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	Ballymahon
Organisation	Irish Water
Scheme Code	2000PUB1005
County	Longford
Site Visit Reference No.	SV19146

Report Detail

Issue Date	20/12/2019
Prepared By	Aoife Loughnane

Site Visit Detail

Date Of Inspection	17/10/2019	**Announced**	Yes
Time In	10:00	**Time Out**	13:30
EPA Inspector(s) **Additional Visitors**	Aoife Loughnane		
Company Personnel	Irish Water: Andrew Boylan, Aodhnait Ni Chathasaigh, Teresa Burke, Ian Walsh, Pierce Casey, Michael Cunniffe. Longford County Council: Tom Murtagh, Barry Lennon, Karina O'Grady, Kierna Gaffney, Liam Donnelan, Dessie Reynolds, John Byrne. Veolia: Pat Kinsella		

Summary of Key Findings

1. Recent improvements to the coagulation and disinfection processes at Abbeyshrule water treatment plant have reduced the risk of THM formation in Ballymahon Public Water Supply. Irish Water has undertaken a programme of verification monitoring in the distribution network which demonstrates 3 rounds of compliant THM results across the distribution network.

2. A new run-to-waste facility has been installed on the rapid gravity filters, which allows greater control over the filtration process.

3. The disinfection system has been upgraded, however the process proving work has not yet been completed.

4. Ballymahon Public Water Supply will remain on the EPA's Remedial Action List until the disinfection upgrade process proving works are complete. However, the RAL category has been changed from 'Elevated levels of THMs above the drinking water standards' to 'EPA Audit Observations - Treatment & Management Issues'.

Introduction

Abbeyshrule water treatment plant abstracts water from the River Inny and serves Ballymahon Public Water Supply. Treatment consists of pH correction, coagulation, flocculation, clarification, rapid gravity filtration, chlorination and fluoridation.

The production level at Abbeyshrule water treatment plant increased by 500 to 600 m3/day in 2019 to serve new development in the area. The plant now produces approximately 4,600 m3/day and operates almost continuously, 24 hours per day, 7 days per week.

Ballymahon Public Water Supply was added to the EPA's Remedial Action List in Q3 2015 due to persistent THM failures in the supply.

Supply Zones Areas Inspected

The purpose of the audit was to verify if Ballymahon Public Water Supply can be removed from the RAL following the completion of works to address THM formation in the supply. The audit covered the raw water abstraction and the treatment processes at Abbeyshrule water treatment plant.

1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	No

Comment

1. Three new monitors are due to be installed on the raw water intake at Abbeyshrule water treatment plant, for the continuous measurement of ammonia, hydrocarbons and UVT. Irish Water confirmed that these new monitors are due to be installed by the end of November 2019.

2. Using the protozoal compliance log credit treatment approach, there is currently a 2-log treatment deficit at Abbeyshrule water treatment plant because the River Inny is in the highest category for a surface water source (*S3 lowland catchment, high concentration of cattle, sheep, horses or humans in immediate vicinity or upstream, or waste water treatment outfall upstream*). An S3 source requires 5-log credit treatment, and the current coagulation, flocculation, clarification and filtration processes provide 3-log credits. As there is currently a 2-log deficit at the plant, Irish Water should implement a monitoring programme for *Cryptosporidium* in treated water. Irish Water stated that they plan to commence a *Cryptosporidium* monitoring programme in early 2020.

2. Coagulation Clarification Flocculation (CFC) Stage

		Answer
2.1	Is the CFC process optimised to respond to changes in raw water quality?	Yes

Comment

Recent improvements to the CFC processes at the plant include:

- The installation of a new sulphuric acid dosing system on the raw water (which is typically in the pH range of 7.3 to 8.0) to achieve the target of 6.0 pH for optimal coagulation has been completed. Acid dosing is flow proportional and the new system is automatically controlled, with a feedback signal.
- Increased coagulant dose, informed by a jar testing programme.
- Relocation of the coagulant injection point, to prevent shearing of floc.

		Answer
2.2	Were the CFC processes visually observed to be operating appropriately during the audit?	Yes

Comment

An inspection of the clarifiers found no evidence of pin floc rising to the surface of the clarifiers, which had been identified as an issue in previous EPA audits at the plant.

3. Filtration

		Answer
3.1	Are the filters designed and managed in accordance with EPA guidance?	Yes

Comment

A new run-to-waste facility has been installed on the 3 rapid gravity filters to allow the filters run-to-waste for a set period of time after a backwash, before being brought back into service. The turbidity set-point for bringing the filters back into service after a backwash is 0.3 NTU.

4. Disinfection

		Answer
4.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	No

Comment

1. The disinfection system at Abbeyshrule water treatment plant has been upgraded under Irish Water's National Disinfection Programme, however the process proving works have not yet been completed. During the audit, Irish Water stated that there would be a 4 week process proving period to demonstrate that the upgraded system is operating satisfactorily. Site acceptance testing was due to commence on 22/10/19.

2. In September 2019, the chlorine dosing point was relocated from the clear water tank to the rising main to Richmount Hill Reservoir, in order to minimise THM formation in the water supply. The sampling point for the chlorine monitor needs to be relocated because it is currently located too close to the dosing point.

5. Reservoirs and Distribution Networks

		Answer
5.1	Are reservoirs adequately inspected and maintained?	Yes
	Comment	
	Irish Water confirmed that the 3 reservoirs for the storage of treated water in Ballymahon PWS (Richmount Hill Reservoir, Moydow Reservoir and Ballymahon Water Tower) have all been cleaned in the last two years.	

6. Management and Control

		Answer
6.1	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	Yes

Comment

Irish Water confirmed that the plant will automatically shutdown to prevent inadequately treated water entering the rising main to Richmount Hill Reservoir if the following set-points are reached:

- low chlorine level of 0.9 mg/l
- high chlorine level of 4.75 mg/l
- clarified water turbidity of 1 NTU
- final water turbidity of 0.6 NTU

		Answer
6.2	Are instrument calibrations within date?	No

Comment

The calibration labels on the chlorine dosing pumps showed the next service was overdue since January 2019. Longford County Council confirmed that calibration and servicing is carried out on a quarterly basis under contract by EPS.

7. Supply on the Remedial Action List

		Answer
7.1	Do the audit findings support progress made with the Remedial Action List upgrades?	Yes

Comment

1. Ballymahon Public Water Supply was added to the RAL in Q3 2015 due to persistent THM failures in the supply. Following the completion of improvements to the coagulation and disinfection processes at Abbeyshrule water treatment plant, Irish Water undertook a programme of verification monitoring in September 2019 which demonstrates 3 rounds of compliant THM results at the plant and the following 8 network locations:

- Richmount Hill Reservoir inlet (25 - 26 ug/l THM);
- Richmount Hill Reservoir outlet (34 ug/l THM);
- Ballymahon Water Tower inlet (36 - 54 ug/l THM);
- Ballymahon Water Tower outlet (46 - 54 ug/l THM);
- Moydow Reservoir inlet (47 - 56 ug/l THM);
- Moydow Reservoir outlet (53 - 55 ug/l THM);
- Kenagh extremity (47 - 51 ug/l THM); and
- Edgeworthstown (41 - 48 ug/l THM).

2. Ballymahon Public Water Supply will remain on the RAL until the disinfection upgrade process proving works are complete.

3. The RAL category has been changed from 'Elevated levels of THMs above the drinking water standards' to 'EPA Audit Observations - Treatment & Management Issues'.

8. Site Specific Issues

		Answer
8.1	Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No

Comment

1. A disinfection failure incident occurred at Abbeyshrule water treatment plant on 03/10/19 due to the failure of the automatic switchover between the duty & standby chlorine tanks. This resulted in approximately 1,000 m3 of undisinfected water leaving the plant and entering the rising main to Richmount Hill Reservoir between 14:00 and 19:40 hours.

2. Alarms were sent to notify the plant operators of low chlorine levels. However, the automatic shutdown system and fail safes completely failed, i.e. the plant should have automatically shutdown due to chlorine levels going below the low level set point. Upon receiving the alarm at 18:00, a plant operator visited the site and manually switched over to chlorine tank No. 2. The chlorine disinfection system was put into manual mode and chlorination recommenced at 19:40 hours.

3. The undisinfected water entered Richmount Hill Reservoir where it received secondary (booster) chlorination at the reservoir outlet. Chlorine residual levels dropped to 0.12 mg/l (pre-booster chlorination) and were at least 0.388 mg/l leaving the reservoir (post-booster chlorination) at 23:18 on 03/10/19. The chlorine levels steadily increased and recovered to normal levels shortly after.

4. There was a power cut at 07:00 on 04/10/19 due to Storm Lorenzo so the chlorine trends could not be viewed until 12:00 on 04/10/19. The plant operator viewed the issue as primarily a mechanical failure and set about to address this first, and in the process consulted with an Irish Water project engineer, to inform them that the chlorine system and all associated fail safes and automatic shutdowns had failed.

5. The operator undertook a set of follow-up checks on 04/10/19 to assess drinking water quality including chlorine residuals in the distribution network and at Richmount Hill Reservoir. The operator was satisfied that everything was in order and did not escalate the event to the direct line manager in Longford County Council.

6. Following the incident, Longford County Council undertook a review of chlorine contact time and confirmed during the audit that the water always had adequate contact time due to residence time in Richmount Hill Reservoir.

7. The cause of the failure of the switchover between the two chlorine tanks was subsequently identified as a programming error, which has since been rectified. The plant failed to automatically shutdown upon reaching the low chlorine setpoint because of a programming error, whereby the disinfection control panel did not send the signal to the main plant PLC. This issue has since been rectified.

8. This incident was only communicated to the HSE & EPA on 15/10/19, 12 days after the incident occurred. This delay in notifying the incident prevented a timely assessment by the HSE & EPA of the impact of this incident on drinking water quality, and whether it presented a health risk to consumers served by Ballymahon Public Water Supply.

Recommendations

Subject	Ballymahon PWS Audit Recommendations	Due Date	20/01/2020
Action Text	***Recommendations*** 1. Irish Water should complete the installation and commissioning of the ammonia, hydrocarbon and UVT monitors on the raw water intake at Abbeyshrule water treatment plant. 2. Irish Water should identify how the protozoal compliance log deficit is to be addressed at Abbeyshrule water treatment plant. 3. Irish Water should implement a programme of monitoring for Cryptosporidium and Giardia in the final treated water at Abbeyshrule water treatment plant. 4. Irish Water should complete the process proving of the disinfection system upgrade at Abbeyshrule water treatment plant, including the relocation of the sampling point for the chlorine monitor to an appropriate location after the dosing point. 5. Irish Water should ensure that plant and equipment is calibrated and serviced in accordance with the manufacturers' instructions, and that calibration records and labels are kept up to date. 6. Irish Water should ensure that operational incidents are escalated in a timely manner and managed appropriately, in order to maintain drinking water quality and protect public health. Irish Water should ensure that all relevant information is provided to the HSE & EPA to determine if the water supply presents a risk to public health, and if consumers need to be informed promptly thereof and given the necessary advice. **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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team. Irish Water should submit a report to the Agency on or before 20/01/2020 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 File Reference Number DW2011/35 in any future correspondence in relation to this Report.		