Drinking Water Audit Report

County:	Cork	**Date of Audit:**	15/02/18
Plant(s) visited:	Conna Regional PWS (Scheme Code 0500PUB1204)	**Date of issue of Audit Report:**	20/02/18
		File Reference:	DW2018/2
		Auditors:	Ms. Criona Doyle Ms. Regina Campbell
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *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. ***Giardia* was detected in the Conna Regional Water Supply in January 2018. Irish Water should provide an update on the process optimisation works and the results of the investigations into the cause of the *Giardia* detection.**
ii. **Irish Water should forward two months of SCADA data including the filtered water turbidity data for the individual filters following the completion of the process optimisation works.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* 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 following the detection of *Giardia* in the Conna Regional Public Water Supply (PWS) on the 16th, 24th and 30th of January 2018.

The Conna Regional PWS provides a daily volume of 1,100m^3/d and serves a population of approximately 3,000 people. The supply is sourced from the River Bride. Treatment at the plant includes coagulation, flocculation, clarification, rapid gravity filtration, disinfection and fluoridation. The WTP serves the area of Bride Bridge, Castlelyons and Rathcormac and the rural area towards Glenville and Conna.

The opening meeting commenced at 9:45am at the Conna Regional Drinking Water Treatment Plant (WTP). 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 audit observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water:
Deirdre O'Loughlin, Drinking Water Compliance Specialist.
Jim Fitzgerald, SLA Lead.

Representing Cork County Council:
Pat Walsh, Senior Executive Engineer.
Patrick Kelly, Water Liaison Engineer.
Finbarr Jones, Executive Engineer.
Dave Sheehan, Executive Scientist.
Liam Ronayne, Curator.
Jim Cullinane, Curator.

Representing the HSE:
Adrian O'Sullivan, Senior Environmental Health Officer.

Representing the Environmental Protection Agency:
Regina Campbell, Inspector.
Criona Doyle, 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.	**Exceedances of the Parametric Values** a. On the 23/01/18 the EPA was notified of the detection of *Giardia* (result 0.007 / 10 L) in the treated water at the Conna Regional WTP from a sample taken on the 16/01/18. The sample was taken following a period of heavy rainfall. b. Giardia was detected in resampling of the treated water undertaken on the 24/01/18 (result 0.03 / 10 L) and 30/01/18 (result 0.005 / 10 L). c. The HSE advice was to undertake weekly monitoring of the treated water. It was outlined at the audit that no *Giardia* was detected in the treated water in the most recent weekly sample on 06/02/18. The HSE have instructed that weekly monitoring is to continue until 4 consecutive clear samples have been obtained. d. A review of the historic monitoring data for the supply indicated there had been no previous detection of *Giardia* or *Cryptosporidium*. Monitoring is undertaken on a quarterly basis. e. Process optimisation of the coagulation, clarification and filtration stages has identified a number of issues which may have contributed to the *Giardia* exceedance. The issues identified to date include (i) breakdown of one of the transient flow generators in Settlement Tank No. 2 (ii) a blockage in the polyelectrolyte dosing line (iii) the 1 hour delayed start on the automatic filter backwash programme was not initialising and the filter was being returned immediately to supply. f. Process optimisation works are still ongoing. The process optimisation works had been scheduled to take place in advance of the *Giardia* detection.
2.	**Coagulation, Flocculation and Clarification** a. Raw water from the River Bride is pumped to the WTP where it undergoes coagulation,

	flocculation and clarification. The plant normally operates for 22 hours per day. b. Water is pumped to the balance tank which provides 3 hours storage. c. There is online turbidity monitoring of the raw water. d. Raw water is dosed with liquid aluminium sulphate (coagulant). Between 8 and 10 minutes contact time is provided prior to the dosing of polyelectrolyte at the splitter chamber. Automatic dosing of the aluminium sulphate is linked to the streaming current analyser. Jar tests are undertaken as required and when drift is observed on the streaming current analyser. e. Polyelectrolyte (0.1%) is injected at a concentration of 0.15 mg/l. The polyelectrolyte mixing takes place in the chemical dosing building. The injection point is located at the splitter chamber. There was an issue with blocking of the poly dosing line during the recent plant optimisation works. The blockage may have been related to a longer than normal period of plant shutdown during optimisation works or the distance from the polyelectrolyte mixing point to the dose point. A new poly electrolyte dosing line is to be installed and a review of the current poly dosing concentration is taking place to determine if a lower concentration would be more suitable. f. There are two flat bottomed settlement tanks on site. Only one is being used as the plant is operating below its design capacity (50%). The settlement tanks are operated on a six month rotation basis. Tank No. 1 was in use having switched over from Tank No. 2 two weeks previously. It had been intended to use Tank No. 2 but due to an issue identified with its transient flow generator during plant optimisation works it was necessary to revert to Tank No. 1. g. The caretaker reported that the sludge blanket was in the process of re-establishing after the recent optimisation works. All decanting channels were level and clean and no floc carry over was visible. h. The number of sludge bleeds per settlement tank has been increased from 4 no. to 8 no. since the last audit in 2013.
3.	**Filtration** a. There are 3 no. rapid gravity sand filters on site. Filter No. 3 is not currently being used as the plant is operating below the design capacity. Filtration of the clarified water alternates between Filter No. 1 and Filter No. 2. Process optimisation works have taken place including improvements to the backwashing process. Normally one filter is used. During part of the process optimisation works Filter No. 1 and Filter No. 2 were operated at the same time. A decision has yet to be made as to whether this practice will be continued in the longer term. b. On the day of the audit Filter No. 1 was in use and a backwash was observed. Backwashing was observed to be even across the filter. c. A turbidity monitor is in place on each individual filter. d. The filter media was replaced in the summer of 2014 and alterations of the under carriage were undertaken including increasing the freeboard. The air blowers have been replaced and the foot valves extended. The extension of the sumps has allowed the water sequence on the backwash to be increased by 2 minutes. The automatic backwash has a 15 minute air and water sequence followed by 8 minutes water. In the manual backwash the new improvements allow the water sequence to be extended to 12 minutes. e. Automatic backwashing normally takes place on a 4 day timed frequency. Instigating backwashing on the basis of head loss is not undertaken as it results in less frequent backwashing. The backwash water is discharged to waste. f. The caretaker monitors the turbidity levels prior to the filter coming back online. The filtered water typically has a turbidity of the order of 0.03 to 0.04 NTU during normal operating conditions. Cork County Council reported that a level in excess of 0.1 NTU would be unusual at the plant.
4.	**Disinfection** a. Sodium hypochlorite (10-11%) is used for chlorination with a 150 minute contact time. b. Duty, standby and trim chlorine dosing pumps are in place with automatic rotation of pumps every two hours. Dosing is flow proportional and linked to the residual chlorine level at the outlet from the reservoir. The target residual chlorine level is 0.50mg and a level of 0.68mg/l was observed at the audit. All pumps were calibrated and within service dates. There is no booster chlorination on the supply.

	c. The continuous residual chlorine monitor is alarmed. The low level residual chlorine alarm is set at 0.35 mg/l and the high level alarm at 2.1 mg/l. In the event of the alarm setting being exceeded for 30 minutes automatic shutdown of the water supply takes place and a text alert is sent to the caretaker. d. The daily residual chlorine level at the WTP is recorded in the Chlorine Record Sheet from the online chlorine monitor and cross checked using the hand held unit. The monitoring of residual chlorine levels in the network is undertaken several times a week and recorded. e. A cover has been installed above the chlorine dosing points in response to the 2013 EPA audit recommendation.
5.	**Source Protection** a. There are 3 no. waste water treatment plants located up stream of the intake at Glenville, Watergrasshill and Rathcormac. There is a documented procedure in place for the notification of water quality issues arising from the up stream waste water treatment plants to both the curators and engineering staff. b. Continuous online monitoring of the ammonia concentration in the raw water takes place. There is an auto shut off at the intake in the event the ammonia concentration exceed 0.3 mg/l and a text alarm is sent to the caretaker. c. The cryptosporidium risk score was last updated in August 2016. d. Farmers have been written to under the GAP regulations.
6.	**Treated Water Storage and Distribution Network** a. Approximately 2 days treated water storage is provided in the on site embanked service reservoir (volume 2,273m^3). The reservoir was last drained down, inspected and cleaned 6 years ago. It is currently included on a list of reservoirs to be inspected and cleaned. b. A low residual chlorine level was observed in the Kilcor area on 05/01/18. This area is at the end of an 8" main which may be extended in the event of future expansion of the scheme if required. Most of the houses in the area are served by a group scheme and the area is subject to low throughput of water.
7.	**Management and Control** a. Works were ongoing in relation to the process optimisation on the day of the audit.

3. AUDITORS COMMENTS

The audit indicated that the plant is well operated and maintained. Housekeeping was very good at the site. All of the audit recommendations from the previous audit in 2013 have been implemented.

The auditors acknowledge that process optimisation works had been scheduled to take place prior to the detection of *Giardia* and that these works are ongoing at the time of the audit.

4. RECOMMENDATIONS

Exceedances of the Parametric Values

1. Irish Water should provide an update on the status of process optimisation works together with details of the works that have been completed. The findings of the investigations into the cause of the *Giardia* detection should also be provided.
2. Irish Water should forward two months of SCADA data including the filtered water turbidity data for the individual filters and plant flow data following the completion of the process optimisation works together with details of any turbidity alarms in place.
3. Irish Water should keep the EPA informed of any changes to the HSE advice.

Source Protection

4. Irish Water should review the Cryptosporidium risk score to ensure it is up to date.

Treated Water Storage and Distribution Network

5. Irish Water should ensure that the service reservoir is inspected and cleaned out on a regular basis and any maintenance and repairs completed as soon as possible after the need has been identified.
6. Irish Water should ensure that monitoring of the residual chlorine levels is undertaken from houses at the end of the network in the Kilcor area.

General

7. Details on the supply volume and population served should be checked and updated on EDEN.

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 Ms Regina Campbell, Drinking Water Team Leader.

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: Cróna Doyle **Date:** 20/02/18