

# 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>	Newbliss
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	2400PUB1003
<b>County</b>	Monaghan
<b>Site Visit Reference No.</b>	SV22651

Report Detail	
<b>Issue Date</b>	23/08/2021
<b>Prepared By</b>	Michelle Roche

Site Visit Detail			
<b>Date Of Inspection</b>	05/08/2021	<b>Announced</b>	No
<b>Time In</b>	10:00	<b>Time Out</b>	12:00
<b>EPA Inspector(s)</b>	Michelle Roche Daryl Gunning		
<b>Additional Visitors</b>	HSE: Dr. Ian Quintyne Claire O'Dwyer Caitriona Kelly		

<b>Company Personnel</b>	<p>Irish Water: Yvonne McMonagle Pat O'Sullivan Pat Collins Louise Brennan Peter Gallagher Fintan Ruddy</p> <p>Monaghan County Council: John Paul McEntee John Lennon Maria Smyth Peadar McGuinness</p> <p>Veolia: Tomas Teevan Robert McCann Mark Rooney Hugh Gallagher</p>
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## > Summary of Key Findings

1. Elevated manganese, above HSE health based limit of 120µg/l, was detected in the Newbliss public water supply on 27/07/21 and a Do Not Consume notice was placed on the full supply the same day. Irish Water installed manganese dioxide in the rapid gravity filter on 30/07/21 and subsequently cleaned all on-site storage tanks and scoured the distribution network. The Do Not Consume notice was lifted on 13/08/21 following three compliant manganese sampling rounds in the distribution network.
2. The rapid gravity filter at the Newbliss water treatment plant is not currently operating to the requirements outlined in the EPA Filtration Manual. Irish Water plans to undertake remedial works at the plant to address deficiencies in filter operations.
  - i) There is no continuous online turbidity monitors with alarm set-points installed on the outlet of the filter to ensure the filter is operating with a final water turbidity below 0.5 NTU.
  - ii) There is no run to waste facility on the filters to allow filter water turbidity return to below 0.5 NTU before filtered water enters the distribution network.
3. Irish Water's chlorine contact time calculation shows that a free chlorine residual concentration of 1.4 mg/l at the outlet of the chlorine contact tank is required to ensure adequate disinfection in the distribution network. However, the low chlorine alarm set-point of 0.2 mg/l is not currently aligned with this requirement and will not sufficiently alert the plant operators to a disinfection incident. Irish Water should ensure that a minimum free chlorine residual concentration of 1.4 mg/l is maintained after the contact tank, and relevant low chlorine alarm set-points are in place.
4. Irish Water are required to undertake a number of actions to ensure a free chlorine residual of at least 0.1 mg/l is maintained throughout the Newbliss distribution network. These actions include replacing the final 3.2km of cast iron mains at the end of the network.

## > Introduction

The Newbliss public water supply serves a population of 424 with water from Feagh Lake treated at Newbliss water treatment plant. Treatment includes the following;

- pH correction with sulphuric acid
- coagulation with ferric aluminium sulphate
- clarification in a dissolved air flotation unit
- filtration in a rapid gravity filter
- chlorination with chlorine gas
- final water pH correction with caustic soda.

The water treatment plant is operated by Veolia under a Design, Build, Operate (DBO) contract with Irish Water and the distribution network is managed by Monaghan County Council on behalf of Irish Water. Treated water is stored in a treated water reservoir located approximately 1km away from the water treatment plant.

The audit was conducted in response to a number of manganese failures detected at the water treatment plant and in the distribution network from 27/07/21, and subsequent imposition of a Do Not Consume notice on the supply also from 27/07/21. The Do Not Consume notice was lifted on 13/08/21.

## > Supply Zones Areas Inspected

A virtual audit was conducted on 05/08/21 and covered all aspects of the Newbliss public water supply including source protection, treatment and management of the distribution network.



## 1. Incident Management

1.1

	Answer
Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	Yes
<p><b>Comment</b></p> <p>On 27/07/21 water quality monitoring in the Newbliss public water supply distribution network detected elevated manganese and iron at maximum concentrations of 489µg/l and 1560µg/l respectively. The failures were immediately notified to Irish Water by Monaghan County Council and Irish Water initiated consultation with the HSE regarding the potential impact to human health. A Do Not Consume notice was placed on the Newbliss public water supply on 27/07/21 affecting 424 people served by the supply. The notice was issued due to manganese concentrations being above the HSE health based limit of 120µg/l.</p> <p>Irish Water investigations highlighted that manganese and iron concentrations in the raw water on 27/07/21 were significantly elevated to 1450µg/l and 428µg/l compared to the previous weekly sample taken by Veolia on 19/07/21 where results were 121µg/l and 173µg/l. Irish Water stated that manganese and iron at those elevations had not been experienced on the supply previously therefore no manganese or iron treatment was currently installed at the water treatment plant.</p> <p>A layer of manganese dioxide filter media was installed in the rapid gravity filter on 30/07/21 as a remedial action to treat raw water manganese and iron. The reservoir was being inspected and cleaned on the day of the audit, 05/08/21, to remove any manganese and iron sediment and the network was scheduled to be fully scoured after reservoir cleaning. These actions were taken with the aim of returning the supply to water quality compliance and three separate rounds of water quality sampling in the network was to follow to determine if the Do Not Consume notice could be lifted.</p> <p>The Do Not Consume notice was lifted on the Newbliss public water supply on Friday 13/08/21.</p>	



## 2. Coagulation Clarification Flocculation (CFC) Stage

2.1

	Answer
Is the CFC process optimised to respond to changes in raw water quality?	Yes
<b>Comment</b>  There are no continuous online raw water quality monitors in place however Veolia carry out weekly raw water sampling on the supply. The CFC process is controlled and optimised by a continuous online floc pH monitor at the outlet of the flocculation tank. The monitor is set to maintain a floc pH between the range of 5.8 to 6.6 and the floc pH monitor is alarmed to call out to plant operators.  The raw water pH is adjusted with a fixed dose of sulphuric acid dosed on the raw water line before the static mixer and the ferric aluminium sulphate coagulant dose is automatically adjusted to meet the required floc pH range. Both chemicals are dosed with a duty standby dosing pump arrangement with automatic switchover and alarms on the the pumps.  Coagulated water is then directed to the dissolved air flotation unit (DAF). The DAF is automatically scrapped every 30 minutes for 3 minutes and sludge is removed to a sludge holding tank which is emptied twice a month by tanker.	



### 3. Filtration

3.1

Are the filters designed and managed in accordance with EPA guidance?

Answer

No

**Comment**

There is one rapid gravity filter at Newbliss water treatment plant with a combination of sand and gravel media to a depth of 1.2 meters. The manganese dioxide layer that was added to the filter in response to the recent manganese and iron failures was added on top of the sand and gravel depth. The EPA audit found a number of deficiencies in the design of the rapid gravity filter.

1. There is no continuous online turbidity monitor at the outlet of the filter. There is a final water turbidity monitor at the outlet of the chlorine contact tank, however this is not suitable to confirm the effective operation of the filter. Weekly grab samples are taken by Veolia at the outlet of the filter which to date confirm that the filter is operating to a turbidity below 0.3 NTU
2. There is no run to waste in place on the filter to allow the filter water turbidities to return at least below 0.5 NTU before entering the distribution network. A lack of run to waste facility creates a risk of *Cryptosporidium* break-through in the filter after cleaning.
3. The filter backwash is initiated based on headloss and time. As there is no online turbidity monitor on the outlet of the filter, there is no facility for a backwash to be triggered based on an increase in filter turbidity.



## 4. Disinfection

	<b>Answer</b>
4.1 Is the chlorine dosed appropriately?	Yes
<b>Comment</b>	
Chlorine gas is dosed on the filtered water using a duty standby dosing arrangement with automatic switchover between the gas cylinders and the delivery pumps are alarmed in the case of pump failure. The dose is a fixed dose as flow through the water treatment plant is fixed.	

	<b>Answer</b>
4.2 Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	No
<b>Comment</b>	
There is a continuous online chlorine residual monitor on the outlet of the chlorine contact tank at the water treatment plant, however the low chlorine alarm set-point is set at 0.2mg/l which does not match with the 1.4mg/l required to verify adequate contact time, as per the contact time calculation.	

	<b>Answer</b>
4.3 Is there a chlorine residual $\geq 0.1$ mg/l throughout the network?	No
<b>Comment</b>	
<p>Daily chlorine residual grab sample results from the outlet of the Newbliss Reservoir were examined during the audit and there were a number of occasions in June and July where the chlorine residual results leaving the reservoir were between 0.1mg/l and 0.2mg/l. Chlorine residual readings were not submitted for any other location on the distribution network as part of the audit information pack, therefore it could not be determined if 0.2mg/l leaving the reservoir was sufficient to maintain a chlorine residual greater than 0.1mg/l throughout the network.</p> <p>In addition, the final 3.2km of the distribution network is cast iron mains and persistent iron failures and associated low chlorine residuals have been reported to the EPA since December 2020 in this part of the network. A weekly monitoring programme for microbiological contamination is in place in the cast iron network since January 2021. To date there have been no detections of microbiological contamination in the network. Irish Water stated that the cast iron mains is scheduled for replacement in Q4 2021 and Q1 2022.</p> <p>On the 05/07/21 a chlorine residual of 0.1mg/l was recorded leaving the reservoir and on the 06/07/21 a reading of 0.06mg/l was recorded. Following the audit, Irish Water confirmed that any instance of low chlorine residuals in the network is reported by the Monaghan County Council plumber to his line manager and the line manager in turn informs Veolia as water treatment plant operators.</p> <p>In addition to the daily chlorine residual grab samples there is a continuous online chlorine residual monitor on the outlet of the reservoir with a low chlorine alarm set-point of 0.2mg/l. The same response cascade is in place if the alarm set-point is triggered.</p>	



## 5. Management and Control

		Answer
5.1	Is the plant suitably managed and controlled to maintain the designed log credit on each treatment stage?	No
<b>Comment</b>		
<p>Irish Water have determined that the raw water source for Newbliss public water supply, Feagh Lake, has a protozoal compliance log treatment requirement of Log 3. Irish Water have withdrawn all log credits from the treatment process, until a run to waste and continuous online turbidity monitor are installed on the rapid gravity filter. Irish Water are currently carrying out monthly <i>Cryptosporidium</i> monitoring in the distribution network in line with the Irish Water <i>Cryptosporidium</i> Monitoring Rationale for a supply with a protozoal log deficit.</p>		



## Recommendations

Subject	Newbliss audit recommendations	Due Date	23/09/2021
Action Text	<p><b>Recommendation(s)</b></p> <ol style="list-style-type: none"> <li>1. Irish Water should upgrade the rapid gravity filter infrastructure at Newbliss water treatment plant to meet the requirements of the EPA Filtration Manual. Irish Water should ensure that upgrade works include the following;               <ol style="list-style-type: none"> <li>i. Install a continuous online turbidity monitors on the outlet of the filter to ensure filtered water remains below 0.5 NTU at all times.</li> <li>ii. Install a run to waste facility on the filter to allow filter water turbidity return to below 0.5 NTU before filtered water enters the distribution network.</li> </ol> </li> <li>2. Irish Water should ensure treatment at Newbliss water treatment plant is sufficient to provide 3 log protozoal compliance log treatment removal for parasites such as <i>Cryptosporidium</i>.</li> <li>3. Irish Water should ensure that the low chlorine alarm set point is at an appropriate level to ensure that the target residual chlorine concentration identified in the chlorine contact time calculation is met in the final water leaving Newbliss water treatment plant.</li> <li>4. Irish Water should undertake the following to ensure a free chlorine residual of at least 0.1mg/l is maintained throughout the Newbliss distribution network at all times;               <ol style="list-style-type: none"> <li>i. Replace the section of cast iron mains at the end of the distribution network.</li> <li>ii. Implement relevant procedures both between Monaghan County Council and Veolia, and for Veolia operators at the water treatment plant, to ensure that the free chlorine residual leaving the reservoir is sufficient to deliver a chlorine residual of at least 0.1mg/l to the end of the network.</li> <li>iii. Review the network chlorine residual monitoring programme to ensure that sample locations are sufficient to verify that at least 0.1mg/l free residual chlorine is present at the extremities of the distribution network.</li> </ol> </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 Michelle Minihan, Drinking Water Senior Inspector.</p> <p>Irish Water should submit a report to the Agency on or before 23rd September 2021 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, DW20200272 in any future correspondence in relation to this Report.</p>		