

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	LERWSS
Organisation	Uisce Éireann
Scheme Code	2400PUB1001
County	Monaghan
Site Visit Reference No.	SV27690

Report Detail	
Issue Date	28/04/2023
Prepared By	Lorcan Farrell

Site Visit Detail			
Date Of Inspection	05/04/2023	Announced	Yes
Time In	10:30	Time Out	14:20
EPA Inspector(s)	Lorcan Farrell		
Additional Visitors			
Company Personnel	Uisce Éireann: Fionnuala Bonner, Pat Collins, Yvonne McMonagle. Monaghan County Council (Working in partnership with Uisce Éireann): Tom McGuirk, Maria Smyth, Martin Taylor.		

> Summary of Key Findings

(1) There have been recurring exceedances of the manganese parametric value in the Lough Egish Regional Water Supply Scheme (LERWSS) since 2020. Different treatment options have been installed at the treatment plant over this time to aid manganese removal. LERWSS has been included under the Uisce Éireann Manganese Working Group to further develop treatment options to return the supply to compliance with the manganese parametric value.

(2) In a review completed by Uisce Éireann after the audit, it was found that between the 09/02/2023 and 15/03/2023 there were 29 exceedances of the manganese parametric value that were not reported to the EPA.

(3) There is a residual chlorine monitor located at the outlet of Kilkitt Reservoir to verify chlorine contact time has been achieved however there is no alarm or treatment plant shutdown setpoint in place based on the output of this monitor.

> Introduction

LERWSS serves a population of 10,473 people (EDEN figure) and is supplied by Kilkitt Water Treatment Plant (WTP) which produces approximately 4,619 m³/day. The treatment plant sources its water via Corlea pumping station from Lough Bawn which is located approximately 3 km away. Potassium permanganate (for manganese control) is dosed at Corlea pumping station before being pumped to the treatment plant. At Kilkitt WTP treatment consists of alkalinity adjustment, acid dosing (when needed), coagulation, clarification, filtration, chlorination, UV, fluoridation and pH correction.

The audit was undertaken to assess Uisce Éireann's performance in producing clean and wholesome water in response to high manganese levels detected in treated water and in the network, including manganese results in excess of the European Union (Drinking Water) Regulations 2023 limit of 50 ug/l.

> Supply Zones Areas Inspected

The audit comprised of a site visit to Kilkitt WTP and an inspection of the treatment plant.



1. Filtration

	Answer
1.1	Are the filters designed and managed in accordance with EPA guidance? No
Comment	
<p>1. There are four rapid gravity filters at the treatment plant in a multi-media configuration consisting of silica sand, anthracite and a 150mm layer of manganese dioxide. A filter assessment was carried out at the treatment plant in January 2023. The assessment is currently being reviewed by the Uisce Éireann process operations team. Issues identified as part of the filter assessment include filter media loss through backwashing, the need to adjust backwash cycle process and timings, excess media present within the filter, and the need for media replacement.</p> <p>2. In response to the filter assessment, the backwash cycle was adjusted and now consists of an air scour, combined air/water stage before a final water rinse stage. Timings for each backwash stage were adjusted to optimise backwash performance and minimise filter media loss. Other findings from the filter assessment had yet to be actioned. These include a trial to remove of 200mm of filter media to assess the impact on filter media loss through backwashing and the eventual replacement of filter media in all filters. Timescales for completion of these works were given as Q3/Q4 2023 for one filter with the remaining filters following but which have no fixed timescales for completion.</p> <p>3. While filter operation and filter backwashes are visually assessed by staff, there are a number of regular operational checks outlined in Table 5.4 of the <i>EPA Water Treatment Manual: Filtration</i> that are not being completed regularly at the treatment plant. Appropriate records of operational checks should also be maintained as outlined in Section 5.5.4 of the <i>EPA Water Treatment Manual: Filtration</i>.</p>	



2. Disinfection

2.1

Is the residual chlorine monitored at a suitable sample location after contact time has been completed?

Answer

Yes

Comment

1. The chlorine contact time calculation for the treatment plant submitted in pre-audit information includes the rising main and the tanks that comprise Kilkitt Reservoir as part of its calculation to ensure adequate chlorine contact time. While there is a residual chlorine monitor located at the outlet of Kilkitt Reservoir there is no alarm or treatment plant shutdown setpoint based on verified chlorine residuals after contact time has been achieved. The output of this monitor is available on the county telemetry system however it is not available as a trend on the SCADA system at Kilkitt WTP.

2. There is a chlorine residual monitor (with associated alarm and plant shutdown setpoints) located post sodium hypochlorite dosing on the rising main connecting Kilkitt WTP with Kilkitt Reservoir. This monitor ensures untreated water does not reach the reservoir.



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

No

Comment

1. There have been recurring exceedances of the manganese parametric value at Kilkitt WTP and within the LERWSS network since 2020. In response to these exceedances, different treatment options have been implemented at the treatment plant and include the addition of a 150mm layer of manganese dioxide to the filters as well as potassium permanganate dosing pre-filtration. The most recent treatment upgrade to aid the removal of manganese is a potassium permanganate dosing system located at the Corlea pumping station which was installed in 2022. Potassium permanganate is dosed into the raw water to increase manganese oxidation before being pumped to the treatment plant.

2. Potassium permanganate dosing both at Corlea pumping station and the treatment plant is reactive in nature and adjusted manually based on levels detected in the raw water as it arrives at the treatment plant. Raw water is tested daily at the treatment plant for manganese levels. The potassium permanganate dosing system located at Corlea pumping station is the primary dosing system and operates on a continuous basis. The potassium permanganate system dosing before the filters is used when raw water manganese levels exceed 100 ug/l. Both systems were in operation on the day of the audit.

3. Raw water manganese levels are dependent on lake conditions and can increase quickly depending on weather. The exceedances that occurred at the treatment plant and in the network since the start of 2023 have been attributed to sudden decreases in temperature leading to increased manganese levels in the raw water. In response to this, a potassium permanganate dosing matrix is currently being developed at the plant to facilitate faster reaction to sudden increases in raw water manganese levels.

4. Uisce Éireann stated that Kilkitt WTP has been included under the Uisce Éireann Manganese Working Group which will investigate alternative treatment options that may be suitable for the conditions being experienced at the treatment plant. The current option being developed in conjunction with this workshop is the development of the potassium permanganate dosing matrix referred to above. Other options that are being discussed under the manganese working group include the installation of sodium carbonate dosing at the Corlea pumping station for pH correction to facilitate increased oxidation of raw water manganese and the exploration of different continuous online monitoring options to introduce an element of automation in the control of manganese at the treatment plant. Uisce Éireann staff stated that these options were at early discussion stages only and that the development of the potassium permanganate dosing matrix remains as the current option being developed.

5. There have been no exceedances of the manganese parametric value reported within the supply network since 16/03/2023.



	Answer
4.1	Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2023 been notified to the EPA? Comment <p>1. In a response to an EPA request for information submitted by Uisce Éireann on 15/03/2023, it became apparent that a number of failures to comply with the manganese parametric value that occurred at the treatment plant and within the network had not been reported to the EPA. This was discussed during the audit and it was agreed that Uisce Éireann would conduct a review of the exceedances within the supply and submit a report to the EPA.</p> <p>2. The report was submitted to the EPA on the 13/04/2023 and concluded that between the 09/02/2023 and 15/03/2023 there were 29 exceedances of the manganese parametric value that were not reported to the EPA.</p> <p>3. It was also stated in the report that Uisce Éireann and Monaghan County Council have agreed to increase communication along with increased surveillance of reporting protocols to ensure regulatory reporting requirements to both the EPA and HSE are followed in instances where failures to meet the parametric value for manganese are recorded.</p>

Recommendations

Subject	LERWSS - Audit Recommendations	Due Date	26/05/2023
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">1. Prioritise Kilkitt WTP under the Uisce Éireann Manganese Working Group and provide an action programme (with timescales) for the restoration and maintenance of compliance with the manganese parametric value.2. Ensure that all failures to comply with parametric values within the supply are notified to the EPA in a timely manner. This should include consultation with the HSE, where relevant.3. Ensure that: (i) appropriate alarms/shutdowns are in place based on verified chlorine residuals after contact time and (ii) the trend for the verification monitor on the outlet of Kilkitt Reservoir is made available on the SCADA system at the treatment plant.4. Complete actions against recommendations contained in the Uisce Éireann filter assessment carried out at the treatment plant in January 2023.5. Conduct regular operational checks of filters at the treatment plant and maintain adequate records of these checks in accordance with the <i>EPA Water Treatment Manual: Filtration</i>. <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 26/05/2023 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>		