

# 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>	Belturbet PWS
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	0200PUB0108
<b>County</b>	Cavan
<b>Site Visit Reference No.</b>	SV20542

Report Detail	
<b>Issue Date</b>	21/09/2020
<b>Prepared By</b>	Michelle Roche

Site Visit Detail			
<b>Date Of Inspection</b>	26/08/2020	<b>Announced</b>	No
<b>Time In</b>	14:30	<b>Time Out</b>	15:10
<b>EPA Inspector(s)</b>	Michelle Roche Orla Harrington		
<b>Additional Visitors</b>			

<b>Company Personnel</b>	<p>Irish Water: Pat O'Sullivan* Pat Collins** Peter Gallagher** Francis Hughes**</p> <p>Cavan County Council: John Denning* Martin Quigley* Vincent Craig* Andrew Fannon* Gary Boyd** Raymond Warrington** Gráinne Hart** John Fay**</p> <p>*Attended pre-site visit meeting only **Attended both pre site-visit meeting and site visit</p>
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## > Summary of Key Findings

The Belturbet public water supply is well managed with good water quality verification checks and record keeping in place.

The EPA has made five recommendations to improve the operation of the plant and address any operational risks that were observed during the audit. Two recommendations which Irish Water should progress as a priority are;

1. Install automatic switchover between the duty and standby chlorine dosing pumps.
2. Ensure that relevant plant alarms are dialled out to a number of staff on a cascade system to allow a timely response in the event of staff unavailability.

## > Introduction

The Belturbet public water supply serves a population of 1,926 people in Belturbet town and the surrounding hinterland, in addition to providing treated water to approximately 90 people on the Derryvoney public group water scheme. The raw water abstraction is from the River Erne and the water treatment comprises of;

- Potassium permanganate treatment to remove manganese,
- Coagulation with aluminium sulphate,
- Clarification and filtration in a dissolved air flotation and filtration treatment unit,
- Disinfection with sodium hypochlorite,
- pH correction on the final water, and
- Fluoridation.

The reservoir for the supply is a reservoir tower constructed above the water treatment plant.

The audit consisted of a pre-site visit video conference meeting with all relevant parties on 25/08/20, and a site visit with essential Irish Water and Cavan County Council staff on 26/08/20.

## > Supply Zones Areas Inspected

The audit included a review of water quality results and online monitoring data submitted by Irish Water and a full walk through of the Belturbet water treatment plant. The top of the reservoir at the water treatment plant was not inspected during this audit and neither was the River Erne source.



## 1. Source Protection

	Answer
1.1	Is the abstraction source(s) adequately protected against contamination?
	Yes
<b>Comment</b>	
<p>The raw water abstraction point is located on the River Erne. The abstraction point is fitted with a fine and coarse screen and inspected every day by the caretaker.</p> <p>Online raw water measurements are taken for turbidity and there is an alarm set-point of 12 NTU in place. There was no online raw water monitoring for pH at the time of the audit. pH measurements were being taken everyday by the caretaker on a handheld pH meter, and that measurement was being used to regulate the coagulant dose. Irish Water stated that an online pH monitor had been ordered at the time of the audit and they expected it to be commissioned by the end of September.</p>	



## 2. Coagulation Clarification Flocculation (CFC) Stage

2.1

	Answer
Is the CFC process optimised to respond to changes in raw water quality?	No
<b>Comment</b>	
<p>The coagulant dose (aluminium sulphate) is currently based on a daily raw water pH sample manually taken by the plant caretaker. The raw water pH is generally in the range of 6.7 - 7 pH units. The caretaker also manually adjusts the coagulant dose based on the raw water pH, but the dose is automatically adjusted for the proportionate flow through the plant. An online pH monitor is expected to be commissioned by the end of September and following that Irish Water will review the possibility of automating the coagulant dose.</p> <p>The coagulant is dosed with duty/standby dosing pumps and there is automatic switchover between the pumps. The pumps are also alarmed to alert the caretaker if one of the pumps has failed. While there are two coagulant dosing pumps at the treatment plant, there is only one coagulant dosing line feeding in to the raw water pipeline. Installing a second dosing line would reduce the risk of a coagulant dosing failure if the existing dosing line became blocked.</p>	



### 3. Filtration

3.1

	Answer
Does monitoring indicate that the filters are operating effectively?	Yes
<b>Comment</b>  After coagulation, the water is filtered across a dissolved air flotation and filtration unit (DAFF). There is a turbidity monitor at the outlet of the DAFF with an alarm set-point of 0.3 NTU. Filtered water turbidity results were examined as part of the audit and all results were below 0.3 NTU. Filtered water at the time of the audit was 0.103 NTU.  The DAFF filter enters a backwash every 12 hours and the filter runs to waste until a turbidity of 0.2 NTU is reached. A backwash of the DAFF filter is also triggered if the filter water turbidity alarm is triggered.  Sludge from the DAFF is directed to an on-site sludge holding tank. The decant water from the sludge is directed to the sewer and the remaining solids are tankered off-site once the holding tank is full.	



## 4. Disinfection

		Answer
4.1	Is the chlorine dosed appropriately?	No
<b>Comment</b>		
<p>Sodium hypochlorite is dosed flow proportionately with a duty/standby dosing pump arrangement and the dose is adjusted based on chlorine residual readings from a submersible pump, located within the reservoir. The dosing pumps are alarmed to alert the caretaker to a pump failure however there is no automatic switchover in place between the pumps.</p> <p>The Irish Water Disinfection Programme had begun work at the Belturbet water treatment plant and the Phase 1 Site Assessment has been complete, however the Phase 2 Site Upgrade Works has not progressed and Belturbet has been removed from the current Disinfection Programme (to be complete by end of 2021) due to funding constraints.</p>		

		Answer
4.2	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
<b>Comment</b>		
<p>The final water chlorine residual sample is being taken from a submersible pump located within the reservoir. Due to the large volume capacity of the reservoir an average chlorine contact time of 150mg.min/l is being achieved within the reservoir, which is significantly above the minimum disinfection requirement of 15mg.min/l. A final water chlorine residual of 1.06mg/l was observed during the audit.</p>		

		Answer
4.3	Is there a chlorine residual $\geq 0.1$ mg/l throughout the network?	No
<b>Comment</b>		
<p>Chlorine residuals in the distribution network are measured once a week on the Belturbet public water supply, and chlorine residual readings from April to July were examined during the audit.</p> <p>Two chlorine residual readings below the minimum requirement of 0.1mg/l were recorded on 29th July 2020, at two separate network locations. Cavan County Council staff scoured the network in this area and increased the chlorine dose at the water treatment plant in response to these low residuals. Follow up sampling showed that the response was successful in returning the network to compliance</p>		



## 5. Management and Control

	Answer
5.1 Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators?	No
<b>Comment</b>	
<p>There are relevant plant alarms which call-out to the water treatment plant operators and to senior Cavan County Council staff, however there is currently no cascade system in place for these alarms. Five Cavan County Council staff currently receive a dial-out alarm at the same time, but there is no way for the other members in the call-out to know when somebody has responded to an alarm.</p> <p>Irish Water and Cavan County Council are currently conducting a county-wide review and upgrade of their SCADA, and the alarm dial-out cascade will be included in this upgrade. The upgrade is due to be complete by the end of October 2020.</p>	





		Answer
6.1	Have failures of the parametric values or the detection of pathogenic micro-organisms or parasites in the water supply been adequately investigated?	Yes
<b>Comment</b>		
<p>There have been a number of final water and distribution network manganese failures reported to the EPA from January to July 2020, with the latest manganese failure detected on the 7th July 2020. All failures have also been reported to the HSE and there has been no concern raised of any potential danger to human health. The water treatment plant has potassium permanganate treatment in place to treat excessive manganese in the raw water, however Irish Water have found that the predominant form of manganese in the raw water has changed from dissolved to suspended and this has caused the increase in manganese failures in the network.</p> <p>Irish Water's response to the manganese failures has been to continue with daily raw and final water manganese testing at the water treatment plant, establish a weekly testing programme for manganese in the network and carry out a programme of uni-directional flushing in the network. Since the completion of uni-directional flushing on 24th July 2020 there have been no manganese failures reported to the EPA. Where weekly network sampling detects manganese approaching the parametric limit of 50 ug/l, localised flushing of the network will be carried out.</p> <p>Irish Water have a longer-term plan to install a larger potassium permanganate treatment system at the plant to provide greater removal of manganese from the raw water. This system is expected to be installed by the end of March 2021.</p>		

## Recommendations

<b>Subject</b>	Belturbet Audit Recommendations	<b>Due Date</b>	21/10/2020
<b>Action Text</b>	<p><b>Recommendation(s)</b></p> <ol style="list-style-type: none"><li>1. Irish Water should install a continuous pH monitor on the raw water at the Belturbet water treatment plant and subsequently investigate the feasibility of automating the coagulant dose based on the continuous raw water pH measurements.</li><li>2. Irish Water should install a second coagulant dosing line on the raw water feed into the water treatment plant to provide two fully separated duty and standby coagulant dosing systems.</li><li>3. Irish Water should install automatic switchover between the duty and standby chlorine dosing pumps.</li><li>4. Irish Water should ensure an alarm response cascade is in place to ensure that critical plant alarms are responded to in a timely manner. The cascade should be fully operational so that when an alarm is responded to the other people in the cascade are appropriately notified.</li><li>5. Irish Water should progress with the installation of a larger capacity potassium permanganate treatment system to improve the removal of manganese from the raw water.</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 Aoife Loughnane, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 21st October 2020 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 DW2020017 in any future correspondence in relation to this Report.</p>		