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	Meelick PWS
Organisation	Uisce Éireann
Scheme Code	1600PUB0005
County	Laois
Site Visit Reference No.	SV29614

Report Detail

Issue Date	02/04/2024
Prepared By	Derval Devaney

Site Visit Detail

Date Of Inspection	04/03/2024	**Announced**	Yes
Time In	11:00	**Time Out**	13:35
EPA Inspector(s) **Additional Visitors**	Derval Devaney		
Company Personnel	Uisce Éireann (UÉ): Joseph Moran Laois County Council (working in partnership with UÉ): Michael Drennan, Brendan Garry, Conor Ryle, Tom O'Carroll, Martin Glesson Coffey Construction Ltd: David Monaghan		

Summary of Key Findings

1. Uisce Éireann's Incident Communication Response Guidance Form did not contain site specific trigger levels to protect critical disinfection processes at the WTP.
2. The UV treatment system's alarm and inhibit set points did not correspond to the setpoints outlined in the validation documentation based on the volume of water flowing through the plant. The turbidity and chlorine alarm and inhibit settings also require to be revised to protect critical treatment performance.
3. The UVI units displayed on SCADA were inaccurate.
4. Chlorine residual results for the Meelick PWS distribution network were unavailable for inspection during the audit.

Introduction

The Meelick Public Water Supply (PWS) supplies an average of 600 m3/day of water, serving a population of 1500. This is not reflective of the volume and population listed on the EPA EDEN system. The water supply serves Meelick PWS and also supplements Portlaoise PWS (the Meelick South District Metered Area) and 3 km of the Ballyroan PWS.

The source for the supply is a borehole. Treatment consists of UV treatment and secondary chlorination.

The audit was undertaken to assess Uisce Éireann’s performance in producing clean and wholesome water with a focus on the alarms and inhibits in place at the water treatment plant (WTP) and the procedures in place to ensure appropriate oversight of treatment processes.

Supply Zones Areas Inspected

The borehole, treatment plant and associated equipment and monitors were inspected during the audit.

1. Source Protection

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

Comment

1. There is no raw water monitoring programme in place for the groundwater source.

2. The groundwater well is encased in a lockable kiosk, however there appeared to be some gaps in the borehole's cap which may present a route for contamination of the water supply's source.

2. Disinfection

		Answer
2.1	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No

Comment

1. The water supply serves Meelick PWS and also supplements Portlaoise PWS (the Meelick South District Metered Area) and 3 km of Ballyroan PWS. The Meelick PWS plant operator takes chlorine residual readings at various locations on the Portlaoise PWS network and only at one location served by the Meelick PWS. These results were available on the day of the audit and were satisfactory at above 0.1 mg/l.

2. The Ballyroan PWS plant operator takes chlorine residual readings at other locations in the Meelick PWS. These results were not available for inspection during the audit to determine if the frequency of monitoring was suitable and concentrations satisfactory.

3. Treatment Process Chemicals

		Answer
3.1	Are treatment process chemicals appropriately managed and stored?	No

Comment

1 There were two 25 litre plastic containers labelled sodium hypochlorite 10/11% w/w containing liquid. These were stored outside on the treatment plant yard in an unbunded area. The Water Services staff believed the drums contained water not sodium hypochlorite.

2. There were empty sodium hypochlorite containers stored outdoors on a pallet. The Water Services staff stated these were due to be removed off-site for disposal.

4. Alarms, Inhibits & Oversight Audits 2024

		Answer
4.1	Is there a documented site specific incident response and incident escalation process?	Yes

Comment

1. The Uisce Éireann Incident Communication Response Guidance Form displayed at the WTP did not contain certain site specific trigger levels to protect critical processes at the WTP. For example the form did not include trigger levels related to the UV treatment system (such as UVI, Flow and Lamp Status) which provides primary disinfection at the site.

2. The Uisce Éireann Incident Communication Response Guidance Form displayed at the WTP stated 0.5 mg/l was the minimum free chlorine required for the site. However during the audit it was stated that 0.85 mg/l was the free chlorine residual target for the site to ensure adequate disinfection.

3. The Uisce Éireann Incident Communication Response Guidance Form displayed at the WTP did not contain an up-to-date list of site specific personnel relevant to the site. The form needs to be updated to reflect the contact change for UÉ Compliance.

		Answer
4.2	Is suitable continuous monitoring in place to verify treatment performance?	Yes

Comment

1. UV treatment is the primary form of disinfection on the Meelick water supply. The Visades T 1200L-400 duty-standby UV units are ONORM validated for a maximum flow of 40 m3/hour at a minimum UVT of 79.4%. The UV units alarm depending on flow, UVI, and lamp status, all of which are continuously monitored at the plant. The UV unit also shuts down on UVT monitored pre UV treatment. The UV unit did not have a plate to display it's operational validation criteria for adequate disinfection.

2. The supply is secondary disinfected with sodium hypochlorite to maintain at least 0.1 mg/l of residual chlorine in the distribution network at all times. A chlorine monitor measures the chlorine residual once it goes through a 15 minute contact coil.

3. The free chlorine residual target is 0.85 mg/l at the plant. The chlorine monitor read 0.86 mg/l during the audit. The Water Services team stated that the chlorine target could possibly be revised downwards, given that the recently installed UV unit now provides primary disinfection and chlorine is required for secondary disinfection only to ensure a minimum of 0.1 mg/l free chlorine residual is met in the distribution network.

		Answer
4.3	Were online monitors within their calibration dates?	No

Comment

1. It was not possible to determine if online monitors were within their calibration date as there were no stickers on the monitors to indicate when they were last calibrated.

2. Uisce Éireann explained that the plant was being upgraded under its Disinfection Programme and is currently in the process proving stage. It stated all online monitors will display calibration details once the process proving stage has ended.

		Answer
4.4	Are suitable alarm settings in place to alert operators to deteriorating water quality or the failure of a critical treatment process?	No

Comment

1. The alarms and inhibits in place did not protect critical treatment processes.

2. The UV unit's alarm and inhibits set points did not correspond to the set points outlined in the UV validation documentation, to ensure adequate disinfection is based on the volume of water that can go through the WTP. The plant's maximum production capacity is 40 m3/hr which, based on the UV validation certificate, requires a minimum UVI of 35.2 W/m2 and a minimum UVT of 79.4 % to ensure adequate UV disinfection. The audit found:

- The alarm and inhibit settings for process flow water (FL001) were were set at 50m3/hr (Hi) and 60 m3/hr (HiHi), which were not site specific as the raw water pumps can only pump up to a maximum of 40 m3/hour;
- The UVT (UVT001) LoLo alarm and inhibit was set at 75%, which was outside the validated range which requires a minimum UVT of 79.4% for a maximum flow of 40 m3/hr;
- The UVI (UVI 001 and UVI002) Lo alarm was set at 3.03 mW/cm2 (30.3 W/m2) and LoLo alarm and set inhibit at 2.53mW/cm2 (25.3 W/m2). These settings were outside the validated range which requires a minimum UVI of 35.2 W/m2 for a maximum flow of 40 m3/hr.

3. An HiHi alarm signals the plant to shutdown when turbidity (TU001), monitored pre-UV treatment, is 1 NTU or above for 6 minutes. This time delay is too long and should be revised to 3 minutes in line with EPA Guidance. An alarm also signals and the plant is shutdown when turbidity is 2 NTU or greater for 2 minutes. This turbidity level is too high and should be revised to alarm at 1 NTU or below to protect the regulatory limit on final water turbidity.

4. An alarm signals when the chlorine monitor (CL001 located after a 15 minute contact coil) falls below 0.5 mg/l. The plant shuts down if chlorine residual falls below 0.4 mg/l. These alarm and inhibit settings do not protect the 0.85 mg/l chlorine target to ensure 0.1 mg/l is met in the distribution network at all times. It was stated during the audit that the chlorine residual target may need to be revised downwards, given that chlorination is now used for secondary disinfection.

		Answer
4.5	Has UÉ carried out an alarm and inhibit review at the water treatment plant?	No

Comment

1. UÉ has yet to carry out an alarm and inhibit review at Meelick WTP. The plant is currently being upgraded under a disinfection programme contract and is in the process proving stage.

2. UÉ will complete an alarm and inhibit review once the upgrade works are complete. Works are expected to be complete by the end of March 2024 with the review to commence in Q2 2024.

		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. Suitable plant shutdowns/inhibits were not in place to protect critical treatment processes and ensure a safe water supply at all times. See Point 4.4 above.

		Answer
4.7	Are plant performance trends accessible by operational staff at the water treatment plant?	Yes

Comment
1. The chlorine monitor trend on SCADA from 25 January to 20th February 2024 indicated frequent fluctuations in chlorine levels ranging from 0.6 mg/l to 1.15 mg/l. The variation in chlorine levels should be investigated to determine if the cause is due to the minimum target level and automatic dosing arrangements or the location of the chlorine monitor. 2. The unit scale for UVI on SCADA was incorrect and reading mW/m2 instead of mW/cm2.

		Answer
4.8	Is there a documented alarm response procedure?	No

Comment
1. There was no documented alarm response procedure available for inspection.

Recommendations

Subject	Meelick PWS Audit Recommendations 04.03.2024	Due Date	02/05/2024
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. Update EDEN with the correct supply population and volume. 2. Regarding the Meelick PWS groundwater source (i) put in place a raw water monitoring programme and (ii) ensure that any gaps in the borehole cap are sealed. Uisce Éireann should have regard to *EPA Advice Note No. 14: Borehole Construction and Wellhead Protection* when carrying out these works. 3. Ensure that (i) the Uisce Éireann Incident Communication Response Guidance Form displayed at the WTP contains site specific trigger levels protecting critical processes at the WTP and up-to-date contact details, (ii) there is a documented alarm response procedure in place and (iii) training is provided to relevant staff on alarm response and incident escalation. 4. Review (i) the target chlorine residual at the plant to ensure adequate chlorine residuals can be maintained at the extremities of the distribution network, (ii) the low chlorine alarm and inhibit set-point to ensure the required target chlorine residual is achieved at all times, (iii) and investigate the cause of the fluctuating chlorine residual concentrations and take measures to reduce variation in chlorine residual post the 15 minute contact coil. 5. Ammend the units for UVI displayed on SCADA to ensure it is displayed correctly. 6. Undertake an Alarm and Inhibit Review of the plant and implement the findings to protect treatment processes and treated water quality. Include a review of the alarm and inhibit setpoints for (i) UVI, Flow and UVT on both UV units to meet the validation criteria and (ii) turbidity to verify critical treatment performance and demonstrate that there is an effective protozoal barrier at the plant. 7. Ensure (i) the UV validation certificate, or a UV plate outlining the UV's validation criteria, is available onsite and (ii) critical equipment at the plant has service/calibration stickers with appropriate service interval dates, including the UV unit and sensors, chemical dosing pumps and online monitors. 8. Ensure routine monitoring of chlorine residuals is carried out at suitable locations within the network at a frequency of at least several times per week. Take actions if results are detected below the minimum 0.1 mg/l for adequate disinfection. 9. Remove containers stored in unbunded areas from the water treatment plant immediately and dispose of appropriately. **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 the above due date 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.		