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	Clogh-Castlecomer PWS
Organisation	Uisce Éireann
Scheme Code	1500PUB1005
County	Kilkenny
Site Visit Reference No.	SV27621

Report Detail

Issue Date	14/04/2023
Prepared By	Orla Harrington

Site Visit Detail

Date Of Inspection	16/03/2023	**Announced**	Yes
Time In	11:30	**Time Out**	13:45
EPA Inspector(s) **Additional Visitors**	Orla Harrington		
Company Personnel	Uisce Éireann: Samantha Keane, Ornaith Hanna Kilkenny County Council (working in partnership with Uisce Éireann): Sean Tyrell, John Cody, David O' Brien, Denis Lawlor, Kevin Hogan.		

Summary of Key Findings

1. A Boil Water Notice (BWN) was placed on the Clogh-Castlecomer Public Water Supply (PWS) on 27/02/2023 to protect public health due to high turbidity. Uisce Éireann stated that the BWN will remain in place until remedial measures are complete to improve the performance of the pressure filtration stage. It was found that the incident was escalated appropriately once operational staff became aware of the issue.

2. Current treatment at the Clogh-Castlecomer Water Treatment Plant (WTP) does not effectively remove manganese in the raw water sources. Uisce Éireann need to put an action programme in place to restore compliance with the manganese parametric value in the supply.

3. Elevated manganese levels in the sources have resulted in repeated failures of the manganese parametric value of 50 ug/l since 09/08/2022 in water serving the Clogh-Castlecomer PWS. Information provided during the audit led to the EPA subsequently becoming aware of six additional manganese exceedances in final treated water leaving the Clogh-Castlecomer WTP during 10/01/2023 to 22/02/2023. The EPA was not notified of these exceedances in a timely manner.

4. The protozoal compliance log treatment requirement for the supply has been determined as 3 log. No monitoring for *Cryptosporidium* in line with Uisce Éireann's *Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies* is currently taking place for the supply.

Introduction

The Clogh-Castlecomer PWS serves a population of 3,298 people and produces approximately 546 m3/day (EDEN figures). The source of the supply is from an infiltration gallery, located on the south bank of the River Dinn and one borehole located on the grounds of the treatment plant referred to as BH2. There is a second borehole (BH1) located close to the infiltration gallery which is currently not in use.

Treatment consists of pressure filtration (manganese removal), chlorination and fluoridation. The details on treatment provided on EDEN includes UV disinfection. Uisce Éireann stated that UV disinfection does not take place at the plant.

The audit was undertaken to assess Uisce Éireann's performance in producing clean and wholesome water in response to high manganese levels in treated water and in the network and following the imposition of a BWN on the supply on 27/02/2023 which remains in place at the time of issue of this audit report. There were also three previous BWN's on this supply for elevated turbidity during the following time periods; 29/10/2022 to 07/11/2022, 16/12/2022 to 27/01/2023 and 10/02/2023 to 17/02/2023.

Supply Zones Areas Inspected

The raw water sources, pressure filtration and chlorination systems were inspected during the audit.

1. Source Protection

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

Comment

1. The supply is fed by one borehole (BH2) located at the plant and an infiltration gallery located 150m east from the boundary of the plant parallel to the River Dinn. A second borehole (BH1) is close to the infiltration gallery and currently not in use. Kilkenny County Council stated during the drier weather a proportion of the supply can be supplemented by BH1.

2. The BH1 wellhead is poorly protected and does not meet the design principals set out in EPA Drinking Water Advice Note No. 14: Borehole Construction and Wellhead Protection. Kilkenny County Council advised that the borehole is not housed due to the overhead ESB lines which would need to be isolated in order for any work to be carried out. The in-use borehole (BH2) is located in locked chambers, however the well head is below ground and not completely sealed.

3. Raw water monitoring results for 2022 and 2023 were reviewed subsequent to the audit. It was noted that raw water samples collected show manganese detected on all 20 sampling occasions. Kilkenny County Council stated that the infiltration gallery, BH1 & BH2 will be flushed to remove any manganese coating built-up at the abstractions. The expected completion date could not be confirmed at the audit.

4. There is no continuous turbidity monitoring on each of the raw water sources.

2. Filtration

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

Comment

1. At the audit, Kilkenny County Council stated that monitoring of manganese is undertaken in the raw water and treated water on a fortnightly frequency (at the raw water, filters, final water, network). The monitoring results indicate that the level of manganese in the raw water combined (infiltration gallery and BH2) is naturally elevated with levels of up to 1221 ug/l recorded on 21/12/2022.

2. Only water from the infiltration gallery undergoes filtration in two pressure filters operating in parallel which contain Filox - R filter media. There is no coagulation stage before these filters. Filtered water from the infiltration gallery and BH2 is then mixed together prior to chlorination.

3. During the audit the turbidity monitor on filter no 1 showed a 50% reduction in turbidity post filtration and filter no 2 showed an increase: Raw water: 0.466 NTU; Filter No 1 = 0.228 NTU and Filter No 2 = 0.863 NTU. Kilkenny County Council stated that filter no 2 was not as effective as filter no 1 and that there is a long term plan to install a third pressure filter at the plant. There are no turbidity alarm or shutdown set points in place after the individual filters.

4. The filters are backwashed based on time (every second day) or pressure differential between 2.5 and 3 bar, but not based on turbidity levels. The operator confirmed that the filters are run to waste for a period of time (approximately 20 mins) before filters are brought back into use. According to Kilkenny County Council there is a daily demand of 40 m3/hr and the filters can meet 34 m3/hr. Uisce Éireann plan on installing and commissioning a package plant on BH2 in the next 5 -6 weeks which will include pressure filtration. It is anticipated that this package plant will take approximately 15 m3/hr off the existing filters.

5. Uisce Éireann stated that a full PLC system upgrade was scheduled for completion in the coming days which will: (i) automate backwashing and run to waste; (ii) link the turbidity monitors on the filters to a setpoint and time; and (iii) allow one filter to operate while the other filter is undergoing backwash.

3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	No

Comment

1. The water supply is disinfected using sodium hypochlorite (15%). There are duty and standby dosing pumps with automatic switchover between the pumps.

2. The target chlorine concentration in the final water is 2 mg/l. During the audit the final water chlorine monitor (CL002) was reading 2.09 mg/l. Chlorine contact time of 421.39 mg.min/l is provided at the inlet to Mahova Reservoir (1.5km from the plant). This satisfies the target Ct of 23.40 mg.min/l for the current maximum flow of 40 m3/hr. There are no connections served before the reservoir.

3. Chlorination alarms on the final water are as follows: a) warning low: 1 mg/l; b) warning high: 3 mg/l (the warning alarms have a 300 second delay); c) shutdown low: 1mg/l; and d) shutdown high: 4mg/l (the shutdown alarms have 480 second delay). The low chlorine alarm setpoint is not set at an appropriate level to provide adequate warning of low chlorine levels in the final water leaving the plant. There are two people (caretaker and supervisor) on a cascade system responding to alarms.

4. The chlorine trend was viewed at the plant and a stable residual chlorine trend was observed.

4. Reservoirs and Distribution Networks

		Answer
4.1	Is the distribution network adequately maintained to protect drinking water quality?	No

Comment

1. Kilkenny County Council advised that manganese monitoring is being carried out at the plant and network on a fortnightly basis.

2. On the day of the audit, monitoring results for manganese between 13/03/2019 and 08/03/2023 were provided to the EPA and exceedances with values of between 51 ug/l and 109 ug/l have been detected in the distribution network, thereby failing to comply with the manganese parametric value set out in the European Union (Drinking Water) Regulations 2023, for which the parametric value is 50 ug/l.

3. In response to the ongoing manganese exceedances, Uisce Éireann implemented the following actions: filter media replacement, upgrade of backwash pump to increase flow, extended backwash sequence to include longer rinse, cleaned raw and clear water sumps and installed a self-cleaning turbidity monitor on the final water.

4. During the audit, it was reported that a high number of complaints are being received about discoloured water at consumers taps. In response to these complaints Kilkenny County Council undertake a programme of flushing on a weekly basis in the distribution network and undertake follow up sampling.

5. Management and Control

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

Comment

1. Uisce Éireann confirmed that the protozoal log treatment requirement for the groundwater sources and infiltration gallery at the Clogh-Castlecomer WTP is calculated as 3 log.

2. The Clogh-Castlecomer WTP provides treatment by pressure filtration and disinfection using chlorination, however this does not provide an adequate barrier to *Cryptosporidium* entering the water supply. No log credit can be granted if a coagulant is not dosed continually upstream of the filter.

		Answer
5.2	Is there a documented alarm response procedure?	No

Comment

1. A copy of the Uisce Éireann Water Incident Communication Guidance Form was not on display in the operations room at the plant. This chart outlines who is to be contacted in the event of an incident that is likely to have an effect on the quality or quantity of drinking water and provides contact details for relevant personnel.

2. Kilkenny County Council stated that training has not been provided to all operational staff.

6. Drinking Water Quality

		Answer
6.1	Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2014, as amended, been notified to the EPA?	No

Comment

Elevated manganese levels in the infiltration gallery and groundwater sources have resulted in repeated failures of the manganese parametric value of 50 ug/l since 09/08/2022 in water serving the Clogh-Castlecomer PWS. Information provided during the audit led to the EPA subsequently becoming aware of six additional manganese exceedances in final treated water leaving the Clogh-Castlecomer WTP detected during 10/01/2023 to 22/02/2023. The EPA was not notified of these exceedances at the time.

		Answer
6.2	Is Cryptosporidium monitoring being carried out in accordance with Irish Water's 'Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies'?	No

Comment

At the audit, Uisce Éireann stated that it would commence monitoring the supply in accordance with Uisce Éireann's Rationale for Determining the Frequency of *Cryptosporidium* Monitoring in Public Water Supplies.

7. Fluoridation

		Answer
7.1	Is the fluoridation dosing system appropriately controlled?	No

Comment

1. There are duty and standby pumps but no automatic switchover between pumps in the event of a failure. There is a manual changeover of pumps on a weekly basis.

2. There was no data sheet for recording results available at the plant. Kilkenny County Council stated that results generally do not go over 0.8mg/l.

8. Site Specific Issues

		Answer
8.1	Is the data on EPA EDEN Portal correct?	No

Comment

EDEN indicated treatment as being manganese removal, chlorination, fluoridation and UV treatment. There is no UV disinfection taking place at Clogh-Castlecomer WTP.

Recommendations

Subject	Clogh-Castlecomer PWS - Audit Report	Due Date	15/05/2023
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. Manganese: (i) provide an action programme with timeframes for the restoration and maintenance of compliance with the manganese parametric value (ii) continue to undertake a fortnightly monitoring programme of raw water, post filters, final water and network manganese until compliance with the parametric value has been achieved (iii) notify the EPA and the HSE of all historical manganese exceedances between 10/01/2023 and 22/02/2023 that have not been notified to date and (iv) continue to manage the network to minimise manganese failures. 2. Boil Water Notice: (i) notify the EPA when the BWN is lifted (ii) put remedial measures in place to ensure that future occurrences of elevated turbidity do not impact on the security of the supply (iii) install a continuous turbidity monitor on each source and ensure appropriate alarms/shutdowns are in place. 3. Pressure Filtration: (i) Review the performance of each of the two filters in the removal of manganese and turbidity and take appropriate actions to optimise the operation of the filters and (ii) install appropriate turbidity alarm settings and inhibits for the individual filters. 4. Ensure that appropriate alarms/shutdowns are in place on verified chlorine residuals after contact time. 5. Log Credits: (i) confirm how the log deficit will be addressed (ii) commence *Cryptosporidium* monitoring in accordance with Uisce Éireann's *Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies* and (iii) inform the HSE that the protozoal barrier cannot be verified. 6. Ensure that (i) the Incident Communication Response Guidance Form is displayed at the Clogh-Castlecomer WTP with site specific information including contacts for escalation and relevant trigger levels protecting critical processes at the WTP (ii) there is training provided to WTP operators (including relief and temporary staff) on the requirements of the Uisce Éireann Incident Communication Response Guidance Form to ensure incidents are recognised and escalated promptly and (iii) there is prompt and timely consultation with the HSE and notification to the EPA of incidents and all parametric failures. 7. Fluoridation: (i) install duty and standby dosing pumps with automatic switch over in the event of the failure of one of the pumps and (ii) ensure appropriate records are maintained onsite for dose rates and any associated calculations. 8. Update EDEN with the correct treatment types currently in place at the treatment plant. 9. Ensure that all boreholes are maintained in accordance with EPA Advice Note No. 14: Borehole Construction and Wellhead Protection. **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 12/05/2023 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.		