

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	Ballyhooly
Organisation	Irish Water
Scheme Code	0500PUB1203
County	Cork
Site Visit Reference No.	SV20669

Report Detail	
Issue Date	02/11/2020
Prepared By	Criona Doyle

Site Visit Detail			
Date Of Inspection	15/10/2020	Announced	Yes
Time In	11:10	Time Out	12:18
EPA Inspector(s)	Criona Doyle Orla Harrington		
Additional Visitors			

Company Personnel

Irish Water:
Deirdre O'Loughlin*
Oliver Harney***
Tommy Roche***
Ciaran Connolly ***

Cork County Council:
Frances Whoriskey***
Pauline McAree*
Timothy Hegarty **

*Attended pre-site meeting on 14/10/20.

**Attended site visit on 15/10/20.

***Attended pre-site meeting on 14/10/20 and site visit on 15/10/20.

> Summary of Key Findings

1. The audit confirmed the treatment plant upgrades have been completed at the Ballyhooly Water Treatment Plant. The remedial works include the upgrading of the chlorination disinfection system and the installation of a new UV treatment stage to provide a barrier against *Cryptosporidium*.
2. The completion of the works and the submission of the verification data has allowed the Ballyhooly Public Water Supply (PWS) to be removed from the EPA's Remedial Action List in the Quarter 3 2020 review.

> Introduction

The Ballyhooly Public Water Supply (PWS) was added to the EPA's Remedial Action List in October 2017 under the heading Inadequate Treatment for *Cryptosporidium* following an EPA audit in September 2017 in response to the detection of *Cryptosporidium* in the treated water. The population served by the supply is 1,1096 (EDEN figure) while the volume distributed was reported as being 700m³/d at the audit (EDEN figure 1,006m³/d).

The source of the supply is a covered spring located adjacent to the Awbeg River. Upgrade works have been completed at the water treatment plant to provide a barrier against *Cryptosporidium*. The works include the installation of (i) new UV treatment stage (ii) new chlorine dosing equipment and (iii) raw water monitors (pH, turbidity, UVT and temperature). Two months verification data has been provided to confirm the system is working effectively as a barrier against *Cryptosporidium*.

> Supply Zones Areas Inspected

The purpose of the audit was to verify if the Ballyhooly Public Water Supply can be removed from the EPA's Remedial Action List following the treatment plant upgrades to address the inadequate treatment for *Cryptosporidium*. The audit focussed on the UV and chlorination disinfection systems and the associated controls.

In response to COVID-19 social distancing requirements the audit comprised of a video conference meeting with all relevant parties on 14/10/20, followed by a site visit with essential audit participants on 15/10/20.



1. Disinfection

	Answer	
1.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
Comment		
<p>A new UV disinfection system has been installed to provide a barrier against <i>Cryptosporidium</i>. Continuous monitoring of UVT, turbidity, flow, UVI and dose were in operation during the audit.</p> <p>Alarm and shut down setpoints are in place to prevent the UV unit from operating outside of its validated range. The warning level alarm setpoints for the UV unit are 85% UVT, flow 46m³/hr and UV dose 14.0 mJ/cm². The warning alarms generate a text alert to the caretaker and standby caretaker to warn that the unit is operating close to the limit for which it is validated. Automatic plant shutdown is instigated at 80% UVT, at flow 48m³/hr and UV dose 13.0 mJ/cm² to prevent the unit operating outside of its validated range. A plate was not present on the reactor on the day of the audit to display the design criteria for the UV unit.</p> <p>The chlorination disinfection system has been upgraded to meet the requirements of the Irish Water Disinfection Programme. There are 3 no. residual chlorine monitors now provided on site, one at the water treatment plant after chlorine dosing (CL001) and 2 no. validation analysers on the outlet from the reservoir (CL002 & CL003). The warning alarms generate a text alert to the caretaker. High (0.90mg/l) and low (0.25mg/l) chlorine warning alarms are in place at the water treatment plant (CL001). Automatic plant shut down is instigated at low chlorine level of 0.20mg/l and a high chlorine level of 1.0mg/l at the water treatment plant (CL001). There are further alarms in place on the validation analysers on the outlet of the reservoir (CL002 & CL003) with warning alarms for low level chlorine 0.35 mg/l and high level chlorine 0.80mg/l and automatic shutdown of the supply instigated by low chlorine 0.30mg/l or high chlorine 0.90mg/l.</p> <p>The trends for the UV reactor (UVT, UVI and UV dose) and the residual chlorine trends were available to view on site on the HMI. The data can also be viewed remotely on the cloud and will also be available on the Cork County Council SCADA once handover from the contractor has been completed.</p>		
		Answer
1.2	Are duty and standby chlorine pumps/ UV units in operation?	Yes
Comment		
<p>There are duty and standby chlorine dosing arrangements at the Ballyhooly WTP with an additional trim dose being provided at the reservoir. The duty / standby pumps automatically switch over every 2 hours.</p> <p>A duty UV reactor has been installed. There is 1.5 days treated water storage provided in the reservoir. Cork County Council and Irish Water stated the reservoir provides adequate storage in the event of shutdown of the plant for repairs or maintenance of the UV unit.</p>		
		Answer
1.3	Is the UV system suitably validated?	Yes
Comment		

The ATG UV reactor (model type UVLX-1800-6) is validated to provide 3 log inactivation for micro-organisms including *Cryptosporidium* in accordance with USEPA UVDGM validation method. The reactor validated performance table for the UV unit was provided in advance of the audit. This illustrated the minimum UVT for variable flow rates between 20m³/hr and 96.3m³/hr to provide a validated dose of 12 mJ/cm².

		Answer
1.4	Is the UV disinfection system operating within its validated range?	Yes
Comment		
<p>Prior to the audit two months of trend data was submitted by Irish Water which verified that the UV unit was operating within its validated range. At the audit the control panel on the UV unit indicated the unit was operating at a flow of 45.0m³/hr and delivering a dose of 44 mJ/cm². The monitors indicated the raw water UVT was 99.5% and the turbidity was 0.044 NTU.</p>		

		Answer
1.5	Is the chlorine dosed appropriately?	Yes
Comment		
<p>Chlorine dosing is flow proportional with a trim based on the residual chlorine monitor (CL002 & CL003) on the outlet of the reservoir.</p>		

		Answer
1.6	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
Comment		
<p>2 no. validation residual chlorine monitors are located on the outlet of the reservoir after contact time has been achieved.</p>		

		Answer
1.7	Is there adequate chlorine contact time before the first connection?	Yes
Comment		
<p>The contact time calculation was provided and indicated an effective contact time of 64.74mg.min/l.</p>		

1.8

Is there a suitable monitoring frequency for residual chlorine in the network with records available?

Answer

Yes

Comment

The residual chlorine levels in the network are checked several times per week and recorded by the caretaker. A copy of the records for the month of September was provided in advance of the audit. The records indicated the residual was > 0.1 mg/l.



2. Management and Control

		Answer
2.1	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	Yes
Comment		
Warning alarms and shutdowns are in place for both the UV and chlorination disinfection systems. Shutdowns are in place for low and high chlorine levels and in the event the UV unit drops outside of its validated operating range.		

		Answer
2.2	Are instrument calibrations within date?	Yes
Comment		
Calibration stickers were in place on the newly installed monitors indicating the date when they were last checked. The next service due date was not indicated on the stickers.		



3. Supply on the Remedial Action List

		Answer
3.1	Do the audit findings support progress made with the Remedial Action List upgrades?	Yes
Comment		
<p>The audit confirmed the following upgrade works have been completed at the Ballyhooly water treatment plant:</p> <ol style="list-style-type: none">1. Installation of 1 no. UV reactor;2. Upgrade of the chlorine disinfection system;3. Installation of new continuous raw water monitors for pH, temperature, turbidity and UVT. <p>The audit confirmed the treatment infrastructure has been commissioned and all elements were operational on the day of the audit. The installation of the UV disinfection system provides a barrier against <i>Cryptosporidium</i>.</p>		

		Answer
3.2	Is further information needed to assess completion of the Remedial Action List upgrade?	No
Comment		
<p>Irish Water has submitted the validation details for the UV unit and provided 2 months operational data since the system was commissioned to verify the unit has been successfully commissioned.</p>		



4. Site Specific Issues

	Answer
4.1	Has training been provided to site staff following the upgrade of the Ballyhooly water treatment plant ?
	No
Comment	
At the audit it was outlined that training of local authority operational staff had not been fully completed following the upgrade works. While some training had been provided by the contractor further training was to be scheduled. Documented Alarm Response Procedures were not available for the new UV system.	

	Answer
4.2	Has the site been assessed under the new Irish Water Source Crypto Risk Assessment Methodology to date ?
	No
Comment	
Irish Water outlined at the pre-site visit meeting that the Ballyhooly WTP had yet to be reviewed under the new Irish Water Source Crypto Risk Assessment Methodology.	

Recommendations

Subject	Ballyhooly RAL Audit October 2020	Due Date	02/12/2020
Action Text	<p>Recommendation(s)</p> <ol style="list-style-type: none">1. Irish Water should ensure that documented alarm response procedures are in place for the UV treatment system and that staff are trained on use of the procedures.2. Irish Water should assess the Ballyhooly water treatment plant using the Irish Water protozoal compliance criteria and address any log deficit that is identified.3. Irish Water should update the data on the EPA's EDEN portal in terms of the treatment provided following the upgrades at Ballyhooly water treatment plant and confirm the volume distributed.4. Irish Water should ensure the service due date is displayed on all monitoring equipment.5. Irish Water should ensure a plate is attached to the UV unit displaying the validation criteria for the unit. <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 Regina Campbell, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 02/12/20 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 Action Reference Number compliance plan DW20170124 in any future correspondence in relation to this Report.</p>		