed to mode 2 (which removes this monitor from the chlorine trim process). Because it was left in mode 4, the faulty monitor overdosed chlorine which led to the overdosing of ammonium to maintain the chloramination ratio. Considering the probe had been giving erratic readings for some time, this would seem an obvious procedure to implement to mitigate the effects of the faulty probe.
2. The ICCs decision to defer the alarm was compounded by several factors. Telemetry updates for ammonia are at a low frequency, making issues less obvious and therefore more difficult to identify and rectify; the ammonia monitor was exhibiting a ‘noisy’ trend due to insufficient maintenance;
3. To trend monitors on site, operators are required to manually scroll through each instrument at a time. This makes it difficult to spot longer term trends and act accordingly.

DWQR Assessment of Actions Taken by Scottish Water

Scottish Water operational staff reacted quickly and appropriately when they received the alarm notification from ICC on 5th January. However several points should be noted:

1. It is disappointing that ICC staff were unaware that the pCCT-Cl monitor controlled chlorine trim dosing (and therefore had a knock-on effect on ammonium dosing).
2. The Hi and HiHi alarms on the monitor were set very close to the pcv, allowing very little warning time for ICC staff and site operators to control any issues with ammonium dosing.
3. The faulty probe was allowed to continue for almost a month prior to the incident. Whilst site staff were aware of the issue, there appears to have been no urgency in resolving the issue, which indicates a lack of training to ensure operators are fully aware of the significance of these monitors. This is particularly disappointing as this incident occurred only 2 months after another incident at the same site for a similar issue.

The event has been categorised as Significant. Scottish Water has identified a number of actions and DWQR accepts that these are appropriate. In addition, DWQR has also made one recommendation following this incident and will be monitoring to ensure both it and the actions are completed prior to signing off the incident.