Drinking water 2019

Quarter 1

January - March 2019

A report by the Chief Inspector of Drinking Water

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Public water supplies for England and Wales

Quarter 1
January – March 2019

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Water quality compliance monitoring

In the first quarter of 2019, companies reported a total of 264 compliance breaches which required the Inspectorate's assessment and a further 83 samples where the fluoride concentration did not meet the specification required by Public Health England in fluoridated water supply zones. This represents an increase of 30 compliance breaches on the same period last year and is largely due to an increase in the reporting of microbiological failures (23 extra breaches mainly at consumers' taps).

It is notable that during the quarter Inspectors made recommendations related to poor investigations whereby companies had not provided sufficient evidence to confirm root causes of failures and also cases where errors or miscommunication led to delays, unnecessary action and potentially increased risk to consumers.

Companies are advised to reflect on the observations outlined below and consider whether it can improve its communication and investigation procedures and ensure that its investigators have sufficient competence, experience and time to investigate regulatory breaches thoroughly.

Water quality at treatment works

Microbiological failures at treatment works

Table 1: Q1: 2019 – Microbiological tests

Parameter	Total Number of tests	Number of tests not meeting the standard
Water leaving water treatment works		
E.coli	44929	0
Coliform bacteria	44929	11

Whilst there were no E.coli failures at treatment works, in quarter one, there were 11 coliform breaches (SRN 7, SVT 2, ANH 1 and SWT 1). Repeated coliform detections should always be investigated to determine a root cause as these may indicate integrity failure such as storage tanks, site connections/piping/valves or suboptimal processes among other causes. From the 7 failures at Southern Water, 4 were at Testwood Works, (3 on the industrial feed). Investigations point to an air valve on the main between the

break pressure tank and the clear water tank or integrity issues on either of the tanks. Of the remaining three failures experienced by Southern Water, at Hazells Works and Balsdean Rottingdean Works the company failed to determine a cause despite a satisfactory investigation and at Broadwater Works the failure was considered to be unlikely to recur on the basis the tap had been replaced on the same day which may have resulted in an anomalous outcome. However, Large volume investigational samples should be considered an option to monitor more robustly any site where uncertainty exists as to the cause. Failures at Southern Water's Testwood works and Goldstone Hove works are subject to legal improvement notices.

The Inspectorate considered further enforcement following two coliform failures at Severn Trent Water's Mitcheldean works in January and March. The company had failed to act on concerns raised by the Inspectorate following an audit of the site in November 2017. The company belatedly addressed structural integrity issues at the site. I am pleased to note enhanced sampling at Mitcheldean WTW was initiated for the contact tank outlets, final water and through-plant sampling 3 times a week and all samples were satisfactory with no unusual detections in the lead up to the detection in the final water. Whilst this hasn't fully identified the root cause, this approach provides confidence that the company takes coliform detections seriously and seeks to maintain confidence in the processes throughout the treatment.

At Barrow Works, (ANG), Ingress via the upstands on two of the hatches, in combination with standing water on the tank roof, was identified following a thorough investigation. Following satisfactory repairs to the Contact Tank 1, the failure is unlikely to recur. This example highlights robust action taken by the company to act in response to finding coliforms. By focussing on coliform failures and predictors of failure, companies will secure water supplied to consumers with a higher degree of certainty.

Turbidity at treatment works

There were 11 exceedances of the PCV for turbidity at treatment works in the first quarter of 2019 (SVT 3, AFW 1, DWR 1, NNE 1, SBW 1, SEW 1, SST 1, UUT 1 and YKS 1).

Enforcement action was considered after three exceedances at Severn Trent Water's Boughton Borehole Pumping Station in February and March. However, the company action was to clean both compartments of the nitrate blending tank, since which time no further turbidity issues have occurred. The company need to be mindful that the likely source of the elevated turbidity is sand from the boreholes, based upon reports from the cleaning team, and there is a risk that in time this failure could recur.

The Inspectorate made recommendations to Affinity Water to improve its investigations into turbidity failures after elevated turbidity readings were

reported at Blackford works in February. It was not clear from the investigation whether the turbidity was due to the pumping main or, as the company suggested, the sampling line.

Recommendations were also made to South Staffs Water in relation to a turbidity breach at Seedy Mill works, where the company failed to find a cause. Recommendations related to ensuring that treatment processes were managed to mitigate against further breaches and that sampling practices were carried out in such a way that the water being sampled was always representative.

Water quality at service reservoirs and in distribution

There were no E.coli failures at service reservoirs in quarter one of 2019. There were 11 coliform detections (SVT 4, TMS 2, AFW 1, SRN 1, SST 1, WSX 1, and YKS 1). It was the assessing Inspectors opinion that satisfactory investigations had found no cause for four of these breaches and a further four were considered unlikely to recur following actions taken by the company.

Table 2: Q1 2019 – Microbiological tests

Parameter	Total Number of tests	Number of tests not meeting the standard
Water leaving service reservoirs		
E.coli	50494	0
Coliform bacteria	50494	11

During their investigations Severn Trent Water detected elevated turbidity readings at the supplying works for Snailbeach service reservoir. The company were planning to take action to internally inspect the reservoir following a coliform detection in March. The Inspectorate recommended action be taken at Ford works as well to address the risk of elevated turbidity. The company plan to install variable speed drives to address the transient turbidity risk seen during pump changeover. The remaining 3 failures at Severn Trent's Ockeridge, Churchdown and Highwood DSR's were subjected to intensive investigations including investigational sampling, flood testing, site inspections and where necessary repairs. The regulatory assessment for these sites concluded that investigations were satisfactory, and that failure were unlikely to recur.

The Inspectorate identified shortcomings in Thames Water's investigation of coliform failures at its Wyck Beacon reservoir, reported in January. Whilst enhanced monitoring was undertaken and satisfactory, there were issues to note including the chlorine level from the supplying works registering as zero coupled with a depressurisation of the upstream main which the company hadn't sought to verify after previous failures and concerns around the air valves in the network. It was necessary to make recommendations to ensure that network flows and pressures were considered as part of bacteriological failure investigations at service reservoirs.

Water quality at consumers' taps

E.coli

In the first quarter, there were 8 *E.coli* detections at consumers' taps **(**TMS 3, UUT 2, AFW 1, HDC 1 and SVT 1). The Inspectorate was satisfied that companies had taken sufficient action to investigate the breaches and provide advice that would make each of them unlikely to recur on seven occasions. In January, in Belle Vue supply zone, the company sought advice from Public Health England following an *E. coli* at a consumer tap. Immediate action was not advised as the consumer was not considered vulnerable and a purposeful review of the outcome of the investigation was the prudent approach. The investigation by the company did not conclusively find evidence to link the failure to the domestic plumbing, but it identified unhygienic conditions in the area surrounding the sink. The Inspectorate recommended that Severn Trent Water provide appropriate tap hygiene advice to a consumer in the interests of maintaining information to the consumer to protect health.

Clostridium perfringens

Northumbrian Water's investigation into a *Clostridium perfringens* failure in its Hebron and Ashington supply zone identified a failure to continuously verify disinfection at Tosson works, due to aeration in the sample line to a turbidimeter. Following a recommendation by the Inspectorate the company are taking steps to ensure the sample line remains charged at all times to prevent aeration causing an ongoing breach of Regulation 26. Companies are advised to carry out similar assessments for water quality monitors at all treatment works to ensure that the readings are always representative of the water supplied to consumers.

Taste and Odour

5 Taste failures (NNE 2, ANH 1, BRL 1 and SVT 1), 17 Odour failures (SVT 6, ANH 3, SEW 2, AFW 1, BRL 1, DWR 1, ESK 1, NNE 1 and TMS 1)

The number of odour failures that were rejected by laboratory staff for taste testing reduced to two samples in this quarter (ANH 1 and TMS 1). In both cases no advice was given to consumers that the water should not be consumed.

Recommendations were made to Northumbrian Water related to breaches in March in the Billingham and Mill Hill Outlet supply zones where the company had failed to carry out appropriate investigations into the cause of the detections. The Inspectorate recommended that Severn Trent Water investigate internal administrative errors which led to delays in carrying out the appropriate investigations into an odour failure in Polesworth supply zone in January.

Lead

There were 16 lead failures between January and March (TMS 4, UUT 2, SVT 2, NNE 2, ANH 1, AFW 1, ESK 1, SRN 1, WSX 1 and YKS 1). Seven of these failures were in zones where improvement notices have already been issued.

Orthophosphate dosing is a key mitigation measure in supply zones that are susceptible to lead failures and following a lead failure in St Helen's South Supply Zone, United Utilities eventually identified that there was a leak on the phosphate dosing line at the supplying service reservoir. It was apparent from a review of phosphate analysis that the under dosing had been ongoing for many months. The company had not installed a phosphate dosing monitor and the frequency of downstream sampling is not sufficient to protect consumers from the variable lead concentrations that could ensue from unreliable dosing. Consequently the Inspectorate is considering further enforcement to address the issue at this site and others across the company where similar risks were found.

In a similar situation, the Inspectorate recommended that Southern Water carry out risk assessments when carrying out valve operations at its sites following a lead failure in its Ramsgate supply zone in January. The water from three treatment works is normally dosed with orthophosphate at the service reservoir supplying the affected area. However, valving operations, carried out to repair a seized valve meant that the water from one of the three works was supplied directly to the reservoir without the phosphate dose. The company failed to record this change or to reinstate the normal flow conditions once the work to repair the faulty valve had been completed.

The orthophosphate dosing at Severn Trent Water's Church Wilne works was found to be unreliable following a lead failure in Ruddington supply zone in February. The Inspectorate recommended that the company review its operating philosophy for plumbosolvency control. In June the company

implemented its revised policy and raised its target phosphate dose to 1.1 mg/l across its supply area.

Nickel

Of the 8 nickel failures in the first quarter (AFW 1, DWR 1, IWN 1, NNE 1, PRT 1, SVT 1, WSX 1 and YKS 1), seven were considered as either unlikely to recur or a satisfactory investigation did not identify a cause.

After assessing an exceedance in Lumley supply zone in January, the Inspectorate recommended that Northumbrian Water provide appropriate advice to address the risks associated with nickel, for example flushing or replacing the tap with a nickel free alternative. This is a requirement of regulation 18 (6) and applies to any breach where the cause is due to the domestic distribution system.

Iron

Of the 30 iron failures (YKS 8, SVT 4, NNE 4, DWR 3, UUT 3, ANH 2, SES 2, SEW 2, AFW 1 and BRL 1), 21 were considered to be either trivial, unlikely to recur or there were legal instruments in place to address the risk of recurrence.

Following elevated iron detections in Severn Trent Water's Fenn Lane zone in February, the company is developing a scheme to replace the unlined cast iron main supply the failing property. The process for completing the replacement has not yet been completed and the Inspectorate shall keep a watching brief on progress before deciding on possible further enforcement action.

Similarly the Inspectorate recommended a time bound work package to replace a cast iron main in Yorkshire Water's Wakefield City North zone following a breach in January. The Inspectorate also suggested the company review the effectiveness of flushing programmes to address iron compliance issues in the same zone as well as Pateley Bridge and Ripon zones (February and January respectively).

Northumbrian Water identified a planned flushing exercise as the root cause of iron and turbidity failures in its Fowberry supply zone in January. The company's risk assessment for the work failed to consider risks to water quality; the flow/pressure logger to be used was not operationa; and the company failed to take appropriate investigatory samples to assess the impact. A similar failure to investigate was identified following an iron failure in the company's Derwent trunk main South and Durham supply zone in March. The Inspectorate made recommendations for the company to improve its procedures. A failure to do so may result in further enforcement action.

The Inspectorate recommended that Anglian Water should take steps to prevent a recurrence of an iron failure in Bourne supply zone after a failure occurred in March. The company had failed to take action to flush the main or to provide evidence that the extent of the failure had been identified.

Likewise, the Inspectorate recommended that Affinity Water carry out investigations and remedial actions as a priority, after the company proposed to take up to 9 months to resolve issues associated with aluminium and iron failures in its Ickenham/ Denham zone.

Copper

In February, a sample taken in Severn Trent Water's Market Drayton zone failed for copper. The company identified that the domestic distribution system was the root cause and pre-emptively issued a do not drink notice, temporarily, whilst further investigations were carried out to determine appropriate flushing advice. A wider survey identified elevated levels of copper at neighbouring properties, although these were compliant with the standard. The company were proactive in issuing flushing advice to these neighbouring properties.

Pesticides – Asulam

A sample taken at Northumbrian Water's Lumley works was reported as an exceedance in February. In response the company investigated this unusual laboratory result and found no issue with the sampling and analysis, a catchment investigation and review of works performance also ensued.

Resamples identified positive results in the raw water and one in a consumer tap sample supplied from the works. The company carried out an investigation at the works and replaced the GAC media in one of the filters. A further compliance breach was reported at the works in April and follow up tests appeared to show that the filter with regenerated GAC was better at removing the Asulam than the remaining filters and funding was obtained to replace the GAC in two more of the filters in the current financial year. A more in depth survey of the catchment was undertaken to determine the source of Asulam. Its presence in the catchment is unusual in that since 2011 it is only permitted for use in an emergency and in 2019 cannot be applied outside of the period 1 July to 31 October. This information prompted the company to look again at the analytical method and comparison samples were sent to two independent laboratories to confirm whether Asulam was present. Asulam was not detected by either laboratory and further investigation into Northumbrian Water's analytical method identified that there was an interference in the water supply, which was unique to the Lumley supply. The company now conclude that the root cause of these detections was the original technical set up of the instrument software.

Companies are advised to reflect on the level of resource and concern associated with this apparent breach and are advised to review and ensure that their analytical methods are fit for purpose; that interferences are appropriately considered and can be accounted for before the analysis is carried out.

Northumbrian Water – Horsley WTW Fluoridation Chemical Spillage

The fluoridation of drinking water brings together a number of responsibilities for water companies and their duties under the Water Act 1991 and this involves a number of regulators, authorities and agencies. Multi-agency involvement can often be confusing when something goes wrong. This event highlights just this outcome when a leak was discovered in the fluoride storage area of Horsley works.

In accordance with RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) reporting requirements, Northumbrian Water informed the Health and Safety Executive (HSE). Responsibility for entering into and maintaining legal agreements for fluoridation schemes with water undertakers rest with the Secretary of State for Health (SoS) but in practice, many of the responsibilities of SoS are discharged by Public Health England (PHE). In response the company informed PHE. Where the concentration of fluoride in public drinking water supplies is raised via an authorised fluoridation scheme, water companies are expected to comply with the requirements of the Code of Practice on Technical Aspects of Fluoridation of Water Supplies (2016). DWI will audit the water company's arrangements as specified in the code to ensure this is the case. However, the event was not notified to the Inspectorate when it occurred, on the basis that final treated water quality was unaffected. Instead, the Inspectorate became aware of the spillage from a contact with PHE, and required the company to notify it as an event. This event did not affect water quality but it was still classified as serious.

The Inspectorate investigated the event and considered whether the company complied with accepted standards specified in the Code of Practice, a document drawn up between PHE and DWI to provide guidance for water undertakers to draw up their own policies and procedures for the continued supply of fluoridated water and which protects the health of the public and staff alike.

The details for learning are described below for the wider learning of the industry to avoid a recurrence and to ensure understanding of the role of DWI in this area.

Horsley WTW is a large surface water works that supplies up to 110 megalitres per day (ML/d) of water to approximately 700,000 consumers in Tyneside. Water supplied from Horsley is artificially fluoridated under the terms of an agreement with Public Health England (PHE), using the liquid chemical hexafluorosilicic acid (HFSA).

On 11 January 2019 a leak of HFSA was noticed coming from the bunded HFSA storage area. The chemical had leaked into the reinforced concrete

bund, penetrated the internal protective coating and degraded the concrete, allowing acid to leak into the chemical storage and dosing plant building. Acid travelled through cable ducting and underground channels to other parts of the site. The fluoride dosing plant was switched off soon after the leak was discovered, and the neutralisation and clean-up operation commenced. It was later discovered that acid had found its way through an underground access corridor into one of the final water pumping stations.

The company estimated that approximately 1,000 litres of acid was lost. There was no contamination of the final water or water within the treatment process, and the concentration of fluoride in water supplied to consumers remained at the target concentration of around 1.0 mg/l, until fluoride dosing was switched off the same day.

The root cause of the leak was a fractured pipe between the bulk HFSA storage tank and the transfer pump. This pump and its associated pipework were contained within the concrete bund. The cause of the fracture remains unknown, but the company concluded that it may have been caused by vibration, possibly from a recent operation to erect scaffolding around the bund. This pipework was not double-skinned or otherwise protected. The size of the fracture can be seen in the photograph below, provided by Northumbrian Water:

Figure 1. Fractured pipework

The HFSA bund alarm was not activated. This was a float-activated alarm positioned in the sump of the bund. The company investigated the reason for its failure, and found that it was positioned too high. The float-switch itself was not faulty.

As part of the investigation the Inspectorate concluded that the Code of Practice had not been fully complied with because the bund alarm had not

been installed correctly. A further concern is whether concrete bunds are suitable for HFSA storage and delivery facilities. In this case it potentially took less than 7 hours for the acid to penetrate the internal epoxy coating, degrade the concrete and leak into the surrounding area. The company's risk assessment of the installation failed to take into account the short-term protection afforded by this coating.

The Inspectorate also made a recommendation that the company should have notified this as an event as required by the Information Direction. The Inspectorate has a duty to provide technical advice to PHE on aspects of fluoridation, and events of this nature could lead to the Inspectorate issuing new or updated advice to PHE and water companies.

The company has implemented some changes to its internal procedures to reduce the risk of a recurrence, and is reviewing the design standard for HFSA storage facilities. The company has also shared the findings from this event with other water companies through the cross-industry fluoridation forum.

Water suppliers are advised to review their design standards for chemical storage facilities and liquid chemical bunds in particular, to ensure that they are fit for purpose and that the risks associated with treatment chemical leaks are understood and considered, where appropriate, in company's drinking water safety plans.

Audit Programme - Risk Reviews

Water companies often find that they have competing demands on their resources and this may potentially lead to sub-optimal resource allocation in treatment processes or other mitigations to protect public health. In the first quarter of 2019, the Inspectorate carried out a series of audits at sites where the company's own risk assessments had identified a need for further investigation or additional control measures, but further evidence of the steps to be taken had not been forthcoming. Any risk reduction is only successful if actions identified as part of the review actually reduce risk. Too often there are examples where existing risks are deprioritised; not acted upon; inadequately resolved; or just forgotten and not completed. The following examples highlight just such occurrences for companies to consider where they can improve.

Water Safety Plans and Risk Evaluation

The Inspectorate have welcomed the fact that both Southern Water and United Utilities have been using a HAZREV (Hazard Review) approach as part of their water safety planning processes. The purpose of the HAZREV is to ensure there is a fully integrated review of catchment, operational and asset based hazards at sites. When applied appropriately, the in depth nature of this approach has been found to identify more clearly the risks faced by the company at its sites.

The Southern Water approach to HAZREV has been through some iterative improvements as greater understanding of the process identified that the early HAZREV assessments did not identify all risks at a site. For example, at Weirwood works the HAZREV failed to identify an unlagged dosing pipe, which froze and led to a works shutdown and consequently a notifiable event.

Following the identification of hazards, Southern Water completes a detailed prioritisation assessment of these hazards, based upon water quality risk. The process showed a continuing improvement in the company's investment process since a Transformation Programme was entered into with the Inspectorate. The step-change from financial ranking of risk alone to prioritisation of water quality, incorporation of reputational damage (based on causing water quality events and unnecessary impact upon consumers) and consideration of the Inspectorate's risk indices is also welcomed.

In 2017, a HAZREV assessment at United Utilities Castle Carrock works identified risks to filtration, which is challenged by powdered activated carbon dosing and constraints on backwash capacity. A new scheme has now been identified for the company's asset management plan for the future. Whilst there is good evidence of identification and tracking of risks, including escalation and visibility to senior management, there was less evidence of closure and tracking deadlines for task completion. The Inspectorate recommended that the company reviews all relevant procedures to ensure there are mechanisms in place to ensure completion of all tasks associated with risk mitigation and to track progress.

At Anglian Water's Candlesby works, the company's risk assessment reports identified that additional control measure were required to address risks of objectionable taste, but these were erroneously unspecified in the report. The company has a Water Quality Action Plan in place and it was suggested that this was referenced in future risk assessment reports.

Following the Inspectorate's request for information about Netley Mill works, Thames Water identified a need to more regularly review potential red risks for urgent intervention. A number of unmitigated risks had been identified but not addressed. The Inspectorate recommended that the company implements a robust procedure to address this deficiency. A water fittings inspection carried out in 2015 had identified two contraventions requiring actions, but Thames Water did not take action to address these until after the

Inspectorate's audit, some four years after the issues were identified. The company had not tracked these actions to completion and they were subsequently overlooked. The Inspectorate recommended the company put in place appropriate measures to prevent a further recurrence. Thames Water were also required to review all other actions from water fittings inspections that it has undertaken at its treatment works since 2015 to ensure that all actions have been completed.

Dŵr Cymru Welsh Water were carrying out a process to ensure that all risks identified in the company's drinking water safety planes were captured in its Investment Manager system. The Inspectorate concluded that in the interim period there was a risk that timely investment may not be delivered to address these risks and recommended the company complete this process as soon as is practicable.

In July 2018, Hafren Dyfrdwy was formed following the delineation of all Severn Trent Water and Dee Valley Water assets in Wales. At the audit of New Pendinas works it was acknowledged that several risks in the sites safety plan were shown as requiring further mitigation, however the company showed that this was an artefact of merging the asset data into the Severn Trent system. The Inspectorate recommended a timely reassessment of these risks to give clarity to the risk position at its works.

Hafren Dyfrdwy have developed a specific app for use by audit staff that allows information to be manually recorded while carrying out the audit. It can be used on a smartphone and allows GIS based site audits. Users can generate actions which then informs other apps and allows risks to be highlighted and managed by others. The Inspectorate welcomes this innovative approach.

Assets

Many water companies share their assets with the local community or clubs, one such example, and by no means unusual, is a sailing club which uses motorised boats on the raw water reservoir supplying Southern Water's Weirwood works. When Inspectors visited this site they observed reservoir users in prohibited areas that were protected on water quality grounds. There is no online monitoring at the draw off tower to give an immediate warning should contaminated water enter the process. The Inspectorate recommended the company reassesses the risk to water quality posed by the sailing club, and other users, and develops further mitigation measures as necessary. Sometimes simple measure such as enforcing the rules of where and how communities share facilities is an obvious mitigation.

In an example further downstream at a works, Thames Water are unable to verify disinfection at Netley Mill works as required by regulation 26 due to the lack of chlorine residual monitoring post contact tank – a completely unacceptable practice. The company had also identified the need to replace

the disinfection equipment, which was nearing the end of its operational life. In addition, issues were identified with excessively long loop times before a representative chlorine residual is detected on the pre-contact tank monitor. Following an internal inspection of the contact tank in 2017 repairs requiring an extended outage of the tank were identified. The work was not carried out because this presented risks to the downstream supply zone. The construction of a second contact tank was recommended to maintain output, but this was not implemented. The company has prepared a contingency plan, including alternative supply arrangements but this is a short term solution without regard for a resilient supply. The company would do well to understand why de-prioritisation of an asset was considered an acceptable outcome.

An example of good forward planning to ensure regulatory compliance, is the new run to waste facility at Dŵr Cymru Welsh Water's Talybont works, which was in the design phase at the time of the audit. The facility was welcomed by the Inspectorate as it shall provide resilience during water quality events.

Maintenance

Proactive preventative maintenance and control of processes are key to reducing risks of failure; a principle widely used in many industries such as airlines, motor and other utility industries. It is why well serviced machinery have a low risk of failure and reactive repairs are avoided.

Unfortunately, reactive maintenance was necessarily carried out on the chlorinators at Thames Water's Netley Mill works as part of its actions in response to an event in March 2019. The chlorinators are critical components in maintaining compliance with regulation 26 and the Inspectorate recommended that chlorinators are included for the routine maintenance strategy at this site in line with the manufacturer's instructions.

Segregation of workers between clean and dirty water embodies the principle of preventing cross-contamination. However, Instrumentation, Control & Automation (ICA) technicians at United Utilities have recently been assigned to water and wastewater duties, but the company had not yet carried out hygiene audits. The company considered the need for a standard operating procedure based on the Water UK Principles of Water Supply Hygiene in December 2017, but at the time of the audit, no such procedure had been implemented. Such lack of proactive risk planning presents an unmitigated risk to water quality. No procedure was identified in the site's drinking water safety plan. The Inspectorate recommended the company takes appropriate steps to mitigate this risk.

General Process Issues

At United Utilities, a company who have had repeated issues with pH control, it was disappointing to note problems still remain. At Castle Carrock works,

caustic is added before the manganese filters to raise the pH to a set point of 8.2. However further work is required because the pH measurement post addition is taken at a point where the caustic reaction with the water being treated has not completed. The company have made some attempts to address this issue, but there is no identifiable timeline for its complete resolution, despite the issue being known about for some years. The Inspectorate recommended the issue was resolved in a specific timescale. A further issue at this site related to a Hach chlorine pocket colorimeter which is used to calibrate the on-line analysers. The instrument was not verified against a UKAS accredited result, as required by ISO17025. The Inspectorate recommended that this is put in place at Castle Carrock and implemented across the business, by the end of August 2019.

The contact time (Ct) calculation to ensure disinfection for Anglian Water's Candlesby works makes an assumption on the flow efficiency for hydraulic retention in the contact tank. The assumption is considered as theoretically highly unlikely. Such an issue had previously been identified at other Anglian Water sites. To ensure compliance with regulation 26, the Inspectorate recommended that the company carries out a review of the Ct calculations at all treatment works and ensures that the efficiency of the contact tank is taken into account in all circumstances.

Southern Water identified a risk that partially treated backwash water could enter the contact tank at Weirwood works, as it could overflow a dividing wall between the two processes. The company installed depth transducers to monitor the backwash water level, however, the physical link presents a high risk as a potential route for partially treated water entering the contact tank and the process to be bypassed. Consequently, the Inspectorate recommended that the company investigates suitable remedial measures to mitigate the risk to disinfection.

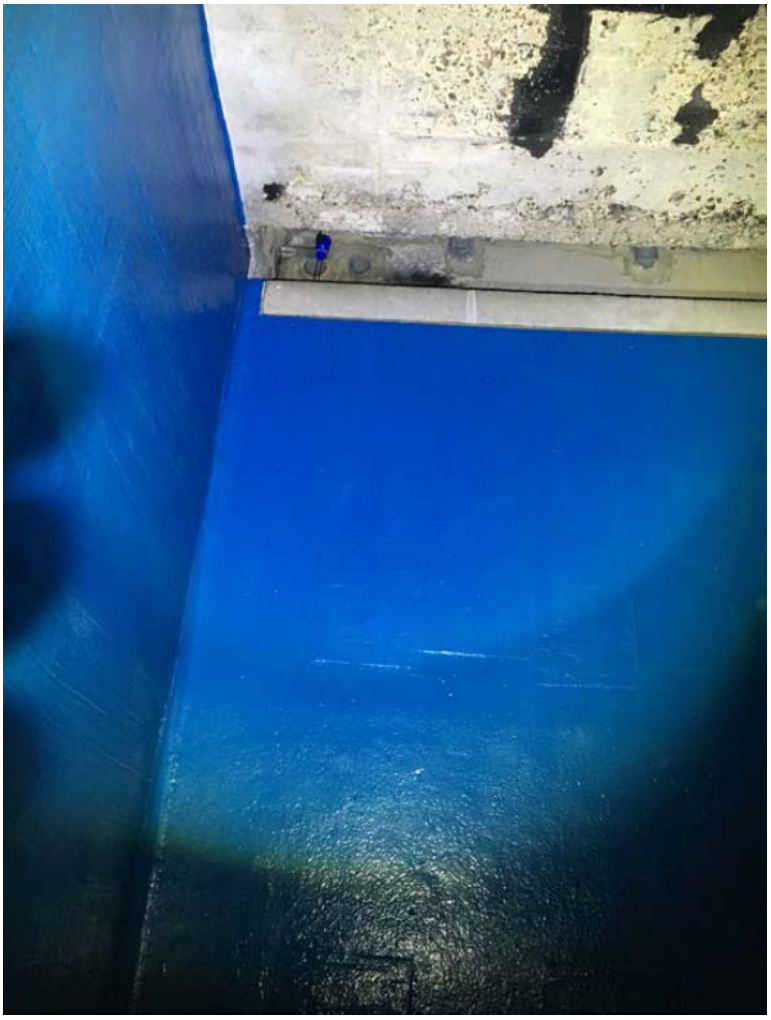

Figure 2: Gap between Weirwood Contact Tank & Backwash Tank

At Dŵr Cymru Welsh Water's Talybont works the contact tank also acts as a storage tank and therefore has a variable level. This is not appropriate due to the increased risk of disinfection failure. Section 26.10 of the DWI guidance to the Water Supply (Water Quality) Regulations (Wales) 2018 states that contact tanks should not be used to provide on-site storage. The Inspectorate recommended that the company submits a review of potential solutions to remove the risk of low contact tank level causing a regulation 26 breach. There was also a risk of a regulation 26 breach due to an assumed pH of 7.24 in the Ct calculations, but the high pH shutdown does not operate until pH 9.0 is reached. At this pH the minimum Ct value would be compromised. The company have since changed their operating practices to address this issue. However, the company chose not to heed the Inspectorate's recommendation to reduce the delay timer to shut down the works in the event of an elevated pH as it is believed that this would generate spurious alarms. The company's decision will be further considered should any associated issues occur at this works.

The contact tank at Talybont works is situated adjacent to a field used for livestock at roof level. At the time of the audit drainage was poor; one of the hatches had ivy growing around it and sealant was becoming detached from another hatch. There was also some evidence of animal burrowing. The company subsequently took steps to address all issues except the animal burrowing.

Figure 3: Waterlogged field adjacent to Talybont Contact Tank

With the exception of the issues highlighted above, the Inspectors welcomed that Dŵr Cymru Welsh Water's Talybont and Lower Carno sites were generally clean and tidy and in a good state of repair with good record keeping and several examples of good practice operationally. There is a laboratory on site at Talybont works, the Inspectors welcomed the level of record keeping as an example of good practice as it was immediately evident that optimisation of the site was a continuous process.

Legal Instruments

The first quarter of 2019 was a busy period. The issuing of AMP7 Notices, annual progress report assessment and high numbers of change applications, closures and milestones all contributed to a significant work load.

Annual Progress Reports

The Inspectorate's assessment of the annual progress reports submitted as part of companies requirements for each legal instruments (Notices under Regulation 28(4) of the Water Supply (Water Quality) Regulations 2016 or Regulation 29(4) of the Water Supply (Water Quality) Regulations 2010 (as amended) (Wales) and Undertakings accepted under section 19 of the Water Industry Act 1991) has now been completed.

During January of 2019, the Inspectorate received a total of 308 annual progress reports. This year very few queries (5 in total) were raised with companies in relation to these reports.

New Legal Instruments Issued

In the first quarter of 2019, the Inspectorate served 30 new legal instruments;

- Notice under Regulation 28(4) of the Regulations – 1 CAM, 2 DWR, 1 PRT, 16 SRN, 10 SVT.

The Inspectorate served 16 regulation 28(4) Notices on Southern Water Services Ltd and 10 on Severn Trent Water. These represent the first of the AMP7 scheme Notices to be issued. The remaining notices were served to the industry during the second quarter of 2019.

Closures

The Inspectorate received 65 closure reports in the first quarter of 2019 (1 ANH, 5 DVW, 3 DWR, 1 ESK, 1 NNE, 20 SEW, 1 SRN, 1 SST, 12 SWT, 3 TMS, 12 UUT, 2 WSX and 1 YKS). Traditionally, a high number of closure reports are received in January in place of progress reports, as schemes come to an end. The high numbers of closures for South West Water, United Utilities and South East Water are associated with the completion of work for discolouration programmes.

Change Applications

54 applications to change legal instruments were received by the Inspectorate during quarter 1 (4 AFW, 1 ANH, 1 BRL, 1 DVW, 1 NNE, 1 SES, 1 SEW, 4 SRN, 1 SSE, 1 SVT, 1 SWT, 1 TMS, 35 UUT and 1 YKS). The high number of changes for United Utilities were again associated with a discolouration programme the company are working on to allow more time to complete some of the measures.

On 21 December 2018, the Inspectorate wrote to all companies regarding the ministerial decision to ban metaldehyde. Those companies with metaldehyde catchment undertakings were written to individually and invited to submit changes to the current schemes, or closure reports where there was evidence that there was no longer a risk to drinking water quality from metaldehyde. 13 of the change applications listed above are for metaldehyde catchment schemes. The Inspectorate shall be issuing the revised metaldehyde schemes in due course.

Milestones

Companies submitted 79 milestone reports (independent of closure reports, change applications and annual progress reports) to the Inspectorate during the first quarter of 2019 (14 DVW, 5 DWR, 34 SRN, 22 SVT, 1 TMS, 3 UUT). The high numbers of milestone reports submitted by Southern Water Services Ltd are associated with discolouration schemes and the HAZREV schemes being worked on by the company.

Radioactivity waivers

During the first quarter of 2019, the Inspectorate received two applications to cease regulatory monitoring for radioactivity parameters under regulation 6 (1 ALB, 1 ICW).

Regulation 15 Applications

Two applications under regulation 15, to use new sources were received during the first quarter of 2019 (1 TMS, 1 UUT).

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