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	Dunhill
Organisation	Irish Water
Scheme Code	3100PUB1040
County	Waterford
Site Visit Reference No.	SV25767

Report Detail

Issue Date	18/08/2022
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	03/08/2022	**Announced**	Yes
Time In	11:00	**Time Out**	12:15
EPA Inspector(s) **Additional Visitors**	Regina Campbell		
Company Personnel	Irish Water: Patrick Duggan, Ronan Walsh Waterford City & County Council (acting under service level agreement to Irish Water): Maura Phelan, David Hourigan		

Summary of Key Findings

1. A Boil Water Notice (BWN) was placed on the Dunhill PWS (Public Water Supply) on 14/07/22 to due to high turbidity and it remains in place at the time of issue of this audit report. There is naturally high iron and manganese levels in the raw water and the metal filtration system at the plant is being reviewed as it is thought that high iron and manganese levels contributed to the high turbidity levels in the final water.

2. The audit found that turbidity alarms and shutdowns had been disabled at the plant due to an issue with the location of the turbidity monitor sample line. This lead to a delay in escalating the turbidity issues to Irish Water initially until further laboratory sampling was undertaken on 13/07/22. Once the laboratory results were received the incident was escalated to the HSE which lead to the placing of the BWN on the supply to protect public health.

3. There are a number of shortcomings identified at this plant and Irish Water should take actions to address the recommendations as outlined in the audit report.

Introduction

The Dunhill Public Water Supply (PWS) serves a population of 146 and produces 20 m3/day (EDEN figures). The sources comprise of two boreholes which are located in the grounds of a housing estate where the treatment planthouse is situated. EDEN only lists one borehole Dunhill Cois Coille.

The audit was undertaken to assess Irish Water's performance in producing clean and wholesome water following the imposition of a Boil Water Notice (BWN) on the supply on 14/07/22 which remains in place at the time of issue of this audit report.

Supply Zones Areas Inspected

The pH correction, metal filtration and chlorination systems were inspected during the audit.

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

A Boil Water Notice (BWN) was placed on the Dunhill supply on 14/07/22 due to elevated turbidity (5.66 NTU).

Waterford City and County Council staff (WCCC) said that during a visit by an operator to the plant on 12/07/22 it was noticed that the turbidity monitor was displaying a high reading. The planthouse is not visited daily. WCCC staff said that turbidity alarms and shutdowns had been disabled for some time because the turbidity sampling line is located at the wrong point and is prone to erroneous readings due to trapped air. Therefore it was initially thought that the turbidity readings displayed on the monitor may be erroneous.

The treated water and water in the network were sampled on 13/07/22 and results showed elevated turbidity > 1 NTU in the treated water (5.66 NTU) and very high iron results (up to 790 ug/l versus drinking water limit 200 ug/l) and manganese (up to 99 ug/l versus drinking water limit 50 ug/l). On foot of the results, WCCC notified Irish Water and Irish Water consulted with the HSE. It was agreed that disinfection could be compromised as a result of the elevated turbidity and that a BWN should be issued to protect public health.

Irish Water said that investigations into the incident are ongoing. It is believed that the elevated iron and manganese in the raw water contributed to the turbidity issues. The operation of the iron and manganese filter at the plant is being reviewed to determine what remedial measures are required.

Trends submitted showed that turbidity in the treated water was > 1 NTU between 4pm and 10pm on July 12th and between 2am and 3am on July 13th and between 8am and 12 noon on July 13th. It is considered that there was a delay in the incident being escalated because the turbidity alarms and shutdowns were disabled. Once the laboratory results were received the incident was then escalated to the appropriate authorities.

At the audit turbidity in the supply had settled (0.151 NTU) but sampling undertaken on 20/07/22 showed another very elevated iron result (910 ug/l).

Records submitted by Irish Water show a compliant manganese result in September 2021 and a compliant iron result in October 2021.

Irish Water said that the HSE have agreed criteria for the lifting of the Boil Water notice which include: a) once the filtration system has been serviced b) the turbidity level falls below 1NTU c) both the iron and manganese are within their parametric value and d) two satisfactory microbiological samples have been taken from the network over two separate days and the free residual chlorine remains above 0.2 mg/L.

2. Source Protection

		Answer
2.1	Is the abstraction source(s) adequately protected against contamination?	No

Comment

It was not possible to inspect borehole 1 as the hatch over the borehole chamber could not be opened during the audit.

Both boreholes are located in common areas of the housing estate and while they are covered and locked, they are not fenced off.

3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	No

Comment

Irish Water have reported that the Dunhill disinfection system was upgraded and commissioned under the Irish Water National Disinfection Programme in 2017.

Following pH correction and passing through the metal removal filter, the combined water is dosed with 10% sodium hypochlorite. Dosing is flow proportional with duty/standby dosing pumps with automatic switchover in place. Trends are available for viewing on the HMI panel and remotely via SCADA. There is one chlorine monitor: CL001 (control analyser) after chlorine dosing and there is no validation analyser to verify chlorine levels after contact time has been achieved.

The following chlorine alarms were displayed at the plant:

CL001 low warning 0.3 mg/l and low shutdown 0.25 mg/l; CL001 high warning 1 mg/l and 1.1 mg/l high shutdown 1.1 mg/l

Irish Water submitted a chlorine contact time calculation that demonstrated that the plant achieves a total effective contact time of 26.5 mg.min/l at a chlorine level of 0.5 mg/l and this is greater than the target residual chlorine of 23.4 mg.min/l. However there is no chlorine validation monitor to verify contact time and also the low chlorine alarm is set too low to alert the operator to an issue with inadequate chlorine levels in the final water which may result in inadequate chlorine contact time being achieved.

Irish Water said that an alarm and inhibit review would be undertaken at the plant shortly.

		Answer
3.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes

Comment

Alarms are received by the caretaker and relief caretaker and training has been provided to caretakers on how to respond to incidents.

		Answer
3.3	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	No

Comment

There is no chlorine monitor at the outlet of the 6m3 reservoir tank where chlorine contact time is achieved.

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's calculated desktop groundwater assessment model is indicating a 3 Log treatment requirement (when rounded up) for the Dunhill Cois Cille source. Irish Water said that this needs to be confirmed.	

5. Drinking Water Quality

		Answer
5.1	Is Cryptosporidium monitoring being carried out in accordance with Irish Water's 'Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies'?	No

Comment

No *Cryptosporidium* monitoring results are available for the supply.

Irish Water said that it would commence monitoring the supply in accordance with 'Irish Water's Rationale for Determining the Frequency of *Cryptosporidium* Monitoring in Public Water Supplies'.

6. Site Specific Issues

		Answer
6.1	Is the metal filtration system operating satisfactorily?	No

Comment

Following pH correction, water is mixed with 14% sodium hypochlorite and air in a tank prior to passing through 2 no. metal removal filtration units which operate in parallel. WCCC said that the air/chlorine dosing prior to entering the filters is to assist in precipitation of the metals. Iron and manganese are naturally elevated in the raw water.

The units were labelled as Puresep Birm filters but little information was available at the audit on how the filters operate. WCCC said the filters are usually serviced once per year but no service records were available at the audit.

Contractors have inspected the filters in response to the recent elevated iron and manganese levels in the treated water. However it is not yet known if the filters will be serviced or if they will be replaced.

WCCC said that there could be an issue with backwashing of the filters due to lack of available water at the plant for backwashing.

Records submitted show that prior to the incident in July that manganese and iron levels had not been monitored in the treated water since September and October 2021 and this is not frequent enough to demonstrate that the units are operating satisfactorily.

		Answer
6.2	If the pH correction system verified?	No

Comment

There is a pH correction unit at the site which uses limestone to raise the pH of the naturally acidic water.

There is a continuous pH monitor on the raw monitor which was reading 6.32 at the audit. However there is no continuous pH monitor on the final water or regular monitoring for pH. Occasional sampling undertaken in 2019 to 2021 show compliant pH results however it is considered that more regular monitoring is required to verify compliance with the pH parametric value on an ongoing basis.

Recommendations

Subject	Dunhill Audit Recommendations	Due Date	18/09/2022
Action Text	**Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues Irish Water should implement the following recommendations without delay.** **Recommendations** 1. Irish Water should notify the EPA when the BWN is lifted. 2. Irish Water should a) undertake corrective actions to ensure that the metal filtration system is operating effectively so that iron and manganese are below the drinking water parametric values and b) operate the filters (or replacement) in accordance with the manufacturer's instructions. and c) undertake a regular monitoring programme of final water iron and manganese to verify compliance with parametric values. 3. Irish Water should ensure that a filter logbook is maintained containing the following information: a) a record of completed backwashes, b) a record of all maintenance and inspections carried out on the filters and c) details of the media replacement 4. Irish Water should a) relocate the turbidity monitor sampling point for the final water to ensure that accurate readings are provided b) enable the turbidity alarms and shutdowns on the final water. 5. Irish Water should a) install a chlorine monitor with alarm and shutdown at an appropriate location after contact time has been achieved. 6. Irish Water should confirm the alarms and inhibits operational at the plant after the alarm and inhibit review has been undertaken. 7. Irish Water should: a) confirm the log treatment requirement for the plant; b) confirm how the log deficit will be addressed and c) commence *Cryptosporidium* monitoring in accordance with the Irish Water Rationale for Determining the Frequency of Monitoring *Cryptosporidium* in Public Water Supplies. 8. Irish Water should ensure a) that all borehole linings and seals are maintained in accordance with EPA Advice Note No. 14: Borehole Construction and Wellhead Protection and b) update EDEN to include two boreholes as sources. 9. Irish Water should commence regular monitoring of pH of the final water to ensure that the water is complying with the pH parametric values after pH correction has been undertaken. 10. Irish Water should reassess the works completed at Dunhill WTP under the National Disinfection Programme and determine whether further actions are required at this plant. **Follow-Up Actions required by Irish Water** 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. This report has been reviewed and approved by Dr. Michelle Minihan, Senior Inspector, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 18/09/22 detailing how it has dealt with the issues of concern identified during this audit. 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. 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. Please quote the Compliance Plan DW2022090 in any future correspondence in relation to this Report.		