

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 | Croom PWS |
| Organisation | Uisce Éireann |
| Scheme Code | 1900PUB1023 |
| County | Limerick |
| Site Visit Reference No. | SV29868 |

| Report Detail | |
|--------------------|-----------------|
| Issue Date | 29/02/2024 |
| Prepared By | Orla Harrington |

| Site Visit Detail | | | |
|----------------------------|---|------------------|-------|
| Date Of Inspection | 08/02/2024 | Announced | Yes |
| Time In | 10:30 | Time Out | 11:45 |
| EPA Inspector(s) | Orla Harrington | | |
| Additional Visitors | | | |
| Company Personnel | Uisce Éireann: Susan Cook, Duane O'Brien Limerick City and County Council (working in partnership with Uisce Éireann): Neal Boyle | | |

> Summary of Key Findings

1. The UV disinfection system at Cois Struthain water treatment plant was disabled on 22/01/2024 during repair works to the chlorine dosing system. This allowed water to enter the distribution network without a treatment barrier in place for *Cryptosporidium* until the 29/01/2024 when the UV disinfection system was turned back on. Uisce Éireann did not notify the EPA and HSE of the incident until 30/01/2024. The audit found that the incident was not suitably escalated and managed in order to maintain water quality and protect human health.
2. Prior to the audit, trend data submitted indicated a malfunction with the chlorine dosing system at the Cois Struthain water treatment plant between 16/01/2024 and 02/02/2024. At the time of the audit, investigations into the cause of the chlorine dosing pump failures were ongoing.

> Introduction

The Croom public water supply (PWS) serves a population of 1,685 and supplies on average 411 m³/day of water to Croom village and the surrounding area. The supply has three raw water sources; the 'Bypass' borehole (18 m³/hr), a spring known as the Skagh well (13 m³/hr) and the Cois Struthain borehole (7.5 m³/hr). Treatment at the Skagh well consists of UV disinfection and chlorination. Treatment at the Bypass borehole consists of chlorination only. Both of these water treatment plants pump directly to the Croom Village reservoir before distribution.

The audit took place at the Cois Struthain water treatment plant (WTP), located at the entrance to the Cois Struthain estate near Croom village. This plant supplies water to approximately 400 people. Treatment at the plant consists of UV disinfection (primary) and chlorination (secondary). Treated water then travels to an onsite underground reservoir before distribution to the Cois Struthain estate.

Uisce Éireann plans to rationalise the Croom PWS and connect to Limerick City Environs PWS, by Quarter 3 2024.

The audit was undertaken to assess the operation and management of the Cois Struthain WTP in response to the failure of the UV disinfection system between 22/01/2024 and 29/01/2024.

> Supply Zones Areas Inspected

The treatment processes at Cois Struthain water treatment plant were inspected as part of the audit. The Cois Struthain borehole was not inspected as part of the audit.



1. Incident Management

1.1

| | Answer |
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| 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. A UV disinfection system was installed in May 2023 under the County Limerick Disinfection Programme to provide primary disinfection at the Cois Struthain WTP. Uisce Éireann advised that the protozoal log treatment requirement for the groundwater source has not been determined.</p> <p>2. The UV disinfection system at Cois Struthain WTP was disabled on 22/01/2024 by contractors during repair works to the chlorine dosing system. This allowed water to enter the distribution network without a treatment barrier in place for <i>Cryptosporidium</i> until the 29/01/2024 when the UV disinfection system was turned back on by Limerick City and County Council staff. Uisce Éireann notified the EPA and HSE of the incident on 30/01/2024. The audit found that the incident was not suitably escalated and managed in order to maintain water quality and protect human health. There was no supervisory oversight of trend data to detect any abnormal change in the data between 22/01/2024 and 29/01/2024.</p> <p>3. Uisce Éireann advised that contractors working at the WTP had turned the UV system off either in error or to allow works to be carried out and did not return the plant to normal operations prior to leaving the site. Uisce Éireann stated that a procedure will be put in place to govern the disabling of shutdowns at Cois Struthain WTP during repairs or maintenance works, and their restoration once work is complete and the plant is back in production. A timeline for completion was not provided on the day of the audit.</p> <p>4. On 06/02/2024 monitoring of chlorine residuals and microbiological sampling was undertaken in the network. While the results were satisfactory, it was noted that a prolonged period of time had elapsed following the incident before the samples were taken.</p> | |



2. Disinfection

| | | Answer |
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| 2.1 | Is the disinfection system verified using monitors and alarms? | No |
| Comment | | |
| <p>1. Primary disinfection is provided by duty/standby UV units. Secondary disinfection is provided by dosing of sodium hypochlorite. The chlorine dose is flow proportional and linked to chlorine monitor (CL001) located post dosing, where a target chlorine residual of 0.5 mg/l is aimed for before leaving the plant. This chlorine monitor was reading 0.44 mg/l on the day of the audit.</p> <p>2. At the audit, the following alarm set-points were identified for CL001: (i) low: 0.4mg/l; (ii) low shutdown: 0.3mg/l; (iii) high: 1mg/l and (iv) high shutdown: 1.2mg/l. The low alarm settings are currently too low to allow the plant operators to react in time when chlorine levels drop below the target level and may not ensure that treated water at the extremities of the distribution network contains at least 0.1mg/l residual chlorine to ensure adequate disinfection.</p> | | |

| | | Answer |
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| 2.2 | Is there a procedure in place for caretakers and contractors to check and sign-off that all alarms have been correctly re-set on completion of any maintenance work? | No |
| Comment | | |
| <p>1. There is no documented procedure covering the verification of alarms or inhibits following maintenance or other work on site. Uisce Éireann confirmed that a procedure will be developed and implemented. A timeframe for completion was not provided at the audit.</p> | | |

| | | Answer |
|--|--------------------------------------|--------|
| 2.3 | Is the UV system suitably validated? | Yes |
| Comment | | |
| <p>1. Primary disinfection at the plant is provided by a "VISADES T400F" (2 reactors) UV disinfection system installed and commissioned at the Cois Struthain WTP in May 2023. The UV system is validated to ONORM standards. A copy of the validation certificate was provided at the audit.</p> <p>2. The validated operating range is a minimum of 77.68 % UVT and 56.48 W/m² UVI for flows up to 9.86 m³/hr. The UV Unit No. 1, which was in operation at the time of the audit had a reading of 116.9 W/m² UVI and 94.7 mJ/cm² UV dose indicating the UV system was operating within its validated range during the audit. The UV is alarmed and set to shutdown at 40 mJ/cm² (300 secs).</p> <p>3. Turbidity was 0.079 NTU prior to UV disinfection at the time of the audit.</p> <p>4. A cascade system is in place to alert staff in the event of an alarm being triggered.</p> | | |

| Answer |
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| 2.4 | Is the chlorine dosed appropriately? | No |
| Comment | | |
| <p>1. Prior to the audit, the chlorine residual SCADA trend data for CL001 was reviewed. This data indicated that levels dropped intermittently to 0 mg/l for prolonged periods of time from 16/01/2024 to 02/02/2024. Uisce Éireann said that initial investigations pointed to a blockage in the chlorine dosing pumps which was resolved. However, on the day of the audit, it was evident from trend data that issues with chlorine dosing and pumps failing to restart were continuing at the plant. Investigations are ongoing to try and resolve the issue.</p> <p>2. The plant shuts down at the low low level chlorine alarm of 0.3 mg/l (120 second delay). Treated water is stored in the onsite reservoir which provides approximately 3 hours supply.</p> <p>3. There are duty and standby chlorine dosing pumps in operation, however Uisce Éireann were unable to confirm if there was automatic switchover of the chlorine dosing pumps.</p> | | |

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| | | Answer |
| 2.5 | Is the residual chlorine monitored at a suitable sample location after contact time has been completed? | No |
| Comment | | |
| <p>1. Chlorine residual levels are monitored in one location on the network, a local supply hydrant, and are recorded daily by the caretaker. The records from 16/01/2024 to 02/02/2024 showed no drop in chlorine levels at this location. It is recommended that monitoring of residual chlorine is undertaken several times a week at different points on the network to include the network extremities.</p> | | |



3. Management and Control

| | | Answer |
|--|---|--------|
| 3.1 | Has the protozoal compliance log treatment requirement been identified for the water treatment plant? | No |
| Comment | | |
| 1. Uisce Éireann advised that the protozoal compliance log treatment requirement has not been identified for the Cois Struthain WTP. | | |

| | | Answer |
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| 3.2 | Is there appropriate oversight of plant performance? | No |
| Comment | | |
| 1. On the day of the audit, there was no information available on how plant performance trend data is reviewed by supervisory staff. | | |

Recommendations

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|--------------------|--|-----------------|------------|
| Subject | Croom PWS - Audit Report | Due Date | 29/03/2024 |
| Action Text | <p>Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendation(s) without delay.</p> <ol style="list-style-type: none"> 1. Ensure there is a procedure in place for caretakers and contractors to check and sign-off that all alarms have been correctly re-set on completion of any maintenance work. 2. Ensure the review and oversight of trends by supervisory staff is undertaken regularly. 3. (i) Put appropriate and corrective actions in place to address the issues with chlorine dosing at the plant and (ii) Provide one month of trend data to verify effectiveness of the works. 4. Ensure that there is a documented communications protocol for the reporting of incidents in Croom PWS so the relevant parties involved are alerted promptly and a timely assessment of the risk to public health can be undertaken. Uisce Éireann should ensure that all relevant staff are trained in the protocol and understand the incidences in which it should be used. 5. Ensure that the alarm set points for the low residual chlorine alarm are amended to enable a minimum of 0.5 mg/l of residual chlorine. The alarms should align with the guidance outlined in the EPA Water Treatment Disinfection Manual as regards levels and time delays. 6. Confirm the protozoal log treatment requirement for the Cois Struthain borehole. 7. Ensure duty and standby chlorine dosing pumps have automatic switchover in the event of the failure of one of the pumps. 8. Ensure the monitoring of residual chlorine is undertaken several times a week at different points of the network to include network extremities, ensuring chlorine is >0.1 mg/l in the network. <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 29/03/2024 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> | | |