

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	Doon PWS
Organisation	Irish Water
Scheme Code	1900PUB1024
County	Limerick
Site Visit Reference No.	SV25401

Report Detail	
Issue Date	05/04/2022
Prepared By	Orla Harrington

Site Visit Detail			
Date Of Inspection	15/03/2022	Announced	Yes
Time In	10:30	Time Out	12:10
EPA Inspector(s)	Orla Harrington		
Additional Visitors			
Company Personnel	Irish Water: not in attendance. Limerick City and County Council (acting under service level agreement to Irish Water): Willie Hurley, Neal Boyle.		

> Summary of Key Findings

1. The UV disinfection system at the Doon water treatment plant failed on 22/02/22 when a fault occurred due to a power outage. This failure allowed water to enter the distribution network without a treatment barrier in place for *Cryptosporidium* until the 24/02/22 when a Boil Water Notice was implemented. A Boil Water Notice was placed on the Doon public water supply from the 24/02/22 to the 23/03/22 while the UV units were being repaired and verification monitoring data collated.
2. Irish Water's chlorine contact time calculations demonstrate that the final treated water is not achieving the World Health Organisation minimum recommended value of 15 mg.min/l. This meant that the plant produced unsafe drinking water for a period of 2 days on 22/02/22 to 24/02/22, due to the temporary loss of the *Cryptosporidium* treatment barrier compounded by inadequate disinfection.
3. There was a delay in escalating the failure of the UV disinfection system and inadequate disinfection to the HSE and the EPA. This prevented timely consultation with the HSE, and a delay in issuing the Boil Water Notice for the protection of public health.

> Introduction

Doon public water supply (PWS) produces approximately 400m³/day serving a population of 350 in Doon village and Carrigmore. Raw water is abstracted from the Cooga spring source. Treatment at Doon water treatment plant (WTP) consists of cartridge filtration and disinfection by UV treatment and chlorination.

The Doon PWS was subject to a Boil Water Notice (BWN) from 24/02/22 until 23/03/22 which related to the failure of the UV disinfection system due to a fault following an electrical power outage. The BWN was lifted subsequent to the audit. The scope of the audit was to investigate Irish Water's response to the UV disinfection system failure at the plant.

> Supply Zones Areas Inspected

The auditor inspected the spring source and treatment processes at Doon water treatment plant.



1. Incident Management

1.1

	Answer
Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
Comment	
<p>1. The EPA was notified on 23/02/22 of an incident at Doon WTP. There was a power failure which compromised the UV disinfection system at the WTP on 22/02/22. As the incident was not escalated with priority, a BWN was not implemented until 24/02/22. Inadequately disinfected water entered the supply network for 2 days from the date the disinfection incident commenced without the protection of a BWN.</p> <p>2. Limerick City and County Council staff and contractors were at the plant on 22/02/22 and 23/02/22, however all attempts to resolve the UV disinfection failure were unsuccessful. Limerick City and County Council escalated the incident to Irish Water for attention on 23/02/22. Irish Water then notified the HSE and EPA on the evening of 23/02/22. The BWN was imposed on 24/02/22 following consultation with the HSE.</p> <p>3. As contractors were unable to restart the UV units, an electrician attended the site and further investigation determined that trip switches had fused together resulting in limited power being supplied to drive the UV disinfection system. The UV disinfection system was returned to service on 09/03/22. The BWN was then rescinded on 23/03/22 following satisfactory monitoring results and consultation with the HSE.</p> <p>4. Disinfection by chlorination remained in place throughout the time that the UV was out of service. However Irish Water advised that there is inadequate contact time in the final treated water leaving the plant.</p> <p>5. <i>Cryptosporidium</i> samples were initiated by Limerick City and County Council on 25/02/22 and these samples returned clear results.</p>	



2. Source Protection

	Answer
2.1	Is the abstraction source(s) adequately protected against contamination? Comment 1. The spring source at Doon WTP is in a covered concrete chamber. On the day of the audit, there appeared to be cracks in the concrete chamber potentially making the source vulnerable to contamination by surface water ingress. 2. Limerick City and County Council stated that landowners in the vicinity of the spring source have been written to reminding them of their responsibilities in protecting the drinking water sources from contamination.



3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
Comment		
<p>1. Primary disinfection including 3 log <i>Cryptosporidium</i> inactivation at the plant is provided by an ATG UVLX-1800-6 UV disinfection system consisting of duty/standby units. The units are validated under the USEPA protocol, for a UVT in excess of 65% and flow rates between 13 to 90m³/hr to achieve a Reduction Equivalent Dose (RED) of 40 mJ/cm². The UV disinfection system is verified using monitors and alarms, with trended data recorded and accessible on SCADA. Subsequent to the audit, the BWN was lifted on 23/03/22. On 28/03/22 Irish Water submitted UVT trend data from 16/03/22 to 23/3/22 in support of the audit, which confirmed that the plant is operating within validation. For all UV failures, the foreman, caretaker and area engineer get an alarm text notification.</p> <p>2. Secondary disinfection is provided by dosing of sodium hypochlorite. There are duty and standby chlorine dosing pumps in operation with automatic switchover. The chlorine dose is flow proportional and linked to the chlorine monitor in use at the WTP located 35 meters post chlorine injection point, where a chlorine residual of 0.5 mg/l is aimed for before leaving the plant.</p>		

		Answer
3.2	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	No
Comment		
<p>1. Irish Water provided a chlorine contact calculation, dated 22/10/2019. At a maximum flow of 30 m³/hr the calculated total effective contact time is 0.62 mg.min/l, below the minimum WHO recommendation of 15 mg.min/l. When there is UV disinfection in place, adequate contact time is not deemed necessary, as chlorine only provides a residual disinfectant within the network.</p> <p>2. In light of the UV disinfection failure, it is the auditors opinion that the EPA and the HSE should have been notified promptly of the inability of the plant to achieve the WHO minimum recommended value of 15 mg.min/l, until such time as Irish Water could confirm that the UV units were back operating within their validated range.</p>		

		Answer
3.3	Is there a chlorine residual ≥ 0.1 mg/l throughout the network?	Yes
Comment		
<p>Chlorine residual monitoring is being carried out on the network 3 times per week and at the plant on a daily basis using a handheld chlorine monitor. On 28/03/22 Irish Water provided chlorine residual monitoring results for the period 14/02/22 to 28/03/22, which were satisfactory.</p>		



4. Site Specific Issues

	Answer
4.1 Is the information reported by Irish Water on the EPA EDEN portal correct?	No
Comment	
Limerick City and County Council did not agree with the population served reported by Irish Water on the EPA EDEN portal. The population figures need to be updated to reflect current data.	

Recommendations

Subject	Doon Audit Recommendations [15/03/22]	Due Date	06/05/2022
Action Text	<p>Recommendations</p> <p>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:</p> <ol style="list-style-type: none">1. Irish Water should ensure that all Limerick City and County Council water service staff are provided with refresher training in incident response to ensure incidents which could impact on treated water quality, including malfunction of disinfection equipment, are recognised and escalated promptly.2. Irish Water should ensure that the UV disinfection system operates within its validated range at all times, to ensure an adequate <i>Cryptosporidium</i> barrier from Doon water treatment plant.3. Irish Water should ensure the spring source concrete chamber is made secure, to prevent contamination by surface water ingress.4. Irish Water should update information on this supply on EDEN to reflect the current population served. <p>Follow-Up Actions required by Irish Water</p> <p>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.</p> <p>This report has been reviewed and approved by Ruth Barrington, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 06/05/22 detailing how it has dealt with the issues of concern identified during this audit.</p> <p>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.</p> <p>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.</p>		