# Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This Audit was carried out to assess the performance of Irish Water in providing clean and wholesome water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

## Water Supply Zone

| | |
|---|---|
| **Name of Installation** | Bruff PWS |
| **Organisation** | Irish Water |
| **Scheme Code** | 1900PUB1013 |
| **County** | Limerick |
| **Site Visit Reference No.** | SV25616 |

## Report Detail

| | |
|---|---|
| **Issue Date** | 30/06/2022 |
| **Prepared By** | Orla Harrington |

## Site Visit Detail

| | | | |
|---|---|---|---|
| **Date Of Inspection** | 23/05/2022 | **Announced** | Yes |
| **Time In** | 11:00 | **Time Out** | 12:50 |
| **EPA Inspector(s)**<br><br>**Additional Visitors** | Orla Harrington | | |
| **Company Personnel** | Irish Water: Tommy Roche, Duane O'Brien<br>Limerick City and County Council (acting under service level agreement to Irish Water): Diarmuid O'Dea, Anne Peters, Neal Boyle | | |

## Summary of Key Findings

1. The audit found that Bruff water treatment plant was performing well and producing safe drinking water on the basis of primary disinfection being achieved by UV disinfection at the plant. Chlorination provides secondary disinfection to maintain an adequate level of residual disinfection in the distribution network. The use of both disinfection methods is a multi-barrier approach which provides full-spectrum pathogen control, to help safeguard drinking water quality.

2. The audit found that the UV disinfection system was operating within its validated range, and there were appropriate alarms and controls in place to ensure the UV system operates as a *Cryptosporidium* barrier.

3. Irish Water's chlorine residual target of 0.5 mg/l is aimed for before leaving the plant to ensure adequate disinfection in the distribution network. However the low chlorine shutdown setpoint (0.2 mg/l) currently in place at the Bruff water treatment plant is not currently aligned with this requirement and will not sufficiently alert the plant operators to a low chlorination incident.

## Introduction

The Bruff water treatment plant (WTP) is located in a field north of the village of Bruff, Co. Limerick and supplies water to approximately 1,460 people. The plant currently produces approximately 674m3/day of treated water and is operating within its design capacity. The supply is served from two borehole abstractions referred to as Moloney's Well and Finn's Well.

Treatment at the plant consists of cartridge filtration followed by UV primary disinfection and chlorination with sodium hypochlorite providing secondary disinfection.

The audit of Bruff WTP was carried out to assess the performance of Irish Water in providing clean and wholesome drinking water.

## Supply Zones Areas Inspected

The auditor inspected the treatment processes and boreholes at Bruff water treatment plant.

## 1. Source Protection

| | | Answer |
|---|---|---|
| 1.1 | Is the abstraction source(s) adequately protected against contamination? | Yes |

**Comment**

1. The supply is served by two boreholes referred to as Moloney's Well and Finn's Well. Both boreholes are housed separately from the drinking water treatment plant and capable of providing a combined flow of 28m3/hr. The boreholes are well sealed and capped, and housed within locked kiosks. Limerick City and County Council estimated that both wells were drilled in the 1970's.

2. While there are turbidity and flow monitors on each borehole source, only the combined water is alarmed and linked to the SCADA control system with a turbidity alarm of 0.8 NTU and shutdown set at 0.9 NTU. Monitoring records submitted show stable turbidity trends in the combined source.

3. A Zone of Contribution has been delineated for Moloney's Well and was provided on the day of the audit. Landuse in the vicinity of the boreholes is primarily agricultural, with some landuse in the immediate vicinity of Finn's Well being residential and agricultural beyond that.

4. At the audit, it could not be confirmed if the landowners had been formally written to about the presence of a drinking water supply in proximity to their lands and their obligations under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014, as amended.*

## 2. Disinfection

| | | Answer |
|---|---|---|
| 2.1 | Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible? | No |

**Comment**

1. The chlorine monitor (CL001) is located post chlorine dosing where a chlorine residual target of 0.5 mg/l is aimed for before leaving the plant. The chlorine monitor was reading 0.626mg/l on the day of the audit, which is satisfactory.

2. Chlorination alarms are as follows: a) warning low: 0.3 mg/l; b) warning high: 0.8 mg/l; c) shutdown low: 0.2 mg/l; d) shutdown high: 1 mg/l. The warning and shutdown alarms have 180 second delay. The low and low shutdown chlorine alarm setpoints are below the target of 0.5mg/l chlorine residual concentration in the final water. Therefore they are not set at an appropriate level to provide adequate warning of low chlorine levels in the final water leaving the plant.

| | | Answer |
|---|---|---|
| 2.2 | Is the UV system suitably validated? | Yes |

**Comment**

1. On the day of the audit, Irish Water stated that primary disinfection including 3 log *Cryptosporidium* inactivation is provided by UV disinfection at the plant. Chlorination is used for secondary disinfection in the network.

2. An ATG UV (model type UVLX-1800-6) disinfection system is installed at the plant in a duty/standby arrangement with automatic switchover if the duty UV fails for any reason. There is also an automatic switchover of duty and standby UV units every 24 hours.

3. The UV units are validated under the USEPA protocols, for a UVT in excess of 55% and flow rates between 4.1m3/hr and 91m3/hr to achieve a Reduction Equivalent Dose between 16.6 to 230 mJ/cm2. A copy of the validation certificate was provided prior to the audit. The UV units are linked to continuous UVT and dose monitors. The HMI displayed the following for Unit No. 2, which was in operation at the time of the audit: UVT 99.97%, Red Dose 50.30 mJ/cm2 and flow 29.53 m3/hr. The UV disinfection system was operating within its validated range during the audit.

4. Irish Water confirmed that the minimum validated dose is 40 mJ/cm2 and the plant is alarmed and programmed to automatically shutdown if the UV dose falls below 40 mJ/cm2. There is also automatic shutdown of the UV system if the UVT reaches 85% (delay of 3 minutes).

5. Access to UVT trends was limited on the day of the audit. Limerick City and County Council stated that trend data was unavailable for the week of 13/05/2022 due to a power trip at the plant. UVT trend data was not submitted prior to the audit. UV dose and turbidity trend data submitted from 17/04/2022 to 12/05/2022 indicated satisfactory trends.

6. Maintenance and servicing of the UV system is carried out by contractor staff every 6 months. Limerick City and Council confirmed that staff training on the UV units has also been provided.

| | | Answer |
|---|---|---|
| 2.3 | Is the chlorine dosed appropriately? | Yes |

| Comment |
| --- |
| 10% sodium hypochlorite is dosed flow proportionally with residual trim prior to the final water leaving the plant to maintain secondary disinfection in the supply. There are duty and standby pumps with automatic changeover in the event of a failure. |

| | | Answer |
| --- | --- | --- |
| 2.4 | Is there a chlorine residual ≥0.1 mg/l throughout the network? | Yes |

| Comment |
| --- |
| Irish Water submitted check monitoring results from 13/01/2020 to 21/03/2022 in support of the audit. The data indicates that while chlorine residual results in the network are satisfactory, the frequency is not sufficient. |

## 3. Management and Control

| | | Answer |
|---|---|---|
| 3.1 | Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators? | Yes |
| | **Comment** | |
| | In the event of an alarm being triggered, there are three people on a cascade system; caretaker, foreman and engineer that receive a text alert. Alarm process flows and contact lists have been developed and provided to Limerick City and County Council. | |

## Recommendations

| Subject | Bruff Audit Report [23/05/2022] | Due Date | 01/08/2022 |
|---|---|---|---|
| **Action Text** | **Recommendations**<br><br>**Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues, Irish Water should implement the following recommendations without delay:**<br><br>1. Irish Water should ensure that the chlorine alarm set points are set at an appropriate level to ensure that the target residual chlorine concentration in the final water leaving the plant is met.<br><br>2. Irish Water should provide two months of recent UVT trend data to show that the UV disinfection system is operating within its validated range at all times.<br><br>3. Irish Water should ensure that monitoring of residual chlorine is undertaken several times a week at different points of the network to include network extremities.<br><br>4. Irish Water should liaise with Limerick City and County Council to ensure that local landowners have been written to in relation to their obligations under the *European Union (Good Agricultural Practice for the Protection of Waters) 2014, as amended*.<br><br>**Follow-Up Actions required by Irish Water**<br><br>During the audit, Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised.<br><br>This report has been reviewed and approved by Regina Campbell, Drinking Water Team Leader.<br><br>Irish Water should submit a report to the Agency on or before 01/08/2022 detailing how it has dealt with the issues of concern identified during this audit.<br><br>The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work.<br><br>The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.<br><br>Please quote the Action Reference Number DW20210162 in any future correspondence in relation to this Report. | | |