Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This Audit was carried out to assess the performance of Irish Water in providing clean and wholesome water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

Water Supply Zone

Name of Installation	Nenagh RWSS
Organisation	Irish Water
Scheme Code	2800PUB1008
County	Tipperary
Site Visit Reference No.	SV22536

Report Detail

Issue Date	05/08/2021
Prepared By	Criona Doyle

Site Visit Detail

Date Of Inspection	07/07/2021	**Announced**	Yes
Time In	11:00	**Time Out**	13:30
EPA Inspector(s) **Additional Visitors**	Criona Doyle		
Company Personnel	Irish Water: Catherine Rice, Pat Duggan, Duane O'Brien*, Colin Cunningham*. Tipperary County Council: Dermot Connolly, Jonathan Molloy**, John Crowley*, Edward Treacy*. Attended Pre site visit Only* Attended Site Visit Only**		

Summary of Key Findings

(1) This audit was carried out to assess the recent Trihalomethanes (THMs) exceedances in the Nenagh Regional public water supply. On the date of the audit exceedances had been reported in the network across two months in 2021 (sample dates 02/06/21 & 14/04/21). Subsequent to the audit exceedances were notified to the EPA from a third month (sample date 13/07/21). The supply was added to the EPA Remedial Action List on 30/07/21 under the category elevated levels of Trihalomethanes above the standard specified in the Drinking Water Regulations.

(2) Irish Water intend to undertake an examination of the booster chlorine dosing controls and a review of the coagulation treatment process to identify remedial works with timeframes to address the elevated levels of Trihalomethanes at the extremities of the network.

(3) Irish Water should continue with the programme of monthly monitoring of Trihalomethanes in the extremities of the network.

Introduction

The Nenagh Regional Public Water Supply (PWS) serves a population of 15,161 and produces 5,866 m3/day (EDEN figures). Raw water is abstracted from Lough Derg and undergoes treatment at the Coolbawn Water Treatment Plant. Treatment includes coagulation, flocculation, clarification, rapid gravity filtration, chlorination and fluoridation. Activated carbon is dosed for part of the year in conjunction with the coagulation stage in response to increased algae in the raw water but carbon dosing had not commenced on the day of the audit. The water treatment plant has a design capacity of 14,000m3/d.

The audit was undertaken in response to exceedances of the trihalomethanes parametric value in the Nenagh PWS on the following dates in 2021: 02/06/21 (112 ug/l Silvermines); 14/04/21 (101 ug/l Portroe, 106 ug/l Gortagarry & 112 ug/l Silvermines). Subsequent to the audit further THMs exceedances occurred on 13/07/21 (113 ug/l Gortagarry, 112 ug/l Portroe & 110 ug/l Silvermines). There have been previous intermittent exceedances of the THMs parametric value between 2016 and 2020.

Supply Zones Areas Inspected

The audit consisted of a video conference call with Irish Water and Tipperary County Council staff on 06/07/21 and an on-site inspection of the Coolbawn Water Treatment Plant (WTP) on 07/07/21. All areas of the treatment process were inspected during the audit including the coagulation, filtration, disinfection, fluoride dosing and sludge treatment stages.

1. Incident Management

		Answer
1.1	Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	Yes

Comment

Exceedances

On 22/04/21 Irish Water notified the EPA of exceedances of the Trihalomethanes (THMs) parametric value in samples taken on 14/04/21 at Silvermines (112 ug/l), Gortagarry (106 ug/l) and Portroe (101 ug/l). Monthly monitoring continued to take place at the extremities of the network at the following locations: Kilbarron, Portroe, Silvermines and Gortagarry.

On the 22/06/21 Irish Water notified the EPA of a further THMs exceedance in a sample taken on 02/06/21 at Silvermines. In response to the receipt of THMs exceedance for a second month in 2021 the EPA notified Irish Water on the 23/06/21 that an audit would take place on 07/07/21.

As part of the EPA request for further information in response to the notification received on 22/06/21 Irish Water were requested to (i) provide an update on progress with the examination of the booster chlorine dosing controls together with details of the proposed remedial works and associated timeframes and (ii) provide an update on the outcome of the review of the coagulation treatment process including details of the works completed and timeframes for completion of any remaining works as part of the Quarterly Tracker update due by 30/06/21. No update was provided by Irish Water as part of the quarterly tracker or in the information provided prior to the audit.

Subsequent to the audit a further notification was received from Irish Water on 26/07/21 relating to THMs exceedances in sample taken on 13/07/21 at Silvermines Kiosk (110 ug/l), Portroe (112 ug/l) and Gortagarry (113 ug/l). Consultation took place with the HSE in relation to all of the THM exceedances in relation to any risk to public health.

Works Undertaken To Date To Address Elevated THMs

There have been intermittent exceedances of the THMs parametric value in the Nenagh Regional PWS between 2016 and 2021. In 2020 there were exceedances across two months in August and November. In 2019 there were exceedances across three months March; June and November. In 2018 there was one exceedance in July and in 2016 there was one exceedance in June.

Investigations were undertaken in 2016 into reducing the capacity in the reservoirs. In April 2017 the reduction of the storage time in the reservoirs commenced. In 2019 a static mixer was installed to optimise coagulation dosing to assist with reduction of THMs formation potential.

At the audit Tipperary County Council and Irish Water outlined that the reservoir storage on the Nenagh Regional PWS continues to be operated on a reduced capacity on a year round basis to reduce THMs formation. Only one cell in the Knigh reservoir (2,000m3 total volume) is being used and the water level is kept at a low level at approximately 25% capacity. At Rapla the storage reservoir (7,500m3 total volume) is kept at a low level at approximately 25% capacity. Both Silvermines (91 m3) and Portroe (90m3) have small volume tanks already with a low retention time. The Kilbarron reservoir (5,000m3 total volume) located 715m from the water treatment plant (WTP) was inspected in the last 6 months. The clear water tank at Coolbawn WTP is to be examined by a specialist contactor (confined space) before end of summer subject to Irish Water funding being available.

Monthly monitoring of THMs at the network extremities is on-going. Scouring is carried out monthly at various locations based on the results of the THMs monthly monitoring programme.

Further Actions Proposed

Irish Water outlined at the audit that a 3 month pilot programme is being undertaken to look at chlorine residuals in the network. This project involves both Irish Water Asset Operations and Tipperary County Council. It is expected that the outcome of pilot programme should be available in Quarter 3 2021.

2. Coagulation Clarification Flocculation (CFC) Stage

		Answer
2.1	Are the CFC processes appropriately controlled?	Yes

Comment

The is no pH correction in operation at the site. The infrastructure is maintained on site but has not been required over the last 15 years. pH is monitored at the splitter chamber located after the balance tank with a target pH of 6.5 to 6.8 pH units. There are automatic shutdown set points at 6.4 pH units (low) and 7.0 pH units (high). On the day of the audit the pH at splitter chamber was 6.75 pH units.

On the day of the audit the dose rate was 300ppm 8% aluminium sulphate with 0.1% polyelectrolyte at a dose rate of 0.2 mg/l. Jar testing is undertaken once per year. Any changes to the dose rate are recorded on daily log sheets located on the wall next to the dosing infrastructure. The aluminium monitoring results from the process control checks for the month of June (24 samples) were submitted prior to the audit and indicated compliant results.

Duty and standby dosing pumps are provided for dosing of aluminium sulphate, polyelectrolyte and activated carbon. However, regular switch over between the duty and standby pumps is not taking place. The duty and standby dosing pumps were reported to be switched over at the following frequencies: poly dosing pumps every 3 to 4 months; activated carbon dosing pumps every few weeks while the aluminium sulphate pumps are not regularly switched over.

3. Filtration

		Answer
3.1	Are the filters designed and managed in accordance with EPA guidance?	No

Comment

There are 3 no. rapid gravity filters (RGFs) on site. Information provided by Tipperary County Council on the filter media makeup indicated pipework set in 150mm stone layer overlain by 100mm grade 12-25mm stone, 100mm grade 6-12mm stone, 100mm grade 2-6mm gravel and 750mm grade 0.8 - 1.5mm sand when it was last replaced 5 to 6 years ago. It was reported that there is no issue with loss of sand from the filters.

It was not possible to confirm the current depth of filter media and regular measurement of the media depth is not undertaken. There are no marker posts present in the filters and coring is not undertaken due to a concern that coring may create rat holes.

		Answer
3.2	Does monitoring indicate that the filters are operating effectively?	Yes

Comment

The turbidity trends for the combined filtered water and individual filters were reviewed as part of the audit. The trends indicated the filters are operating effectively. On the day of the audit the following turbidities were observed: Filter No. 0.07 NTU; Filter No. 2 0.08 NTU; Filter No. 3 0.09 and 0.12 NTU combined. Suitable turbidity alarms of 0.2 NTU are in place on both the individual filters and the combined filtered water.

4. Disinfection

		Answer
4.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes

Comment

The residual chlorine level is monitored on both the inlet and outlet of the Kilbarron reservoir (located 715m from the WTP). Chlorine trend data was submitted prior to the audit and indicated stable chlorine trends. The target at the inlet to the reservoir was confirmed as 1.5 to 2 mg/l. On the day of the audit the level was 1.99 mg/l. The chlorine alarm set points are high 2.40 mg/l, low 1.25 mg/l and low low 1.00 mg/l. The low low and high alarm set points trigger automatic plant shutdown.

		Answer
4.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes

Comment

A cascade system is in place with alarms sent to the duty caretaker, 2nd caretaker and engineer. There is a text alert system to staff phones in addition to the GSM clinkman and metasphere systems. The high and low low chlorine alarms trigger automatic plant shutdown. The caretaker visits the site in response to automatic plant shutdown and attendance on site is required to restart the WTP following automatic plant shutdown. It was outlined that 24 cover is provided for alarms.

		Answer
4.3	Are duty and standby chlorine pumps/ UV units in operation?	Yes

Comment

Chlorine gas is used to provide disinfection. The gas is stored in a secure and clearly labelled room. The gas is mixed via carrier water and chlorine dosing is via a duty / standby gas feed system. The chlorination system is to be upgraded under Irish Water's Disinfection Programme in October / November 2021. Irish Water stated chlorine gas will no longer be used and sodium hypochlorite will be used instead.

		Answer
4.4	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes

Comment

The contact time calculation was provided and indicated a target of 28.08 mg.min/l and a total effective contact time of 55.45mg.min/l. Min residual chlorine level of 0.5 mg/l has been used in the contact time calculation.

The residual chlorine trend provided prior to the audit from the outlet of the reservoir demonstrates the residual chlorine level is above the 0.5 mg/l minimum at all times. The alarms levels (low alarm 1.25mg/l and low low alarm 1.0 mg/l) are also set above the 0.5 mg/l minimum level to ensure contact time achieved.

		Answer
4.5	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes

Comment

Monitoring results for residual chlorine from the network including results from the booster dosing stations and reservoirs were submitted prior to the audit.

5. Management and Control

		Answer
5.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No

Comment

The site is in the process of being assessed to determine the protozoal log treatment requirement under the updated Irish Water risk assessment methodology. At present, until the sanitary survey is completed, the WTP is classed as having a log credit requirement of 4 log total which includes a 1 log penalty for no sanitary survey having been completed to date. It was outlined that the sanitary survey is to be undertaken in conjunction with the Asset Management Improvement Plan (AMIP). The AMIP process is due to commence in August 2021 and is expected to be completed in 2021. Irish Water outlined that the high risks had been identified and were under review.

The supply is being monitored 9 times per annum for *Cryptosporidium*.

		Answer
5.2	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	Yes

Comment

Suitable alarm settings and automatic shutdowns are in place to alert operators of deteriorating water quality. A cascade system is in place for alarm response with 24 hour cover but there is no documented alarm response procedure currently available on site.

Recommendations

Subject	Nenagh Audit	Due Date	06/09/2021
Action Text	**Recommendation(s)** 1. Irish Water should undertake remedial works to address the Trihalomethanes exceedances in the Nenagh RWSS. 2. Irish Water should provide an update on (i) progress with the examination of the booster chlorine dosing controls together with details of the proposed remedial works and associated timeframes and (ii) outcome of the review of the coagulation treatment process and Asset Management Improvement Plan (AMIP) process. 3. Irish Water should continue to monitor the levels of Trihalomethanes at the extremities of the network on a monthly basis and continue to notify any exceedances. 4. Irish Water should confirm the protozoal log treatment requirement for the Coolbawn water treatment plant and identify how any log deficit will be addressed. 5. Irish Water should ensure that there is a documented alarm response procedure is in place at the Coolbawn WTP. 6. Irish Water should ensure the rapid gravity filters meet EPA guidance in relation to (i) provision of marker posts (ii) age and condition of media (iii) media depth. 7. Irish Water should ensure regular switchover between duty and standby chemical dosing pumps to ensure standby pumps remain primed. 8. Irish Water should notify the EPA when the Coolbawn plant has undergone the disinfection programme upgrade and provide details of the works completed. **Follow-Up Actions required by Irish Water** During the audit, Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Regina Campbell, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 06/09/21 detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work. The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water. Please quote the Action Reference Number Compliance Plan DW20160114 in any future correspondence in relation to this Report.		