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	Ennistymon RWS
Organisation	Uisce Éireann
Scheme Code	0300PUB1004
County	Clare
Site Visit Reference No.	SV27802

Report Detail

Issue Date	01/06/2023
Prepared By	Orla Harrington

Site Visit Detail

Date Of Inspection	10/05/2023	**Announced**	Yes
Time In	11:00	**Time Out**	14:15
EPA Inspector(s) **Additional Visitors**	Orla Harrington		
Company Personnel	Uisce Éireann: Duane O'Brien, Aine Butler, Deirdre O'Loughlin Clare County Council (Working in partnership with Uisce Éireann): Mike McNamara, Roisin Breheny, Martin O'Looney.		

Summary of Key Findings

1. The audit found poor management and an absence of operational control of the sludge treatment processes at the plant. The main findings include (i) a lack of alarms to alert plant operators to any malfunction of the sludge treatment process (ii) lack of adequate storage and settlement capacity for sludge treatment (iii) lack of maintenance of sludge treatment equipment and (iv) insufficient frequency of sludge removal off site.

2. The Ennistymon Public Water Supply is on the EPA's Remedial Action List. At the audit, Uisce Éireann advised that a full upgrade of the water treatment plant is progressing and includes the installation of a new clarifier and upgrade of all three rapid gravity filters including installation of a run to waste facility. The auditor advised that further works to improve the operation of sludge management and treatment at the plant will be required. Uisce Éireann stated that this will result in a delay from the current projected date for completion of Quarter 4 2023.

3. There is no alarm cascade system in place on this supply. The caretaker is the only person who is currently notified of the dial out alarms.

Introduction

The Ennistymon Public Water Supply (PWS) serves a population of 6,703 and produces 6,083 m3/day of treated water (EPA EDEN figures). Raw water is abstracted from Lickeen Lough located approximately 2km from Ennistymon Water Treatment Plant (WTP). Treatment includes coagulation, flocculation, clarification, pH correction, filtration, disinfection and fluoridation. There is sludge treatment on-site, consisting of two picket fence thickeners (PFTs) and dewatering units. At the audit it was noted that both PFTs were not in operation due to mechanical failures.

The plant currently produces approximately 320 m3/hr and is operating well above its design capacity of 200 m3/hr. The Ennistymon PWS is on the EPA's Remedial Action List (RAL) since Quarter 4 2015 under the category “EPA Audit Observation – Treatment & Management Issues”.

The EPA were contacted by Inland Fisheries Ireland (IFI) on 03/05/2023 and 05/05/2023 in relation to reports of a discolouration and subsequent fish kill in the Ballymacraven River downstream of the Ennistymon WTP. IFI is currently conducting an investigation into the incident.

Supply Zones Areas Inspected

The audit focused on the treatment and management of the sludge being generated on site and the supernatant discharge to the Ballymacraven River. The rapid gravity filters and chlorination system was also inspected.

1. Filtration

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

Comment

1. The combined water from the clarifiers passes to three rapid gravity filters. Clare County Council stated that the filter media was last replenished in 2013 and could not confirm the media depth in the filters. There are no marker posts installed to allow visual observation of the depth of the filter media.

2. There are individual turbidity monitors after each filter and a combined turbidity monitor on the final water. Turbidity monitors were compliant on the day of the audit. The turbidity monitors are not linked to SCADA which prevents remote access to the system and trend analysis of turbidity readings.

3. Subsequent to the audit, Uisce Éireann provided final water turbidity trend data for the period 09/04/2023 to 11/05/2023 and prolonged spikes were noted > 1 NTU. Uisce Éireann stated that these spikes occurred after filter backwashes.

4. Currently backwash is not automated and requires manual initiation. There is no slow start system or run to waste taking place following filter backwash. The filters are returned to service based on the visual observation of the caretaker.

2. Disinfection

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

Comment

On the day of the audit, there were no network monitoring results to check residual chlorine levels in the distribution network. Clare County Council stated that residual chlorine results are >0.1 mg/l at the end of the line and monitoring usually takes place at four locations per week.

3. Management and Control

		Answer
3.1	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No

Comment

1. There is currently no automatic shutdown of the water going into supply linked to elevated turbidity.

2. There is a shutdown on low chlorine of 0.2 mg/l which is too low to ensure adequately disinfected water at all times. This setting did not match the minimum free chlorine required at the contact time validation point, specified as 0.4 mg/l in the chlorine contact time calculation.

		Answer
3.2	Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators?	No

Comment

There is no cascade system in place for all dial out alarms to safeguard against non-response to alarms. The caretaker is the only person who is currently notified of the dial out alarms. Therefore there is no oversight of alarms and responses made to them.

4. Sludge Management

		Answer
4.1	Is sludge arising from the treatment processes adequately managed?	No

Comment

1. The EPA were contacted by IFI on 03/05/2023 and 05/05/2023 in relation to reports of a discolouration and subsequent fish kill in the Ballymacraven River downstream of the Ennistymon WTP. The EPA audit was undertaken to assess the operation and management of sludge treatment at the Ennistymon WTP.

2. There are two clarifiers at the WTP. Settled sludge (400 m3/day) is drawn off from the clarifiers on an adjustable timed sequence, currently open two minutes and closed six minutes. The sludge is then pumped to a balancing tank before entering two picket fence thickeners (PFTs) operating in parallel. Both PFTs were not operating on the day of the audit. Clare County Council stated that the rotating mechanism of one of the PFTs had been out of operation since April 2020 resulting in less than normal processing of sludge at the WTP. Replacement parts had been sourced for the PFTs and were due to be installed in the coming weeks. At the audit Uisce Éireann stated that the sludge treatment part of the plant is due for demolition in the next 12 months.

3. The sludge is then directed to a holding tank. Clare County Council advised that the agitator in the holding tank was not working. Neither Uisce Éireann or Clare County Council were able to confirm the duration of this malfunction. The sludge is then sent to the centrifuge dewatering units and according to Clare County Council produces a dry solids content of approximately 14%. At the end of the sludge process, the sludge output is sent off-site for disposal at a rate of 1 skip every 10 -12 days to Bunlicky waste water treatment plant (WWTP), Co. Limerick. The supernatant from this stream is sent to a lagoon onsite (referred to as the 'washwater tank').

4. There are three rapid gravity filters at the WTP. Two filters are backwashed every day discharging ~60m3 per filter per day of backwash water to the washwater tank. There is limited capacity at the plant for settlement of the supernatant from the dewatering units and filter backwash before discharge via one outfall to the Ballymacraven River. There is no continuous monitoring of the turbidity or flow of the discharge to the Ballymacraven River. There is no alarm if the depth of sludge is elevated in the washwater tank. Clare County Council stated that the washwater tank and discharge point is visually inspected on a daily basis, however Clare County Council advised that there is potential for the discharge of sludge to the Ballymacraven River during periods when the washwater tank is full. Uisce Éireann provided monitoring results of the discharge between 29/01/2020 and 29/03/2023. Eighteen samples were analysed for pH, suspended solids, iron and total organic carbon. Results show that this discharge can have an iron content ranging from 500 - 31,000 ug/l, pH <4 - 11.39 and suspended solids <2 - 160 mg/l.

5. Clare County Council stated that approximately 30 tonnes/day four times/week of sludge is removed from the washwater tank. The collection of sludge was increased to approximately 145 tonnes from 09/05/2023 to 12/05/2023. Records provided for April and May 2023 substantiate these figures.

6. Uisce Éireann have proposed to undertake the following interim sludge handling measures until sludge treatment at the plant is fully upgraded: (i) fully de-sludge the washwater tank and annually thereafter (ii) adjust timing allowed for settlement of backwash flows and (iii) review operation of the decanting arm. The discharge point to the river was inspected and noted to be clear on the day of the audit. Clare County Council took samples of the discharge on 11/05/2023 in response to the incident. The results of this monitoring were not available at the time of writing this report.

5. Supply on the Remedial Action List

		Answer
5.1	Is the Action Programme on track to meet the Remedial Action List completion date?	No

Comment

1. Ennistymon PWS has been on the RAL since 2015 under the category “EPA Audit Observation – Treatment & Management Issues” following an EPA audit on 07/08/2014. The plant was found to be operating at approximately 55% above its design capacity and under significant pressure. Uisce Éireann's most recent RAL progress report dated 19/12/2022 stated that "Detailed design works are now complete on the water treatment at the Ennistymon plant. Construction work commenced in Q3 2022 and is programmed to be complete by Q4 2023". The auditor advised Uisce Éireann that further works to improve the operation of sludge management and treatment at the plant will be required under the RAL upgrade. Uisce Éireann stated that this will result in a delay from the current projected date for completion of Quarter 4 2023.

2. Uisce Éireann gave a brief outline of RAL upgrade works to be completed by Quarter 4 2023, subsequent to the audit. This upgrade work includes (i) construction of a third clarifier and upgrade of the existing two clarifiers (ii) full grade of all three rapid gravity filters, including installation of backwash and run to waste pipework (iii) electrical and instrumentation upgrade. Uisce Éireann advised the EPA subsequent to the audit that sludge treatment works to be completed by Quarter 2 2025 will include installation of a new sludge balancing tank, PFT's, sludge holding tank, centrifuge, along with electrical & instrumentation works.

Recommendations

Subject	Ennistymon PWS - Audit Report	Due Date	03/07/2023

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. Review current methods of handling and disposal of water treatment sludge to ensure the practice is not in contravention of the Waste Management Act, 1996 - 2012. The discharge of water treatment sludge to receiving water, where practiced, should cease immediately. Leachate from stored drinking water sludge should not give rise to environmental pollution.

2. Submit an action programme (with timeframes) to facilitate the removal of Ennistymon PWS from the EPA's Remedial Action List. The action programme should include (i) details of the upgrades planned on all water treatment processes including the sludge treatment plant and (ii) sludge management plan for when the existing sludge treatment plant is decommissioned.

3. Assess and submit a report on the impact of the discharge of the supernatant on the water quality of the Ballymacraven River to ensure it is not having a negative impact on the recieving water and liaise with Inland Fisheries Ireland, National Parks and Wildlife Service and the Local Authority Waters Programme on the outcome of the assessment.

4. Confirm that the picket fence thickeners are operational.

5. Provide a progress update on the interim sludge handling measures for the washwater tanks including the following: (i) fully desludge the washwater tanks and annually thereafter (ii) adjust timing allowed for settlement of backwash flows and (iii) optimise operation of the decanting arm.

6. Install (i) a flow monitor and (ii) a turbidity monitor with alarms on the supernatant to ensure it is continuously monitored before discharge to the Ballymacraven River.

7. (i) Submit turbidity trends for each individual filter for the last month with an explanation for any spikes or dips and (ii) install shutdown of the plant based on high turbidity in the final water.

8. Review the low chlorine shutdown setting for chlorine monitors to ensure that the setting reflects the minimum free chlorine concentration required at the contact time validation point as per the site specific contact time calculation sheet.

9. Ensure that there is an appropriate cascade system in place for responding to alarms generated at the plant which allows for verification that an alarm has been responded to.

10. Ensure that monitoring of residual chlorine is undertaken in the network several times a week.

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 03/07/2023 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.