

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	Cavanhill
Organisation	Irish Water
Scheme Code	2100PUB1018
County	Louth
Site Visit Reference No.	SV22520

Report Detail	
Issue Date	12/07/2021
Prepared By	Ruth Barrington

Site Visit Detail			
Date Of Inspection	23/06/2021	Announced	Yes
Time In	10:00	Time Out	11:30
EPA Inspector(s)	Ruth Barrington Michelle Minihan		
Additional Visitors	Orla Harrington HSE: Keith Ian Quintyne, Patricia Doonan		
Company Personnel	Irish Water: Dara Chadwick, John Leamy, Annabel Fitzgerald, Jenny Lawlor, John Hand, John Paul Diamond, Alice O'Sullivan, Liliana Mereacre Louth County Council: Martina Sheeran, James O'Hagan, John McCooey, Keith Hanratty, Andrew White Murphy Group: Andrew McCourt		

> Summary of Key Findings

1. Current treatment at the Cavanhill Water Treatment Plant does not effectively remove manganese present in the raw water. Irish Water has recently installed, but at the time of the audit had yet to commission and operate, an additional treatment step for manganese removal at the raw water intake.

2. Network conditions in the Cavanhill Public Water Supply during June 2021 contributed to manganese exceedances and discolouration of water as sediment in pipework was disturbed by a large mains burst on 07/06/2021, by the use of the East Main section of the supply to source water for tankering to another supply on 03/06/2021 to 08/06/2021, and by two industrial sites drawing down large volumes of water from the network over short time periods.

3. Information referred to during the audit led to the EPA subsequently becoming aware of twelve additional manganese exceedances in final treated water at Cavanhill WTP detected during 28/05/2020 to 20/10/2020, ten of which occurred over the period May to July 2020. These exceedances were not notified to the EPA at the time. Failure to notify exceedances of the parametric values is an offence under Regulation 10 (3) of the *European Union (Drinking Water) Regulations 2014* as amended.

> Introduction

The Cavanhill Public Water Supply serves a population of 45,604 people in Dundalk and environs. Water abstracted from the River Fane at Stephenstown is treated at Cavanhill Water Treatment Plant (WTP) which was upgraded through a programme of works completed in June 2020 to enhance the existing treatment and provide additional treatment barriers with the installation of ultraviolet (UV) disinfection. The Cavanhill WTP is designed to provide 27,300 m³ treated water per day. Treatment processes at the WTP include coagulation, flocculation and clarification (CFC), rapid gravity filtration, UV and chlorine disinfection.

The audit was carried out in response to exceedances during June 2021 of the manganese parametric value in final treated water at the WTP and at sample locations in the network, and to large numbers of complaints in relation to discoloured drinking water from consumers on this supply, received by Irish Water. Other parametric values (colour, aluminium, colony count and iron) were exceeded at network sample locations over the same time period.

> Supply Zones Areas Inspected

The audit was carried out by video conference due to the Covid-19 restrictions in place on 23/06/2021.



1. Incident Management

	Answer
1.1 Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
Comment	

1. Irish Water's monitoring of the Cavanhill Public Water Supply carried out in the distribution network since 04/06/2021 showed failures to comply with manganese, colour, aluminium, colony count and iron parametric values set out in the *European Union (Drinking Water) Regulations 2014* as amended. The majority of these exceedances were for manganese, for which the parametric value is 50 ug/l. At the time of the audit, exceedances with values of between 53 ug/l and 461 ug/l had been detected in monitoring.
2. At one location in the Cavanhill Public Water Supply, a result for manganese of 461 ug/l was detected on 08/06/2021. This result is in excess of the World Health Organisation health guideline value of 120 ug/l. Irish Water, in consultation with the HSE, issued a Do Not Consume Notice to this commercial property on 16/06/2021. All other exceedances were between 50 ug/l and 120 ug/l. The Do Not Consume Notice was lifted by Irish Water on 21/06/2021 in consultation with the HSE, following three compliant re-samples taken at that property. A further Do Not Consume Notice was issued to another commercial property subsequent to the audit following a manganese sample result in excess of 120 ug/l. This Notice has since been lifted.
3. The exceedances detected from 04/06/2021 onwards were investigated by Irish Water and notified to the EPA in accordance with the Regulations.
4. Monitoring was carried out by the DBO operator at the Cavanhill WTP to establish whether the WTP was effective in the removal of manganese from the raw water source. The results of the monitoring were provided to the EPA in advance of the audit. Failures to comply with the manganese parametric value in the treated water entering supply were detected from 25/05/2021 and were notified to the EPA in accordance with the Regulations.
5. During the audit, the DBO operator referred to issues with manganese in final treated water during the plant upgrade process proving period in June 2020. Following the audit meeting, Irish Water provided additional data to the EPA in relation to manganese analysis results from that time period. A total of twelve exceedances of the parametric value were detected in samples taken from the final treated water during 2020, from sampling on dates between 28/05/2020 and 20/10/2020 and with ten of the samples being taken between May and July 2020. None of these exceedances were notified to the EPA at the time. Failure to notify exceedances of parametric values to the EPA is an offence under Regulation 10(3) of the *European Union (Drinking Water) Regulations 2014*.
6. Network samples taken during 2020 were compliant with the manganese parametric value.
7. The failure to investigate incidents of manganese exceedances in final treated water during 2020 meant that the requirement for a manganese removal process was not identified until June 2021, a year after the plant upgrade completion. A build up of manganese in the distribution network could then result in sediment being disturbed and discoloured water and manganese exceedances being experienced by consumers following mains burst or additional demands being placed on areas of the network.
8. A pipe burst occurred in the eastern part of the network on 07/06/2021. In order to fix the burst, it was necessary for the distribution network in the area to be temporarily reconfigured while work was being carried out, and then returned to the normal layout after the work was completed on 11/06/2021. Staff described that these changes in layout and flow were likely to have disturbed sediment in that area of the network.
9. Overlapping with the timing of the pipe burst, water was also being tankered from a network location on the Cavanhill Public Water Supply to another supply in Co. Louth, from 03/06/2021 to 08/06/2021. While this activity can be accommodated within the design capacity of the Cavanhill WTP, the fact that it was being undertaken at the same time as the mains burst may have contributed to sediment being disturbed within the distribution area. It did not appear that the location or timing of the tanker abstraction was reconsidered by Irish Water with regard to impacts from the combination of this activity with the mains burst.
10. Irish Water and Louth County Council investigations into the demands placed on the Cavanhill Public Water Supply identified two individual large commercial users taking large volumes of water over a short duration for use on their sites. This drawdown can result in higher turbulence and sediment remaining in suspension within the distribution network. At the time of the audit, these sites had been visited by Louth County Council to initiate measures to restrict the amount of water taken at any one time and to spread the volume required over longer periods of time, to reduce turbulence.



2. Management and Control

		Answer
2.1	Is the water treatment plant resilient enough to cope with significant variations in raw water quality or demand?	No
Comment		
<p>1. Manganese levels in the raw water appear to be variable based on the limited data available. Seasonal variations in manganese in lakes and rivers are expected and can be linked to temperature and oxidation state. This may be indicated further by the manganese exceedances in final treated water at Cavanhill WTP during the summer months of 2020 and 2021.</p> <p>2. The treatment processes at Cavanhill WTP have recently been upgraded to a high standard and the conventional water treatment has been enhanced. However, there was no manganese removal specific step in operation at the WTP as of the date of the audit.</p> <p>3. Following the series of manganese exceedances from 25/05/2021, Irish Water commissioned a consultant's report on the manganese issues and removal options for Cavanhill WTP. The initial findings of the consultant's assessment had led to Irish Water installing a potassium permanganate dosing facility at the raw water intake for the oxidation of manganese, however this had not been commissioned at the time of the audit. Subsequent to the audit, Irish Water informed the EPA that this facility would be brought into use to assess its effectiveness from week beginning 05/07/2021.</p> <p>4. While the facility to dose potassium permanganate has been installed, the rationale for this as the chosen manganese removal process has yet to be demonstrated. The detail of manganese variability in the raw water, the form and oxidation state of manganese present and the pH regime needed for removal have yet to be assessed. Depending on the outcome of this assessment, a different process for manganese removal (e.g. green sand) may be needed to increase the resilience of the Cavanhill WTP and to provide compliance with the manganese parametric value.</p>		

		Answer
2.2	Is the data obtained from sampling and monitoring used to actively inform the processes on site and in the distribution network?	No
Comment		
<p>1. Manganese sampling was undertaken by the DBO operator of Cavanhill WTP on a regular basis during the upgrade works and process proving. Results of the sampling were provided to the EPA following the audit. Twelve exceedances of the manganese parametric value were detected during this sampling.</p> <p>2. There was no evidence available to the EPA to indicate that these results were investigated at the time, or that the need for an additional treatment process for manganese removal was assessed following this sampling.</p> <p>3. The need for manganese removal at Cavanhill WTP was not recognised by Irish Water until the large number of complaints from consumers during June 2021 was further investigated and the review of 2021 investigative monitoring undertaken at the final water at Cavanhill WTP was combined with the detection of manganese exceedances in the network. Had the need for additional treatment been recognised following the monitoring carried out in May to July 2020, some of the network impacts on consumers may have been avoided and compliance at the WTP achieved without delay.</p>		



3.1

	Answer
Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2014, as amended, been notified to the EPA?	No
Comment <p>1. During the audit, the DBO operator made reference to issues with manganese in the final treated water experienced during the process proving period of the Cavanhill WTP. These monitoring results were also apparently referred to in the consultant's report recently commissioned by Irish Water. The consultant's report was not seen by the EPA at the time of the audit.</p> <p>2. Twelve exceedances of the manganese parametric value in samples taken at Cavanhill WTP final treated water were included in data provided by Irish Water to the EPA following the audit. Ten of the exceedances were detected during May to July 2020, one in September 2020 and one in October 2020.</p> <p>3. These twelve exceedances were not notified to the EPA when they occurred. Failure to notify the EPA (as supervisory authority) of exceedances of parametric values is an offence under Regulation 10(3) of the <i>European Union (Drinking Water) Regulations SI No. 122 of 2014</i>, as amended.</p> <p>4. Subsequent to the audit, the results of sampling final treated water for manganese were provided to the EPA in correspondence and the twelve exceedances were then formally notified by Irish Water (dated 27/06/2021) on request by the EPA. This delayed notification does not meet the EPA guidance set out for water suppliers in the publication "<i>Handbook on the Implementation of the Regulations for Water Service Authorities for Public Water Supplies</i>" (EPA, 2010).</p>	



4. Site Specific Issues

	Answer
4.1 Were Irish Water communications suitable to ensure affected consumers received adequate information on their drinking water quality?	No
Comment	
<p>1. On 08/06/2021 Irish Water were informed by their call centre of a cluster of complaints from the Dundalk area. From the 08/06/2021 to 18/06/2021, Irish Water issued a number of press releases to media outlets, elected representatives and business representatives outlining the progress of the investigation following the complaints of discoloured water.</p> <p>2. The news and maps sections of the Irish Water website, where consumers are pointed in order to obtain information about water disruptions/ restrictions etc. in their own area, was not updated by Irish Water to reflect the ongoing investigations in Dundalk until 17/06/2021 following contact from the EPA in relation to the availability of information on the incident, by which time the number of complaints had decreased after the completion of repair works on the mains burst. The auditor considered that information on water quality and ongoing investigations was not made as widely and easily accessible as possible to consumers served by Cavanhill public water supply during the first phase of the investigation.</p>	

Recommendations

Subject	Cavanhill Audit Recommendations	Due Date	12/08/2021
Action Text	<p>Recommendation</p> <ol style="list-style-type: none">1. Irish Water should ensure that exceedances of parametric values are notified to the EPA in accordance with Regulation 10(2) of the <i>European Union (Drinking Water) Regulations, SI 122 of 2014</i> as amended.2. Irish Water should provide an Action Programme to the EPA for the installation, commissioning and operation of suitable treatment on the Cavanhill Public Water Supply to ensure compliance of final treated water with the manganese parametric value. The Action Programme should include details of the works planned and their timescale, and alternative options to achieve compliance with the manganese parametric value, if the potassium permanganate dosing is unsuccessful.3. Irish Water should provide an update on works scheduled or completed in the network since the audit and into the future, to manage turbulence and sedimentation, in order to maintain compliance with the parametric values, and to minimise consumer complaints.4. Irish Water should confirm the overall plan for communications to local communities in the event of drinking water incidents, so that information is readily and easily obtained by all consumers. <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 Aoife Loughnane, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency within one month of the date of the audit 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 in any future correspondence in relation to this Report.</p>		