



# Drinking Water Audit Report

<b>County:</b>	Laois	<b>Date of Audit:</b>	21 <sup>st</sup> October 2015
<b>Plant visited:</b>	Ballyroan PWS	<b>Date of issue of Audit Report:</b>	10 <sup>th</sup> November 2015
	Scheme code	<b>File Reference:</b>	DW2012/50
	1600PUB1074	<b>Auditor:</b>	Aoife Loughnane
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>.</li> <li>• <i>The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i></li> <li>• The recommendations specified in the <i>EPA Drinking Water Report</i>.</li> <li>• The recommendations in any previous audit reports.</li> </ul>		

## MAIN FINDINGS

- i. On 3<sup>rd</sup> December 2014, the EPA issued a Direction to Irish Water to upgrade the UV disinfection system at Ballyroan water treatment plant by 31<sup>st</sup> March 2015. While Irish Water did not meet the Direction deadline, the upgrade works had commenced by the end of March and were due to be completed by the end of September 2015. However, the completion date has now slipped due to problems encountered during the commissioning phase. Irish Water has stated that the revised timeframe for completion of upgrade works is now subject to ESB works at the site.
- ii. Irish Water should ensure that the upgrade of the UV disinfection system is completed as soon as possible, in order to improve the safety and security of the water supply.

## 1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* 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 complying with the EPA Direction to upgrade the UV disinfection system at Ballyroan water treatment plant.

Ballyroan PWS produces approximately 550 m<sup>3</sup>/day and serves 1,784 consumers. Raw water is abstracted from Tullore spring and the Cross of Newtown borehole. Treatment at Ballyroan water treatment plant consists of disinfection by UV treatment and chlorination. The plant design capacity is 36 m<sup>3</sup>/hr and the plant is currently operating at 23 m<sup>3</sup>/hr.

Photographs taken by Aoife Loughnane during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 10.00 am at Ballyroan water treatment plant. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

**Representing Irish Water:**

Andrew Boylan, Water Compliance Specialist, Irish Water  
Aoife Lambe, Water Compliance Analyst, Irish Water  
Padraig Farrell, Minor Programmes Specialist, Irish Water  
John Gavin, Operations & Maintenance Team Lead, Irish Water  
Tselophile Tlou, Operations & Maintenance Team, Irish Water  
Michael O’Hora, Senior Engineer, Laois County Council  
Stan Cullen, Senior Executive Engineer, Laois County Council  
Gavin Cobbe, Executive Engineer, Laois County Council  
Larry Gittens, Clerk of Works, Laois County Council  
Seamus Fitzgerald, Caretaker, Laois County Council

**Representing the Environmental Protection Agency:**

Aoife Loughnane, Inspector

**2. AUDIT OBSERVATIONS**

*The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.*

<p><b>1.</b></p>	<p><b>Source Protection</b></p> <ul style="list-style-type: none"><li>a. The <i>Cryptosporidium</i> risk assessment score for Ballyroan PWS is very high (108).</li><li>b. Water is supplied from two sources, which were both visited during the audit:<ul style="list-style-type: none"><li>(i) <b>Tullore spring:</b> in use for approximately 50 years and supplies 456 m<sup>3</sup>/day. This sand and gravel spring is located within a fenced-off area (see photo 1) and is covered by a concrete chamber. The surrounding land is in agricultural use. Septic tanks are also identified in the catchment.</li><li>(ii) <b>Cross of Newtown borehole</b> was constructed in 2007 and supplies approximately 101 m<sup>3</sup>/day. The wellhead is located above ground level and within a locked compound. The borehole is 120 metres deep, and cased down to bedrock. The surrounding land use is a mixture of residential and agricultural.</li></ul></li><li>c. Laois County Council (LCC) outlined the source protection work that has been carried out. A Source Protection Zone report has been prepared for Tullore Spring and the zone of contribution (ZOC) has been delineated.</li><li>d. No septic tank inspections have been undertaken by LCC within the ZOC. A number of farm inspections have been carried out. LCC has written to all farmers with land within the setback distances under the <i>European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)</i> to ensure that they were aware of the setback requirements.</li><li>e. The raw water monitoring programme for this supply is twice per year. Raw water is monitored continuously for UVT only. During the audit, the spring UVT was 98.46%. It was not possible to see the borehole UVT due to a fault with the monitor.</li></ul>
<p><b>2.</b></p>	<p><b>Disinfection - Chlorination</b></p> <ul style="list-style-type: none"><li>a. Sodium hypochlorite 10 – 12% is dosed via duty and standby chlorine dosing pumps with automatic switchover facilities. The dose is flow proportional.</li><li>b. The chlorine injection point is currently located in the raw water storage tank but is due to be relocated downstream of the UV treatment system as part of the upgrade works.</li><li>c. The target chlorine concentration is 0.5 mg/l leaving the plant. The chlorine monitor was reading 0.45 mg/l during the audit.</li><li>d. The low chlorine alarm setting is 0.2 mg/l.</li><li>e. Ballyroan reservoir (not visited during the audit) provides a chlorine contact time of 220 mg.min/l which satisfies EPA requirements.</li></ul>

	<p>f. A new chlorine monitor has been installed at the reservoir outlet. LCC representatives could not confirm if the monitor is alarmed and linked to a recording device.</p> <p>g. The caretaker carries out weekly chlorine testing at 5 locations on the distribution network. The results inspected during the audit demonstrate that the minimum recommended 0.1 mg/l residual chlorine was present at the network extremities.</p>
<b>3.</b>	<p><b>Disinfection – UV Treatment</b></p> <p>a. A new UV disinfection system has been installed and is in the final stages of commissioning under contract by EPS. The new system consists of duty and standby Trojan Swift SC D6 units, each containing 6 low pressure lamps (see photo 2).</p> <p>b. The new UV system has not yet been fully commissioned because an electrical power surge caused a fault with the ballast cards on UV unit No. 1. Irish Water stated that the ESB are due to upgrade the electricity connection to the site. The timeframe for completion of UV commissioning is subject to the completion of ESB works.</p> <p>c. The new UV system is validated to the German DVGW standards. The validated operating conditions are a minimum UV Intensity (UVI) of 40 W/m<sup>2</sup> and a maximum flow of 43 m<sup>3</sup>/hr.</p> <p>d. During the audit, UV unit No. 1 was not operational due to the fault with the ballast cards. UV unit No. 2 was operating at a UVI of 42.8 W/m<sup>2</sup> and a flow of 6.16 litres/sec (i.e. 22.18 m<sup>3</sup>/hr), demonstrating that the unit was operating within its validated range.</p> <p>e. The UV system control philosophy is:</p> <ul style="list-style-type: none"> <li>• Automatic changeover of UV units from duty to standby is initiated by time or by the UVI approaching the validated threshold (40 W/m<sup>2</sup>).</li> <li>• Automatic changeover of UV units from duty-standby to duty-assist is initiated when UVT drops below 85%. Until UV unit No. 1 is fully commissioned, the old Wedeco UV unit acts as the assist to UV unit No. 2.</li> <li>• When UVT drops to &lt; 75% UVT, the plant automatically shuts-down.</li> </ul> <p>f. Maintenance and calibration of the UV unit (e.g. lamp replacement, calibration of UVI sensor) will be carried out by a contractor.</p> <p>g. The caretaker/plant operator has not yet received UV training.</p>
<b>4.</b>	<p><b>Management and Control</b></p> <p>a. Security at Ballyroan WTP has recently been improved by the installation of new gates and fencing.</p> <p>b. The plant is visited daily by the caretaker, with a back-up caretaker as a contingency arrangement.</p> <p>c. Plant alarms are activated on the SCADA telemetry system, and the caretakers are alerted to alarms by text message. Poor telecommunications signal at Ballyroan WTP mean it is not always possible to access the SCADA system via laptop at the plant.</p> <p>d. LCC representatives stated that while a formal out-of-hours response for drinking water incidents has not yet been agreed for county Laois, the caretakers respond to alarms/incidents at all times.</p> <p>e. There is new <i>Cryptosporidium</i> sampling apparatus at the plant. Once the new UV treatment system is validated and there is verification that the system is operating within its validated range, <i>Cryptosporidium</i> sampling will be of no benefit because any oocysts will be inactivated and therefore of no risk.</p>

### 3. AUDITORS COMMENTS

This audit was carried out to assess the performance of Irish Water in complying with the EPA Direction issued on 3<sup>rd</sup> December 2014 to upgrade the UV disinfection system at Ballyroan WTP by 31<sup>st</sup> March 2015. While Irish Water did not meet the Direction deadline, the upgrade works had commenced by the end of March and were due to be completed by the end of September 2015. The audit found that the majority of the upgrade works are well progressed, however the EPA is disappointed to see that the completion date has slipped due to problems encountered during the commissioning phase. Irish Water should make every effort to ensure the upgrade works are completed without further delay, in order to improve the safety and security of the water supply.

#### 4. RECOMMENDATIONS

##### Management and Control

1. Irish Water should ensure that the upgrade of the UV disinfection system (including the relocation of the chlorine injection point) at Ballyroan water treatment plant is completed as soon as possible.
2. Irish Water should ensure that the UV disinfection system operates within its validated range at all times.
3. Irish Water should ensure that UV training is completed for relevant plant operators and maintenance personnel.
4. Irish Water should ensure that all online/continuous monitors are regularly maintained and calibrated in accordance with the manufacturer's instructions.
5. Irish Water should ensure the chlorine monitor at the outlet of Ballyroan reservoir is alarmed and linked to a recording device.
6. Irish Water should review the practice of *Cryptosporidium* monitoring in Ballyroan PWS once a validated UV treatment system is in operation. In cases where the UV treatment system is validated and there is verification that the system is operating within its validated range, any *Cryptosporidium* oocysts will be inactivated and therefore of no risk. The only situation where *Cryptosporidium* monitoring may be advisable is where the UV treatment system has been bypassed, failed or is being operated outside its validated range.
7. Irish Water should ensure there is a formal out-of-hours response procedure in place for drinking water incidents in County Laois.

##### Source Protection

8. Laois County Council should undertake a programme of farm inspections and septic tank inspections in the zone of contribution of the sources and follow up any failures with appropriate enforcement actions.

#### FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

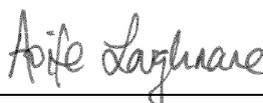
During the audit Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Mr Darragh Page, Senior Inspector, Drinking Water Team.

Irish Water should submit a report to the Agency within one month of the date of this audit report detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including timeframe for commencement and completion of any planned work.

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.

Please quote the File Reference Number DW2012/50 in any future correspondence in relation to this Report.

Report prepared by:



Date:

10<sup>th</sup> November 2015

Aoife Loughnane

Inspector



**Photo 1: Tullore Spring**



**Photo 2: New duty and standby UV disinfection units**