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	Inishturk PGWS
Organisation	Uisce Éireann
Scheme Code	2200PUB1031
County	Mayo
Site Visit Reference No.	SV30288

Report Detail

Issue Date	30/10/2024
Prepared By	Veronica Boland

Site Visit Detail

Date Of Inspection	20/09/2024	**Announced**	Yes
Time In	12:00	**Time Out**	14:45
EPA Inspector(s)	Veronica Boland Maria O'Connell		
Additional Visitors	HSE: Tim Coffey		
Company Personnel	Uisce Eireann: Ronan McDonnell, Vinny McGrath Robert O'Toole.		

Summary of Key Findings

1. A Boil Water Notice was placed on Inishturk Public Water Supply on 03/09/2024 in response to elevated turbidity levels and issues with the chlorine disinfection system. The Boil Water Notice remained in place on the day of the audit but was subsequently lifted on 20/10/2024.

2. There are no automatic shutdowns linked to low and high chlorine residual levels and there was inadequate control of the chlorine dosing system in place at the time of the audit.

3. There are no turbidity monitors, alarms or inhibits on the individual slow sand filters, and no turbidity inhibit on the final water, to prevent inadequately treated water entering the supply.

4. The audit found a lack of appropriate oversight of plant performance trends of the Inishturk WTP.

Introduction

The Inishturk water treatment plant (WTP) serves a population of 44 people (EDEN figure), with 40m3/day of treated water produced at the Inishturk WTP and has a design capacity of 60m3/day. The raw water abstraction is from Coolanick Lake and flows by gravity to Inishturk WTP. The treatment processes comprise of a raw water tank, slow sand filtration, GAC filtration (for prevention of trihalomethane formation) and chlorination. The treated water goes to an onsite reservoir providing 57m3 storage. A source and sanitary survey was completed in 2021 and a Log 3 treatment requirement is assigned to Inishturk WTP.

Supply Zones Areas Inspected

The raw water source, treatment processes and on-site reservoir were inspected on the day of the audit.

1. Incident Management

		Answer
1.1	Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No

Comment

1. On the morning of 02/09/2024, the 4 large GAC filters at the Inishturk WTP were replaced with 4 smaller GAC filters. During the audit Uisce Éireann (UÉ) advised that the smaller GAC filters performed to the same standard as the larger GAC filters.

2. On 03/09/2024 at 03:45 a.m., operational staff received an alarm text message relating to final water 'High Turbidity'.

3. On the 03/09/2024 between approximately 08:00-08:30 a.m., operational staff arrived at the WTP. The final water turbidity monitor was reading between 8 to 9NTU.

4. At approximately 09:30 a.m., operational staff spoke on the phone to Uisce Éireann (UÉ).

5. The operational staff checked the chlorine dosing monitor CL001, it was reading 0.0mg/l. The pump rate of the duty pump was increased throughout the morning.

6. At 12:10 p.m., UÉ rang the HSE and advised of elevated turbidity levels and chlorine problems at Inishturk WTP and a Boil Water Notice (BWN) was immediately issued. The EPA were notified immediately following issue of the BWN.

2. Source Protection

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

Comment

1. The raw water source, Lake Coolanick is located in a 'commonage' grazing area where sheep have access to the water source.

2. The raw water is surrounded by a boggy area. Operational staff stated at the audit that there is a mesh covering on the abstraction point and this mesh has had to be removed and cleaned many times due to the build up of mud and green slimy residue and this slimy residue can block the slow sand filters.

3. Disinfection

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

Comment

1. Chlorine contact time is achieved in the on-site reservoir. The post chlorine contact verification point (CL002) is located on the outlet of the reservoir.

2. The CL002 trends were reviewed at the audit. The chlorine residual trend (CL002) has been very unstable since 15/03/2024 ranging from 0.2 mg/l to 5mg/l.

3. On the 15/03/2024 the On-site Electrolyser (OSEC) unit for producing sodium hypochlorite stopped working.

4. Since the breakdown of the OSEC unit, drummed 10% sodium hypochlorite has been used to achieve disinfection, applied via the chlorine day tank. Operational staff carry out manual dosing from the chlorine day tank with a visual check that the chlorine residual monitor CL002 is reading above the site specific chlorine residual post contact validation.

5. Between 26/09/2021 to 28/08/2024 chlorine trends ranged from 0.25mg/l to 5 mg/l. The EPA is concerned that there is inadequate control over the chlorine dosing at Inishturk WTP. Uisce Éireann advised at the audit that there is no long term plan in place other than to continue with manual chlorine dosing.

		Answer
3.2	Are manual chlorine tests carried out and recorded on final treated water to compare with the continuous monitor results?	No

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

Comment

1. Operational staff advised at the audit that they undertake chlorine residual monitoring at three various locations in the network and check against the CL002 monitor readings on-site. Operational staff could not definitively state how often chlorine residual network monitoring is undertaken.

2. Operational staff advised that they do not record the readings. There were no records available on site for auditors to review and verify if network monitoring is undertaken.

4. Management and Control

		Answer
4.1	Is the plant suitably managed and controlled to maintain the designed log credit on each treatment stage?	No

Comment

1. There are 2 Slow Sand Filters (SSF1 and SSF2) at Inishturk WTP with a raw water tank before the filters and a balancing tank after the filters.

2. While slow sand filters can provide 2.5 Log treatment, this is not achieved in practice at Inishturk WTP because the full range of filtration controls are not in place in accordance with section 4.6.2 of the *EPA Water Treatment Manual: Filtration,* in particular, there are no monitors on the individual filters and there are no alarms or shutdowns linked to individual filtered water. There is no inhibit on final water turbidity.

3. There were no records of filter cleaning. There are no filter depth gauges, there is no headloss monitor on either filter, no information could be provided on the flow rate through the filters, and raw water temperature is not tested, which is not in accordance with the *EPA Treatment Manual: Filtration*.

4. At the audit, UÉ stated that sand in SSF1 was replaced on 09/09/2024, and the sand media depth was 800 mm. Auditors observed holes visible in the sand of SSF1 and the water appeared murky in the areas around these holes.

5. SSF2 had a lot of 'potholing' visible. The sand in SSF2 was scheduled to be replaced following the audit.

6. The EPA requested records of all training completed by operational staff at Inishturk WTP. A record of Incident Management training completed was provided to the EPA, however there is no record of training in relation to the operation, maintenance and record keeping in relation to the filtration and disinfection system.

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

Comment

1. There are no inhibits linked to low and high chlorine residual levels or high turbidity levels at the WTP.

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

Comment

1. The final water turbidity warning alarm setting is >0.8 NTU for 10 minutes. This time delay is not in accordance with the controls specified in Table 4.2 'Turbidity performance criteria for slow sand filtration' of the *EPA Treatment Manual: Filtration*.

2. The site specific chlorine contact calculation sheet for Inishturk WTP submitted in the pre-audit information states a minimum free chlorine requirement of 0.6mg/l at the chlorine contact validation point (CL002).

3. The chlorine dosing (CL001) alarms are 'Low' alarm of 0mg/l and 'High' 2.8mg/l for 900 seconds. The low alarm of 0mg/l is set too low.

4. The chlorine residual validation point (CL002) alarm settings are 'Low' 0.7 mg/l and 'High' 5.0 mg/l for a 10 minute time duration. The 'High' alarm setting should be reviewed, and the time duration is not in accordance with the 5 minute time delay in the *EPA Treatment Manual: Disinfection*.

		Answer
4.4	Are critical alarms dialled out to staff?	Yes

Comment

1. Critical alarms are dialled out to staff including supervisory staff, however only one operational staff member is located on Inishturk to respond to alarms.

		Answer
4.5	Are online monitors operational?	Yes

Comment

1. There are 3 turbidity monitors located at Inishturk WTP for monitoring raw water, pre- reservoir and post-reservoir.

2. The turbidity monitors were not clearly labelled. It was not clear to the auditors what each monitor was monitoring and there was confusion which monitor related to raw water, pre-reservoir and post-reservoir. The SCADA diagram showed a different configuration relating to the location of the turbidity monitors.

3. There were two monitors referring to final water turbidity, readings did not tally, and in one case was higher than the raw water turbidity reading.

		Answer
4.6	Is the data obtained from sampling and monitoring used to actively inform the processes on site and in the distribution network?	No

Comment

1. There are no manual tests undertaken at Inishturk WTP to check if turbidity and chlorine monitors are working properly.

2. The operational staff do not have access to SCADA trended data at the WTP nor remotely via mobile phone. Access to and the use of reviewing trended data is imperative to ensure that the plant is operating correctly and that any performance issues are addressed quickly.

		Answer
4.7	Is there appropriate oversight of plant performance?	No

Comment

1. There is no system for supervisory checks of Inishturk WTP performance trends based and monitoring data. The audit found a lack of appropriate oversight of plant performance trends, and no explanation could be given for the cause of spikes and dips in turbidity and chlorine residual trend data.

2. At the audit, staff advised that oversight of alarms is by the National Operations Management Centre (NOMC). Supervisors receive notification of alarm dial outs via text message but there is no routine review of alarm responses made, for example, how an alarm was responded to, what actions were instigated to address the alarm.

3. There were no records of alarms, alarm responses, issues at the site including any plant downtime, maintenance or servicing undertaken at the WTP and there is no plant performance trend data overview.

4. At the audit, final water turbidity trend data was reviewed. An exceedance of the 1 NTU (3.3 NTU) occurred on 26/08/2024 for a period of 35 minutes between 10:25 to 11:00 hours in August. UÉ could not give an explanation for this exceedance. This exceedance was not notified to the EPA. Also, the breakdown of critical treatment equipment, the OSEC disinfection unit, in March 2024 was not notified to the EPA and only identified during the audit.

Recommendations

Subject	Inishturk PWS Audit 2024 - Recommendations	Due Date	27/11/2024
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. Provide (i) an update to the EPA on interim disinfection dosing and control measures in place at Inishturk WTP to protect public health and (ii) an Action Programme including timeframes for a proposed permanent disinfection system for Inishturk WTP that ensures a robust and stable disinfection system with a regular maintenance schedule. 2. Upgrade the slow sand filters at Inishturk WTP to meet the criteria outlined in Table 4.1 'Critical control parameters for slow sand filters' of the *EPA Water Treatment Manual: Filtration* for the purpose of verifying 2.5 protozoal log treatment removal. 3. (i) Conduct regular operational checks of the slow sand filters at the treatment plant at specified intervals as per 'Regular operational checks' in the *EPA Treatment Manual: Filtration* and (ii) maintain records as per 'Records Management' in the *EPA Water Treatment Manual: Filtration.* 4. Provide and report to the EPA on (i) high and low chlorine residual alarms and shutdowns to protect disinfection and (ii) turbidity alarms and inhibits which meet the criteria for awarding log credits as specified in the *EPA Water Treatment Manual: Filtration*. Ensure operational staff are trained on amendments to all alarm and inhibit settings. 5. Ensure there are robust systems of reviews and checks on water treatment plant performance and interpretation of data and alarms, and act on any deficiencies identified to protect public health and maintain drinking water quality. Ensure that operational staff have access to plant performance trends at the water treatment plant. 6. Notify the EPA of any exceedances including turbidity levels >1 NTU (3 minutes delay) and breakdown of critical treatment processes at the WTP. 7. Ensure that operational staff receive appropriate training, for example the QQI Level 5 course – Plant Operations for Water Treatment. 8. Clearly label all monitors to clearly indicate what each monitor is measuring. 9. Carry out monitoring of residual chlorine several (two to three) times per week at different points of the network to include network extremities, and records of the monitoring results are maintained, ensuring chlorine is > 0.1 mg/L in the network. 10. Investigate the feasibility of re-locating the raw water abstraction point to prevent ingress of algae and mud into the water treatment plant. **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 **27 November 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.		