

# 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	
<b>Name of Installation</b>	Inishmore-Cregacareen
<b>Organisation</b>	Uisce Éireann
<b>Scheme Code</b>	1200PUB1053
<b>County</b>	Galway
<b>Site Visit Reference No.</b>	SV29557

Report Detail	
<b>Issue Date</b>	30/07/2024
<b>Prepared By</b>	Maria O'Connell

Site Visit Detail			
<b>Date Of Inspection</b>	28/06/2024	<b>Announced</b>	Yes
<b>Time In</b>	14:45	<b>Time Out</b>	15:45
<b>EPA Inspector(s)</b>	Maria O'Connell		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	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 criteria were missing from the validation certificate produced during 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. Certificates of calibration were produced for both units.
2. Residual chlorine alarms and shutdowns were not in alignment with the *EPA Water Treatment Manual: Disinfection*.
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 (Cregacareen) Public Water Supply serves a population of 43. The site operator outlined that the water treatment plant produces on average approximately 48m<sup>3</sup> of treated water per day (12m<sup>3</sup>/hour). The plant reservoir has a capacity of 130m<sup>3</sup> 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 GAC and cartridge 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 (Cregacareen) WTP with site personnel.



## 1. Filtration

	Answer
1.1	Are the filters designed and managed in accordance with EPA guidance? <b>No</b>
<b>Comment</b>	
<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. Granulated activated carbon filters are used at the water treatment plant along with cartridge filtration. The pressurised cartridge filtration housing unit contains 15 x 40" cartridges. Cartridges are replaced by operational staff when the flow rate through the filter drops. A supply of filter cartridges is kept on site.</p> <p>3. A filter maintenance log is not in place at the water treatment plant as per <i>EPA Water Treatment Manual: Filtration</i>.</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. 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
<b>Comment</b>		
<p>1. Duty and standby UV units have been installed and commissioned at Cregacreen water treatment plant.</p> <p>2. It was not possible to access the operating and lamp hour data on the individual UV units at the time of the audit. 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 when a fault occurs.</p>		

		Answer
2.2	Is the UV system suitably validated?	No
<b>Comment</b>		
<p>1. The UV units were installed as a <i>Cryptosporidium</i> barrier at this water treatment plant. The units consist of two bestUV b.v Betaline Eco UV models (Serial numbers: 181005 and 181004).</p> <p>2. Although a validation certificate was produced for the units the validation criteria required to achieve the required dose were not included in the certificate and the UV plates were not legible.</p> <p>3. Calibration certificates produced by external contractors were presented for both units (dated 21/08/2023).</p>		



### 3. Alarms, Inhibits & Oversight Audits 2024

		Answer
3.1	Is there a documented site specific incident response and incident escalation process?	Yes
<b>Comment</b>		
<p>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 the minimum chlorine residual requirement was not displayed.</p>		

		Answer
3.2	Are suitable alarm settings in place to alert operators to deteriorating water quality or the failure of a critical treatment process?	No
<b>Comment</b>		
<p>1. There is a dual alarm system in place at the plant which has different alarm settings for the same critical equipment, this has the potential to make management of the plant ill defined.</p> <p>2. <u>Chlorine: Alarms and Inhibits</u></p> <p>i. The site-specific target for chlorine residual is 0.2 mg/l to ensure adequate disinfection and at least 0.1 mg/l is achieved in the network.</p> <p>ii. The new HMI outlined inhibit settings on control analyser (CL001-01) as follows: 0.2mg/l (low) with a time delay of 3 hours and 20 mins and at 2.0mg/l (high) for 1 hour however the plant operator outlined that the inhibit on residual chlorine was not working. Uisce Éireann have identified an issue with the chlorine dosing mechanism (unsteady dosing) and are progressing plans to resolve this issue.</p> <p>iii. On the old HMI residual chlorine residual was set at 0.5 (low) and 2.0mg/l (high).</p> <p>3. <u>UV alarms and inhibits</u></p> <p>i. At the time of the audit the new HMI at Cregacareen WTP displayed the following: (i) UV Intensity warning (UVI-101-01) was listed as 44% for 15 minutes. Post audit Uisce Éireann amended the settings as follows: UVI 44 W/m2 for 15 minutes on both alarm and inhibit settings.</p> <p>ii. A UVT alarm was set at 82% for 6 hour and 50 minutes and an inhibit at 80% for 1 minute (low low) at the time of the audit. Post audit Uisce Éireann confirmed that the settings had been amended as follows: UVT alarm 82% for 3 minutes and inhibit at 80% for 3 minutes.</p> <p>iii. There was no inlet flow alarm for the UV unit detailed on the new HMI.</p> <p>iv. A wiper disabled alarm was displaying on unit reference IW1916607 at the time of the audit.</p> <p>4. <u>Turbidity alarms and inhibits</u></p> <p>i. A final water turbidity inhibit was set at 1 NTU for 15 mins. Post audit the time delay was reduced to 3 minutes in line with the <i>EPA Water Treatment Manual: Filtration</i>.</p> <p>ii. No deteriorating turbidity alarms were in place.</p> <p>5. <u>pH alarms and inhibits</u></p> <p>i. pH alarm and inhibits were set on filter inlet pH analyser (pH-101-01) at pH 6.50 (low) for 15 minutes and pH 9 (high) for 15 minutes. The chlorine contact time calculation refers to a pH of &lt;7.5.</p>		

	<b>Answer</b>
<b>3.3</b>	Are critical alarms dialled out to operators? Yes
<b>Comment</b>	
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.	

	<b>Answer</b>
<b>3.4</b>	Has UÉ carried out an alarm and inhibit review at the water treatment plant? No

	<b>Answer</b>
<b>3.5</b>	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network? No
<b>Comment</b>	
See 3.2 above.	

	<b>Answer</b>
<b>3.6</b>	Is there appropriate oversight of plant performance trends? No
<b>Comment</b>	
1. The site operator outlined that oversight of plant performance trends on a routine basis at is limited at his 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 plants in recent months	
2. It was not possible to verify that oversight reviews were conducted.	

	<b>Answer</b>
<b>3.7</b>	Is there appropriate oversight of alarm responses? No
<b>Comment</b>	
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.	
2. It was not possible to verify that oversight reviews were conducted.	

	<b>Answer</b>
<b>3.8</b> Is there a documented alarm response procedure?	No
<b>Comment</b>	
1. There is no detailed alarm response procedure on site apart from the Uisce Éireann Incident Response Procedure chart.	

	<b>Answer</b>
<b>3.9</b> Are there appropriate procedures covering verification of alarms and inhibits status following maintenance or other work on site?	No
<b>Comment</b>	
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 Cregacareen OEE Audit 2024	Due Date	30/08/2024
Action Text	<p><b>Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendation(s) without delay.</b></p> <ol style="list-style-type: none"> <li>1. <b>UV:</b> (i) submit validation certificates for the UV units outlining the validation criteria necessary to achieve the required dose (please 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 the wiper disabled alarm is addressed (iv) ensure that alarm and inhibit settings and time delays are consistent across all WTP systems.</li> <li>2. <b>Filtration:</b> (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 pressure filtration unit (as per section 7.5.1, page 92 of the <i>EPA Water Treatment Manual: Filtration</i> (iii) ensure a filter maintenance log containing criteria as outlined in the <i>EPA Water Treatment Manual: Filtration</i> is retained on site.</li> <li>3. <b>Chlorine:</b> (i) Ensure alarm and inhibits time delays for residual chlorine are in alignment with the <i>EPA Water Treatment Manual: Disinfection</i> (ii) Provide a timeframe for corrective action to be applied to the chlorine dosing mechanism (iii) 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.</li> <li>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.</li> <li>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 and that time delays and setpoints are included on the incident response chart.</li> </ol> <p><b>Actions required by Uisce Éireann</b></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 30/08/2024 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>		