Site Visit Report

Under the *European Union (Drinking Water) Regulations 2023*, the Environmental Protection Agency (EPA) is the supervisory authority in relation to Uisce Éireann and its role in the provision of public drinking water supplies. This audit was carried out to assess the performance of Uisce Éireann in providing clean and wholesome water to the public water supply named below.

The audit process is a sample of the performance of a water treatment plant and public water supply on a given date.

Water Supply Zone

Name of Installation	Adare PWS
Organisation	Uisce Éireann
Scheme Code	1900PUB1002
County	Limerick
Site Visit Reference No.	SV30101

Report Detail

Issue Date	02/07/2024
Prepared By	Orla Harrington

Site Visit Detail

Date Of Inspection	23/05/2024	**Announced**	Yes
Time In	10:30	**Time Out**	11:50
EPA Inspector(s) **Additional Visitors**	Orla Harrington		
Company Personnel	Uisce Éireann: Susan Cook, Ted Ahern. Limerick City and County Council (working in partnership with Uisce Éireann): Peter Fee, Adrian Barrett, Liam Fanning.		

Summary of Key Findings

1. The audit found a number of shortcomings in relation to disinfection at the plant:(i) the warning alarm in place on the continuous residual chlorine monitor on the outlet of the Adare reservoir is not set at an appropriate level and there is no automatic shutdown based on low and high levels for chlorine in the final water; (ii) review of data from the chlorine monitor post dosing found unstable trends, with chlorine levels dropping and spiking between 15/04/2024 and 05/05/2024 and (iii) there are no duty and standby arrangements in place at the chlorine dosing pumps.

2. Uisce Éireann confirmed that the Adare public water supply has a protozoal log credit requirement of 4 log. Currently treatment at the plant provides 3 log credit if operated in accordance with the log credit performance approach. This gives a - 1 log treatment deficit. On the day of the audit, Uisce Éireann advised that they have not yet considered installing an additional treatment barrier to address the log deficit. Monthly *Cryptosporidium* sampling is undertaken at the plant.

3. At the previous audit, Uisce Éireann had planned to rationalise Adare public water supply and connect to Limerick City Environs public water supply as an alternative source of clean and wholesome drinking water. At the audit, Uisce Éireann advised that progress with this rationalisation could no longer be confirmed. A number of the previous audit recommendations to improve and optimise treatment processes have not been completed. A completion date was not provided on the day of the audit.

Introduction

The Adare public water supply (PWS) serves a population of 2,097 and produces approximately 1,073 m3/day of treated water. The supply has two raw water sources, the Maigue River and one groundwater borehole, supplying 40m3/hr and 26m3/hr respectively.

Treatment of the surface water source consists of coagulation, flocculation, hopper-bottomed tank settlement, rapid gravity filtration (RGF) and chlorination before entering a clearwater tank where it is combined with chlorinated water from the borehole. The combined water is pumped approximately 3km to Adare Reservoir before distribution.

The focus of the audit was on protozoal barriers at the plant. This audit was also carried out to assess Uisce Éireann's progress with the recommendations from the previous audit undertaken by the EPA on 24/09/2021.

Supply Zones Areas Inspected

The audit consisted of an inspection of the rapid gravity filters and chlorination. The Adare reservoir was not inspected during the audit.

1. Disinfection

		Answer
1.1	Is the disinfection system verified using monitors and alarms?	No

Comment

1. There is a chlorine monitor (CL002) at the outlet of the reservoir where contact time (Ct) is achieved. Prior to the audit, trend data from CL002 between 03/05/2024 and 04/05/2024 indicated low chlorine residual, below the warning alarm level, in treated water. This incident was identified by the triggering of the low level chlorine alarm which is set at 0.5mg/l. The high-level alarm is set at 1.5mg/l. Uisce Éireann stated that CL002 was not operating correctly on those dates as the float valve to the monitor was found to be sticking, affecting the sample flow to the probe resulting in inaccurate trend readings. Operational staff cleaned the flow valve and flow to the probe returned to normal on 04/05/2024. On the day of the audit, CL002 was reading 0.66mg/l.

2. Satisfactory trends of the chlorine monitor controlling dosing (CL001) between 03/05/2024 and 04/05/2024 were provided post audit. The auditor noted that chlorine residuals in the network on 03/05/2024, 04/05/2024 and 06/05/2024 were >0.1 mg/l.

3. There are high and low warning alarms in place on CL002. The low alarm setpoint (0.5 mg/l) on CL002 is lower than the minimum free chlorine concentration (0.71mg/l) required at Ct validation point as specified on the chlorine Ct validation calculation. There is no plant shutdown based on the output of this monitor which is not in accordance with the EPA Water Treatment Manual: Disinfection.

4. It is not possible to review any trends in chlorine demand at the plant. Limerick City and County Council advised there is no broadband so plant performance trends are not accessible at the plant. Uisce Éireann advised that this would be addressed without delay.

		Answer
1.2	Are duty and standby chlorine pumps/ UV units in operation?	No

Comment

1. There are no duty and standby arrangements in place at the chlorine dosing pumps. Limerick City and County Council advised that a purchase order has been raised to put this duty/standby arrangement in place.

		Answer
1.3	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	No

Comment

1. The contact tank is 30 minutes behind real-time so the dosing pumps are constantly playing catch up in terms of having to suddenly increase or decrease the disinfection dose every 30 minutes in line with chlorine residual data measured in the contact tank. This then gives rise to increased fluctuations in residual chlorine trends. Prior to the audit, the chlorine residual post dosing SCADA trend data for CL002 was reviewed. This indicated that levels fluctuated between a low of 0.3 mg/l and a high of 2.10 mg/l between 15/04/2024 and 05/05/2024. Investigations are ongoing to try and resolve the issue.

2. The high lift pumps to the Adare reservoir shut down when the chlorine residual in the contact tank drops to <0.5 mg/l. These pumps must be manually reset by operational staff.

		Answer
1.4	Is there a chlorine residual ≥0.1 mg/l throughout the network?	No

Comment

1. Records show that residual chlorine is monitored several times a week at one location referred to as Station Road.

2. A reading of 0.07mg/l was recorded at Station Road on 07/05/2024. Treated water received an additional boost of chlorine on 07/05/202 and this was successful in restoring chlorine levels at Station Road on 08/05/2024, 09/05/2024 and 10/05/2024.

2. Management and Control

		Answer
2.1	Have the recommendations from the previous EPA audit been satisfactorily addressed?	No

Comment

1. A number of recommendations from the previous EPA audit undertaken on 24/09/21 have not been completed to date. The outstanding recommendations are as follows:

No. 5 and 6: Uisce Éireann should submit details of how the log treatment deficit identified will be addressed, and continue to monitor the supply as per the *Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies* until the log deficit is addressed.

Update: Uisce Éireann has indicated that the Adare PWS source has a protozoal log credit requirement of 4 log. Currently treatment at the plant provides 3 log credit if operated in accordance with the log credit performance approach. This gives a 1 log treatment deficit. At the audit, Uisce Éireann advised that they will continue to monitor the supply in accordance with the *Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies*. Uisce Éireann could not confirm how this protozoal log deficit at the plant will be addressed.

No. 7: Uisce Éireann should install automatic switchover between alum and poly dosing pumps and investigate the feasibility of installing an alarm to warn of pump failure.

Update: At the previous audit, Uisce Éireann had planned to rationalise Adare PWS and connect to Limerick City Environs PWS as an alternative source of clean and wholesome drinking water. However progress with this rationalisation could no longer be confirmed. The audit found that installation of automatic switchover has not commenced and a completion date could not be provided.

No. 10: Uisce Éireann should review chemical storage arrangements at the plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein.

Update: There has been no progress with this recommendation due to the fact that Uisce Éireann had previously planned to rationalise the supply and connect to Limerick City Environs PWS. At the audit, a completion date could not be provided.

2. The supernatant resulting from sludge treatment at the plant is discharged to the River Maigue. Recommendation No. 4 from the previous audit required Uisce Éireann to carry out a full ecological assessment on the impact of the discharge from the Adare WTP on the Maigue River. At the audit, Uisce Éireann provided a report to the EPA entitled 'Assessment of the impacts of Adare WTP discharge, Co. Limerick' dated September 2023. The reports states that while the discharge from Adare WTP to the River Maigue is not having an observable negative impact on the water quality of the river. It acknowledges that the presence of settled solids within the river channel is not appropriate and should be addressed.

3. Protozoal Barriers Audits 2024

		Answer
3.1	Did staff confirm they have received training on the site specific incident response and incident escalation process?	No

Comment

1. At the time of the audit, Limerick City and County Council could not confirm if full training on the site specific incident response and incident escalation process had been received.

		Answer
3.2	Has UÉ identified the protozoal compliance log treatment requirement for the water treatment plant?	Yes

Comment

1. Uisce Éireann confirmed that the Adare PWS source has a protozoal log credit requirement of 4 log. Currently treatment at the plant provides 3 log credits if operated in accordance with the log credit performance approach. This gives a -1 log treatment deficit.

2. There is monthly *Cryptosporidium* monitoring being carried out at the plant. On the day of the audit, Uisce Éireann stated that they have not yet considered installing an additional treatment barrier to address the log deficit at Adare WTP.

		Answer
3.3	Are the filters designed and managed in accordance with EPA guidance?	No

Comment

1. There are four rapid gravity filters in place at the treatment plant. There are no filter media depth gauges in place to visually assess filter media depth.

2. Operational staff were unable to confirm when the filter media was last replaced and could not confirm the media depth in the filters.

3. Backwashing is not triggered by the turbidity alarm setpoints or triggered by head loss. Each filter is manually backwashed every 2 days.

4. There is a turbidity alarm setpoint at 0.3 NTU on each of the individual filter turbidity monitors. The auditor noted that the 0.3 NTU level is protected by a run to waste trigger with an appropriate time delay of 15 minutes.

		Answer
3.4	Are coagulant residual monitoring results compliant in final water?	No

Comment

1. Aluminium sulphate is used as the coagulant at the plant. Limerick City and County Council advised that there is daily aluminium monitoring of the final water at the plant. On the day of the audit, there was no log of the aluminium monitoring results available for inspection.

Recommendations

Subject	Adare PWS - Audit Report	Due Date	02/08/2024
Action Text	**Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.** 1. Disinfection: (i) ensure duty and standby arrangements in place with automatic switchover at the chlorine dosing pumps; (ii) install appropriate alarms/shutdowns on verified chlorine residuals after contact time; (iii) investigate the fluctuating chlorine residual trends at chlorine monitor CL001 and put corrective actions in place and (iv) ensure all chlorine monitors are regularly maintained in accordance with the manufacturer's instructions. 2. Ensure that operational staff have access to plant performance trends at the water treatment plant. 3. (i) Submit an action programme with timeframes to address the protozoal log treatment deficit at the plant; (ii) Inform the HSE that there is a 1 log protozoal treatment deficit at the plant and (iii) continue to monitor the supply as per the *Uisce Éireann Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Suppliers* until the log deficit is addressed. 4. Install automatic switchover between alum and poly dosing pumps and investigate the feasibility of installing an alarm to warn of pump failure. 5. Review chemical storage arrangement at the plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. 6. Ensure that monitoring of residual chlorine is undertaken several times a week at different points of the network to include network extremities, and that records of the monitoring results are maintained, ensuring chlorine is > 0.1mg/l in the network. 7. Ensure that (i) filter media depth is at a minimum of 1m operating depth; (ii) a filter media depth gauge is installed on the filters and (iii) assess feasibility of installing automatic backwashing of the filters based on turbidity. 8. Ensure that training is provided to all relevant staff on the Site Specific Incident Response and Incident Escalation process. 9. Undertake regular monitoring of residual aluminium at the plant and maintain adequate records on site. 10. Complete all recommendations identified in the Uisce Éireann Report '*Assessment of the impacts of Adare WTP Discharge, Co. Limerick'* September 2023. **Actions required by Uisce Éireann** During the audit, Uisce Éireann representatives were advised of the audit findings and that action must be taken by Uisce Éireann to address the issues raised. Uisce Éireann should submit a report to the EPA on or before 02/08/2024 detailing the actions taken and planned, with timescales, to close out the above recommendations. The EPA advises that the findings and recommendations from this audit report should, where relevant, be addressed at other public water supplies.		