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	Kill/Ballylaneen
Organisation	Irish Water
Scheme Code	3100PUB1106
County	Waterford
Site Visit Reference No.	SV20712

Report Detail

Issue Date	30/11/2020
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	20/11/2020	**Announced**	Yes
Time In	11:00	**Time Out**	12:00
EPA Inspector(s)	Regina Campbell Orla Harrington		
Additional Visitors	Larry O' Connor (HSE)		
Company Personnel	Irish Water: Pat Duggan, Samantha Keane, Brian O' Leary Waterford County Council: Declan Halpin, Maura Phelan		

Summary of Key Findings

1. A Boil Water Notice was placed on the Kill/Ballylaneen Public Water Supply (PWS) on 09/11/20 following detections of *Cryptosporidium* and *Giardia* in a sample taken in the distribution network of the supply on 29/10/20. The Boil Water Notice was rescinded on 25/11/20 following 4 rounds of clear resampling results.

2. Investigations by Irish Water and Waterford County Council have not to date found any cause for the detections. A review of the plant operations indicated that the plant treatment processes were operating normally during the time leading up to the detections.

3. Irish Water has indicated that the Kill/Ballylaneen PWS source has a protozoal log credit requirement of 5 log. Currently treatment at the plant provides 3 log credit if operated in accordance with the log credit performance approach. This gives a -2 log treatment deficit and Irish Water need to identify how the protozoal log deficit at the plant will be addressed. Irish Water should monitor the supply in accordance with the Irish Water Rationale for Determining the Frequency of *Cryptosporidium* Monitoring in Public Water Supplies.

Introduction

The Kill/Ballylaneen Public Water Supply (PWS) serves a population of 1,156 and produces 250 - 275 m3/day. The source of the supply is the River Mahon. The plant operates approximately 20 hours/day depending on demand and treatment consists of pH correction, coagulation, flocculation, rapid gravity filtration and chlorination. The audit was undertaken to assess Irish Water's performance in producing clean and wholesome water following the notifications of *Cryptosporidium* and *Giardia* detections in a sample taken in the distribution network of the supply on 29/10/20 that lead to the placing of a Boil Water Notice on the 09/11/20. Repeat protozoal sampling was undertaken in the network and at the plant on 09/11/20 and 16/11/20 and at the plant on 11/11/20 and 19/11/20 and all repeat sampling was clear.The boil water notice was rescinded on 25/11/20.

Irish Water advised at the audit that the protozoal log credit requirement for the source water is 5 log but that the methodology for source classification is currently under review. The treatment processes at the plant provide 3 log credits if operated in accordance with the log credit performance approach and this indicates that there is a -2 log deficit at the plant. Monitoring in accordance with the Irish Water 'Rationale for Determining the Frequency of *Cryptosporidium* Monitoring in Public Water Supplies' commenced in August 2020.

Irish Water previously advised the EPA that the plant would be rationalised by Q4 2020. However at the audit Irish Water advised that there were no longer plans to rationalise the plant.

Supply Zones Areas Inspected

The audit consisted of a video conference call with Irish Water and Waterford County Council staff. The HSE were also in attendance. The Kill/Ballylaneen water treatment plant was not visited during the audit due to Covid-19 restrictions. The EPA last undertook an audit of the plant in February 2019. The audit assessed each step of the treatment process including alarms and process verification data from continuous online monitors. Final water quality data from both continuous online monitors and from daily testing was also examined.

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?	Yes

Comment

The EPA were notified on the 09/11/20 of *Crypotosporidium* and *Giardia* detections in a sample taken at Ballylaneen Community Centre on 29/10/20. At the audit Irish Water advised that the sample was received by the laboratory on 05/11/20 and they were notified of the results on the 09/11/20. No reason was provided for the delay between the sampling date and when the sample was received by the laboratory. Following receipt of the results on 09/11/20, Irish Water and Waterford County Council consulted with the HSE and on foot of the consultation a Boil Water Notice was placed on the supply on 09/11/20.

The raw water turbidity trend was examined from the 19th October to the 11th November. There is a turbidity alarm of 5 NTU on the raw water intake. Raw water turbidity trends showed turbidity < 5 NTU in the raw water for 5 days prior to the detections on 29/10/20. The final water turbidity trend was examined during the audit for the period 19/10/20 to 14/11/20 and was satisfactory with turbidity generally <0.1 NTU which indicates that the filter was operating effectively as a protozoal barrier during this time. Residual chlorine trends examined for the same period were also satisfactory.

Repeat sampling was undertaken at the Community Centre and at the plant on 09/11/20 and 16/11/20 and at the plant on 11/11/20 and 19/11/20 and all repeat sampling was clear. The boil water notice was rescinded on 25/11/20.

2. Source Protection

		Answer
2.1	Is the abstraction source(s) adequately protected against contamination?	Yes

Comment

The source for the supply is the Mahon River. Landuse in the vicinity is agriculture and the Kilmacthomas Wastewater Treatment Plant is situated approximately 5 kilometres upstream of the intake. There are online alarmed monitors on the raw water intake for turbidity (alarm 5 NTU) and ammonia (alarm 0.15 mg/l). Abstraction ceases if the ammonia alarm is triggered. The raw water is fed to a sump that is monitored by a hydrostatic sensor to provide an early warning of the build up of silt at the sump.

Irish Water advised that the protozoal log credit requirement for the source water is 5 log but that the methodology for source classification is currently under review. The treatment processes at the plant system provide 3 log credits if operated in accordance with the log credit performance approach and this indicates that there is a -2 log deficit at the plant.

The EPA 's EDEN system lists the River Ballylaneen as the source for the plant but Waterford County Council advised that the correct name for the source is the River Mahon.

3. Coagulation Clarification Flocculation (CFC) Stage

		Answer
3.1	Is the pH within a suitable range for the coagulant used?	Yes

Comment

pH correction of the raw water takes place by adding 25% sodium hydroxide at a fixed dose of 5 mg/l. Dosing is flow proportional with duty and standby pumps in place.

		Answer
3.2	Are the CFC processes appropriately controlled?	Yes

Comment

17% kibbled aluminium sulphate is used to make up the coagulant dose. It is intended to change the coagulant to liquid alum and to install a static mixer in the next few months. A streaming current monitor controls the dose using a feedback system. Dosing of polyelectrolyte to aid coagulation commenced in early 2020. Dosing of the poly takes place on a flow proportional basis at a dose rate of 0.06 mg/l. Duty and standby coagulant and poly dosing pumps are in operation. Waterford County Council said that the addition of coagulant aid dosing to the treatment process has improved the stability of the sludge blanket. There is an online turbidity monitor on the clarified water that is alarmed at 0.81 NTU.

Twice daily aluminium testing is undertaken on the final water at the plant. Automatic sludge bleeds are undertaken on a timed basis at a 60 minute frequency for 2 minutes duration.

4. Filtration

		Answer
4.1	Are the filters designed and managed in accordance with EPA guidance?	Yes

Comment

Settled water passes through one rapid gravity filter. The media consists of 1.2 m sand and a sublayer of gravel which was replenished in February 2020. A media depth gauge was also installed at the same time. A filter backwash takes place every 24 hours with a run to waste for 12 minutes. There is a Filter Backwash Procedure in place.

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

Comment

The final water turbidity trend was examined during the audit for the period 19/10/20 to 14/11/20 and was satisfactory with turbidity generally <0.1 NTU which indicates that the filter was operating effectively as a protozoal barrier during this time.

Final water turbidity is alarmed at 0.25 NTU. If the alarm is triggered an investigation will take place and if necessary the pumps to the reservoir can be shut-off remotely. There is no automatic shutdown based on turbidity in the final water.

The turbidity alarms and shutdown setpoints at the plant are not in accordance with the EPA's turbidity performance criteria for rapid gravity filters of 0.2 NTU (using the turbidity approach) or 0.3 NTU (using the log credit approach). Under the current source classification methodology the plant has a treatment deficit of -2 log.

5. Disinfection

		Answer
5.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes

Comment

The water is disinfected using 10% chlorous. Duty and standby/assist chorine dosing pumps are in place with automatic switchover in place. Dosing is flow proportional with assist boosting if required.The target residual chlorine at the plant is between 1.1 and 1.2 mg/l. The low chlorine alarm is set at 0.88 mg/l and the high chlorine alarm is set at 1.8 mg/l. There are no automatic shutdown setpoints in place for residual chlorine in the final water leaving the plant.

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

Comment

Residual chlorine is monitored after contact time has been achieved.

		Answer
5.3	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	Yes

Comment

Residual chorine trends for the final water at the plant were examined for the period 19/10/20 to 14/11/20 and showed a stable trend.

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

Comment

The chlorine contact is 37.91 mg.min/l which is adequate.

		Answer

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

Comment

Records of residual chlorine monitoring in the network were requested in advance of the audit. A trend of residual chlorine monitoring at the outlet of Ballyvadden reservoir was submitted for the period 19/10/20 to the 13/11/20 which showed stable chlorine levels. However records were not submitted at locations throughout the network including the extremities. Waterford County Council said that residual chlorine results are usually 0.3 - 0.4 mg/l at the end of the line and that monitoring takes place once per week.

6. Reservoirs and Distribution Networks

		Answer
6.1	Are reservoirs adequately inspected and maintained?	No
	Comment	
	There are two above ground reservoirs located at Ballyvadden. At the audit it could not be confirmed when they were both last inspected and cleaned.	

7. Management and Control

		Answer
7.1	Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators?	Yes
	Comment	
	All relevant alarms are received by three people, caretaker, assistant caretaker and technician.	

		Answer
7.2	Is the data obtained from sampling and monitoring used to actively inform the processes on site and in the distribution network?	Yes
	Comment	
	Trended data from online monitors is available for viewing. However the plant would benefit from being connected to SCADA.	

Recommendations

Subject	Kil/Ballylaneen PWS Audit Recommendations	Due Date	30/12/2020
Action Text	***Recommendations*** 1.. Irish Water should ensure that there is no delay between the date of sampling and the date of delivery of a sample to the laboratory. 2. Irish Water should review and implement turbidity alarms & shutdowns in the final water to ensure that the plant operates in accordance with the EPA turbidity performance criteria in order to demonstrate that there is an effective protozoal barrier at the plant. 3. Irish Water should confirm the protozoal log treatment requirement for the plant and identify how the deficit will be addressed. 4. Irish Water should monitor the supply in accordance with the Irish Water Rationale for Determining the Frequency of *Cryptosporidium* Monitoring in Public Water Supplies. 5. Irish Water should install automatic shutdown based on residual chlorine in the final water. 6. Irish Water should update EDEN with the correct population for the supply and the correct name of the source. 7. Irish Water should monitor residual chlorine in the network, including the extremities, several times a week to ensure that a minimum residual chlorine of > 0.1 mg/l is maintained. 8. Irish Water should confirm the volume in the reservoirs on the network and confirm when they were last inspected and cleaned. 9. Irish Water should ensure that all key operational monitoring equipment at the plant and in the network are connected to SCADA. **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. Irish Water should submit a report to the Agency on or before 30/12/2020 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 Action Reference Number DW20200248 in any future correspondence in relation to this Report.		