

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	Clonuff
Organisation	Uisce Éireann
Scheme Code	1400PUB1013
County	Kildare
Site Visit Reference No.	SV27877

Report Detail	
Issue Date	04/07/2023
Prepared By	Lisa Noone

Site Visit Detail			
Date Of Inspection	23/05/2023	Announced	Yes
Time In	09:30	Time Out	11:05
EPA Inspector(s)	Lisa Noone		
Additional Visitors			
Company Personnel	Uisce Éireann: Ed Haythornthwaite, Jessica Evans Kildare County Council (working in partnership with Uisce Éireann): Danny McCormack, Mark Flanagan		

> Summary of Key Findings

1. The EPA is seriously concerned at the findings of the audit carried out at Clonuff Water Treatment Plant (WTP) on 23/05/2023. The audit found that inadequately disinfected water enters the Clonuff Public Water Supply (PWS) at least twice daily for up to an hour at a time with low chlorine residuals in water entering the network.
2. Elevated turbidity levels have been recorded leaving the plant throughout the day ranging from 1 NTU to 2 NTU with no automatic shutdown or run-to-waste facility in place, further compromising disinfection.
3. Low chlorine residual alarms were regularly deactivated at Clonuff WTP for time periods ranging from a number of days to weeks, meaning staff are not alerted when disinfection processes are compromised.
4. There are no plant shutdowns in place for low chlorine residual or elevated turbidity to prevent inadequately treated water entering the network.
5. At present, shutdown is only in place at Clonuff WTP for high chlorine levels.

> Introduction

Clonuff PWS serves a population of approximately 50 people with an average daily output of 8 m³/day. The raw water abstraction is from a single borehole located approximately 100m from the plant. Water treatment at the WTP consists of pre-chlorination and iron and manganese removal via filtration. There is no storage of treated water at Clonuff WTP.

The audit of Clonuff WTP was carried out to assess the performance of Uisce Éireann in providing clean and wholesome drinking water, focusing mainly on alarms, inhibits and management oversight.

Uisce Éireann were requested during the audit to submit information regarding chlorine and turbidity trends and associated alarms without delay. However this information was not provided to the EPA until 23/06/2023 - one month following the audit resulting in a delay in finalising this report.

> Supply Zones Areas Inspected

All treatment processes on site and the groundwater borehole were inspected as part of the audit.



1. Disinfection

		Answer
1.1	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	No
Comment		
<p>1. Chlorine is dosed prior to filtration for iron and manganese, with no additional chlorination post filtration.</p> <p>2. Chlorine disinfection trends inspected as part of the audit showed that inadequately disinfected water enters the public supply on a daily basis. For the dates provided from 05/05/2023 to 20/05/2023, low chlorine residuals ranging from 0mg/l to 0.1mg/l were recorded twice daily on most days in the early hours of the morning at approximately 02:00 and 05:00. On some occasions, this drop in chlorine residual was recorded to have lasted up to an hour.</p> <p>3. In addition, low chlorine residuals have also been recorded during time periods outside of the usual backwashing cycle, for example 0mg/l was recorded at 09:00 on 07/05/2023, and 0.01mg/l of residual chlorine was recorded leaving the plant 19:00 on 08/05/2023.</p> <p>4. Turbidity trends also showed that water with elevated turbidity regularly leaves the plant. Based on the information provided, on fourteen separate occasions from 05/05/2023 to 20/05/2023, elevated turbidity ranging from 1NTU and 2NTU was recorded leaving the plant - with the majority of exceedances recorded at 23:15.</p> <p>5. Kildare County Council operators stated that these issues regarding chlorine residual have been occurring for approximately 4 years. As far as can be determined, the HSE have not been consulted on the potential public health implications of the low chlorine residuals.</p> <p>6. During the audit, Uisce Éireann were requested to provide the EPA with turbidity and chlorine residual trends (for 15 minute intervals) for water leaving the plant without delay. This information was provided to the EPA on 23/06/2023 - one month after the audit was completed.</p>		

		Answer
1.2	Is there a chlorine residual ≥ 0.1 mg/l throughout the network?	Yes
Comment		
<p>1. Kildare County Council and Uisce Éireann were requested during the audit to provide network monitoring results for chlorine residuals to the EPA without delay. This information was provided to the EPA on 23/06/2023 - one month after the audit was completed.</p> <p>2. Chlorine residual monitoring results from the network were provided to the Agency for five different dates in April/May. For the dates provided, monitoring was carried out at approximately midday and results at this time were >0.1mg/l in the network.</p>		



2. Alarms, Inhibits & Oversight Audits 2023

	Answer	
2.1	Is there a documented site specific incident response and incident escalation process?	No

	Answer	
2.2	Did UÉ confirm the target residual for chlorine contact time?	Yes
Comment		
<p>1. The minimum residual chlorine concentration required for verification of primary disinfection is 0.23mg/l, meaning that if chlorine residual drops below 0.23mg/l at the chlorine contact time validation point that adequate disinfection may not be achieved.</p> <p>2. The Uisce Éireann Disinfection Programme has been completed at Clonuff WTP and Control option A is currently in use at the WTP whereby chlorine dosing is done on a flow proportional basis. Under the Disinfection Programme works, live chlorine contact time was made available which facilitates automatic adjustment of the chlorine dose rate based on real time changes in the water (pH, temperature, flow etc.) to ensure the chlorine target set point is achieved, however this control option is not currently being utilised.</p>		

	Answer	
2.3	Are critical alarms dialled out to operators?	No
Comment		
<p>1. Critical alarms for pH, high turbidity and high chlorine are dialled out to alert operators of deteriorating water quality.</p> <p>2. Based on the information provided for 2023 following the audit, the low chlorine residual alarm at the plant is deactivated for timeframes ranging from a number of days to a number of weeks. Low chlorine alarms were fully deactivated from 16/03/2023 to 31/03/2023, and 26/04/2023 to 26/05/2023.</p> <p>3. During the audit, Uisce Éireann were requested to provide the EPA with information regarding the dialling out of chlorine alarms without delay. This information was provided to the EPA on 23/06/2023 - one month after the audit was completed.</p> <p>4. Uisce Éireann informed the EPA on 23/06/2023 that the low chlorine residual alarms have since been reinstated at the plant.</p>		

	Answer	
2.4	Has UÉ carried out an alarm and inhibit review at the water treatment plant?	Yes
Comment		

	Answer
2.5 Were all findings of the UÉ alarm and inhibit review implemented?	No
Comment	
1. It could not be determined at the audit when the Uisce Éireann alarm and inhibit review at the WTP had been carried out and whether the findings had been implemented.	

	Answer
2.6 Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No
Comment	
<p>1. Suitable plant shutdowns/inhibits are not in place to prevent the entry of inadequately treated water entering the distribution network.</p> <p>2. Plant shutdowns are only currently in place for high chlorine levels of 3mg/l after 15 minutes.</p> <p>3. There is no plant shutdown for elevated turbidity or low chlorine residual post contact time.</p> <p>4. In addition to the potential risk posed to consumers on the supply during late night/early morning as detailed in Section 1.1, the lack of appropriate plant shutdowns for low chlorine and elevated turbidity coupled with the lack of treated water storage present at WTP presents a further risk of inadequately disinfected water being supplied directly to consumers before the chlorine and turbidity alarms can be responded to.</p>	

	Answer
2.7 Is there a documented alarm response procedure?	No

Recommendations

Subject	Clonuff Audit Recommendations	Due Date	04/08/2023
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. Provide safe and adequately treated water, and ensure sufficient management oversight of operations at Clonuff WTP to prevent inadequately disinfected water entering the public supply. 2. Consult with the HSE immediately on public health advice regarding the repeated low chlorine residuals, high turbidity and lack of appropriate controls on critical processes at Clonuff WTP, and ensure prompt and timely notification to the EPA of incidents and parametric failures. 3. Provide details of the outcome of the investigation into (i) the low chlorine residuals post backwash of the filters. Provide details of remedial actions taken or proposed, including the feasibility of installing an automatic shutdown and run-to-waste facility at Clonuff WTP to prevent the entry of inadequately disinfected water into the network, and (ii) the elevated turbidity regularly recorded at 23:15, and provide clarification as to whether there is a spike in turbidity post filter backwash as stated during the audit. 4. Ensure that (i) the Uisce Éireann Incident Communication Response Guidance Form is displayed at the Clonuff WTP and contains site specific information including contacts for escalation and relevant site specific trigger levels protecting critical processes at the WTP, (ii) training is provided to WTP operators on the requirements of the Uisce Éireann Incident Communication Response Guidance Form to ensure incidents are recognised, appropriately escalated to relevant Uisce Éireann personnel and acted upon promptly, and (iii) there is prompt and timely consultation with the HSE and notification to the EPA of incidents and all parametric failures. 5. Ensure appropriate alarms for low chlorine residuals post contact time and high turbidity in final water are reinstated at the WTP and enabled at all times. 6. Put a documented procedure in place for responding to and escalating all alarms generated at the water treatment plant. The procedure should clearly document the corrective actions and set out delegation of responsibilities. <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 04/08/2023 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>		