

# 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>	Achill RWSS
<b>Organisation</b>	Uisce Éireann
<b>Scheme Code</b>	2200PUB1001
<b>County</b>	Mayo
<b>Site Visit Reference No.</b>	SV27850

Report Detail	
<b>Issue Date</b>	19/06/2023
<b>Prepared By</b>	Derval Devaney

Site Visit Detail			
<b>Date Of Inspection</b>	30/05/2023	<b>Announced</b>	Yes
<b>Time In</b>	11:00	<b>Time Out</b>	02:20
<b>EPA Inspector(s)</b>	Derval Devaney Maria O'Connell		
<b>Additional Visitors</b>	Tim Coffey, Health Service Executive (HSE).		
<b>Company Personnel</b>	Uisce Éireann: Thomas Gibbons, Pat Collins, Ronan McDonnell.  Mayo County Council (working in partnership with Uisce Éireann): Joe McGuire, Michael Conmy, Padraic Molloy.  Atkins Ireland (Consulting Engineers) : Paul Kearns.		

## > Summary of Key Findings

1. Failure of critical plant equipment and automatic plant inhibits resulted in inadequately disinfected water entering Achill Public Water Supply (PWS) over a period of five hours from 6:00 am to 11:00 am on 18/05/2023. The chlorine pump failure, which occurred at 11:25 pm on 17/05/2023, was not discovered by Mayo County Council until 8.30 am on 18/05/2023. There was a significant delay in communicating the incident to Uisce Éireann which prevented a timely assesment of the potential risk to human health to be carried out.
2. A power failure incident which ocured on 26/05/2023 did not affect water quality leaving the plant as the plant automatically shutdown. However raw water continued to flow into the plant during the plant shutdown, which resulted the clarifers and filters flooding. This caused a significant reduction in the plant's treatment capacity once power was restored.
3. Treated water storage capacity at the Achill Water Treatment Plant is limited with a maximum of 4 hours' supply in the event of plant shutdown posing a risk to the continuity of supply on activation of critical process shutdowns.

## > Introduction

The Achill public water supply serves a population of 2,554 people on the island of Achill and Achill Sound, Polranny and Corraun on the Achill mainland. The public supply also provides treated water to approximately 440 people served by 10 public group water schemes on the island.

The raw water abstraction is from Accroymore Lake and the water treatment comprises of screening, aeration to remove naturally occurring iron from the raw water, pH correction, coagulation, clarification, filtration across four rapid gravity filters, disinfection with sodium hypochlorite, and fluoridation.

There are 18 reservoirs on the distribution network and two have disinfection booster stations (at Bunacurry and Polranny Reservoirs).

The audit was conducted in response to a chlorine pump failure incident lasting 11 hours from 11:25 pm Wednesday 17/05/2023 and resulting in inadequately disinfected water entering the Achill PWS over a period of five hours from 6 am to 11 am on 18/05/2023. A power failure event, which occurred on 26/05/2023 and was notified to the EPA, was discussed during the visit. The HSE were also in attendance at the audit.

## > Supply Zones Areas Inspected

The water treatment plant filters and disinfection system was inspected during the audit. The auditors visited the source, Acorrymore Lake after the audit.



## 1. Incident Management

		Answer
1.1	Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
<b>Comment</b>		

## INCIDENT 1: CHLORINE PUMPS FAILURE 17/05/2023 - 18/05/2023

1. At 11.25 pm Wednesday 17/05/2023 both the duty and standby chlorine pumps failed, resulting in unchlorinated water entering the clear water tank onsite for 11 hours. Water entering the distribution network was not adequately disinfected from approximately 6:00 am to 11:00 am on Thursday 18/05/2023 as a result.
2. Mayo County Council (MCC) did not become aware of the issue until the following morning when the plant was visited by Operational Staff at approximately 8.30 am on 18/05/2023, despite a low chlorine alarm text being sent to Operational Staff at 11.25 pm on 17/05/2023. The water treatment plant (WTP) had failed to shutdown on low chlorine, an inhibit programmed on the chlorine dose which is monitored by chlorine monitor CL001 at the water treatment plant.
3. Rather than contacting UÉ Drinking Water Compliance team by phone, in accordance with the Uisce Éireann Incident Communication Response Guidance Form, MCC alerted the team by email at 12.14 pm on the 18/05/2023. UÉ's Drinking Water Compliance team initiated contact with the HSE by phone once it became aware of the incident.
4. Due to the significant delay in communicating the incident, a timely assessment by the HSE of the potential risk to human health, within the remit of when the incident had commenced, was unable to be made. It also prevented microbiological samples to be taken swiftly. Microbiological samples were taken on 19/05/2023, a day after the event had passed.
5. Operational Staff took necessary action to restart the chlorine pumps and maintain a sufficient chlorine dose. Trends on SCADA show that CL001 commenced dosing at approximately 9:45 am on 18/05/2023 and contact time for adequate disinfection was achieved in the water leaving the plant from 11 am 18/05/2023.
6. Operational Staff took action to scour the clear water tank and trunk main (the "green road") for a number of hours after the incident and take chlorine residual samples pre and post the reservoirs. An additional member of staff was also deployed to assist in taking chlorine residual samples in the network. However this sampling commenced at 2:20 pm on 18/05/2023, over three hours after the incident had passed. The chlorine samples taken in the network were all well above the recommended concentration of 0.1 mg/l.
7. Microbiological samples taken on the 19/05/2023 were free from bacteria. However the chlorine residual reported for a National School on the supply was 0 mg/l and a supermarket was 0.04 mg/l. This was contrary to chlorine residuals taken on the same day at the same premises by MCC, which were recorded as 0.58 mg/l and 0.75 mg/l respectively.

## INCIDENT 2: POWER OUTAGE 26/05/2023

1. A phase 3 outage occurred at 12:30 pm on Friday 26/05/2023 which resulted in the air compressor at the plant shutting down. The public water supply's water quality was not compromised during this incident as water did not leave the plant, due to the plant automatically shutting down while the power was down. MCC Operational Staff also received a text alert of the plant shutdown.
2. However raw water from Acorymore Lake continued to flow into the plant, resulting in a flooding of the clarifiers and rapid gravity filters on-site. This meant it took many hours to return to full production as treatment systems recovered from the overloading.
3. It was explained during the audit, four days after the event, that the treated water storage capacity within the reservoirs on the network was still being negatively impacted by the incident with many reservoirs on the network still at lower than normal treated water levels. UÉ stated its Infrastructure Delivery team are currently progressing the proposal to build a new reservoir, which is at detail design stage and review process with the contractor. Their Infrastructure Delivery team are also reviewing Planning Exemptions on the proposed option, to determine if planning is required.



## 2. Filtration

2.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	Yes
<b>Comment</b>	
<p>1. There are four rapid gravity filters in place at Achill WTP. There are continuous turbidity monitors on each filter and the final water.</p> <p>2. The plant shuts down at a turbidity of &gt; 1 NTU for 15 minutes on each filter and the final water. The setpoint was changed to &gt; 0.3 NTU during the audit for the filters inhibit. Run to waste kicks in when turbidity is &gt; 0.3 NTU after 5 minutes.</p>	



### 3. Disinfection

	Answer	
3.1	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	No
<b>Comment</b>		
Chlorine alarms are dialled out by text to the caretaker. The alarm does not cascade to another person if the alarm is not responded to. There is only one caretaker at Achill PWS. UÉ stated that it is in the process of hiring an additional caretaker.		

	Answer	
3.2	Are duty and standby chlorine pumps/ UV units in operation?	No
<b>Comment</b>		
1. Ultraviolet (UV) treatment has been used in the past at the plant during periods where supply demand was high.		
2. UÉ discussed the need to use UV treatment again this summer to augment the supply to meet high water demand during the holiday period. It was stated that the UV units operate on duty-duty arrangement and are fully validated under the operating conditions proposed for Achill WTP and there are adequate controls in place to ensure adequately treated and disinfected water will enter supply.		

	Answer	
3.3	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
<b>Comment</b>		
1. Chlorine monitor CL002 monitors chlorine exiting the clear water tank after contact time is complete. CL001 and CL002 monitors were recently calibrated on 29/05/2023. All readings and trends from continuous monitors are available remotely for review.		
2. There was no plant inhibit linked to chlorine monitor CL002 during the chlorine pump failure incident on 17/05/2023. This automatic plant inhibit is now in place. It is thought CL001 did not activate a plant shutdown during that incident when chlorine levels were unacceptably low due to a programming error. Measures have been taken and tested to verify that plant inhibits linked to both chlorine monitors are now in good working order.		



## 4. Management and Control

		Answer
4.1	Is there a documented alarm response procedure?	No
<b>Comment</b>		
<p>1. There was no documented site specific alarm procedure in place at the water treatment plant setting out how alarms are responded to in order to protect water quality and public health.</p> <p>2. While an incident escalation flow chart and caretaker contacts chart was on display at the plant setting out who to contact in response to an incident; the communications response did not set out examples of reportable / notifiable incidents with site specific trigger levels and it did not set out what to do in response to an incident as detailed in UÉ's Water Incident Communication Response Guidance Form.</p> <p>3. Training on UÉ's Incident Response and Incident Escalation process was provided in the past, but it was agreed that refresher training should be provided to staff involved in the operation and oversight of the WTP.</p>		

## Recommendations

<b>Subject</b>	Achill PWS Audit Recommendations	<b>Due Date</b>	19/07/2023
<b>Action Text</b>	<p><b>Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.</b></p> <ol style="list-style-type: none"><li>1. Ensure that (i) the Uisce Éireann Incident Communication Response Guidance Form displayed at the Achill WTP 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, escalated 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.</li><li>2. Ensure (i) there is a cascade system for responding to alarms generated at the plant, (ii) there is 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 and (iii) ensure that all staff are trained on the alarm response procedures.</li><li>3. Ensure that, in the event that an alarm is not responded to, there are fail safes in place at the WTP to ensure inadequately treated water is prevented from leaving the WTP and entering the distribution network.</li><li>4. Advance the provision of additional treated water storage to enhance the resilience and security of the Achill PWS.</li><li>5. Put measures in place to automatically prevent raw water flowing into the WTP at times when treatment is compromised or the water treatment plant is shutdown.</li><li>6. Report on the cause of discrepancies between the chlorine residual readings taken on 19/05/2023 in the network.</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 19/07/2023 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>		