

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	Abbeyfields Housing Estate Clonard
Organisation	Irish Water
Scheme Code	2300PUB2008
County	Meath
Site Visit Reference No.	SV22460

Report Detail	
Issue Date	24/06/2021
Prepared By	Aoife Loughnane

Site Visit Detail			
Date Of Inspection	15/06/2021	Announced	Yes
Time In	10:30	Time Out	13:00
EPA Inspector(s)	Aoife Loughnane Michelle Minihan		
Additional Visitors			
Company Personnel	Irish Water: Fran Glancy, Donal Heaney, Ivan Corcoran Meath County Council: David O'Reilly, John Carroll, Helen McDonnell, Christina Sweeney, Joe Cleary		

> Summary of Key Findings

1. Irish Water issued a Boil Water Notice to all consumers served by Abbeyfields Estate Clonard public water supply from 4th to 16th June 2021 following an incident of inadequate disinfection at Abbeyfields water treatment plant. The incident was not escalated and managed in a timely manner by Meath County Council, which resulted in a two day delay before the Boil Water Notice was issued to protect public health.
2. The incident was caused by a mechanical issue at one of the pressure filters, which resulted in backwash failure. This caused a carryover of iron in the filtered water, which increased the chlorine demand and resulted in low chlorine levels in final water leaving the treatment plant. The filter control unit was replaced on 8th June 2021 and adequate disinfection of the water supply was restored.
3. The audit found serious deficiencies in the filtration & disinfection equipment and controls at Abbeyfields water treatment plant, including no system to monitor filter performance and no access to real-time data trends to enable the operator to monitor the plant performance.
4. The upgrade of Abbeyfields water treatment plant under Irish Water's National Disinfection Programme has been delayed. Irish Water needs to provide an action programme, including timeframes, for addressing the treatment deficiencies identified at the plant.

> Introduction

Abbeyfields water treatment plant provides approximately 62 m³/day of water to 328 people in Abbeyfields and Meadowview housing estates in Clonard, Co. Meath. The supply was originally developed by a private developer and was taken in charge by Meath County Council when the developer ceased trading.

The source of the supply is two boreholes located at the treatment plant. Treatment consists of pressure filtration and disinfection by chlorination. There is 17 m³ storage of treated water at the plant.

This audit was carried out in response to the disinfection incident and issuing of a Boil Water Notice on 4th June 2021.

> Supply Zones Areas Inspected

The auditors inspected the boreholes sources and the treatment processes at Abbeyfields water treatment plant.



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?	No
Comment	
<u>Incident Response:</u>	
<p>1. The residual chlorine level in treated water at Abbeyfields water treatment plant dropped below 0.1 mg/l at 12 noon on 2nd June 2021. Meath County Council operational staff received the low chlorine dial-out alarm and attended the site, checked the disinfection system and chlorine monitor, and re-primed the chlorine dosing pumps. The chlorine pumps appeared to be operating correctly so they left site and expected the chlorine levels to recover to the target level of 0.4 mg/l in treated water.</p> <p>2. When Meath County Council operational staff visited the plant on 3rd June, the residual chlorine levels remained below 0.1 mg/l, with a level of 0.067 mg/l recorded at the end of the network in Meadowview. They arranged for maintenance contractors to visit the plant on the following morning, 4th June. The maintenance contractors subsequently found no issue with the disinfection system.</p> <p>3. Meath County Council operational staff escalated the incident at 12 noon on 4th June, and Irish Water were alerted to the incident. Following consultation with the HSE regarding the risk to consumers health, Irish Water issued a Boil Water Notice on the afternoon of 4th June, due to inadequate disinfection of the water supply.</p> <p>4. The failure to escalate the incident promptly resulted in a delay of two days before the Boil Water Notice was issued to protect public health. While Meath County Council operational staff responded promptly to the low chlorine alarm, they believed the issue was resolved upon completion of their disinfection system checks, and therefore did not escalate the incident until the external contractors confirmed that the problem was not caused by the disinfection system.</p> <p>5. There are no monitors (flow, turbidity, head loss) on the pressure filters, so it was not possible for the plant operator to promptly identify the filters as the cause of the incident.</p> <p>6. There is no access at the plant to real-time data trends on a HMI or SCADA system, therefore the plant operator is unable to monitor the plant performance to ensure the safety of the drinking water supply.</p>	
<u>Investigation & Corrective Actions</u>	
<p>1. Meath County Council's investigations found that the incident was caused by a mechanical issue with the control unit on one of the pressure filters, which resulted in backwash failure. This caused a carryover of iron in the filtered water, which increased the chlorine demand and resulted in low chlorine levels in final water leaving the treatment plant.</p> <p>2. The filter control unit was replaced on 8th June and adequate disinfection of the water supply was restored. The SCADA trend demonstrates adequate chlorine levels in final water leaving Abbeyfields WTP since the repair of the filter control unit on 8th June.</p> <p>3. Investigative samples showed compliant microbiological water quality on 10th, 11th & 12th June at Abbeyfields WTP and at the extremity of the supply (Meadowview pumphouse), with chlorine levels adequate to ensure a properly disinfected water supply.</p> <p>4. The raw water has very high levels of iron and manganese. Investigative samples show that the treatment plant is providing >95% removal of these parameters, and treated water quality is compliant with the iron & manganese parametric values.</p>	



2. Source Protection

2.1

	Answer
Is the abstraction source(s) adequately protected against contamination?	No
Comment	
<p>1. The two borehole sources are located in sealed manhole chambers at the rear of the treatment plant. The tops of the borehole casings are not capped, however the sealed manhole covers would prevent the surface water ingress into the boreholes.</p> <p>2. Land use in the vicinity of the boreholes is generally agricultural (with cattle grazing in the adjacent field) and residential.</p> <p>3. Neither the borehole construction logs or raw water monitoring data were available for inspection during the audit. Meath County Council representatives stated that historic raw water monitoring showed elevated iron and manganese and slightly elevated levels of ammonia in the source water.</p>	



3. Filtration

3.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	No
Comment 1. There are two pressure filters at the plant which operate in series. The filters backwash once per day, triggered by time. A mechanical clock system activates the backwash. The cause of the backwash failure on 2nd June was a broken cog in the mechanical clock system. 2. An inspection of the pressure filters found the following deficiencies: <ul style="list-style-type: none">• There is no flowrate monitor on the filters. The filtration rate is unknown.• There is no system in place to measure filter media bed depth, which is unknown.• There are no continuous monitors to assist in managing the performance of the filtration system or to demonstrate filter performance, e.g. individual filtered water turbidity or differential pressure/head loss. An online turbidity monitor (post filtration) was installed at the plant in 2020 for investigative purposes. However, that monitor was not in operation during the audit and is not used to control the filters.• There is no run-to-waste facility to prevent out of specification water from entering supply after a filter backwash.	



4. Disinfection

4.1

Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?

Answer

No

Comment

1. The disinfectant used at the plant is 15% sodium hypochlorite with 10% Calgon. The disinfection system comprises of duty & standby chlorine dosing pumps, with flow proportional dosing. There is a chlorine monitor and alarm in place, with an alarm dial out facility to Meath County Council operational staff.

2. The chlorine monitor was reading 0.5 mg/l in final water at the time of the audit. The calibration label showed the monitor was serviced in June 2021 by an external contractor, with the next service due in September 2021.

3. The chlorine alarm setpoints are:

- Low chlorine alarm @ 0.2 mg/l. Prior to this incident the setpoint was 0.15 mg/l.
- High chlorine alarm @ 0.7 mg/l. Prior to this incident the setpoint was 0.6 mg/l.

4. Chlorine contact time is provided in a 17 m³ storage tank at the plant. Meath County Council representatives confirmed the chlorine contact time is 15.19 mg.min/l based on a final water residual chlorine concentration of 0.25 mg/l (the target final water chlorine level is actually 0.4 mg/l). The first consumers are located immediately adjacent to the treatment plant.

5. The chlorine levels in final water are manually checked daily by Meath County Council operational staff using a handheld monitor, and recorded in the plant log book. Daily chlorine analysis in the network is carried out and recorded in the operators log book. All records were available for inspection during the audit, and demonstrated good record keeping of disinfection performance.

6. An inspection of the disinfection system found the following deficiencies:

- There is no automatic switchover between the duty and standby chlorine dosing pumps, in the event of failure of one of the pumps.
- There is no automatic shutdown of the plant if chlorine levels in final water reach a critically low or high setpoint.
- There is no access to HMI or SCADA system at the plant, so the plant operator is unable to see the chlorine trend data, to assist in managing the performance of the disinfection system.



5. Site Specific Issues

	Answer
5.1	Has Abbeyfields water treatment plant been upgraded under Irish Water's National Disinfection Programme? Comment <p>1. Irish Water stated that during their review of the proposed Disinfection Programme upgrades for 2021, Irish Water and Meath County Council identified treatment deficiencies with the pressure filtration system at Abbeyfields WTP, in particular its ability to remove iron and manganese from the raw water. The proposed Disinfection Programme upgrade was put on hold until a further assessment of the pressure filtration performance was completed.</p> <p>2. Irish Water's assessment will include a programme of raw, in-process and final water sampling at Abbeyfields WTP in order to determine the iron and manganese removal capability at the plant. The findings will be used to inform the development of an action programme to address any treatment deficiencies.</p> <p>3. Irish Water installed an online turbidity monitor in 2020 as part of the investigation works, however it is not being used to control the plant operations. The online turbidity monitor was not in operation during the audit. Irish Water stated they intend to recommission the monitor, and use the data to inform the assessment of plant performance.</p> <p>4. Irish Water stated that all the treatment deficiencies will be addressed under the proposed plant upgrade works to bring the plant up to the required disinfection standards, including proper a telemetry system. A timeframe for completion of these works could not be confirmed, however the assessment phase is due for completion in Q3 2021. The site has severe space constraints and planning permission may be required to facilitate the upgrade works.</p>

Recommendations

Subject	Abbeyfields Estate PWS - Audit Recommendations	Due Date	22/07/2021
Action Text	<p>Recommendations</p> <ol style="list-style-type: none"> 1. Irish Water and Meath County Council should ensure prompt and timely consultation with the HSE and notification to the EPA of drinking water quality incidents and parametric failures as required in the <i>European Union (Drinking Water) Regulations, SI No 122 of 2014 as amended</i>. 2. Irish Water should undertake a comprehensive assessment of raw water quality in order to inform the scope of plant upgrade works at Abbeyfields water treatment plant, to ensure an appropriate level of treatment for a safe and secure water supply. 3. Irish Water should ensure the boreholes are lined, sealed and capped in accordance with <i>EPA Drinking Water Advice Note 14: Borehole Construction and Wellhead Protection</i> 4. Irish Water should provide an action programme, including timeframes, for addressing the following deficiencies at Abbeyfields water treatment plant: <ol style="list-style-type: none"> (i) Provision of automatic plant shutdown if chlorine levels in final water reach a critically low or high set-point; (ii) Provision of automatic switchover between the duty and standby chlorine dosing pumps, in the event of failure of one of the pumps; (iii) Provision of online turbidity monitors on individual pressure filters; (iv) Provision of run-to-waste facilities on the pressure filters to prevent out of specification water from entering supply; (v) Upgrade of the telemetry system, to include the provision of access to HMI or SCADA system at the plant, to assist the plant operator in the management and control of the water treatment plant. <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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team.</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. 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 Compliance Plan Number in any future correspondence in relation to this Report.</p>		