Drinking Water Audit Report

County:	Kilkenny	**Date of Audit:**	07/05/19
Plant(s) visited:	Glenmore Water Treatment Plant (Scheme Code 1500PUB1006)	**Date of issue of Audit Report:**	23/05/19
		File Reference:	DW2017/126
		Auditor:	Regina Campbell
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014), as amended.* • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* • The recommendations specified in the EPA *Drinking Water Report*. • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **Glenmore Public Water Supply (PWS) was added to the EPA's Remedial Action List in October 2017 due to inadequate treatment for Cryptosporidium. Irish Water intend to replace the springs currently in use with a new groundwater well and have advised, if the programme of works go to plan, that the remedial works will be completed by December 2019. Irish Water should continue to progress the remedial works in order to meet this date.**

ii. **Irish Water should take immediate actions to improve the source protection measures at both the first spring and middle spring chambers. The covers over both spring chambers should be sealed to prevent surface water ingress. The middle spring should be made secure from unauthorised access.**

iii. **Glenmore PWS should be prioritised under Irish Water's Disinfection Programme for Co. Kilkenny. The current chlorine dosing arrangements are inadequate. There is no automatic changeover of the dual and standby pumps in the event of a malfunction of the duty pump. The Quarter 1 2019 Disinfection Programme update from Irish Water advised that the current disinfection programme at Glenmore would be completed by 30/09/19.**

1. INTRODUCTION

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 drinking water. The Glenmore Public Water Supply was placed on the EPA's Remedial Action List in October 2017 following three detections of Cryptosporidium in the final water in August 2017.

Raw water is sourced from two springs, the first spring (or Holy Well), which is the main source, and the second (middle) spring. The springs are piped to the water treatment plant (WTP). Treatment

consists of disinfection by chlorination and pH correction. According to the EPA's Eden system, the volume distributed is 64 m^3/day and the population served is 137.

Photographs taken by Regina Campbell during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 3.00pm at the Glenmore Water Treatment Plant. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water:

Patrick Duggan – Compliance Specialist
Catherine Rice – Compliance Analyst
P.J. Phelan – Disinfection R.E.
James O' Toole – Operations

Representing Kilkenny County Council
Eoin Molloy – Caretaker
David McArdle – Supervisor
John Ormond – Operations E.E.
Ken Boland – Operations S.E.E.
Kevin Hogan - Technician

Representing the Environmental Protection Agency:

Regina Campbell - Inspector

2. AUDIT OBSERVATIONS

The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.

1.	**Remedial Action Plan for the Glenmore PWS** a. Cryptosporidium was detected on three separate occasions in August 2017. There is no barrier to Cryptosporidium and as a result the Glenmore PWS was added to the EPA's Remedial Action List in October 2017. b. The source of the raw water are two springs. The Cryptosporidium Risk Score (as reported on the EPA's Eden system) is 81 which is High Risk. c. A monthly Cryptosporidium monitoring programme has been in place since the initial detection and there have been no further detections since August 2017. d. In Quarter 1 2019, Irish Water advised the EPA that the revised completion date for remedial works is December 2019. A planning application was submitted in Q1 2019 prior to commencing trial well drilling. If no issues arise from the planning process it is anticipated that the trial well will be completed by end Q2 2019. The results of this trial well drilling will determine the viability of proceeding with a full production well. If a full production well can be developed then the completion date for works is December 2019, with a further quarter required for collation, assessment and submission of verification data. Irish Water advised that if a production well is not deemed as a viable option (i.e. if surface water treatment is required), then there may be a requirement for detailed design, planning, etc. in which case the projected completion date may need to be extended. e. On the day of the audit I was shown the intended location of the trial well at the plant.

2.	**Source Protection** a. Raw water is sourced from two springs, the first spring (or Holy Well), which is reported to be the main source, and the second (middle) spring. The supply is reported to be in use since the late 1940s. Both springs are located on rough ground near to the public road. b. The lids covering both spring chambers are not adequately sealed to prevent contamination from surface water ingress (see Photos 1 and 2). Dirt and vegetation were visible around the edges of both chambers. The first spring was padlocked and had a gate preventing access from the nearby road. The middle spring had no padlock on the cover on the day of the audit and the gate separating the spring from the nearby public road was missing. c. Buffer zones (100m and 250m) have been delineated around the springs. The land in the nearby vicinity is agricultural in nature (silage and grazing). Kilkenny County Council said that landowners had been written to under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)*. The zone of contribution to the supply is generally 'extremely' vulnerable to contamination (according to the Co. Kilkenny Groundwater Protection Scheme Report, 2002). d. There is a continuous inflow monitor which was reading 8.2 m^3/h at the time of the audit. e. There is no other continuous monitoring of the raw water. f. At present, monthly monitoring is undertaken on the raw water for E. coli, coliforms, Cryptosporidium, turbidity and UVT.
3.	**Disinfection** a. The raw water is disinfected by chlorination using 10-12% sodium hypochlorite. b. The chlorination system does not meet the requirement of EPA Advice Note 3. There are duty and standby chlorine dosing pumps but there is no automatic changeover in the event of a failure of the duty pump. The system is alarmed and the caretaker, assistant caretaker and supervisor receive alarms in the event of an issue. Dosing is flow proportional. c. The target chlorine residual level is 0.8 mg/l. This is monitored at a sample point in the underground reservoir. However it could not be confirmed if monitoring takes place after the achievement of the required disinfection contact time. The chlorine monitor was reading 0.809 mg/l during the audit. d. The chlorine monitor was calibrated on 02/05/19 and the calibration label was displayed. e. The low level chlorine alarm is 0.5 mg/l and the high level chlorine alarm is 1.5 mg/l. f. There are three people in the cascade system for responding to alarms, the caretaker, the assistant caretaken and the supervisor. g. The chlorine level is also checked daily using a manual kit. h. Irish Water could not confirm the contact time calculation on the day of the audit. i. There was no expiry date on the drums of sodium hypochlorite inspected. The date of manufacture was displayed. j. The Quarter 1 2019 Disinfection Programme update from Irish Water advised that the current disinfection programme at Glenmore would be completed by 30/09/19.
4.	**pH Correction** a. pH correction is currently undertaken using a sodium carbonate solution. b. There are duty and standby pumps but there is no automatic changeover in place. c. Irish Water advised that it is intended to upgrade the pH correction system as part of the Disinfection Programme works planned for the site. It is planned to replace sodium carbonate with caustic soda.
5.	**Treated Water Storage and Distribution Network** a. There is no currently an underground storage reservoir (35 m^3 storage) at the plant. It is planned to decommission this reservoir shortly and connect to a newly constructed reservoir built on-site that has 60 m^3 capacity.
6.	**Monitoring and Sampling Programme for treated water** a. Chlorine monitoring is undertaken once per week. Results are recorded and those reviewed during the audit were satisfactory.

7.	**Exceedances of the Parametric Values** a. There were three detections of Cryptosporidium in August 2017. At the time of the detections, Irish Water advised that it was suspected that construction works on the site may have lead to surface water entering the source and contributing to the detection. Irish Water advised in August 2017 that works were done to divert surface water away from the source at the plant. There have been no further detections of Cryptosporidium since August 2017 or no other parameter exceedances notified to the EPA.
8.	**Hygiene and Housekeeping** a. The water treatment plant was tidy and well maintained. Record keeping was good.
9.	**Management and Control** a. All monitors inspected were calibrated with stickers displaying the next scheduled calibration dates.

3. AUDITORS COMMENTS

Glenmore PWS is on the EPA's Remedial Action List since October 2017 because it does not have a barrier to Cryptosporidium. Irish Water intend to address this issue by drilling a new production well and have advised a projected date for completion of works of December 2019.
On the day of the audit a number of vulnerabilities were noted including inadequate sealing and security at the springs, lack of continuous turbidity monitoring on the raw water and lack of automatic changeover for the chlorine and pH dosing pumps. These vulnerabilities continue to pose a risk to the security and safety of the Glenmore PWS.
Irish Water should progress the construction of the new groundwater borehole and disinfection upgrade works at this plant without delay.

4. RECOMMENDATIONS

General

1. The Glenmore PWS is on the EPA's Remedial Action List for inadequate treatment for Cryptosporidium. Irish Water have advised that they intend to replace the current spring sources with a new groundwater source by December 2019. Irish Water should progress the programme of works without delay.

Source Protection

2. Irish Water should take immediate actions to improve the source protection measures at both the first spring (Holy Well) and middle spring. The covers on both springs should be sealed to prevent surface water ingress. The middle spring should be made secure from unauthorised access.
3. Irish Water should continue to carry out monthly monitoring for Cryptosporidium and continue to characterise the raw water including sampling for *E .coli*, coliforms, turbidity and UVT.
4. Irish Water should install an alarmed continuous turbidity monitor to alert plant operators of any changes in raw water quality.
5. Irish Water should construct, seal and protect the proposed new groundwater well in accordance with EPA Advice Note No. 14: Borehole Construction and Wellhead Protection.

Disinfection

6. Irish Water should review the contact time for chlorine disinfection to ensure that the effective contact time achieved is 15mg.min/l and that the first connections are receiving appropriately

disinfected drinking water.

7. As part of the Disinfection Programme Upgrade Works, Irish Water should install a continuous chlorine residual monitor on the final water after achievement of the required disinfection contact time. This monitor should be alarmed and linked to a recording device to ensure that either a sudden increase in chlorine demand or a failure of the chlorine dosing system is immediately detected.
8. Irish Water should install automatic changeover of the chlorine dosing pumps.
9. Irish Water should put a system in place so that stocks of sodium hypochlorite on-site are regularly checked to see if they are in date.

pH Correction

10. Irish Water should submit a timeframe for the upgrade of the pH correction system.

Treated Water Storage

11. Irish Water should confirm when the current underground reservoir is decommissioned and that the new reservoir is in operation.

Distribution System

12. Irish Water should ensure monitoring of residual chlorine is undertaken several times a week at different points of the network to include the network extremities.

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.

Irish Water should submit a report to the Agency within one month of the date of this audit report 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 timeframe 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 File Reference Number in any future correspondence in relation to this Report.

Report prepared by: Regina Campbell **Date:** 23/05/2019

Inspector

Photo 1 Cover on First Spring

Photos 2 and 3 Cover on Middle Spring