

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	Glengarriff
Organisation	Irish Water
Scheme Code	0500PUB4208
County	Cork
Site Visit Reference No.	SV22590

Report Detail	
Issue Date	20/08/2021
Prepared By	Criona Doyle

Site Visit Detail			
Date Of Inspection	21/07/2021	Announced	Yes
Time In	11:00	Time Out	11:50
EPA Inspector(s)	Criona Doyle		
Additional Visitors			
Company Personnel	Cork County Council: Michael Russell; Seamus Sutton; Con O'Sullivan** Irish Water: Tommy Roche; Conor Williams*; Deirdre O'Loughlin* *Attended pre site visit meeting on 20/07/21 only. ** Attended site visit on 21/07/21 only.		

> Summary of Key Findings

1. The audit confirmed that the treatment plant upgrades have been completed to (i) reduce the potential for the formation of trihalomethanes in the supply (installation of GAC filtration stage) and (ii) provide an adequate barrier against *Cryptosporidium* (installation of UV treatment).
2. Irish Water have completed a programme of verification monitoring to demonstrate that the actions undertaken have been adequate. 3 no. consecutive compliant samples for trihalomethanes have been provided from the network. The completion of the upgrade works and the submission of the verification data has allowed the removal of the Glengarriff Public Water Supply from the EPA's Remedial Action list (RAL) under the category of elevated levels of Trihalomethanes (THMs) in the Quarter 2 2021 RAL Review.
3. Irish Water also submitted 2 no. months of verification data to demonstrate the UV units are operating within their validation range. This data was received after the deadline for the Quarter 2 2021 RAL Review. The data has since been reviewed and the Glengarriff PWS will be removed from the RAL in the Quarter 3 2021 RAL Review as it has been demonstrated that adequate treatment for *Cryptosporidium* is now being provided.

> Introduction

The Glengarriff Public Water Supply (PWS) supplies a population of 364 with an average daily volume of 345m³/d (EDEN figures). The source of the supply is the Barony River. Treatment includes slow sand filtration, a granular activated carbon (GAC) filtration stage, UV and chlorination.

The supply was added to the EPA Remedial Action List (RAL) under the category of elevated levels of Trihalomethanes on 27/10/17. The Glengarriff PWS was subsequently added to the RAL under a second category of inadequate treatment for *Cryptosporidium* on the 30/04/19. This followed the detection of *Cryptosporidium* in the treated water due to the absence of a treatment barrier to prevent *Cryptosporidium* from entering the supply.

The purpose of the audit was to assess progress with the upgrade works that have been completed under the RAL improvement programme. Works completed include the installation of a granular activated carbon (GAC) filtration stage to address the elevated levels of Trihalomethanes and UV treatment to provide a barrier against *Cryptosporidium*. The installation works were completed on 05/05/21 and have been followed by a period of process proving to gather verification data.

> Supply Zones Areas Inspected

The audit consisted of a video conference call with Irish Water and Cork County Council staff on 20/07/21 and an on-site inspection of the Glengarriff Water Treatment Plant (WTP) on 21/07/21. All areas of the treatment process were inspected during the audit including the filtration and disinfection stages.

> 1. Filtration

		Answer
1.1	Are the filters designed and managed in accordance with EPA guidance?	Yes
Comment		
<p>4 no. slow sand filters are provided on site. The maximum depth of media in the slow sand filters at 0.8m is less than the range of 0.9m to 1.2m recommended in the EPA Filtration Manual. The maximum depth of media cannot be increased above 0.8m based on the available depth to the bellmouth but the depth is greater than the minimum allowable depth of 0.6m specified in the EPA Filtration Manual. The filters were last resanded in December 2020 and January 2021.</p> <p>In response to Audit Recommendations No. 3. from the previous audit undertaken on 14/02/2019, turbidity monitors have been installed in each of the individual slow sand filters.</p> <p>A plug and play granular activated carbon (GAC) filtration system has been installed to address the elevated trihalomethanes in the supply. The system consists of Aquaflow AF2000 GAC filters. Four vessels are provided on site operating a 2 stream process. The water in both streams is passed through two vessels (1st and 2nd stage). Backwashing of the filters or run to waste is not required. The GAC vessels are not regenerated on site. The vessels are removed when spent and replaced with new vessels. Monitoring of UVT takes place pre and post GAC. The setpoint for replacement of the GAC filters is 85% UVT post GAC. The GAC filters meet the EPA Filtration Manual guidance.</p>		

		Answer
1.2	Was there visual indication that the filters were operating appropriately?	Yes
Comment		
<p>3 months of turbidity trends were provided for the individual slow sand filters and combined filtered water turbidity and explanations were provided for any spikes. At the audit the final water turbidity was 0.203 NTU.</p> <p>At the audit the pre GAC UVT was 80.7% and post GAC UVT was 92.4%.</p>		



2. Disinfection

		Answer
2.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
Comment		
<p>Primary disinfection of the supply is via chlorination using 10% sodium hypochlorite. Dosing is flow proportional and linked to the residual chlorine monitor on the outlet from the reservoir. 80% of the dose is provided by the first pump and 20% is provided by the second pump. The pumps alternate between duty and boost every 3 hours. The chlorine trends can be viewed on site and on the county wide SCADA. 3 months of trends were provided as part of the audit. An explanation was provided for the data gaps on the trends which is reported by Cork County Council to be due to signal issues. The trends indicate adequate and stable levels of disinfection.</p> <p>The chlorine alarms are 0.5 mg/l for the low alarm setpoint and 1.9mg/l for the high alarm setpoint. Both alarm setpoints instigate automatic plant shutdown with a 15 minute time delay.</p>		

		Answer
2.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes
Comment		
<p>Alarms are sent to the caretaker and standby caretaker. The alarms continue to be generated by the system until they are acknowledged. On the day of the audit Glan Agua were also on the alarm cascade system as the plant has not been fully handed over to Cork County Council following the recent upgrade works. As outlined above both the high and low chlorine alarm instigate automatic plant shutdown.</p>		

		Answer
2.3	Is the UV system suitably validated?	Yes
Comment		

2 no. ATG UVLX-1800-6 UV units are provided on site. The units operate on a duty / standby basis with automatic switchover on a 24 hour frequency. The validated operating range of the UV system was provided to the EPA in advance of the audit. The units are validated under USEPA UVDGM which is the Intensity Setpoint Approach.

The minimum UV dose for 3-log removal is 12mj/cm2. The alarm limits are: Set point at 18mj/cm2, 14mj/cm2 (warning alarm) and 12 mj/cm2 (critical & shutdown alarm). Irish Water clarified these alarm setpoints subsequent to the audit via email on 29/07/21. On the day of the audit the contractor had the incorrect validation criteria on the WTP wall. Irish Water outlined that this is being rectified.

The minimum UVT is 65% @22m3/hr flow. Lamp replacement is carried out by an external contractor.

At the audit the UV dose was 35 mJ/cm2, flow 21.0m3/hr, UVT 92.6% and UVI 3.9W/m2. The UV alarm setpoints are low UVT 85% with a 900sec delay prior to the warning alarm. The low low alarm set point is 68% UVT with 900 sec delay which instigates automatic plant shutdown.

The purpose of the UV system is to provide a barrier against *Cryptosporidium*. A copy of the UV cert is provided on site. 2 months of verification data was provided to demonstrate that the UV unit was operating within its validation range.

		Answer
2.4	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
Comment		
A copy of the contact time calculation was provided. The target contact time is 37.55 mg.min/l. A total effective contact time of 38.70 mg.min/l is being achieved. The residual chlorine monitor is located on the outlet from the reservoir which is a suitable location after contact time has been achieved. The low level chlorine alarm (0.5 mg/l) is at a suitable level to ensure contact time is achieved as per the contact time calculation provided. This change has been made since the previous audit on 14/02/19 in response to previous audit recommendation no. 5.		

		Answer
2.5	Is there a chlorine residual ≥ 0.1 mg/l throughout the network?	Yes
Comment		
The daily network residual chlorine readings were provided for the month of June 2021. The readings are representative of the end of the line and indicate levels > 0.1 mg/l on all dates.		



3. Reservoirs and Distribution Networks

	Answer
3.1 Are reservoirs adequately inspected and maintained?	Yes
Comment	
There are two reservoirs on site. The Square Reservoir (No. 1) has 2 cells each with a Capacity of 90 m3. The circular Reservoir (No.2) 2 has a capacity of 190 m3. In response to the previous EPA Audit of 14/02/2019 (Audit Recommendation No. 5) both reservoirs were cleaned by AQS in November 2020.	



4. Management and Control

		Answer
4.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
Comment		
Irish Water indicated that the site is assessed as having a 3 log treatment requirement (1.79 plus 1 log due to absence of site specific sanitary survey which rounds up to 3 log requirement). A sanitary survey has not been completed on site and the final score may be reduced at a future date when this work is completed. The UV treatment recently installed provides an adequate barrier against <i>Cryptosporidium</i> as it provides 3 log removal.		

		Answer
4.2	Is there a documented alarm response procedure?	No
Comment		
The documented standard operating procedures and alarm response procedures need to be updated following the addition of the new treatment stages (GAC & UV). On the day of the audit Cork County Council had not received a copy of the Operations and Maintenance (O & M) Manual for the GAC and UV treatment stages to allow this work to be completed.		

		Answer
4.3	Have the recommendations from the previous EPA audit been satisfactorily addressed?	Yes
Comment		
The audit recommendations from the previous audit have all been addressed.		

> 5. Supply on the Remedial Action List

	Answer
5.1 Do the audit findings support progress made with the Remedial Action List upgrades?	Yes
Comment	
<p>Irish Water has completed the installation of a granular activated carbon filtration stage to address the elevated trihalomethanes (THMs). A programme of verification monitoring has been undertaken to provide 3 no. consecutive compliant samples for THMs from the network. The completion of the upgrade works and the submission of the THMs verification data has allowed the removal of the Glengarriff Public Water Supply from the EPA's Remedial Action list (RAL) under the category of elevated levels of Trihalomethanes (THMs) in the Quarter 2 2021 RAL Review.</p> <p>Irish Water has completed the installation of the UV treatment stage to provide an adequate barrier against <i>Cryptosporidium</i>. Irish Water submitted 2 no. months of verification data to demonstrate the UV units have operated within their validation range. This data was received after the deadline for the Quarter 2 2021 RAL Review. The data has since been reviewed and the Glengarriff PWS will be removed from the RAL in Quarter 3 2021 RAL Review as the verification data demonstrates that adequate treatment for <i>Cryptosporidium</i> is now being provided.</p> <p>The EPA EDEN portal should be updated to reflect the treatment being provided since the addition of GAC filtration and UV treatment stages.</p>	

Recommendations

Subject	Glengarriff Audit	Due Date	20/09/2021
Action Text	<p>Recommendation(s)</p> <ol style="list-style-type: none">1. Irish Water should ensure the data on the EPA's EDEN portal is updated in terms of the treatment now provided following the plant upgrades.2. Irish Water should ensure the Operation and Maintenance Manual is provided by the contractor to allow Standard Operating Procedures to be developed for routine and periodic check and maintenance activities to be undertaken by the plant operator on the UV and GAC systems.3. Irish Water should confirm the timeframe for the completion of the sanitary survey to allow confirmation of the protozoal log treatment requirement for the water treatment plant. <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 20/09/21 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 Compliance Plan DW20160159 in any future correspondence in relation to this Report.</p>		