

Site Visit Report

Under the *European Union (Drinking Water) Regulations 2023*, the Environmental Protection Agency (EPA) is the supervisory authority in relation to Uisce Éireann and its role in the provision of public drinking water supplies. This audit was carried out to assess the performance of Uisce Éireann in providing clean and wholesome water to the public water supply named below.

The audit process is a sample of the performance of a water treatment plant and public water supply on a given date.

Water Supply Zone	
Name of Installation	Greenmount
Organisation	Uisce Éireann
Scheme Code	2100PUB1002
County	Louth
Site Visit Reference No.	SV28056

Report Detail	
Issue Date	15/08/2023
Prepared By	Lorcan Farrell

Site Visit Detail			
Date Of Inspection	18/07/2023	Announced	No
Time In	10:30	Time Out	14:00
EPA Inspector(s)	Ruth Barrington Lorcan Farrell		
Additional Visitors			
Company Personnel	Uisce Éireann: Daniel Behan, Michael Cunniffe, Edward Haythornthwaite, Aisling Neary. Louth County Council (Working in partnership with Uisce Éireann): Noel Bailey, Patrick Callan, Andrew White.		

> Summary of Key Findings

1. Failure of critical plant equipment and automatic plant shutdowns at Greenmount Water Treatment Plant (WTP) resulted in inadequately disinfected water entering Greenmount Public Water Supply (PWS) over a twelve hour period between 8:00 pm on Sunday 02/07/2023 and 8:00 am Monday 03/07/2023. There was a significant delay in communicating the incident to Uisce Éireann which prevented a timely assessment of the potential risk to human health to be carried out.
2. There is no verified protozoal barrier in place at Greenmount WTP due to the absence of appropriate filter turbidity alarms/inhibits. No monitoring for *Cryptosporidium* in line with Uisce Éireann's *Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies* is taking place at the treatment plant.
3. Further upgrade works under the Uisce Éireann Disinfection Programme are under way at Greenmount WTP to allow the disinfection system to operate in the desired control option.

> Introduction

Greenmount PWS serves a population of 3,955 with an average daily volume of 1,089 m³/d (EDEN figures). Raw water for Greenmount WTP is abstracted from the River Dee and treated via two separate process streams. Stream one comprises of coagulation, flocculation and clarification followed by pressure filtration while stream two comprises of coagulation and flocculation followed by a combined absorption clarification/filtration unit. Both streams are subsequently combined with the final treatment stages comprising of chlorination and fluoridation.

The supply has been on the EPA's Remedial Action List (RAL) since 2019 for EPA Audit Observations pertaining to treatment and management issues. Works to upgrade the plant in response to being included on the RAL are due to be completed by September 2026.

The audit was carried out in response to a chlorination disinfection failure lasting approximately 12 hours from 8:00 pm Sunday 02/07/2023 to 8:00 am Monday 03/07/2023 resulting in inadequately disinfected water entering the Greenmount PWS during this time.

> Supply Zones Areas Inspected

The audit consisted of a review of the incident response to the chlorination disinfection failure that occurred on 02/07/2023 and a site inspection of Greenmount WTP.



1. Incident Management

1.1

	Answer
Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
Comment	
<p>1. At 8:00 pm Sunday 02/07/2023 the duty sodium hypochlorite dosing pump failed at Greenmount WTP. The standby dosing pump was not available for operation as it was out of service awaiting replacement parts and repair. Louth County Council staff confirmed that the standby dosing pump had been out of service since April 2023.</p> <p>2. The low shutdown setpoints in place based on the output of chlorine monitors located on the final water at the treatment plant and on the outlet of Greenmount Reservoir both failed to activate. As a result, the treatment plant continued to operate resulting in unchlorinated water entering the supply network from 8:00 pm Sunday 02/07/2023 until the treatment plant was shut down by the caretaker at 8:00 am Monday 03/07/2023 when the issue was discovered. Louth County Council confirmed that warning alarms were generated during the incident indicating low residual chlorine levels however, no out of hours monitoring of plant alarms was in place at the treatment plant. Uisce Éireann confirmed in the incident notice submitted to the EPA on 05/07/2023 that chlorine residuals at the outlet of Greenmount Reservoir dropped below adequate levels between 01:00am 03/07/2023 and 11:00am on 03/07/2023.</p> <p>3. On discovery of the incident on Monday morning (03/07/2023) the caretaker contacted maintenance staff to arrange for repairs to be carried out and the plant resumed production at approximately 11:00 am. The caretaker also contacted supervisory staff to escalate the incident. A breakdown in the escalation process meant that Uisce Éireann was not made aware of the incident until the afternoon of Tuesday 04/07/2023. Once aware of the incident, Uisce Éireann made contact with the HSE.</p> <p>4. Due to the delay in escalation of the incident between Louth County Council and Uisce Éireann, a timely assessment by the HSE of the potential risk to human health could not be made. The delay in escalation also prevented microbiological sampling to be undertaken swiftly with samples being taken on 05/07/2023, two days after the event. Two residual chlorine measurements taken within the network on the afternoon of 03/07/2023 and a residual chlorine survey undertaken within the network on 04/07/2023 returned satisfactory chlorine residuals for all samples.</p> <p>5. Uisce Éireann confirmed that the low chlorine shutdown setpoints in place at the treatment plant and the outlet of Greenmount Reservoir failed to operate due to a conflict with obsolete shutdown setpoints that were thought to be deactivated after the upgrade of the disinfection system. A specialist contractor reinstated the shutdown setpoints at the treatment plant on 03/07/2023 and at Greenmount Reservoir on 04/05/2023. Uisce Éireann have confirmed since the audit that these obsolete shutdown setpoints have been permanently deleted from the plant control system and that both shutdown setpoints have been tested to ensure correct operation.</p> <p>6. On the day of the audit, the standby sodium hypochlorite dosing pump remained out of service awaiting parts and repair. Uisce Éireann have confirmed since the audit that the standby pump has been repaired and both duty and standby pumps are fully operational.</p>	



2. Treatment Process Chemicals

2.1

Are treatment process chemicals appropriately managed and stored?

Answer

No

Comment

1. The fill point for the hydrofluosilicic acid is located at the top of a set of steps with limited space for access and a straight pipe connection which may make attachment during chemical delivery more difficult.



3. Management and Control

3.1

Is the water treatment plant resilient enough to cope with significant variations in raw water quality or demand?

Answer

No

Comment

1. The River Fane that supplies Greenmount WTP with raw water can experience elevated levels of ammonia at times throughout the year due to landspreading of animal waste within the catchment. High levels of ammonia within the treated water result in increased chlorine demand and as a result Greenmount WTP has experienced plant shutdowns based on low residual chlorine levels in treated water since upgrade works under the Uisce Éireann Disinfection Programme .
2. Uisce Éireann staff indicated that a contact column in place at the treatment plant may be part of the issue leading to plant shutdowns due to elevated ammonia levels. As a result of this issue, the disinfection system at the treatment plant is operating in Control Option A.
3. Uisce Éireann confirmed that works under the Uisce Éireann Disinfection Programme have recommenced at the treatment plant to correct the issues experienced as a result of elevated ammonia levels in the source water. The scope of works includes: (i) replacement of the contact column at the treatment plant with a contact coil with the aim of operating the plant in Control Option D and (ii) installation of a raw water ammonia monitor at the treatment plant. Works to replace the contact column and move to Control Option D are due to be completed by Q4 2023 while the raw water ammonia monitor has been installed at the treatment plant and is due to be trended, with appropriate alarms/inhibits being installed and final commissioning to take place by Q3 2023.

3.2

Is the plant suitably managed and controlled to maintain the designed log credit on each treatment stage?

Answer

No

Comment

1. The protozoal log treatment requirement for Greenmount WTP has been confirmed as a log 3 requirement. There is no verified protozoal barrier in place at the treatment plant and no monitoring in line with *Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies* is taking place.
2. There are turbidity monitors present on stream 1 filters however there are no alarms or inhibits in place based on the output of these monitors. There is also a turbidity monitor in place on the outlet of the stream 2 Trident unit however the high turbidity shutdown setpoint is set at 1 NTU.
3. Greenmount WTP is on the EPA's RAL for treatment and management issues. An action programme to upgrade the coagulation, flocculation, clarification and filtration systems is being progressed with a completion date of September 2026. This upgrade should include a verified protozoal barrier at the treatment plant.



4. Site Specific Issues

		Answer
4.1	Is the final water continuous online UVT monitor reading accurately?	No
Comment		
1. The final water UVT monitor at the treatment plant was reading 56.3 % during the audit which appears to be an unusually low value for final water UVT. The unit was serviced in July 2023.		

		Answer
4.2	Is there a documented site specific incident response and incident escalation process?	Yes
Comment		
1. A copy of the Uisce Éireann Incident Communications Response Guidance Form was present on the wall of the office in the treatment plant which contained site specific trigger levels protecting critical plant processes at the treatment plant. There are no trigger levels for the new ammonia monitor that has been installed at the treatment plant and trigger levels referring to a 0.1 NTU log 4 barrier is not representative of the capabilities of the treatment plant.		

Recommendations

Subject	Greenmount PWS Audit Recommendations	Due Date	15/09/2023
Action Text	<p>Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.</p> <ol style="list-style-type: none"> 1. Review and update the incident response procedure at the treatment plant to ensure that (i) there is prompt and timely consultation with the HSE to facilitate assessment of potential risk to human health and that incidents are notified to the EPA without delay, (ii) refresher incident response and escalation training is provided to all staff and (iii) that the Uisce Éireann Incident Communications Response Guidance Form is updated with the appropriate trigger levels that protect critical processes at the water treatment plant. 2. Carry out monitoring for <i>Cryptosporidium</i> in line with the Uisce Éireann's <i>Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies</i> until a verified protozoal barrier is in place at the treatment plant. 3. Complete works under the Uisce Éireann Disinfection Program including: (i) replacement of the contact column and associated return to disinfection system operation to Control Option D and, (ii) installation of a raw water ammonia monitor which should be trended on SCADA and include appropriate alarms/inhibits. 4. Review the position and suitability of the hydrofluosilicic acid fill point and ensure all fill points for storage tanks are located within a bunded area. Refer to EPA guidance document –“<i>IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities</i>”. 5. Investigate the accuracy of the final water UVT monitor and submit one week of trended data to verify final water UVT levels at the treatment plant. <p>Actions required by Uisce Éireann</p> <p>During the audit, Uisce Éireann representatives were advised of the audit findings and that action must be taken by Uisce Éireann to address the issues raised.</p> <p>Uisce Éireann should submit a report to the EPA on or before 15/09/2023 detailing the actions taken and planned, with timescales, to close out the above recommendations.</p> <p>The EPA advises that the findings and recommendations from this audit report should, where relevant, be addressed at other public water supplies.</p>		