

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	The Strand PWS
Organisation	Uisce Éireann
Scheme Code	1600PUB0027
County	Laois
Site Visit Reference No.	SV30556

Report Detail	
Issue Date	04/12/2024
Prepared By	Derval Devaney

Site Visit Detail			
Date Of Inspection	25/10/2024	Announced	Yes
Time In	11:00	Time Out	13:10
EPA Inspector(s)	Derval Devaney Becci Cantrell		
Additional Visitors			
Company Personnel	Uisce Éireann (UÉ): Linda Doran. Laois County Council (working in partnership with UÉ): John Mc Court, Brendan Garry, Conor Ryle, Tom O'Carroll, PJ Fitzpatrick.		

> Summary of Key Findings

1. The time delay on the chlorine alarm and plant inhibit setting was not in line with EPA guidance and UÉ's specification. There was no hi alarm warning set point in place for final water turbidity.
2. Trends and historical data from critical monitors at the plant are not accessible to the plant operator.
3. The chlorine contact time calculation provided in advance of the audit was inaccurate.
4. There was no (i) operational monitoring programme in place to verify that manganese and iron filtration treatment is effective (ii) turbidity monitors on the pressure filters and (iii) the Water Supplier could not provide details of filter media in place or when it was last replaced.

> Introduction

The Strand Public Water Supply (PWS) produces approximately 6 m³/day to three properties next to the water treatment plant serving approximately 11 people.

Raw water is abstracted from a borehole next to the water treatment plant. Treatment consists of iron and manganese filtration and disinfection by chlorinating the supply with sodium hypochlorite.

The audit was undertaken to assess Uisce Éireann's performance in producing clean and wholesome water with a focus on verifying that recommendations from previous EPA files relating to the supply have been addressed, that appropriate alarms and inhibits are in place at the water treatment plant (WTP), and procedures are in place to ensure appropriate oversight of treatment processes.

> Supply Zones Areas Inspected

The borehole source and treatment processes at the water treatment plant were inspected.



1. Source Protection

1.1

Is the abstraction source(s) adequately protected against contamination?

Answer

Yes

Comment

1. The Water Supplier stated that landowners were written out to in the past in relation to their obligations under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022 as amended and a reminder letter of their obligations would be sent following this audit.
2. The Water Supplier stated the nearby houses served by the WTP have septic tanks. These tanks are likely to be within the supply's zone of contribution (ZOC). The Water Supplier could not provide details during the audit of Local Authority inspection of the tanks.
3. The Water Supplier stated during the audit that it abstracts approximately 5 - 6 m³ / day of raw water from it's borehole source. This does not correlate with the Water Supplier's submission on the EPA's Abstraction Register, which states that 78 m³ / day is abstracted. The flow meter illustrated that 202 litres / hour was being treated on the day of the audit.



2. Filtration

2.1

		Answer
Does monitoring indicate that the filters are operating effectively?		No
Comment		
<ol style="list-style-type: none">1. Raw water flows through two pressure filters in sequence. There is a pressure gauge on each filter but there is no turbidity monitor on each filter to verify they are operating satisfactorily. Backwash occurs automatically every 24 hours at 2 am lasting 21 minutes.2. Chlorine is dosed post the pressure filters.3. Water flows from the pressure filters and post chlorination through a manganese and iron filox filter. Backwashing also occurs automatically every 24 hours at 3 am.4. An operational monitoring programme is not in place to verify that the manganese and iron filters are effective and operating optimally.5. The Water Supplier was unable to provide details on the filtration media in place in the filtration vessels on-site and if or when such media was replaced.6. Treated water then flows through a series of three recently installed holding tanks on-site before entering the distribution network. The holding tanks provide enough contact time to disinfect the water. The chlorine and turbidity final water monitors are located on the outlet of the 3rd holding tank.		



3. Management and Control

3.1

Is the water treatment plant resilient enough to cope with significant variations in raw water quality or demand?

Answer

Yes

Comment

1. On the day of the audit the plant appeared to be coping with the water presented however it is unclear if the WTP is resilient enough to cope with the raw water quality as UÉ does not have a raw water monitoring programme in place for the groundwater source.

3.2

Has the protozoal compliance log treatment requirement been identified for the water treatment plant?

Answer

Yes

Comment

1. UÉ completed a source and sanitary survey for the source and assigned a 3 log protozoal treatment for the water treatment plant (WTP).
2. UÉ confirmed during the audit that it would clarify if the log assigned is correct given that treatment provided includes pressure filtration, manganese and iron filtration and chlorine disinfection only. There is no UV treatment at the plant.



4. Alarms, Inhibits & Oversight Audits 2024

4.1

Is suitable continuous monitoring in place to verify treatment performance?

Answer

No

Comment

1. There are no turbidity monitors on the pressure filters to indicate if they are operating effectively.
2. There is a continuous turbidity and chlorine monitor on the final water post treatment.
3. The chlorine trend submitted in advance of the audit from 20th September 2024 displayed a cycle of spikes (up to 0.825 mg/l) and dips (down to 0.4 mg/l) in chlorine concentration post Contact Time (Ct).
4. The Water Supplier explained that three final water holding tanks were installed to increase capacity at the plant for backwash water and Ct and since this installation the chlorine concentration has varied and requires further investigation to determine the cause and rectify the matter.

4.2

Were online monitors within their calibration dates?

Answer

No

Comment

1. There were no calibration records for the flow meter on-site.
2. It was unclear what the manufacturer's recommendations were for the calibration of the flow meter at the WTP. The Water Supplier stated the flow meter is not calibrated unless there is an issue with the monitor.
3. To achieve adequate disinfection the chlorine dose is based on flow volumes, and therefore it is critical that the flow meter is reading accurately at all times.

4.3

Are suitable alarm settings in place to alert operators to deteriorating water quality or the failure of a critical treatment process?

Answer

No

Comment

1. The WTP HMI displayed a 30 minute time delay on the chlorine monitor hi hi alarm and plant inhibit, this does not meet the 5 minute time delay recommended in the EPA's Water Treatment Manual: Disinfection.
2. The chlorine alarm time delay settings on the HMI at the WTP differed from those submitted by UÉ in advance of the audit. For example it stated the time delay for the hi hi chlorine alarm was 3 minutes, whereas 30 minutes was displayed on the plant's HMI during the audit.
3. There is a hi hi alarm on the final water turbidity monitor with a time delay of 3 minutes which enables a plant shutdown. However there is no hi turbidity alarm to act as a warning that turbidity is approaching the hi hi alarm set point.

4.4

Has UÉ carried out an alarm and inhibit review at the water treatment plant?

Answer

Yes

Comment

1. UÉ carried out an alarm and inhibit review the week prior to the EPA audit.

	Answer
4.5	Were all findings of the UÉ alarm and inhibit review implemented?
	No
Comment	
1. The Water Supplier stated that the time delay on the final water turbidity should have been adjusted downwards from 30 minutes to 3 minutes when Water Supplier personell were at the site the week prior to the audit.	

	Answer
4.6	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?
	No
Comment	
1. See Q 4.3 above relating to the inadequate time delay in place for the hi hi final water chlorine alarm that triggers a plant shutdown.	

	Answer
4.7	Are plant performance trends accessible by operational staff at the water treatment plant?
	No
Comment	
1. Plant operational staff can read the current status from each critical online monitor but do not have access to data trends or historic data.	

	Answer
4.8	Is there a documented alarm response procedure?
	No
Comment	
1. There is no site specific procedure for The Strand PWS setting out how alarms are responded to in order to protect water quality and public health.	

	Answer
4.9	Is the chlorine contact time calculation correct?
	No
Comment	

1. The contact time (Ct) calculation submitted in advance of the audit contained a maximum flow of 0.3 m³/hr.
2. During the audit the Water Supplier stated the raw water pumps have a max. flow capacity of 9 m³/day and on average pump 5 - 6 m³/day with the maximum flow being approximately 0.4 - 0.5 m³ /hr. The maximum flow in the Ct Calculation needs to be amended to reflect the latter greater figure.
3. The Ct calculation included the effective contact time for a pipeline associated with the manganese treatment process which uses chlorine to oxidise manganese in advance of the disinfection process. The manganese treatment process is a separate process to disinfection and therefore should not be included in the calculation of Ct for adequate disinfection.

Subject	The Strand PWS Audit Recommendations 24.10.2024	Due Date	06/01/2025
Action Text	<p>Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.</p> <ol style="list-style-type: none"> Liaise with Laois County Council to ensure: <ol style="list-style-type: none"> local landowners have been written to in relation to their obligations under the <i>European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022</i>, as amended; inspection(s) are carried out of the nearby septic tank(s) within the water supply's zone of contribution to assess if they are operating optimally and do not present a risk to human health or the environment. Put in place a raw water monitoring programme for The Strand PWS groundwater source. Put in place a routine operational monitoring programme for manganese and iron that samples from the raw and treated water to verify treatment in place is effective. Calibrate the flow meter in accordance with manufacturer's instructions. Ensure there is a documented site-specific alarm response procedure in place and training is provided to all relevant staff on the procedure. Provide details on the filter media in place for the pressure filters and the iron and manganese filtration system and when media was last replaced. Provide clarity on the protozoal log treatment in place at The Strand WTP, the log treatment required and how any deficit will be met. <ol style="list-style-type: none"> Install a turbidity monitor with appropriate alarm and inhibits on the pressure filters; Review the alarm and inhibit settings for turbidity and chlorine to ensure critical treatment processes and water quality targets are protected and settings align with EPA Guidance (e.g. the <i>EPA Water Treatment Manual: Disinfection</i>), UÉ's Disinfection Specification, and statutory limits; Implement the findings of UÉ's alarm and inhibit review of the water treatment plant and incorporate this audit's findings. <ol style="list-style-type: none"> Submit a revised Ct Calculation taking account of maximum flow at the plant (m³/hr) and the effective contact time relating to the disinfection process only; Ensure the cause for spikes and dips in final water chlorine concentrations are investigated and rectified; Ensure monitoring trends from critical online monitors are available to operational staff. Address the discrepancy (and make changes where necessary) in the daily volume (m³/day) provided to the EPA via EDEN and via the EPA's Abstraction Register for The Strand PWS. <p>Actions required by Uisce Éireann</p> <p>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.</p> <p>Uisce Éireann should submit a report to the EPA on or before the above due date detailing the actions taken and planned, with timescales, to close out the above recommendations.</p> <p>The EPA advises that the findings and recommendations from this audit report should, where relevant, be addressed at other public water supplies.</p>		