Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This Audit was carried out to assess the performance of Irish Water in providing clean and wholesome water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

Water Supply Zone

Name of Installation	Listowel Regional PWSS
Organisation	Irish Water
Scheme Code	1300PUB1204
County	Kerry
Site Visit Reference No.	SV23025

Report Detail

Issue Date	14/12/2021
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	01/12/2021	**Announced**	Yes
Time In	11:00	**Time Out**	13:50
EPA Inspector(s) **Additional Visitors**	Regina Campbell		
Company Personnel	Irish Water: Kian Guihen, Derek O' Toole Kerry County Council (acting under service level agreement to Irish Water): Aileen Dillon, Owen O'Sullivan, Seamus O'Mahony, Brian Lennon, Paul Neary.		

Summary of Key Findings

1. There have been 4 no. exceedances of the THM (trihalomethanes) parametric value of 100 ug/l notified to the EPA during September, October and November 2021 for the Listowel Public Water Supply (PWS). The EPA is considering adding this supply to the Remedial Action List (RAL) under the category of elevated THMs above the Drinking Water Regulations. Irish Water should submit a programme of works to address the risk of THM formation in the Listowel supply.

2. The audit found that the Listowel Water Treatment Plant (WTP) is well managed and is producing good quality water as evidenced by the turbidity and chlorine trends submitted for the final water. However, Irish Water should 1) install turbidity alarms and inhibits in accordance with the EPA Water Treatment Manual: Filtration to verify the performance of the protozoal barrier and 2) should install chlorine alarms on the monitors post contact time to verify chlorine contact time is being achieved on an ongoing basis.

Introduction

The Listowel Regional Water Supply serves a population of 14,781 including the settlements of Listowel, Lixnaw, Ballybunion, Ballyduff, Moyvane and surrounding areas. The supply volume is 9,749m3/day and the source of the supply is the River Feale.

The raw water is treated at the plant as follows: pH correction, coagulation using alum and poly, clarification, rapid gravity filtration, fluoridation, ph correction and chlorination using sodium hypochlorite.

The plant is manned 7 days a week from 8.30am to 5pm.

The audit was undertaken to assess the general operation and management of the plant in response to 4 no. THM exceedances notified to the EPA in 2021.

Supply Zones Areas Inspected

The coagulant dosing area, contact tank, settlement tanks, rapid gravity filters and process monitors were inspected.

1. Coagulation Clarification Flocculation (CFC) Stage

		Answer
1.1	Are the CFC processes appropriately controlled?	Yes

Comment

Raw water pH correction takes place followed by alum and then poly dosing.

Caustic soda is added to the raw water at the inlet kiosks. The water passes through a static mixer and then alum is added. The water then passes through a second static mixer before entering the contact tank where poly is dosed at a concentration of 0.14 mg/l. Duty and standby pumps with automatic changeover are in place for caustic soda and alum. Target pH is monitored in the contact tank. Target pH varies (6.3 up to 6.6/6.7) depending on river colour, pH and UVT as the raw water conditions are very variable. At the audit pH was observed to be 6.5 at the contact tank.

The plant shuts down based on low pH of 5.6 and high pH of 7.3 in the contact tank.

Currently coagulant dosing is manually controlled using daily jar tests as well as operator experience. A streaming current monitor was previously in use at the plant but has been out of operation for 5/6 months. Kerry County Council said that there had been problems with the instrument and that they are waiting for a replacement sensor.

Online monitoring and twice daily tests for aluminium in the final water showed very low levels present.

		Answer
1.2	Were the CFC tanks, channels and weirs observed to be clean, level and well maintained during the audit?	Yes

Comment

CFC tanks and channels and weirs were clean, level and well maintained with no algal growth visible or obvious rust or corrosion.

		Answer
1.3	Were the CFC processes visually observed to be operating appropriately during the audit?	Yes

Comment

There are 6 no. settlement tanks at the plant. Tanks 1 and 2 are hopper bottomed and Tanks 3 to 6 are flat bottomed.

There is a turbidity monitor after settlement tanks 3 to 6 with shutdown on high turbidity of 2 NTU after 15 minutes. At the audit the monitor was reading 0.487 NTU.

There is no turbidity monitor after settlement tanks 1 and 2 and the plant would benefit by having an additional monitor at this location. Kerry County Council said that the turbidity reading after Tanks 3 to 6 is representative of settled water quality from Tanks 1 and 2.

2. Filtration

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

Comment

There are 6 no. rapid gravity sand filters at the plant. An assessment of the filters was completed in 2019. Kerry County Council said that media had not been replenished since 2009/2010. Kerry County Council said that the media depths range between 630mm and 730mm which are less than the minimum filter media depth of 1000mm recommended in the EPA Water Treatment Manual: Filtration.

Kerry County Council said that the sequence of filter backwashing is decided based on operator experience including a visual assessment of headloss. Two filters are backwashed each day. There is no automatic backwashing triggered by turbidity, headloss or time. The backwash cycle consists of air for 10 minutes followed by 10 to 15 minutes of water. Each filter settles for 10-15 minutes prior to going back into service. There is no run to waste facility.

There is a turbidity monitor on each filter, however none of the monitors are alarmed. The lack of alarms on the filters means that the performance of the protozoal barrier cannot be verified in accordance with the EPA Water Treatment Manual: Filtration.

		Answer
2.2	Does monitoring indicate that the filters are operating effectively?	Yes

Comment

At the audit the turbidities from the filters 1-6 ranged from 0.042 NTU to 0.072 NTU which are satisfactory and trends for 4 weeks submitted prior to the audit also showed stable and low turbidity readings of < 0.2 NTU.

There is a turbidity monitor at the clearwater tank which represents combined filtered water but this is not alarmed. This monitor was reading 0.069 NTU which is satisfactory.

There is a turbidity monitor on the final water which is sampled before the on-site reservoirs. This monitor is alarmed at 0.2 NTU and the monitor was reading 0.084 NTU at the audit which is satisfactory. There is no shutdown based on final water turbidity at the plant.

While the monitoring data shows that the filtered water and final water turbidity trends are stable and low, the lack of alarms on the filters means that the protozoal barrier cannot be verified in accordance with the EPA Water Treatment Manual: Filtration.

3. Disinfection

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

Comment

The Listowel plant was upgraded under the Irish Water Disinfection Programme works completed in 2017. The filtered water is disinfected using sodium hypochlorite. Dosing is flow proportional with residual trim and takes place between the clear water tank and the reservoir. There are duty and standby chlorine pumps with automatic changeover in the event of a failure.

Chlorine dosing is monitored by monitor CL001 and there is a low chlorine alarm of 0.5mg/l and automatic shutdown of 0.2 mg/l at this point. There is a high chlorine alarm of 4 mg/l and no high chlorine shutdown on CL001. The low alarm and shutdown settings for monitor CL001 should be reviewed to ensure any issues with chlorine dosing are escalated promptly.

The target residual chlorine level after contact time is 1.2 mg/l with contact time being achieved at on-site reservoirs. There are two sets of dual validation monitors.

Residual chlorine monitors CL002 and CL003 are after reservoirs Reservoirs 1 and 4 which serve the Listowel and Ballybunion areas.

Residual chlorine monitors CL004 and CL005 are after reservoirs 2 and 3 which serve the Tarbert area.

Trended data is recorded and accessible for all monitors CL001 to CL005. Trends submitted of the chlorine monitors show adequate and stable levels of chlorination.

There are no alarms on any of the chlorine monitors after contact time (CL002/CL003/CL004/CL005) which is not in accordance with EPA Advice Note No. 3.

		Answer
3.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes

Comment

Alarms are dialled out and there is a cascade system of 2 people in place.

		Answer
3.3	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes

Comment

Records submitted show very frequent monitoring for residual chlorine in the network with all samples having ≥ 0.1mg/l residual chlorine.

There are also 4 no. secondary chlorination stations with chlorine monitors on the network.

		Answer
3.4	Is there adequate chlorine contact time before the first connection?	Yes

Comment

Chlorine contact time calculations submitted by Irish Water show that Reservoirs 1 and 4 achieve a total effective contact time of 82.93 mg.min/l, at a residual chlorine concentration of 1.2 mg/l and this is greater than the target contact time of 24 mg.min/l. Reservoirs 1 and 4 are monitored by monitors CL002 and CL003 which were reading 1.18/1.17 mg/l residual chlorine respectively at the audit which demonstrates that target contact time is being achieved.

Chlorine contact time calculations submitted by Irish Water show that Reservoirs 2 and 3 achieve a total effective contact time of 128.05 mg.min/l, at a residual chlorine concentration of 1.2 mg/l, which is greater than the target contact time of 24 mg.min/l. Reservoirs 2 and 3 are monitored by monitors CL004 and CL005 which were both reading 1.2 mg/l at the audit which demonstrates that target contact time is being achieved.

Trends submitted showed stable chlorine levels post contact time at all monitors.

4. Reservoirs and Distribution Networks

		Answer
4.1	Are reservoirs adequately inspected and maintained?	No

Comment

The 4 main reservoirs at the plant were inspected in 2018. However there are an additional 9 no. reservoirs in the network and it could not be confirmed at the audit when they were last inspected. It should be ensured that all of the reservoirs are on the Irish Water reservoir inspection and maintenance schedule.

5. Management and Control

		Answer
5.2	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	Yes

Comment

Irish Water confirmed that the protozoal compliance log treatment requirement for the plant is 3 log.

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

Comment

There are no shutdowns based on low turbidity or on high chlorine in the final water.

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

Comment

There are no turbidity alarms on each filter and so the performance of the protozoal barrier cannot be verified.

There are no low chlorine alarms at monitors CL002/CL003/CL004/CL005 to verify that chlorine contact time is being achieved.

The final water pH monitor is currently broken and so no low or high pH alarms in the final water were operational at the audit. Manual pH tests are being undertaken until a replacement monitor is sourced.

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?	Yes

Comment

THMs

There have been 4 no. exceedances of the THM parametric value of 100 ug/l notified to the EPA in September, October and November 2021. Failures have ranged from 107 ug/l to 145 ug/l with all failures recorded at samples taken at graveyard taps in the Ballylongford area of the supply which is approximately 14km from the plant. Kerry County Council said that a combination of organic matter in the raw water and a large network with slow moving water may be increasing the risk of THM formation at certain times of the year. Kerry County Council are continuing to flush the network and resample at the failed locations and other locations in the network.

On the 06/12/21 Irish Water further advised the Agency of its intention to undertake further sampling in order to confirm whether the THM exceedances are linked to inappropriate sampling locations or whether there is a more widespread issue on the scheme. Irish Water said the failed samples at graveyard locations may be linked to long service lines and little usage.

Irish Water said that it proposes to identify alternative end of line sample locations that are considered to be representative of the water supply and to submit the results to the EPA in January 2022.

Pesticides

There have been 24 no. pesticide exceedances notified to the EPA in the Listowel PWS since 2015 with the latest exceedance detected on 20/09/21 (0.21 ug/l versus parametric value of 0.1 ug/l). MCPA is the most common type of pesticide detected in this supply which is a herbicide widely used in agriculture/horticulture and on grassland and lawns.

		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'?	Yes

Comment

Cryptosporidium monitoring is undertaken 9 times/year. No detections have been reported to the EPA.

Recommendations

Subject	Listowel Audit Recommendations 01/12/2021	Due Date	14/01/2022
Action Text	**Recommendations** **Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues, Irish Water should implement the following recommendations without delay** 1. Irish Water should a) submit an action programme to address the THMs issue in the Listowel supply and b) monitor THMs in the extremities of the network on a monthly basis and notify the EPA of any exceedances. Irish Water should ensure that monitoring points are representative of the quality of the water in that area of the network. 2. Irish Water should a) ensure that the turbidity alarm and shutdown setpoints at the plant are reviewed and operated in accordance with the turbidity performance criteria as set out in the EPA Treatment Manual: Filtration, in order to verify the *Cryptosporidium* barrier at the water treatment plant b) consult with the HSE in relation to the plants inability to verify the *Cryptosporidium* barrier until such time as the appropriate alarms and shutdowns are in place. 3. Irish Water should a) install alarms on the chlorine monitors (CL002/CL003/CL004/CL005) to verify that chlorine contact time is being achieved. The alarm settings should have due regard for the minimum chlorine concentration required to verify the site target chlorine contact time is being achieved b) review the low chlorine alarm and shutdown setpoint on CL001. 4. Irish Water should continue with at least monthly monitoring of treated water for pesticides from April to November inclusive until a minimum of one full growing season's worth of compliant results (over a period not exceeding 2 calendar years) is obtained. 5. Irish Water should install a turbidity monitor with alarm after settling tanks 1 and 2. 6. Irish Water should a) replace and refurbish the sand media in the rapid gravity filters to a minimum depth of 1000m in accordance with the EPA Water Treatment Manual: Filtration b) install run to waste or slow start after backwashing of the rapid gravity filters and c) automate backwashing so that it is triggered on turbidity, headloss and time. 7. Irish Water should confirm that the UVT monitor and streaming current monitor have been replaced and are operational. 8. Irish Water should confirm that the final water pH monitor with high and low alarms has been replaced and is operational. 9. Irish Water should continue monitoring for *Cryptosporidium* in accordance with the Irish Water Rationale for Monitoring *Cryptosporidium* in Public Water Supplies. **Follow-Up Actions required by Irish Water** During the audit, Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Dr. Michelle Minihan, Senior Inspector, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 14/01/2022 detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work. The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water. Please quote the Compliance Plan DW20210160 in any future correspondence in relation to this Report.		