

# 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	
<b>Name of Installation</b>	LCB Lismore Deerpark
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	3100PUB1144
<b>County</b>	Waterford
<b>Site Visit Reference No.</b>	SV22952

Report Detail	
<b>Issue Date</b>	02/12/2021
<b>Prepared By</b>	Regina Campbell

Site Visit Detail			
<b>Date Of Inspection</b>	19/11/2021	<b>Announced</b>	Yes
<b>Time In</b>	11:00	<b>Time Out</b>	12:20
<b>EPA Inspector(s)</b>	Regina Campbell		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	Irish Water: Pat Duggan, Ronan Walsh Waterford City and County Council (acting under service level agreement to Irish Water): Ciaran Bourke, Declan Halpin, Maura Phelan		

## > Summary of Key Findings

1. A Boil Water Notice (BWN) was placed on the Lismore Deerpark Public Water Supply (PWS) between 17/09/21 and 01/10/21 due to inadequate disinfection of the supply due to failure of the UV and chlorination disinfection systems. The audit found that the incident was adequately escalated and managed to protect public health.
2. As a result of the incident Irish Water have installed a continuous turbidity monitor with alarm and have installed automatic shutdown of the supply based on high turbidity, low UVI and low chlorine setpoints.
3. Currently there is no UVT monitor at the plant and so Irish Water cannot demonstrate and verify that that the UV unit is operating within its validated range at all times.
4. There is a lack of resilience in the Lismore Deerpark PWS. Primary disinfection is provided by a single UV unit only with secondary disinfection provided by chlorination. There is no treated water storage available and so there is no supply if the treatment plant shuts down due to any issue.

## > Introduction

The Lismore Deerpark Public Water Supply (PWS) serves a population of 1,701 and produces 634 m<sup>3</sup>/day. The source is a borehole located next to the planthouse. The planthouse, borehole and UV unit are located on a roadside verge on the outskirts of Lismore.

The audit was undertaken to assess Irish Water's performance in producing clean and wholesome water following the imposition of a Boil Water Notice (BWN) on the supply from 17/09/21 to 01/10/21.

## > Supply Zones Areas Inspected

The borehole, UV and chlorination disinfection systems were inspected.



## 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?	Yes
<p><b>Comment</b></p> <p>A BWN was placed on the Lismore Deerpark PWS on 17/09/21 and was lifted on the 01/10/21. The BWN was imposed due to inadequate disinfection of the supply due to the tripping of the UV unit (which provides primary disinfection) several times on 16/09/21 and due to a separate issue in relation to the blocking of the chlorine injection point on the 16/09/21 and 17/09/21.</p> <p>Irish Water and Waterford City and County Council (WCCC) did not know the reason why the UV unit tripped as upon investigation no faults were found.</p> <p>A separate issue also developed on 16/09/21 and 17/09/21 when the single chlorine injector also started to block due to scale build up as the water source is very hard.</p> <p>Irish Water consulted with the HSE on 17/09/21 in relation to the issues at the treatment plant so as to assess the risk to public health which lead to the imposition of the BWN on the same date.</p> <p>Irish Water undertook the following remedial works in response to the incident and prior to the lifting of the BWN:</p> <ul style="list-style-type: none"> <li>• inspection and minor electrical upgrades undertaken on the UV unit.</li> <li>• unblocking and cleaning of the chlorine injector point. Irish Water said that a second standby chlorine injector point has been ordered.</li> <li>• an online turbidity monitor with alarm was installed and commissioned and is now trending on SCADA.</li> <li>• installation of autoshutdown of the supply based on high turbidity, low UVI and low chlorine setpoints. Prior to the incident autoshutdown was not in place. As the supply has no treated water storage, the installation of shutdown has improved the safety of the supply.</li> </ul> <p>The BWN was lifted on 01/10/21 following consultation by Irish Water with the HSE. The lifting criteria agreed with the HSE for the lifting of the BWN was the return of 3no. clear bacteriological samples taken on different days and confirmation that the UV and chlorine disinfection systems were operating satisfactorily.</p>	



## 2. Source Protection

2.1

	Answer
Is the abstraction source(s) adequately protected against contamination?	Yes
<p><b>Comment</b></p> <p>The source of the supply is a borehole approximately 20m from the treatment house. The borehole is located beside a main road and is housed in a secure steel kiosk on the roadside verge. The well head is capped and sealed.</p> <p>WCCC did not have an exact date for construction of the borehole and estimated sometime between 1997 to 2000. A borehole log was not available but WCCC estimated it is drilled to a depth of 56m.</p> <p>There is low density housing across the road from the borehole and tillage land in the field besides the borehole. WCCC could not confirm if relevant landowners had been written to under the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014). Subsequent to the audit Irish Water confirmed that it had been in contact with WCCC to send the letters to relevant landowners and that it was waiting confirmation of this.</p> <p>Monitoring undertaken in 2019 and 2020 showed nitrate levels ranging between 22-23 mg/l which is below the parametric value of 50 mg/l.</p> <p>An online turbidity monitor was installed and commissioned in early October 2021. There is an alarm at 0.8 NTU with shutdown at 1 NTU.</p> <p>The turbidity monitor was reading 0.044 NTU at the audit and WCCC said that the turbidity has been very low and stable since the monitor was installed.</p>	



3.1

Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?

Answer

No

**Comment**

Primary disinfection is achieved by UV followed by chlorination to maintain a residual disinfectant in the supply.

UV

There is a duty only Trojan Swift SC B8 UV unit at the plant. The unit is housed in a secure steel kiosk on the roadside verge next to the treatment plant. The UV unit was installed in 2012.

The plate on the UV unit stated that the unit delivers a dose of 40 mJ/cm<sup>2</sup> at a maximum flow of 59 m<sup>3</sup>/hour and at a minimum UVT of 88% (1cm). Further validation information submitted by Irish Water on 26/11/21 provided a range of maximum flows where minimum UVI is required to achieve UV dose delivery of 40 mJ/cm<sup>2</sup>. The information showed that at a maximum flow of 40 m<sup>3</sup>/hr (Lismore operates typically at 33 m<sup>3</sup>/hr) that a minimum UVI of 19 W/m<sup>2</sup> is required to assure a UV dose delivery of 40 mJ/cm<sup>2</sup>.

Based on the information submitted the plant has suitable UVI alarms and shutdowns in place as follows (all with time delay of 5 minutes):

Lo UVI alarm < 50 W/m<sup>2</sup>

Lolo UVI alarm < 45 W/m<sup>2</sup>

Automatic shutdown if UV < 40 W/m<sup>2</sup>.

There is also a turbidity alarm at 0.8 NTU with automatic shutdown at 1 NTU. The turbidity reading on the day of the audit was 0.044 NTU.

The flow on the day of the audit was 33.7 m<sup>3</sup>/hour which is satisfactory and within the validated range of the unit.

However there is no UVT monitor at the plant to demonstrate that the UVT of the water is within the validated range of the UV unit (as specified on the UV plate). A UVT monitor is needed to demonstrate and verify that the UV unit is operating within its validated range at all times.

There was also standing water observed on the concrete pad holding the UV unit and coils of electrical wiring were lying on the water. WCCC said that there was a leak in a seal in the UV unit that needed to be repaired.

Chlorination

2% sodium hypochlorite is dosed at the plant to maintain residual disinfection in the supply. The sodium hypochlorite is diluted with softener prior to use to prevent scale built up due to very hard water damaging the equipment at the plant.

A low chlorine alarm (0.35 mg/l after 300 seconds) and low chlorine shutdown ( 0.3 mg/l after 300 seconds) are in place.

A high chlorine alarm (1mg/l after 300 seconds) and high high chlorine alarm (after 1.2mg/l after 300 seconds) are in place. There is no autosutdown based on high chlorine.

	<b>Answer</b>
<b>3.2</b> Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes
<b>Comment</b>	
Alarms are operational and texted out with a cascade system of three personnel in place.	

	<b>Answer</b>
<b>3.3</b> Are duty and standby chlorine pumps/ UV units in operation?	No
<b>Comment</b>	
<p><u>UV</u></p> <p>There is a single duty only UV unit at the plant which provides primary disinfection. There is no treated water storage and in the event of failure of the UV unit, the plant will shutdown and there will be no supply into the network.</p> <p><u>Chlorination</u></p> <p>There are duty and standby/assist chlorine dosing pumps with automatic changeover in the event of failure of a dosing pump. Chlorine is dosed on a flow proportional basis.</p>	

	<b>Answer</b>
<b>3.4</b> Is the UV system suitably validated?	Yes
<b>Comment</b>	
<p>The validation certificate submitted by Irish Water in advance of the audit showed that the unit was validated to the German DVGW Technical Standard W294, however the period of the validity of the certificate submitted had expired since 20/02/2008. On inspection of the plate on the UV unit, it was observed that the date of manufacture of the unit was 2011/2012 which meant that the certificate submitted did not correspond to the unit in-situ at the treatment plant. Subsequent to the audit Irish Water submitted on 26/11/21 a more recent validation certificate for the UV unit with a period of validity up to 25/07/2024.</p>	

	<b>Answer</b>
<b>3.5</b> Is the UV disinfection system operating within its validated range?	No
<b>Comment</b>	

The UV unit was observed to be operating within its validated UVI range based on the validation certificate submitted on 26/11/21 and flow range on the plate attached to the UV unit.

However the UV plate indicated that at a maximum flow of 59 m<sup>3</sup>/hour that UVT should be >88% and there is no UVT monitor at the plant to demonstrate that the UV unit is operating within its validated range. A UVT monitor needs to be installed to demonstrate this.

		Answer
3.6	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	Yes
<b>Comment</b>		
Chlorine is dosed to achieve 0.5mg/l leaving the plant. Trends submitted showed that this is being achieved. The chlorine residual monitor displayed 0.53mg/l at the audit.		

		Answer
3.7	Are manual chlorine tests carried out and recorded on final treated water to compare with the continuous monitor results?	Yes
<b>Comment</b>		
Daily manual chlorine tests are also undertaken and recorded at the plant		

		Answer
3.8	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes
<b>Comment</b>		
The caretaker logbook showed that residual chlorine is checked in the network several times a week and records viewed showed that residual chlorine is > 0.1 mg/l which is satisfactory.		



## 4. Management and Control

	Answer	
4.1	Is the water treatment plant resilient enough to cope with significant variations in raw water quality or demand?	No
<b>Comment</b>		
The Lismore Deerpark PWS does not have any treated water storage. Therefore in the event that there is a shutdown at the plant then there is no supply into the network.		

	Answer	
4.2	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
<b>Comment</b>		
Irish Water advised that the <i>Cryptosporidium</i> Source Risk Assessment Methodology (C-SRAM) is currently in development for groundwater sources nationally and so the protozoal compliance log treatment requirement has not been identified for the treatment plant.		

	Answer	
4.3	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	No
<b>Comment</b>		
The plate attached to the UV unit says at a maximum flow of 59 m <sup>3</sup> /hour that the UVT of the water must be > 88%. However there is no currently no UVT monitor at the plant to demonstrate that this is the case. There is no shutdown based on high chlorine in the final water.		

	Answer	
4.4	Are instrument calibrations within date?	No
<b>Comment</b>		
There were no calibration stickers on the monitoring equipment to show when monitors were last calibrated and when due for calibration again.		

## Recommendations

<b>Subject</b>	Lismore Deerpark Audit Recommendations	<b>Due Date</b>	02/01/2022
<b>Action Text</b>	<p><b>Recommendations</b></p> <p><b>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.</b></p> <ol style="list-style-type: none"><li>1. Irish Water should ensure that there are duty and standby UV disinfection units with automatic changeover in the event of failure of one the units.</li><li>2. Irish Water should install a UVT monitor with alarm at the plant to demonstrate and verify that the UV unit is operating within its validated range at all times.</li><li>3. Irish Water should a) repair the leaking seal on the UV unit and b) ensure that the UV unit, including electrical wiring, are securely and safely housed.</li><li>4. Irish Water should install automatic shutdown based on high residual chlorine in the final water.</li><li>5. Irish Water should install a second chlorine injection point.</li><li>6. Irish Water should confirm the protozoal log treatment requirement for the plant and provide details of how any log treatment deficit will be addressed.</li><li>7. Irish Water should liaise with Waterford City and County Council and confirm that relevant landowners have been written to in relation to setback distances in accordance with the <i>European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)</i> for the source of the supply.</li><li>8. Irish Water should ensure that all monitoring equipment is calibrated and that calibration stickers are clearly displayed on all equipment.</li></ol> <p><b>Follow-Up Actions required by Irish Water</b></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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team.</p> <p>Irish Water should submit a report to the Agency on or before 02/01/2022 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> <p>Please quote the Compliance Plan Number DW20210142 in any future correspondence in relation to this Report.</p>		