

Drinking water 2020

Quarter 4

Oct - Dec 2020

A report by the Chief Inspector of Drinking
Water



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England and Wales

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Introduction

During the year, the quarterly Chief Inspectors Reports have included a detailed report on the audits which have occurred in each quarter. The fourth quarter saw the publication of the Chief Inspectors annual report, which only included a summary of the main findings of the previous quarterly report audit programmes. For the benefit of the Industry, full details of the fourth quarter audit findings are published in this special report.

Groundwater Audit Programme

In November and early December, the Inspectorate undertook a series of eight audits of groundwater works across England. The Inspectorate's risk assessment to ensure that the audits could be undertaken safely, was revised and updated as guidance on the pandemic evolved. Cooperation from all companies to allow the audits to be carried out safely was appreciated.

Catchment

The boreholes for Wessex Water's Rodbourne works are located within Source Protection Zone 1 for the merged Malmesbury sources. The aquifer is confined, however, the catchment risk assessment reports that "*Emerging evidence suggests that under certain conditions confined areas in the catchment may become unconfined*". This concern primarily relates to metaldehyde detections. The Inspectorate recommended that the risk assessment was updated to reflect the risk of the aquifer being unconfined at times. In response Wessex Water added an assessment of metaldehyde risk to one of the borehole sources which barely addressed the recommendation.

The turbidity requirements of categorising Rodbourne works as the best quality (Category 1) source did not meet the company's own standard. The Inspectorate recommended the company re-appraise the source water to ensure the water presented at point of disinfection meets the company's own internal guidance. The company provided a vague commitment to review its raw water categorisation process without timescales or clear outcomes. The Inspectorate also recommended that Wessex Water review its triggers for updating catchment risk assessments, which were fixed at every five years. The company took action to revise its policy and carry out interim reviews where new information indicates a change in risk. This is captured as part of the scheme that led to Wessex Water's accreditation under the DWI Risk Management Assessment Scheme (DWIRMAS), which all companies are encouraged to achieve.

The borehole headworks at United Utilities Cliburn works are located below ground. The company had identified the risk and decided to raise the headworks above ground. The Inspectorate recommended this was completed in a timely manner, the company subsequently commenced work on site in January 2021 to raise the headworks with completion expected in June 2021.

Similarly, the borehole headworks for the onsite 'Emergency Bore' at Redgrave works is below ground. However, Essex and Suffolk Water have assessed the risks and do not consider raising the headworks above ground level is required. The company have installed bollards to prevent vehicles

parking on the headplate and have raised an internal investment request to install flood prevention measures for all below ground headworks.

Groundwater monitoring pipework at Yorkshire Water's Nutwell works did not have a satisfactory sanitary seal and may allow vermin to enter. The company took steps to decommission both Groundwater Monitoring Points onsite. But a wider recommendation was made that the company reviews its policy, procedures and onsite checks for groundwater monitoring pipework sanitary seals throughout the company. The policy was later revised.

It was uncertain whether the lack of level probe maintenance in the below-ground borehole headworks at Nutwell works provides adequate flood risk control. The company were recommended to review this arrangement and to maintain the probes to reduce the ingress risk. However, Yorkshire Water considered their flood management strategy for the site was appropriate and backed up by weekly proactive inspection of the borehole headworks. The company is considering the funding for groundwater assets including a scheme for raising the headworks at Nutwell. Although the company were in the evaluation stage and would not commit to this investment.

Flooding the borehole headworks at Cliburn works was considered low risk by United Utilities, but the Inspectorate considered the mitigation - catchment inspection and monitoring; contingency plans; and liaison with external bodies - unlikely to prevent borehole chambers from flooding and recommended a review and institution of appropriate mitigation until the borehole headworks have been raised. The company reiterated its measures and reported alternative supply vehicles as an additional measure and so the risk remains the companies to bear.

Inspector's visiting Cliburn works identified uncapped pipework in a borehole chamber and recommended this was addressed. United Utilities subsequently took action to cap the pipework.

Figure 1: Newly capped pipework at Cliburn works



The spring collection chamber at Hook works had not been inspected for some time. Inspectors recommended scheduling regular checks of spring collection chambers, to identify required maintenance in a timelier manner and mitigate against security and contamination risks. South West and Bournemouth Water instigated regular checks.

Treatment

Anglian Water planned to replace the air valve, fit an isolation valve to aid future maintenance and construct a new chamber with lid after the discovery of the asset in a poor condition at West Pinchbeck works.

Figure 2: Air valve in poor condition on raw water to West Pinchbeck works



There were no media depth checks on the biological iron removal filters at West Pinchbeck works. Following a recommendation, Anglian Water, chose not to inspect the media and initiated a review of possible non-intrusive measures of assessing media depth and plans to benchmark with others in the industry for best practice in this area.

There is no automated wash process for the pressure filters at Redgrave works, so manual backwashes are completed on one filter each weekday. On inspection, the sight glasses were stained and contained media and algae limiting visibility of the wash water. Essex and Suffolk Water cleaned the sight glasses and improved the documented procedure. A programme of media inspections was also arranged.

Flap valves were missing on two of three discharge points at Rodbourne works, but Wessex Water installed them following a recommendation to prevent contamination and animal ingress to the treatment process.

Conversely, Yorkshire Water do not consider flap valves to be a robust asset and would not commit to installing flap valves where these were missing from borehole washouts at Nutwell works. Instead the company committed to assess the risk of contamination due to washout facilities at their treatment works by the end of June 2021. This remains the company's risk to take.

Turbidity is identified as a critical parameter in the site-specific disinfection policy for South West and Bournemouth Water's Hook works. Yet, Inspectors found one turbidity monitor had been out of service for over six months at the time of audit, due to lack of available parts. Although the monitor was replaced shortly after the audit, the Inspectors considered it necessary to recommend that the company ensures water quality critical monitors are always operational when the works is in supply or that suitable spares are available to ensure timely replacement.

The membrane plant room at Hook works variously had unmarked containers some containing liquids, and some chemical cabinets had conflicting information about the strength of chemicals being stored. Following a recommendation, the company tidied the plant room and ensured those chemicals remaining were clearly labelled.

At Yorkshire Water's Nutwell works the disinfection contact tanks are underneath the filter gallery. Water and dirt on the floor indicate a risk of ingress into the contact tank. There were no records on contact tank hatch inspection, and the company policy was unclear. Consequently, the Inspectorate recommended the company takes steps to inspect the asset. ROV inspections of all tanks were arranged, to be followed by full internal inspections of each tank sequentially.

Inspectors observed parts of a rabbit carcass on a clean water hatch at Nutwell works and recommended Yorkshire Water review risks and vermin control at its works. Yorkshire Water subsequently reviewed its policy and engaged a pest control contractor to address vermin issues at the site.

Figure 3: Remains of rabbit carcass on clean water hatch at Nutwell works



Disinfection

When United Utilities initially provided a copy of the disinfection policy for Cliburn works, the calculation was incorrect, the pipe length inaccurate and the hydraulic efficiency had not been considered. The company rectified the error and then began a review of all site disinfection policies. The sign off procedure for disinfection policies was unclear and the Inspectorate recommended this was made clearer and there was an independent review of the disinfection calculations. The company changed the procedure to ensure a review by independent competent individuals and went further by signposting the author or reviewer to provide technical guidance for readers.

At the Hook works audit, the dual validation chlorine monitor readings were noticeably different, and one was overdue the annual calibration check. The company reviewed the calibration schedules and increased visibility of the most recent validation check by recording this prominently in the control room.

At Cliburn works, calibration records and other documents were not provided in response to Inspectorate requests without an explanation for why they were missing. Companies are obliged to provide such information under section 86(3) of the Water Industry Act 1991 and following a recommendation, United Utilities changed its procedure and will seek clarity from the Inspectorate in relation to information requests. Likewise, the Inspectorate is happy to clarify points raised by companies in respect of requests for information.

A handheld chlorine monitor was in use five months after the calibration expired at Redgrave works. Consequently, verification of the online monitor readings was undermined. Essex and Suffolk Water reported that the usual recalibration visits were unable to take place due to the CoViD-19 crisis. Whilst the company had purchased some additional monitors, it had not taken adequate steps to ensure that only calibrated instruments were in use and had relied upon the use of chlorine standards to verify the instruments in the meantime. Such practice is not appropriate. Whilst the challenges presented by the coronavirus are understood, all companies are reminded that this does not absolve them of their regulatory duties, including the need to appropriately verify online monitor readings.

The sole disinfectant at Affinity Water's Thundridge works is UV. The dead band for turbidity shutdown of the UV reactors was five minutes allowing for several reactor volumes to pass through treatment that maybe compromised by elevated turbidity. Following a recommendation to reduce the dead band setting to be as low practically possible the company took steps to reduce the time to 150 seconds. Overall, the audit was generally satisfactory.

There is a single sodium hypochlorite storage tank at Cliburn works, which is topped up regularly. The procedure could lead to risks from increased disinfection by-product (dbp) formation as a proportion of the hypochlorite

could spend an extended period in storage. The Inspectorate recommended the company institutes appropriate control measures to prevent risks from dbp's and suggested a second storage tank may be appropriate, such that an appropriate cleaning schedule can be put in place for sodium hypochlorite tanks. In response, United Utilities have developed a cleaning procedure, however, there are no criteria (time, dbp concentration etc.) for when to initiate a clean, consequently the risk remains.

Flaws were observed in the Ct calculation at Anglian Water's West Pinchbeck works as the chlorine sample was taken from within the balance tank and did not reflect the full contact time. The Inspector recommended the company adequately verifies the disinfection process. Rather than relocate the online monitor draw off points to a post contact tank location, Anglian Water chose to carry out a tracer test and determine the Ct value at the existing draw off point, effectively ignoring any contact downstream of this point in the calculation.

There are two onsite electrolytic chlorination (OSEC) units at Hook WTW that normally operate as duty/standby. However, one unit was out of service for around five months. South West Water repaired the unit shortly after the audit. A recommendation was made that the company ensures maintenance or replacement of key equipment is completed in a timely manner.

Discrepancies between the Site-Specific Disinfection Policy and the shutdown and start-up instructions for Hook works led Inspectors to recommend both procedures include the relevant alarm setpoints and shutdown details. A recommendation was also made to better define the use of membrane filtration for disinfection.

More importantly South West and Bournemouth Water were unable to demonstrate continuous verification for membrane disinfection processes as required by regulation 26 and further investigations are ongoing with the company in this regard. Pressure Decay Tests performed offline may be able to demonstrate that the membranes are fit for purpose at intervals between periods of operation, but they do not provide the means of continuous verification required by regulation.

Cryptosporidium samples are taken from the Finningley boreholes but not from any of the other borehole sites or the final water at Nutwell works. With potential ingress risks and a site which had significant numbers of rabbit's present, the Inspectors recommended that the company reviews its *cryptosporidium* risk assessment and sampling to mitigate against breaches of the regulations. However, Yorkshire Water missed the point and referred to their risk criteria based upon coliform and *E. coli* results on the boreholes to identify high risk sources and failed to consider the onsite risks worthy of further monitoring.

Other Matters

The Inspectors visiting Thames Water's Dartford works considered the treatment arrangements to be satisfactory with work underway to replace corroded inter stage pipework, which had been identified as the cause of turbidity issues. Only one recommendation was made, and this related to improving the control of local operating procedures and other documents used by site operators.

There was evidence of a fuel spill at Anglian Water's West Pinchbeck works and a small amount had seeped into a chamber containing the sample point tapping. The company addressed the recommendations raised by retraining staff about the chemicals used on treatment sites including fuels and lubricants. Anglian Water have also committed to reviewing the flood risk of all compliance sample tapping points in chambers.

The raw water sample points for boreholes supplying Nutwell works were exposed to the elements. Yorkshire Water acknowledged the sample points should be secure and arranged to install new lockable cabinets for the raw water sample points.

Anglian Water were unable to provide evidence that two employees carrying out restricted operations were trained under the National Water Hygiene scheme. This highlighted the need to improve the management of refresher training and record keeping, the company arranged to carry out a review of their practices to improve their effectiveness.

Good Practices

Cliburn works had a run to waste "bag", to allow non-compliant water to be captured and transferred away from the site by tanker. The Inspectorate welcomed this innovative solution to providing run to waste facilities for small remote locations.

Inspectors also welcomed the installation of a water-resistant panel behind the regulatory sampling facilities at Dartford works, which protects the wall they are fixed to.

At Rodbourne works, Wessex Water had installed a clear plastic cover to protect operators in case of a leak at the chlorine dosing point.

The company have also adopted the good practice of having a well-ordered site information board in the control room

Figure 4: Perspex cover to protect operators at Rodbourne works



The spring collection chamber at South West and Bournemouth Water's Hook works was an old concrete structure that was difficult to open, the company avoided the need for the Inspectorate to raise a recommendation by promptly removing the source from supply and instigating a replacement cover for the chamber.

The Inspectors were able to witness and welcome that flood prevention measures were in place at Hook works following an event in 2016.

Figure 5: Replacement Technocover on the spring source at Hook works



Essex and Suffolk Water are rolling out an initiative “WQ Spot It” application, which aims to provide an opportunity for early reporting of potential water quality issues and is being linked to GPS to allow catchment issues to be captured. Inspectors also welcomed the company’s swift response to three matters observed on the day of the audit which prevented the need to raise recommendations to address.



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