

# 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>	Burncourt Regional
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	2900PUB0105
<b>County</b>	Tipperary
<b>Site Visit Reference No.</b>	SV22430

Report Detail	
<b>Issue Date</b>	22/06/2021
<b>Prepared By</b>	Criona Doyle

Site Visit Detail			
<b>Date Of Inspection</b>	28/05/2021	<b>Announced</b>	Yes
<b>Time In</b>	12:30	<b>Time Out</b>	13:30
<b>EPA Inspector(s)</b>	Criona Doyle		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	Attendees: Irish Water: Pat Duggan, Catherine Rice. Glan Agua: Dave Flanagan, Richard Fitzgibbon** Tipperary County Council: Joe Burke*, Sharon O'Dwyer*, Christopher Kidawa*  *Attended virtual audit only **Attended site audit only		

## > Summary of Key Findings

(1) The water treatment plant is operated by Glan Agua (DBO contractor) on behalf of Irish Water. The water treatment plant operates with a large degree of automation. A detailed series of process alarms are in place which trigger automatic plant shutdown in the event a critical alarm setpoint is exceeded.

(2) Irish Water should provide an explanation for the turbidity spike (operational event) observed on the turbidity trends for the individual filters (No.1, No.2 and No.3) for the time period 13th - 14th of May and provide details of any corrective actions undertaken in response to the high turbidity warning alarm.

## > Introduction

The Burncourt Regional Public Water Supply (PWS) serves a population 1,902 and produces a volume 1,281m<sup>3</sup>/day (EDEN figures). The audit was undertaken to assess the performance of Irish Water in providing clean and wholesome drinking water.

Raw water is obtained from the Burncourt River and is treated at the Glengarra Water Treatment Plant (WTP). The treatment plant has been in operation since May 2016 and is operated by Glan Agua under a design, build and operate contract (DBO). Treatment includes coagulation, clarification via dissolved air flotation (DAF) with multimedia filtration, chlorination, fluoridation and sludge treatment.

Treated water storage of 2,600m<sup>3</sup> is provided in the on site reservoir. There is an off site storage reservoir at Dromroe (364m<sup>3</sup>) which was not visited where booster chlorination is provided. There is also a supply to the Kilroe reservoir from the Burncourt Regional PWS which provides 50% of the supply of the adjacent Burncourt Ballylooby PWS (EDEN figure 1,059m<sup>3</sup>/day).

## > Supply Zones Areas Inspected

The audit consisted of a video conference call with Irish Water, Tipperary County Council and Glan Agua staff on the 27/05/21 and an on site inspection of the water treatment plant on 28/05/21. The audit included an inspection of the coagulation, clarification stage (DAF), filtration, chlorine dosing and chemical storage areas.



## 1. Coagulation Clarification Flocculation (CFC) Stage

	Answer	
1.1	Is the CFC process optimised to respond to changes in raw water quality?	Yes
<b>Comment</b>		
<p>Monitoring of raw water quality includes continuous monitoring of colour, pH, turbidity, dissolved oxygen, conductivity and temperature. Warning alarm level setpoints are in place linked to automatic shutdown of the intake in the event the high high or low low set points are exceeded. A twin cell storage tank provides 520m<sup>3</sup> of raw water storage. The automatic coagulation process is controlled by the PLC based on UVT dose bands which have been developed to deal with the site specific raw water quality conditions.</p>		

	Answer	
1.2	Are the CFC processes appropriately controlled?	Yes
<b>Comment</b>		
<p>10% Poly aluminium chloride (PAC) coagulant is used with pH adjustment using sodium hydroxide to ensure optimal coagulation. Duty / standby and assist coagulant dosing pumps are provided. The coagulant dosing is flow proportional with a trim automatically controlled by the raw water UVT dose bands which have been developed based on the site specific conditions.</p> <p>A twin train treatment system is provided with each stream passing through a flocculation tank followed by clarification via dissolved air floatation (DAF). Both trains operate continuously in parallel.</p> <p>Turbidity and pH of the clarified water is continuously monitored post the DAF and prior to the filters. There are alarm set points post DAF with high pH 8, low pH 5.5 and high turbidity 2 NTU.</p> <p>The clarified water from both DAF units is then split between 3 no. polishing filters.</p>		

		Answer
2.1	Are the filters designed and managed in accordance with EPA guidance?	Yes
<b>Comment</b>		
<p>Filtration is provided via 3 no. polishing filters with dual media (0.55m sand and 0.45m anthracite). The media was installed in 2016 and regular core sampling is undertaken by the in house process team together with regular backwash optimisation checks.</p> <p>Backwashing is undertaken automatically on a timed basis. Backwashing is also automatically triggered if turbidity &gt; 0.2 NTU for 120 seconds on an individual filter. If another filter is in a backwash it will enter a queue system for backwash upon completion of the filter which is currently backwashing. Manual backwashing can also be undertaken on basis of head loss if required.</p> <p>Following backwashing there is run to waste for 10 minutes and until the turbidity &lt; 0.2 NTU. Site staff undertake biweekly visual observations of backwashing and record observations.</p> <p>Each filter has a high turbidity alarm set point which triggers automatic backwashing. The combined filtered water high turbidity alarm set point is 0.2 NTU which generates a warning alarm. There is also a high high final water turbidity set point at 0.5 NTU which generates automatic plant shutdown of the WTP after 120 seconds based on the turbidity of the combined filtered water.</p>		

		Answer
2.2	Does monitoring indicate that the filters are operating effectively?	No
<b>Comment</b>		
<p>Subsequent to the audit Irish Water submitted turbidity trends on 02/06/21 for the previous month for the 3 no. individual filters and combined filtered water turbidity at clear water tank. A turbidity spike &gt; 0.3 NTU was observed on Filter No.1, Filter No. 2 and Filter No. 3 for the time period 13-14th of May. The trends provided indicate that the combined filtered water turbidity at the clear water tank remained &lt; 0.3 NTU at all times and it is expected that 0.2 NTU high alarm would have been triggered.</p> <p>Section 5.5.2 of the EPA Filtration Manual provides guidance on log removal credits and states “Turbidity does not exceed 0.3 NTU from any individual filter for more than 15 consecutive readings or 0.5 NTU from any individual filter for more than three consecutive readings without operational intervention and corrective action”.</p> <p>The set point to trigger automatic backwashing on an individual filter (0.2 NTU) would have been exceeded however the treated water flow data provided suggests water was being produced at the WTP at this time. Confirmation is required from Irish Water on the duration of this operational event and provide details of any corrective actions undertaken in response to alarms.</p>		



### 3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
<b>Comment</b>		
<p>14% sodium hypochlorite is used on site. Documentation provided on site confirmed an expiry date of 19/06/21 and details of the PCS number were provided subsequent to audit. The chlorine dosing target set point is 1.2 mg/l in the clear water tank in order to have 1 mg/l on outlet from reservoir. Trended data is recorded and was provided prior to the audit and indicated stable trends.</p> <p>Glan Agua monitor the chlorine alarms at the outlet of the reservoir. The low level chlorine alarm at 0.9 mg/l provides a warning alarm and the 0.75 mg/l low low alarm level instigates automatic plant shutdown. The final water high chlorine warning alarm level is 1.4 mg/l and the high high alarm level of 1.5 mg/l (120 seconds time delay) results in automatic plant shutdown.</p> <p>Cover for alarm responses is provided by Glan Agua on a 24 hour basis with an operator on call at night and weekends. In the event of a disinfection issue at the Glengarra WTP Glan Agua staff notify both Irish Water Operations and the Caretaker of the adjacent Burncourt Ballylooby PWS, which is partially supplied by Burncourt Regional PWS.</p> <p>Tipperary County Council also monitor a series of chlorine alarms on their PMAC system. The PMAC alarm set points for Glengarra (Burncourt WTP) are high chlorine 1.31 mg/l and low chlorine 0.59 mg/l. Booster chlorination is carried out at Dromroe reservoir if the setpoint on the chlorine analyser drops below 0.8mg/l. The chlorine analyser at Dromroe Reservoir is alarmed and trended via PMAC with a PMAC high chlorine alarm at 1.31 mg/l and low chlorine alarm set point at 0.50mg/l.</p>		

		Answer
3.2	Are duty and standby chlorine pumps/ UV units in operation?	Yes
<b>Comment</b>		
<p>Duty / standby chlorine dosing pumps are provided with automatic switch over. Dosing of sodium hypochlorite is flow proportional with a residual trim.</p>		

		Answer
3.3	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
<b>Comment</b>		
<p>A copy of the contact time calculation was provided and indicated a total effective contact time of 69.20mg.min/l with monitoring on the outlet of the reservoir with alarms.</p>		

3.4

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

**Answer**

No

**Comment**

Monitoring of residual chlorine in the network is undertaken by Tipperary County Council. Records submitted prior to the audit indicated monitoring is taking place once per week which is insufficient.



## 4. Treatment Process Chemicals

		Answer
4.1	Are treatment process chemicals appropriately managed and stored?	No
<b>Comment</b>		
All chemical tanks were internally bunded. The fill points for the bulk storage tanks were observed to be outside the bunds.		



## 5. Management and Control

		Answer
5.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	Yes
<b>Comment</b>		
Irish Water indicated that the source score for the supply is a log 3 requirement including plus 1 for no sanitary survey completed. The treatment provided on site gives Log 3 removal of protozoa.		

		Answer
5.2	Are instrument calibrations within date?	Yes
<b>Comment</b>		
Calibration and maintenance of monitors is undertaken on a monthly frequency. QR codes (quick response code) were present on all equipment. A system alert is sent to plant staff to notify when the calibration and maintenance work is due to take place.		



## Recommendations

<b>Subject</b>	Burncourt Regional PWS Audit	<b>Due Date</b>	22/07/2021
<b>Action Text</b>	<p><b>Recommendation(s)</b></p> <ol style="list-style-type: none"><li>1. Irish Water should provide an explanation for the turbidity spike (operational event) observed on the turbidity trends for the individual filters (No.1, No.2 and No.3) for the time period 13-14th May and provide details of any corrective actions undertaken in response to the high turbidity warning alarm.</li><li>2. Irish Water should ensure the residual chlorine levels are monitored several times per week in the extremities of the network.</li><li>3. Irish Water should ensure that all bulk storage tank fill points are located within bunds.</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 Regina Campbell, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 22/07/21 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 the Action Reference Number DW20210080 in any future correspondence in relation to this Report.</p>		