

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	Inishmore-Kilcarna
Organisation	Uisce Éireann
Scheme Code	1200PUB1054
County	Galway
Site Visit Reference No.	SV29558

Report Detail	
Issue Date	25/07/2024
Prepared By	Maria O'Connell

Site Visit Detail			
Date Of Inspection	28/06/2024	Announced	Yes
Time In	13:30	Time Out	14:30
EPA Inspector(s)	Maria O'Connell		
Additional Visitors			
Company Personnel	Uisce Éireann: Pearse Faherty. Galway County Council (Working in partnership with Uisce Éireann): Brendan Hayes, Enda Gill, Dimetri Zukovs.		

> Summary of Key Findings

1. Validation certificates for the duty and standby UV units were not available at the time of the audit . Although UV alarms and inhibit set points were implemented at the WTP it will not be possible to verify the appropriateness of these settings until validation criteria is submitted.
2. Chlorine alarms and shutdowns were not in alignment with the *EPA Water Treatment Disinfection*. The low residual chlorine alarm was set at 0.3mg/l. At this alarm level sufficient contact time cannot be achieved.
3. A formally recognised standard and testing certificates for the cartridge filtration unit were not available at the time of the audit. This is necessary to claim log credits for the filtration process.

> Introduction

The Inishmore (Kilcarna) Public Water Supply serves a population of 279 and is interconnected with the Oghill supply which serves a population of 361. Raw water for the supply is abstracted from a rainwater spring source and is supplemented by 3 shallow boreholes situated in a turlough approximately 200m from the plant. The site operator outlined that the water treatment plant produces on average approximately 350m³ of treated water per day (28m³/hour). The plant reservoir has a capacity of 100m³ and was cleaned under the Uisce Éireann Reservoir Programme in 2023. Uisce Éireann confirmed that a source and sanitary survey was completed and a 3 log protozoal treatment requirement has been assigned. Treatment consists of filtration, UV and chlorination using low sodium hypochlorite. This audit was undertaken to assess Uisce Éireann's performance in producing clean and wholesome water with a focus on the alarms and inhibits in place at the treatment plant to ensure the appropriate oversight of treatment processes.

> Supply Zones Areas Inspected

The audit included a site tour of the treatment processes at the Inishmore (Kilcarna) WTP with site personnel.



1. Filtration

	Answer
1.1	Are the filters designed and managed in accordance with EPA guidance? No
Comment	
<p>1. Continuous raw water turbidity monitoring takes place but no alarms were detailed on the HMI system at the time of the audit.</p> <p>2. Cartridge filtration is used at this water treatment plant with 15 x 40" cartridges in one pressurised housing unit. Cartridges are replaced by operational staff when the flow rate through the filter drops.</p> <p>3. The site operator advised that the filters are serviced regularly and the cartridges disposed of appropriately however there is no filter maintenance log at the site. A supply of filter cartridges is kept on site.</p> <p>4. A formally recognised standard approval document and testing certificates for the cartridges and housing unit was not available at the time of the audit (as per section 7.5.1, page 92 of the <i>EPA Water Treatment Manual: Filtration</i>). This is necessary to claim log credits for the filtration process.</p>	



2. Disinfection

		Answer
2.1	Are duty and standby chlorine pumps/ UV units in operation?	Yes
Comment		
<p>1. Duty and standby UV units have been installed and commissioned at Kilcarna water treatment plant.</p> <p>2. The lamp hours noted on both units at the time of the audit were as follows: MVA169256.1, 3276hrs and MVA166349.1, 1560hrs. The site operator outlined that switchover between units takes place regularly on a manual basis.</p> <p>3. Duty and standby pumps are in place for the chlorine dosing system. Switch over between duty and standby pumps takes place manually and is automatic if there is a fault.</p>		

		Answer
2.2	Is the UV system suitably validated?	No
Comment		
<p>1. The UV units were installed in 2018 as a <i>Cryptosporidium</i> barrier at this water treatment plant. The units consist of two Wedeco LBX90e FAN models (Serial numbers: MVA169256.1.3 and MVA166349.1).</p> <p>2. The site operator outlined that validation certificates were not available for the units at the time of the audit however calibration certificates produced by external contractors were presented for both units (dated 21/08/2023).</p> <p>3. A UV plate was present on unit MVA 166349.1 which outlined the following on operating criteria: max flow rate: 28m³/hr, min UV dose value: 12 mj/cm², min UVT:60%.</p>		



3. Alarms, Inhibits & Oversight Audits 2024

		Answer
3.1	Is there a documented site specific incident response and incident escalation process?	Yes
	Comment	
	1. A documented site specific incident response and incident escalation process was available on site in the form of an Incident Response Procedure - COO-AO-PR-024-FM-01 with the effective date being 10/01/2024. This document was on display at the plant however alarm and inhibit time delays were missing from the chart.	
		Answer
3.2	Is there a chlorine residual monitor located after contact time for verification of primary disinfection?	Yes
	Comment	
	1. CL001-01 operates on the basis of a contact loop after contact time for verification of primary disinfection. This monitor is connected to the WTP HMI and labelled "control analyser". Uisce Éireann outlined that a contract programmer will be required to attend the site to rectify this issue.	
		Answer
3.3	Are suitable alarm settings in place to alert operators to deteriorating water quality or the failure of a critical treatment process?	No
	Comment	

1. Chlorine:Alarms and Inhibits.

i. The site-specific target for chlorine residual is 0.56 mg/l to ensure both adequate disinfection and at least 0.1 mg/l is achieved in the network.

ii. Warning alarms were enabled on control analyser CL001-01 as follows — low 0.30mg/l and high 3.0mg/l (1200sec). According to the contact time calculation submitted the 0.3mg/l setpoint does not allow for sufficient contact time. This setting could not be changed on the plant HMI at the time of the audit. Uisce Éireann confirmed that a contract programmer is required to enable this functionality and that a request has been referred to the contractors to resolve the issue. No timeframe was provided for this action.

iii. Inhibits were in place on control analyser CL001-01 as follows: (low) 0.560mg/l and (high) 2.5mg/l (1200 sec). The settings are valid for residual chlorine level according to calculation but not with time settings.

iv. Validation analyser CL002-01 had inhibit setpoints of 0.6mg/l (low) and 1.7mg/l (high) but were not enabled at the time of the audit. The site operator outlined that CL002 cannot be enabled on HMI and requires a programmer to enable this functionality. Uisce Éireann confirmed that a request has been referred to the contractors to resolve the issue.

2. UV alarms and inhibits

i. At the time of the audit the Kilcarna WTP HMI displayed the following: UV Intensity inhibit (UVI01/2-01) was listed as 7.0mW/cm2 for 600 seconds and the alarms at 1.050 above the inhibit value for 600 seconds.

ii. Post audit Uisce Éireann confirmed that UV alarms and inhibits are follows: UVI alarm setpoint of 7.35 mW/cm2 for seconds 600 seconds and inhibit set point of 7 mW/cm2 for 600 seconds, UVT alarm setpoint of 63% for 600 seconds and inhibit at 60% for 600 seconds.

iii. UV validation certificates were not available for the units. The UV plate on unit reference MVA166349.1 detailed the following: max flow 28m3/h, min dose 12mj/cm2, min UVT 60%. The UV Unit HMI display stipulated a max flow of 67.7m3/h.

iv. The inlet flow inhibit on the Plant PLC (FI001-02) was set at 29m3/h at the time of the audit. Uisce Éireann confirmed post audit that the flow inhibit setpoint has been adjusted and is now set at 28m³/hr for 600 seconds.

3. Turbidity alarms and inhibits.

i. Final water turbidity alarm and inhibit settings were not in alignment with the *EPA Water Treatment Manual: Filtration* as time delays were too long. Setpoints for alarms were 0.850NTU (Hi) for 600 seconds and 0.960NTU (Hi) for 1200 seconds. Inhibits were set at 0.900 (Hi Hi) for 600 seconds and at 0.990NTU (Hi Hi) for 1200 seconds.

4. pH alarms and inhibits.

i. The plant inlet pH inhibits were set as follows: (low) 6.0 and (high) 8.5 for 600 seconds. The chlorine contact time calculation submitted outlined that pH should be <7.5.

3.4

	Answer
Are critical alarms dialled out to operators?	Yes
Comment	
1. Critical alarms are issued by text to the duty and standby caretakers. To verify that the alarm has been responded to a test code is issued to the standby caretaker to verify a response has been made.	

	Answer
3.5 Has UÉ carried out an alarm and inhibit review at the water treatment plant?	No

	Answer
3.6 Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No
Comment	
See 3.3 above.	

	Answer
3.7 Is there appropriate oversight of plant performance trends?	No
Comment	
1. The site operator outlined that oversight of plant performance trends on a routine basis at is limited at this time due to resource shortages. Trends are available for operational staff to review on mobile devices and at the plant. A new software system has been commissioned for the WTP in recent months.	

	Answer
3.8 Is there appropriate oversight of alarm responses?	No
Comment	
1. The site operator outlined that oversight of alarm responses on a routine is limited at this time due to resource shortages. Records of some alarms are available via the SCADA system.	

	Answer
3.9 Is there a documented alarm response procedure?	No
Comment	
1. There is no detailed alarm response procedure on site apart from the Uisce Éireann Incident Response Procedure chart.	

Answer

3.10	Are there appropriate procedures covering verification of alarms and inhibits status following maintenance or other work on site?	No
Comment		
1. There were no written procedures covering verification of alarms and inhibits status following maintenance or other work on site however the site caretaker is present when works are being undertaken.		

Recommendations

Subject	Inishmore Kilcarna Audit 2024	Due Date	26/08/2024
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. UV: (i) Submit validation certificates for the UV units at the plant outlining the validation criteria necessary to achieve the required dose (refer to the <i>EPA Water Treatment Manual: Disinfection</i>)(ii) review the UV switch over arrangements for the duty and standby UV units to ensure that switchover occurs on a frequent periodic basis (iii) ensure that the inlet flow inhibit is in line with the UV validation criteria (iv) ensure that alarm and inhibit details are correct and consistent on the UV HMI and WTP HMI. 2. Filtration: (i) install appropriate alarm and inhibits setpoints and time delays on the filtration system as per the <i>EPA Water Treatment Manual: Filtration</i> (ii) submit the standard approval document and any testing certificates for the filtration unit (as per section 7.5.1, page 92 of the <i>EPA Water Treatment Manual: Filtration</i>) (iv) ensure a filter maintenance log containing criteria as outlined in the <i>EPA Water Treatment Manual: Filtration</i> is retained on site. 3. Chlorine: (i) Ensure alarm and inhibits time delays for residual chlorine are in alignment with the <i>EPA Water Treatment Manual: Disinfection</i> (ii) confirm the timeframe required for the external contractor/programmer to attend the site and ensure that that alarms and inhibits are set at appropriate levels, time delays and are appropriately labelled. 4. Implement (i) a documented procedure for responding to alarms generated at the plant that enables verification of alarm response and timely escalation to relevant parties. The procedure should clearly document the corrective actions and set out responsibilities including verification of alarm and inhibit status following maintenance work at the plant, (ii) undertake and keep records of periodic reviews by supervisory staff on alarm responses and performance trends at the plant. 5. Uisce Éireann should ensure that all relevant staff are trained in any amendments made to the plant following alterations to alarm and inhibit settings. <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 26/08/2024 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>		