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	Ballinteskin Public Supply
Organisation	Uisce Éireann
Scheme Code	3400PUB1049
County	Wicklow
Site Visit Reference No.	SV32062

Report Detail

Issue Date	08/09/2025
Prepared By	Derval Devaney

Site Visit Detail

Date Of Inspection	14/08/2025	**Announced**	Yes
Time In	11:00	**Time Out**	13:40
EPA Inspector(s) **Additional Visitors**	Derval Devaney		
Company Personnel	Uisce Éireann (UÉ): Linda Doran, Cristina Prado Casal, Robbie Confrey. Wicklow County Council (working in partnership with UÉ): Mark Redmond.		

Summary of Key Findings

1. Automated plant inhibits mechanisms are absent on critical infrastructure at Ballinteskin water treatment plant.
2. Trend data from the chlorine dose and final water turbidity monitors showed fluctuations and spikes exceeding 1 NTU, which could potentially compromise water quality and pose a risk to human health.
3. The chlorine monitor responsible for validating the disinfection process was providing inaccurate readings during periods when the treated water reservoir was critically low, yet still supplying water to the network.
4. A continuous final water pH monitor was not in place to verify treatment effectiveness and ensure compliance with water quality standards.

Introduction

The Ballinteskin public water supply serves 29 m3/day to a population of approximately 20 (2025 figures from EDEN) from an on-site borehole. Treatment contsists of primary disinfection via chlorination using sodium hypochlorite and pH adjustment using a limestone contactor.

The borehole is susceptible to reduced water levels during dry summer periods or when network demand increases. To maintain supply, treated water is tankered to the on-site reservoir.

This audit was undertaken to assess Uisce Éireann's performance in delivering clean and wholesome drinking water. It focused on treatment systems and control processes in place, including the use of alarms and inhibits as well as the procedures, to ensure appropriate oversight of water treatment operations.

Supply Zones Areas Inspected

The groundwater borehole and treatment processes were inspected during the audit and monitoring and control systems including alarm set points were reviewed.

1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	No

Comment

1. The top of the on-site borehole supplying Ballinteskin Water Treatment Plant was not adequately capped, posing a risk of source contamination through the potential ingress of surface water, vermin, and other contaminants.

2. Disinfection

		Answer
2.1	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No

Comment

1. Chlorine residual readings are not being taken in the network to ensure chlorine is greater or equal to 0.1 mg/l.

3. Alarms, Inhibits & Oversight Audits 2025

		Answer
3.1	Is there a documented site specific incident response and incident escalation process?	Yes

Comment

1. While a 'Water Incident Communication Response Guidance Form' is displayed at the WTP, it lacks defined site-specific trigger levels for incidents related to treatment performance, for example the minimum chlorine residual required for the site was not included in the form.

		Answer
3.2	Did staff confirm they have received training on the site specific incident response and incident escalation process?	No

Comment

1. Training has yet to be provided on the site specific incident response and incident escalation process.

		Answer
3.3	Is suitable continuous monitoring in place to verify treatment performance?	No

Comment

1. This supply was previously listed on the National pH file due to low pH levels in the final water and removed from it in Q2, 2025.
2. pH correction treatment (via a limestone contactor) is now in place at the plant to adjust low pH levels in the raw water upwards to ensure compliance in the treated water.
3. While pH is monitored in the final water using a handheld meter and recorded in the daily logbook, there is no continuous online pH monitor on the final water to verify treatment performance.
4. The daily log book recorded a pH of 6.92 in the final water taken from the handheld unit on the morning of the audit.

		Answer
3.4	Were online monitors operational?	Yes

Comment

While the following monitors were operating, there appeared to be issues with data accuracy.

Chlorine Day Tank Level Sensor Monitor

1. The trend observed since 07/07/2025 in the online level sensor readings for the chlorine day tank indicates recurring dips to 0 m, suggesting that the tank has periodically been empty of chlorine.
2. UÉ indicated that the levels displaying on the trend were not a true reflection of the volume of sodium hypochlorite in the chlorine day tank as there is an issue with the level sensor.
3. Specialist contractors are scheduled to attend the plant to address the issue.

Chlorine Dose Monitor

1. Chlorine monitor CL001, which continuously monitors residual chlorine levels after chlorine dosing, displayed significant fluctuations in readings within short intervals (30–60 seconds), as noted in the July and August trend data and during the audit.
2. For example during the audit CL001 read 1.38 mg/l and 30 seconds later read 0.79 mg/l.
3. This raises concerns about the accuracy of chlorine residual measurements and the stability of dosing control.

		Answer
3.5	Are suitable alarm settings in place to alert operators to deteriorating water quality or the failure of a critical treatment process?	No

Comment

1. The is an alarm time delay of 1800 seconds (30 minutes) on the chlorine residual monitors; (CL001 post dose) and CL002 (post contact time) and on the final water turbidity monitor which is not in line with the *EPA Water Treatment Manual: Disinfection* and UÉ's *Disinfection: Primary Chlorination Document No. UÉ-TEC-900-05-01.*
2. The low alarm for effective contact time is set at 15.03 mg.min/L, which does not meet the site-specific target Ct value of 18 mg.min/L.
3. A pH monitor is installed on the raw water and is alarmed, this alarm does not reflect the quality of the final treated water and may trigger unnecessarily, as it is set pre-treatment. A final pH monitor which is alarmed would be more appropriate to verify treatment effectiveness.

		Answer
3.6	Are suitable plant shutdowns/inhibits in place to prevent inadequately treated water entering the distribution network?	No

Comment

1. No plant inhibits are currently configured for critical parameters, including the final water chlorine post-contact time, turbidity, and pH, which are essential to prevent inadequately treated water entering the distribution network.

		Answer
3.7	Did plant performance trends demonstrate that data was being captured and recorded at all times?	Yes

Comment

The plant performance trends were reviewed during the audit and the following was discussed:

1. Turbidity trend

- From 07/07/2025 to 05/08/2025 turbidity concentrations recorded by the continuous turbidity monitor (TU001) at the plant varied significantly (ranging from 0.03 NTU to 19.99 NTU). Turbidity spikes on 23/07/2025 and 01/08/2025 above 1 NTU appeared to be for prolonged periods of time and greater than 3 minutes, which may have compromised the disinfection process.
- UÉ indicated that the spikes on 23/07/2025 and 01/08/2025 were due to low water levels in the borehole, but it was not clear if action was taken to determine any potential impact the elevated turbidity may have had on the disinfection process.

2. Chlorine trend

- From 5.25 pm on 04/08/2025 to 12.53 am on 05/08/2025, the chlorine residual trend post contact time (measured by CL002 which takes a sample from the on-site reservoir) showed levels below 0.18 mg/L—the minimum required for adequate disinfection at the plant. Uisce Éireann stated that this was not a true reflection of the chlorine level leaving the reservoir. Due to low water levels in the borehole and therefore the reservoir, the circulation pump which delivers a sample to CL002 (which operates via gravity) was unable to deliver a sample.
- UÉ was aware of the issue, as NONC had contacted the team on the evening of 04/08/2025 regarding a low reservoir warning alarm. The site was attended that evening, where it was confirmed that the circulation pump delievering a sample to CL002 was not operating. A tanker of treated water from Vartry WTP was delivered to the site's reservoir on 05/08/2025.
- This response was not documented in the daily logbook, and chlorine residual readings were not taken from the final water or in the network to verify that chlorine resdual concentrations were adequate and disinfection was not compromosed during the incident.

		Answer
3.8	Did staff confirm they have been trained on the alarm response procedure?	No

Comment

1. Relevant staff have yet to be trained on the alarm response procedure.

		Answer
3.9	Are there appropriate procedures covering verification of alarms and inhibits status following maintenance or other work on site?	No

Comment

1. There is no standard operating procedure (SOP) in place to verify alarms and plant inhibits following on-site work.

Recommendations

Subject	Ballinteskin PWS 2025 Audit Recommendations	Due Date	08/10/2025

Action Text

Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.

1. **Source Protection:** Ensure the borehole is adequately capped and sealed. Uisce Éireann should have regard to *EPA Advice Note No. 14: Borehole Construction and Wellhead Protection* when carrying out these works.
2. **Monitors and Alarms**
    i. Ensure the chlorine residual monitor, CL002, continuously and accurately measures residual chlorine post contact time to verify disinfection integrity.
    ii. Install plant inhibits linked to critical equipment, such the final water turbidity monitor and the chlorine residual monitor located after contact time.
    iii. Investigate chlorine monitor CL001 to address significant short-term fluctuations. Take corrective action to stabilise readings and ensure accurate chlorine dosing for effective disinfection control.
    iv. Install a pH monitor on the final water which is linked to appropriate alarm and plant inhibit settings.
    v. Ensure the effective contact time low alarm setting protects the site-specific target Ct of 18 mg.min/l.
    vi. Amend the time delay setting (1800 seconds) on the turbidity and chlorine alarms to ensure they meet the guidance in *EPA Water Treatment Manual: Disinfection* and UÉ's *Disinfection: Primary Chlorination Document No. UÉ-TEC-900-05-01.*
    vii. Investigate final water turbidity spikes and implement corrective actions to ensure final water turbidity is less than 1 NTU to protect the disinfection process.
    viii. Investigate the feasibility of maintaining the level sensor on the chlorine day tank.
3. **Procedures**
    i. Update the incident response procedure at the plant to include site-specific target values.
    ii. Ensure that incidents, and the corresponding corrective actions taken, are documented and retained on-site. Emergency final water sampling should be included in incident response where final water quality could be compromised or there is no monitoring data at the plant to verify treatment effectiveness.
    iii. Establish a procedure to verify the status of alarms and inhibits following any maintenance or other work carried out on site.
    iv. Provide training to staff on the above procedures once updated and in place.
4. **Network monitoring**
    i. Ensure chlorine residuals are regularly monitored in the network to check that a minimum residual chlorine of 0.1 mg/l is maintained.

Actions required by Uisce Éireann

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.

Uisce Éireann should submit a report to the EPA on or before the above due date detailing the actions taken and planned, with timescales, to close out the above recommendations.

The EPA advises that the findings and recommendations from this audit report should, where relevant, be addressed at other public water supplies.