

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	Cappamore Foileen PWSS
Organisation	Uisce Éireann
Scheme Code	1900PUB2001
County	Limerick
Site Visit Reference No.	SV28294

Report Detail	
Issue Date	25/10/2023
Prepared By	Orla Harrington

Site Visit Detail			
Date Of Inspection	04/10/2023	Announced	Yes
Time In	10:30	Time Out	12:30
EPA Inspector(s)	Orla Harrington Veronica Boland		
Additional Visitors			
Company Personnel	Uisce Éireann: Susan Cook, Denis Hayes. Limerick City and County Council (working in partnership with Uisce Éireann): Diarmuid O'Dea, Willie Hurley, Mike Lonergan.		

> Summary of Key Findings

1. On 25/09/2023 Uisce Éireann received confirmation that *Cryptosporidium* had been detected in a final treated water sample taken at Foileen reservoir on 20/09/2023 (0.14 count/no. per 10L). Following consultation with the HSE, a boil water notice was issued to all consumers served by Cappamore Foileen public water supply on 26/09/2023. *Cryptosporidium* was also detected in a further sample taken on 28/09/2023 (0.02 count /no. per 10L).
2. Cappamore Foileen public water supply provides disinfection using chlorination, however this does not provide an adequate barrier to *Cryptosporidium* entering the water supply. Uisce Éireann has committed to the upgrade of the water treatment plant by installing UV disinfection which will provide a barrier to *Cryptosporidium* entering the water supply. The works are expected to be completed under the Uisce Éireann Disinfection Programme by Quarter 1 2024.
3. There are no automatic shutdowns of the water treatment plant linked to the turbidity and residual chlorine alarm setpoints.

> Introduction

The Cappamore Foileen public water supply (PWS) serves a population of 2,321 and produces 1,082 m³/day. The main source of the supply is the Foileen spring which produces approximately 1,000 m³/day. This can be supplemented by three boreholes which provide approximately 7 - 10 m³/hr each if required. The spring and boreholes are located on the treatment plant site. Treatment consists of disinfection by chlorination. Water is then pumped 1.7 km to the Foileen reservoir before distribution.

The audit was undertaken to assess the performance of Uisce Éireann in providing clean and wholesome drinking water following the detection of *Cryptosporidium* in the Cappamore Foileen PWS from samples taken on 20/09/2023 and 28/09/2023. The supply was placed on a Boil Water Notice (BWN) on 26/09/2023, in consultation with the HSE, following the detection of *Cryptosporidium*.

> Supply Zones Areas Inspected

The treatment processes at the water treatment plant were inspected. The reservoir was also visited as part of the audit.



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. On 25/09/2023 Uisce Éireann received confirmation that <i>Cryptosporidium</i> had been detected in a final treated water sample taken at the Foileen reservoir on 20/09/2023 (0.14 count/no. per 10L). Following consultation with the HSE, a BWN was placed on the supply on 26/09/2023. Uisce Éireann notified the EPA of the detection of <i>Cryptosporidium</i> and the placing of the BWN on 26/09/2023. <i>Cryptosporidium</i> was also detected in a further sample taken on 28/09/2023 (0.02 count /no. per 10L) and notified to the EPA on 02/10/2023.</p> <p>2. A continuous turbidity monitor is in place on the Foileen spring. Turbidity trend data provided to the EPA subsequent to the audit showed that water with turbidity levels > 1 NTU entered the supply on 20/09/2023 and 21/09/2023 which were not notified to the EPA. This meant that during that period, the 1 NTU for turbidity in the final water was breached and the effectiveness of the disinfection at the plant was compromised. Limerick City and County Council confirmed that there is no automatic plant shutdown linked to the raw water turbidity alarm setpoint of 0.8 NTU (300 seconds time delay) but that this will be installed as part of the Disinfection Programme upgrades along with a run to waste capability for both spring and borehole sources.</p> <p>3. Limerick City and County Council stated that no specific activities in the surrounding area were identified as being the likely cause of the <i>Cryptosporidium</i> detection.</p> <p>4. Uisce Éireann has committed to installing UV disinfection to provide a barrier to <i>Cryptosporidium</i> entering the water supply. The proposed timeframe for completion is Quarter 1 2024. The BWN will remain in place until the proposed UV disinfection systems have been installed and are operating within their validated ranges at all times.</p>	



2. Source Protection

2.1

	Answer
Is the abstraction source(s) adequately protected against contamination?	No
Comment	
<p>1. The main source for the Cappamore Foileen supply is the foileen spring, which is located in a below ground locked collection chamber. This spring supply is augmented by three boreholes located within the boundary of the water treatment plant. Each borehole can provide between 7 - 10 m3/hour depending on demand. All three boreholes are capped and sealed.</p> <p>2. Landuse in the immediate vicinity of the spring includes forestry. Limerick City and County Council stated that while there was no unusual activities reported in the catchment prior to the detection of the <i>Cryptosporidium</i>, there are issues with elevated turbidity at Foileen spring in response to tree felling and heavy rain. Limerick City and County Council advised that some of the forestry is now privately owned and that they may not be notified of all forestry activities.</p> <p>3. There is an online turbidity monitor with alarm on Foileen spring, however there is no automatic shutdown of the source linked to the turbidity alarm.</p> <p>4. Monitoring of <i>Cryptosporidium</i> started on 16/02/2016 and is carried out six times per year. <i>Cryptosporidium</i> was first detected on 20/09/2023. Monitoring for <i>Cryptosporidium</i> is now being undertaken in accordance with the <i>Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Supplies</i>.</p>	



3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	No
Comment		
<p>1. Disinfection is achieved using sodium hypochlorite, which is dosed using duty/ standby pumps with automatic switchover. Chlorine dosing is flow proportional but is not linked to the residual chlorine monitor, such that any changes in the chlorine demand can be responded to automatically by the dosing pumps. Chlorine dosing is adjusted manually by the operator and is typically 7 - 8 litres/day to achieve a chlorine dose target of 0.7 mg/l.</p> <p>2. The low level chlorine alarm is set at 0.3 mg/l after a 300 second time delay which is too low to alert the operator to any chlorination issues in a timely manner. There is no auto shutdown of the supply linked to the chlorine alarm. On the day of the audit, the chlorine monitor (CL17) was reading 0.71 mg/l.</p> <p>3. Booster chlorination is provided at Foileen reservoir. There is a chlorine monitor on the outlet of the reservoir with a low alarm of 0.2 mg/l and high alarm of 1.2 mg/l. The residual chlorine target leaving the reservoir is 0.5 mg/l. The low chlorine alarm is not at an appropriate level to verify chlorine Ct. Limerick City and County Council and Uisce Éireann were unable to explain how the chlorine booster station operated. There was no trend data available for chlorine residual at the reservoir during the audit.</p> <p>4. Uisce Éireann advised that the disinfection system at Cappamore Foileen WTP will be upgraded under the Disinfection Programme and confirmed the date for delivery of all disinfection upgrade works is Quarter 1 2024. The BWN will remain in place until all disinfection upgrades are complete.</p>		

		Answer
3.2	Is there adequate chlorine contact time before the first connection?	No
Comment		
<p>1. Limerick City and County Council stated that inadequate contact time was identified for a portion of the supply, affecting six properties between the WTP and Foileen reservoir. Uisce Éireann are in the process of completing the connection of all affected customers to Foileen reservoir where UV disinfection will be installed.</p> <p>2. Contact time (Ct) is achieved at Foileen reservoir. The Ct calculation provides an adequate chlorine Ct of 23.88 mg.min/l but at a minimum free chlorine concentration of 0.65 mg/l. This free chlorine level may not be provided at all times as the low chlorine alarm is set at 0.2 mg/l, which is too low to verify Ct.</p>		



4. Reservoirs and Distribution Networks

		Answer
4.1	Is treated water in tanks and reservoirs suitably protected against contamination?	No
Comment		
<p>1. The Foileen reservoir was visited during the audit. The walls of the reservoir were visibly leaking. Limerick City and County Council stated that there are lining and integrity issues associated with the reservoir. Uisce Éireann could not confirm when the reservoir was last cleaned or inspected.</p>		



5. Management and Control

		Answer
5.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
Comment		
<p>1. At present the Cappamore Foileen WTP is classed as requiring a 3 log removal for protozoa. A sanitary survey has not been completed to finalise the score. Monitoring for <i>Cryptosporidium</i> is being undertaken in accordance with the <i>Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public supplies</i>.</p> <p>2. The current treatment process at the Cappamore Foileen WTP does not provide a barrier against <i>Cryptosporidium</i> entering the supply. Uisce Éireann is currently in the process of installing a UV disinfection system at the Foileen reservoir to address the protozoal compliance log deficit and this work is on track for completion in Q1 2024, with verification data to be submitted to the EPA in Q2 2024.</p>		

		Answer
5.2	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No
Comment		
<p>1. There is no automatic plant shutdown of the plant linked to residual chlorine levels.</p>		

Recommendations

Subject	Cappamore Foileen PWS - Audit Report	Due Date	27/11/2023
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. Prioritise the Cappamore Foileen public water supply for upgrade under the Uisce Éireann Disinfection Programme and provide details of the scope of the works to be undertaken, including timeframes. This should include: (i) installation of UV disinfection to address inadequate treatment for <i>Cryptosporidium</i> with appropriate alarms/shutdowns; (ii) provision of appropriate alarms/shutdown setpoints based on residual chlorine levels; (iii) provision of appropriate alarms/shutdown for turbidity and (iv) provision of adequately disinfected water to all consumers on this supply. 2. Provide training to operational and supervisory staff on the operation of the UV disinfection and all upgraded systems. 3. (i) Confirm the protozoal log treatment requirement for the supply and (ii) monitoring for <i>Cryptosporidium</i> should continue as per the <i>Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies</i> until the Uisce Éireann Disinfection Programme upgrade works are completed and verified. 4. Ensure that the EPA is notified of any turbidity levels >1 NTU (3 minutes delay). 5. Establish procedures to ensure that Uisce Éireann is informed of any forestry activities in the catchment that may impact on water quality. 6. Confirm that the reservoir is inspected, cleaned and any damage to the integrity of the reservoir repaired. <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 27/11/2023 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>		