

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	Ardee
Organisation	Uisce Éireann
Scheme Code	2100PUB1001
County	Louth
Site Visit Reference No.	SV26882

Report Detail	
Issue Date	11/01/2023
Prepared By	Lorcan Farrell

Site Visit Detail			
Date Of Inspection	14/12/2022	Announced	No
Time In	11:30	Time Out	15:20
EPA Inspector(s)	Lorcan Farrell Michelle Roche		
Additional Visitors			
Company Personnel	Irish Water: Daniel Behan, Stephen Brennan, and Edward Haythornthwaite. Louth County Council (working under Service Level Agreement to Irish Water): Patrick Callan, Joseph Griffin, Linda Lynch, John McCooey and Andrew White		

> Summary of Key Findings

(1) Irish Water were unable to confirm the protozoal log treatment requirement for the Ardee Public Water Supply. No monitoring for *Cryptosporidium* in line with Irish Water's *Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies* is currently taking place for the supply.

(2) There are a number of issues regarding disinfection at the treatment plant which include: (i) absence of chlorine contact time verification, (ii) no plant shutdown in place for elevated turbidity in the final water, (iii) inadequate standby pump arrangement for chlorine dosing pumps and (iv) inadequate monitoring of residual chlorine levels in the distribution network.

(3) There is no documented incident response procedure in place at the treatment plant.

> Introduction

Ardee Public Water Supply serves a population of 7,972 people (EDEN figure) and produces approximately 2,700 m³/day. There are two sources for the plant: the river Dee and a borehole located approximately 300m from the plant. Both sources were in production on the day of the audit. Treatment of the surface water source at the plant consists of pH correction, coagulation, clarification, filtration, chlorination and fluoridation. Treatment of the groundwater source consists of chlorination and fluoridation.

The audit was undertaken to assess Irish Water's performance in producing clean and wholesome water.

> Supply Zones Areas Inspected

The audit comprised of a site visit to Ardee Water Treatment Plant (WTP) and involved an inspection of the treatment plant.



1. Coagulation Flocculation and Clarification (CFC) Stage

		Answer
1.1	Is the CFC process optimised to respond to changes in raw water quality?	No
Comment		
(1) Jar testing in accordance with the <i>EPA Water Treatment Manual: Coagulation, Flocculation and Clarification</i> to determine the optimum pH and chemical coagulant dose is not undertaken regularly at the treatment plant.		

		Answer
1.2	Were the CFC tanks, channels and weirs observed to be clean, level and well maintained during the audit?	No
Comment		
(1) Decanting channels in both clarifiers did not appear to be level. Flow over the decanting channel v-notch weirs was not uniform throughout the clarifiers.		



2. Filtration

2.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	No
Comment	
<p>(1) There are three rapid gravity filters in operation at the treatment plant. Media in all filters was replaced in 2019 and it was stated that there is 1.1m of sand in each filter. There is no means or procedure for verifying filter media depth.</p> <p>(2) There is a settlement period of five minutes after filter backwashes are completed before filters return to service. There is no run to waste facility.</p> <p>(3) There was no filter logbook available at the treatment plant.</p> <p>(4) Individual filter trends for the month before the audit were examined and in general were found to be less than 0.3 NTU indicating an adequate filtration barrier.</p>	



3. Disinfection

		Answer
3.1	Are duty and standby chlorine pumps/ UV units in operation?	No
Comment		
<p>(1) There are two chlorine dosing pumps at the treatment plant which operate in a duty/assist arrangement. It was stated that at times when ammonia levels are high in the incoming raw water both pumps are needed to maintain an appropriate dose rate. At these times there is no standby pump available in the event of a mechanical failure of either the duty or assist pumps.</p>		

		Answer
3.2	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	No
Comment		
<p>(1) The chlorine contact time calculation for the treatment plant includes the clearwater tank at the treatment plant, the rising main and Slieve Breagh reservoir as part of its calculation to ensure adequate chlorine contact time. Residual chlorine is monitored at the outlet of the clearwater tank at the treatment plant before being pumped to Slieve Breagh reservoir via the rising main. There is no residual chlorine monitor present at the outlet of Slieve Breagh reservoir to verify adequate chlorine contact time has been achieved. Ardee WTP has been included in the Irish Water Disinfection Programme. Phase 1 (Site Assessment) of the programme was completed in 2018 while phase 2 (Site installation) has yet to be completed.</p>		

		Answer
3.3	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No
Comment		
<p>(1) Free chlorine residual levels are monitored daily at one location at the centre of the network.</p>		



4. Treatment Process Chemicals

	Answer
4.1 Are treatment process chemicals appropriately managed and stored?	No
Comment	
<p>(1) The sodium hypochlorite storage tanks that store product from the on-site electrochlorination (OSEC) system are single skinned and are located in a room with no bund present.</p> <p>(2) There was a can containing 10% sodium hypochlorite in the entrance hall of the plant beside the main office which was an unbunded area. There were empty cans containing residual amounts of 10% sodium hypochlorite located in the hall also as well as on pallets located outside the treatment plant building.</p>	



5. Management and Control

		Answer
5.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
Comment		
<p>(1) An assessment of the protozoal log treatment requirement for the supply is in progress but has not been completed by Irish Water.</p> <p>(2) No monitoring in line with Irish Water's <i>Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies</i> is taking place currently at the treatment plant.</p>		

		Answer
5.2	Is there a documented alarm response procedure?	No
Comment		
<p>(1) There was no documented incident response procedure available at the treatment plant. Louth County Council staff present at the audit had received incident response training from Irish Water in 2022.</p> <p>(2) Alarms that are generated in the treatment plant are sent out to all operational staff on the dial-out list at the same time. There is no formal procedure for ensuring that alarms have been responded to.</p>		

		Answer
5.3	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No
Comment		
<p>(1) A final water turbidity alarm of 0.8 NTU was in place at the treatment plant. There was no plant shutdown setpoint in accordance with the 1 NTU regulatory limit specified in the <i>EPA Water Treatment Manual: Filtration</i> to prevent inadequately treated water from entering the distribution network.</p>		

		Answer
5.4	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	No
Comment		
<p>(1) Filter turbidity alarm setpoints for individual filters at the treatment plant were set at 2.1 NTU for filter one and 2 NTU for filters two and three. These turbidity setpoints are not in accordance with the 0.3 NTU limit as specified in the <i>EPA Water Treatment Manual: Filtration</i> to maintain an adequate treatment barrier.</p> <p>(2) There is no combined filtered water turbidity meter at the treatment plant as recommended in the <i>EPA Water Treatment Manual: Filtration</i>.</p>		

Recommendations

Subject	Ardee PWS Audit Recommendations	Due Date	11/02/2023
Action Text	<p data-bbox="272 315 517 344">Recommendations</p> <p data-bbox="272 371 1326 461">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.</p> <ol data-bbox="300 488 1426 1771" style="list-style-type: none"> <li data-bbox="300 488 1426 607">1. Irish Water should: (i) confirm the log treatment requirement for the plant, (ii) confirm how any log deficit will be addressed and (iii) commence <i>Cryptosporidium</i> monitoring in accordance with Irish Water's <i>Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies</i>. <li data-bbox="300 633 1426 813">2. Irish Water should prioritise Ardee water treatment plant for completion under the Irish Water Disinfection Programme and provide details of the scope of the works to be undertaken including timescales. This should include: (i) verification of chlorine contact time including provision of appropriate alarms/shutdowns and (ii) installation of a standby chlorine dosing pump with automatic switch over or plant shutdown in the event of the failure of one of the duty/assist pumps. <li data-bbox="300 840 1426 958">3. Irish Water should: (i) ensure that an incident response procedure is developed and implemented for the supply, (ii) ensure that training on the new incident response procedure is undertaken for all operational staff and (iii) ensure there is a documented system for confirming treatment plant alarms have been responded to. <li data-bbox="300 985 1426 1104">4. Irish Water in accordance with the <i>EPA Water Treatment Manual: Filtration</i> should: (i) set appropriate filter turbidity alarms/shutdown setpoints to provide an effective protozoal barrier and (ii) investigate the feasibility of installing a continuous turbidity monitor on the combined filtered water including relevant alarm and shutdown setpoints. <li data-bbox="300 1131 1426 1220">5. Irish Water should ensure that appropriate alarms/shutdowns are in place in accordance with the regulatory 1 NTU limit on final water turbidity as detailed in the <i>EPA Water Treatment Manual: Filtration</i>. <li data-bbox="300 1247 1426 1395">6. Irish Water in accordance with the <i>EPA Water Treatment Manual: Filtration</i> should: (i) investigate the feasibility of installing a run to waste system following filter backwashes, (ii) provide a means of assessing the depth of media in the rapid gravity filters, such as depth gauges fixed to the filter walls and (iii) maintain records of all regular filter operational checks. <li data-bbox="300 1422 1426 1480">7. Irish Water should monitor residual chlorine in the network, including extremities, several times per week to ensure a minimum residual chlorine of 0.1 mg/l is maintained. <li data-bbox="300 1507 1426 1626">8. Irish Water should: (i) carry out jar testing in accordance with the <i>EPA Water Treatment Manual: Coagulation, Flocculation and Clarification</i> to determine the optimum chemical coagulant dose and pH for the treatment of the water and (ii) ensure that the settled water outlet channels are level with uniform flow being achieved throughout. <li data-bbox="300 1653 1426 1771">9. Irish Water should review chemical storage arrangements at the treatment plant. Chemicals should be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Fill points for storage tanks should be within bunded areas. <p data-bbox="272 1798 810 1827">Follow-Up Actions required by Irish Water</p> <p data-bbox="272 1832 1426 1890">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 data-bbox="272 1895 1426 1984">This report has been reviewed and approved by Ruth Barrington, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 11/02/2023 detailing how it has dealt with the issues of concern identified during this audit.</p> <p data-bbox="272 1989 1426 2101">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.</p>		

