

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 | Carrigart-Downings |
| Organisation | Uisce Éireann |
| Scheme Code | 0600PUB1044 |
| County | Donegal |
| Site Visit Reference No. | SV32459 |

| Report Detail | |
|--------------------|-----------------|
| Issue Date | 30/07/2025 |
| Prepared By | Veronica Boland |

| Site Visit Detail | | | |
|----------------------------|--|------------------|-------|
| Date Of Inspection | 07/04/2025 | Announced | No |
| Time In | 12:00 | Time Out | 15:05 |
| EPA Inspector(s) | Veronica Boland Donal Howley | | |
| Additional Visitors | Health Service Executive: Patricia Lee | | |
| Company Personnel | Uisce Éireann: John Gallagher, Geraldine Friel, Thomas Gibbons, Daniel Duffy. Donegal County Council (working in partnership with Uisce Éireann): Danny Rogers, James McHugh. | | |

> Summary of Key Findings

1. The audit found that the aluminium and pH exceedances detected in the Carrigart-Downings Public Water Supply (aluminium 2,240 ug/l and pH 5.4) were most likely due to failure of the pre-treatment pH dosing system combined with significant deficiencies and pressures on the treatment process at Carrigart Water Treatment Plant (WTP). The audit found that the incident was not suitably escalated and managed to protect public health.
2. The audit found a lack of control over treatment processes at Carrigart WTP due to lack of appropriate controls and alarms, lack of optimisation of treatment processes, instrumentation not working, and lack of management oversight. Any process interventions required at the water treatment plant must be done manually with no automated dose control, filter backwash or process shutdowns.
3. There is no Protozoal barrier in place at Carrigart WTP.
4. There is no Disinfection barrier in place at Carrigart WTP. There are no automatic shutdowns linked to low and high chlorine residual.

The EPA is very concerned at the findings of this audit and may consider further enforcement action in relation to these matters.

> Introduction

The Carrigart water treatment plant (WTP) raw water abstraction is from Lough Nambraddan & Lough Nameeltoge. Treatment at the WTP consists of pre-treatment pH correction, coagulation, flocculation, clarification, rapid gravity filtration, post treatment pH correction and disinfection using chlorination.

The Carrigart WTP provides treated water to two supplies: Carrigart-Downings Public Water Supply (PWS) and Cranford-Carrigart-Downings mixed water PWS.

The audit was carried out in response to Uisce Éireann's notification to the EPA on 01/04/2025 of aluminium and pH parametric value exceedances in the Carrigart-Downings PWS.

> Supply Zones Areas Inspected

The site areas inspected during the audit:

- Carrigart WTP treatment processes.



1.1

Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?

Answer

No

Comment

1. On 01/04/2025 the EPA was notified by Uisce Éireann of exceedances of the parametric values for aluminium (2,240ug/l) and pH (5.4) in the Carrigart-Downings Public Water Supply (PWS), based on samples taken on 18/03/2025.
2. The Carrigart WTP supplies water to both the Carrigart-Downings PWS and the Cranford Carrigart Downings Mixed Supply. An aluminium exceedance (589ug/l) was detected in the Cranford Carrigart Downings Mixed Supply on 18/03/2025.
3. At 10:00 on Monday 17/03/2025, the operator inspected the clarifiers - with no issues observed. The operator switched dosing from the duty to the standby pre-soda ash tank. Shortly afterwards, he discovered a blockage in the pipe to the dosing pump.
4. After clearing the blockage, the operator carried out a drop test to confirm that the dosing had recommenced. The operator disabled the 'Clarified Water pH' alarm to prevent an automatic shutdown due to potential low pH. The alarm, which triggers shutdown if the pH falls outside of a pH range of 5.7 to 6.55, was not re-enabled before the operator left at 12:00.
5. At 08:00 on Tuesday 18/03/2025, the operator returned and observed clarifier issues and found that the soda ash had again crystalized in the pipework.
6. A contractor arrived at 08.20 and cleared the blockage. The clarifiers cleared immediately. After 45 minutes of settling, the operator re-enabled the 'Clarified Water pH' alarm.
7. The incident was not escalated to Uisce Éireann management, contrary to the 'Carrigart-Downings WTP Drinking Water Incident Response Form' requirements particularly regarding 'Loss of Barrier' and 'Indicator Parameter Exceedance'.
8. At the audit, pH trend data showed treated water water pH (PH001) was around pH 4.4 from 16-17/03/2025, below the Drinking Water Regulations 2023 parametric value range of 6.5 to 9.5.
9. The audit found that the incident was not properly escalated or managed in order to maintain water quality and protect public health.



2. Site Specific Issues

2.1

| | Answer |
|---|--------|
| Are there Water Treatment Plant Design, Management and Control issues? | Yes |
| Comment | |
| <p>1. Log Credit Compliance: Uisce Éireann have assigned Carrigart WTP a default Log 3 requirement. However, there are no alarms or shutdowns linked to filtered or final water turbidity, which are required to claim Log 3 credit as per the <i>EPA Water Treatment Manual: Filtration</i>.</p> <p>2. Disinfection Controls: No chlorine residual shutdown alarms are installed post-contact time, as required by the <i>EPA Water Treatment Manual: Disinfection</i>.</p> <p>3. pH Controls: No final water pH alarms are in place to prevent non-compliant water entering the network.</p> <p>4. Alarm Management: Alarms can be disabled without managerial oversight. Uisce Éireann conducted an Alarms and Inhibits review in March 2023, but the review's recommendations had not been implemented.</p> <p>5. Instrumentation Issues: Several online monitors were non-functional or required servicing:</p> <ul style="list-style-type: none">• The 'Clarifier Turbidity No. 1 and No. 2 monitor was not working, with a service sticker showing the last service in 2021. Staff confirmed that it has not worked since then, and there was no plan in place to repair or replace it.• The Clarifier Temperature and pH monitor screen displayed a warning symbol, with a service sticker showing 'Last service 12/06/2024, Next service due 17/12/2024'. Service records stated that the Clarifier pH failed calibration on 17/12/2024. No corrective action had been taken by the time of the EPA audit. The proper functioning of the Clarifier pH monitor is crucial to the WTP, and it is linked to a shutdown to prevent non-compliant water from entering the network.• The 'PH001 Treated Water pH/TP001 Treated Water Temp' monitor also showed a warning. It was last serviced on 17/12/2024, with the next service due on 17/06/2025. <p>6. Aluminium Monitoring:</p> <ul style="list-style-type: none">• Carrigart WTP does not have a continuous online aluminium monitoring system in place, manual sampling is done but not daily as recommended in the <i>EPA Manual: Coagulation, Flocculation and Clarification</i>.• Aluminium residual results recorded in the day book were compliant, but no data was logged for 16th or 18th-20th March 2025.• Day book showed no aluminium monitoring occurs when coagulant dosage is adjusted. <p>7. Data for raw water turbidity, final water turbidity (post reservoir/outlet to network), and clarified water pH is not currently trended. Trending this data is essential for identifying and addressing treatment process issues promptly, helping to prevent non-compliant water entering the network.</p> <p>8. Trends for key drinking water quality parameters are only accessible via the Disinfection HMI, which has a small screen. These trends are not available on the 'Local SCADA' system in the WTP main office, which only displays reservoir levels, pump status and chlorine levels and chemical dosing pumps. Uisce Éireann advised that Disinfection HMI trend data is included on the Donegal Countywide website, accessible via the operator's phone or the PC at the WTP when internet access is available.</p> <p>9. A one-page site specific 'Uisce Éireann Drinking Water Incident Response Form' (dated 10.01.2024) was displayed at the Carrigart WTP. This Incident Response Form did not contain information on alarm time delays, and some of the information included in the form was incorrect, for example, the section on 'Loss of Barrier' included 'Final Water pH 6.5', this pH range relates to the Clarified Water pH. The Drinking Water Regulations 2023 parametric value for Final Water pH is 6.5 to 9.5, anything outside of this range is an exceedance.</p> <p>10. Operational staff advised that they had not received training on the incident response form.</p> <p>11. No operational monitoring was ongoing at the WTP (with the exception of chlorine residual in the network) as required by the Drinking Water Regulations 2023. The aluminium and pH exceedances reported to the EPA on 30 March 2025 were compliance monitoring sample results.</p> | |

2.2

| | Answer |
|--|--------|
| Are there Coagulation, Flocculation and Clarification (CFC) Stage issues? | Yes |
| Comment | |
| <p>1. Chemifloc 101 was being used as a coagulant and polyelectrolyte as a coagulant aid. Jar testing was not carried out to determine the optimum coagulant dose and pH when the water quality changes. Coagulant dosing was based on set raw water flow going into the plant ranging between 31 m³/hour and 53 m³/hour.</p> <p>2. There was no automatic switchover between the chemical dosing pumps. Issues were noted on site in relation to soda ash and coagulant dosing i.e. 'Soda Pump 3 PRE' had encrusted soda ash around the pump head and valves; the soda tanks, associated pipework and valves had encrusted soda ash build up; and 'Alum pump 2' had a build-up of encrusted aluminium residue around the pump head.</p> <p>3. Operational log daybook and pump service records reviewed following the audit indicate that there have been issues with pH dosing line blockages and issues with the soda ash pump.</p> <p>4. The tube settlers in both clarifiers were broken and appeared blocked. The clarifier channels had rust and algae growing on them.</p> | |

2.3

| | Answer |
|--|--------|
| Are there Filtration Stage issues? | Yes |
| Comment | |
| <p>1. Uisce Éireann advised that the filter media, in the one circular rapid gravity filter (RGF) at the Carrigart WTP, was refurbished in 2015 and had a depth of 800mm. This is below the minimum recommended 1,000 mm as per the <i>EPA Water Treatment Manual: Filtration</i>.</p> <p>2. Backwash is manual and carried out on a timed basis every 24 hours. Backwash is not triggered by turbidity or headloss.</p> <p>3. The washwater used for the backwashes is chlorinated water pumped from the Clear Water Tank (CWT). There is potential for Trihalomethane (THM) formation with organic material within the filter.</p> <p>4. There is no slow start or run to waste on the filter, such that once backwash is complete the filter goes directly back into service.</p> <p>5. There is a 'post filtration' turbidity monitor at the Clear Water Tank (CWT) referred to as 'TU001 Final Treated Water'. This TU001 turbidity trend data indicated that turbidity exceeded 1 NTU on 20 occasions from 13/03/2025 to 06/04/2025 (some exceedances had time durations from 4 minutes to 9 minutes). The EPA were advised that these spikes occur due to backwashing. Schedule 2 of the Drinking Water Regulations 2023 Regulations states 'turbidity at the water supply plant shall not exceed 0.3 NTU in 95 % of samples and none to exceed 1 NTU'.</p> <p>6. Uisce Éireann advised that monthly Cryptosporidium monitoring for Carrigart-Downings PWS commenced following the EPA audit.</p> | |

Recommendations

| | | | |
|--------------------|--|-----------------|------------|
| Subject | Carrigart-Downings PWS - Aluminium & low pH exceedances- Audit (Reactive) 07.04.2025 | Due Date | 01/09/2025 |
| 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. Implement upgrades of the Carrigart WTP, where necessary, to ensure that all stages of treatment are optimized (and include appropriate alarms and shutdown setpoints) to protect all the treatment barriers in place at the WTP in accordance with the <i>EPA Water Treatment Manuals: Treatment and Disinfection</i> and the <i>EPA Water Treatment Manual: Coagulation, Flocculation and Clarification</i> and to prevent inadequately treated water entering the network. 2. Continue <i>Cryptosporidium</i> monitoring as per the <i>Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium in Public Water supplies</i> until a verified protozoal treatment barrier is in place. 3. Install low and high pH alarms on the final water. 4. (i) Repair or replace all faulty monitors including the following: Clarifier pH, Clarifier 1 and 2 turbidity, PH001 monitor and (ii) Ensure that all monitors are always maintained in proper working order. 5. (i) Commence operational monitoring to provide early warning that source water quality is deteriorating, a treatment process is failing or there is a problem in the distribution network and (ii) Ensure all monitoring at the WTP is trended and access to the trended data is made available to both operational and supervisory staff both at the WTP and off-site. 6. (i) Establish a secure process to prevent alarms from being disabled or overridden without authorised access. (ii) Update the incident response form at the WTP and train WTP operators on the Uisce Éireann Incident Communication Response Guidance Form to ensure timely recognition, escalation, and response to incidents. (iii) Develop documented procedures and provide training for: (a) responding to, and escalating all WTP alarms, including corrective actions and clear delegation of responsibilities, and (b) Verifying alarm and shutdown statuses after maintenance or other works at the WTP. (iv) Implement a robust system of managerial reviews and checks on WTP performance and alarm status, and address any deficiencies to safeguard public health and drinking water quality. <p>Actions required by Uisce Éireann</p> <p>Uisce Éireann should submit a report to the EPA on or before 01/09/2025 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.</p> | | |