Drinking Water Audit Report

County:	Tipperary	**Date of Audit:**	06/09/2018
Plant(s) visited:	Glenary Water Supply Scheme (2900PUB0134)	**Date of issue of Audit Report:**	12/09/2018
		File Reference:	DW2018/151
		Auditors:	Ms. Criona Doyle
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. **At the audit, Irish Water advised that there is inadequate contact time to the first consumers on the Glenary supply. Irish Water should confirm the contact time to the first consumer and confirm the number of properties affected by an inadequate contact time. Irish Water should immediately seek the advice of the HSE in relation to the inadequate contact time and submit proposals for the resolution of the contact time issue to the EPA.**

ii. **There is potential for inadequately disinfected water to be discharged to the network in the event of a breakdown of the chlorine disinfection system during the out of hours period (8pm to 8am). Irish Water need to ensure that effective out of hours alarm response procedures are in place to provide safe and secure drinking water on a 24 hour basis.**

iii. **Irish Water should undertake an assessment of the rapid gravity filters to determine if resanding is required. Irish Water should also identify the proposed remedial works to prevent loss of the filter media during backwashing.**

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. The audit of Glenary water treatment plant (WTP) was carried following the introduction of a supplementary source on the 29/08/18 to augment the supply due to the recent drought conditions.

The Glenary water treatment plant serves a population of 10,750 and supplies 3,724m^3/d of water to the town of Clonmel and the surrounding area. Treatment at the plant includes coagulation, flocculation, clarification, filtration, disinfection and fluoridation.

The opening meeting commenced at 10:30am at the Glenary 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 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:

Pat Duggan, Drinking Water Compliance Specialist.

Colin Cunningham, Regional Water Engineer.

Duane O'Brien, Operations.

Representing Tipperary County Council (TCC):

John Fogarty, Acting Senior Executive Engineer.

Flan Real, Assistant Scientist.

Brid O'Hehir, Process Operations.

Eoin Lawlor, Caretaker.

Representing the Environmental Protection Agency:

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.	**Source Protection** a. Raw water is abstracted from the Glenary River. A volume of 180m^3/hr is being abstracted at the main intake. A supplementary supply of 20m^3/hr is being obtained further downstream at a second intake where the water abstracted is a mix of the Glenary River and the Glenabbey Spring. This supplementary source was last used 10 years ago. It was brought back into supply on the 29/08/18 due to falling river levels because of the recent drought. b. Land use in the catchment of the Glenary River is a mixture of forestry and low intensity agriculture. Sheep and deer graze on the catchment. A significant portion of the land to the south of the Glenary River is owned by Coillte. c. A map of the catchment area was provided at the audit. The landowners were visited in 2013 and provided with maps showing the location of the intakes and informed of their obligations under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014).* d. A copy of the Cryptosporidium Risk Assessment was provided at the audit with a final weighted risk assessment score of 63 (moderate risk). e. Monitoring data from the raw water monitoring programme from 2007 to 2015 was provided. The supply is not currently monitored under a raw water monitoring programme. Prior to the supplementary supply being brought online the raw water quality was tested (sample date 21/08/18).
2.	**Coagulation, Flocculation and Clarification** a. Raw water from the Glenary River undergoes coagulation, flocculation and clarification. b. Coagulant dosing at the plant is automatic based on the algorithm developed in 2007 when the plant was upgraded. Jar testing last took place in March 2018. c. The raw water has a low alkalinity and soda ash (5%) is dosed at 20mg/l to raise the alkalinity. There is a duty and standby pumping arrangement for soda ash dosing. d. Aluminium sulphate is used as the coagulant. There are 4 no. dosing pumps. Pumps No. 1 and 2 operate on duty and standby basis with switchover to provide a dose of 40 mg/l. In response to changes in raw water quality, as monitored by the colour monitor, Pumps No. 3 and 4 operate on a duty and standby basis to provide a boost function for aluminium sulphate up to a combined maximum dose of 120mg/l. A dose chart for each of the colour bands was displayed on site showing the required dose in response to colour changes in the raw water. e. Polyelectrolyte coagulant aid (0.1%) is dosed at the end of the flash mixer. There are duty and

	standby poly dosing pumps. f. 15 minutes retention is provided in the flash mixer at a flow rate of 200m^3/hr. g. All dosing pumps were within the service / calibration dates. h. The sticker on the settled raw water turbidity meter indicated a service / calibration was overdue since 15/06/18. i. A build-up of material was visible on the walls of the settlement tanks, underneath the settled water outlet channels and on the lamella plates. It was reported that a full clean of the tanks was due to take place in early November 2018. Details of the settlement tank cleaning are not recorded in the plant log book.
3.	**Filtration** a. There are 3 no. rapid gravity filters in operation. The filter media was last replaced in 2008. The sand was last topped up in 2014. There is no depth indicator present on the wall of the filters to confirm the current sand depth. b. Backwashing is triggered by head loss or alternatively on a timed basis every 40 hours whichever occurs sooner. Backwashing involves 4 minutes air scour followed by 4 minutes water flow. c. A backwash of Filter No. 2 was observed and backwashing looked evenly distributed across the filter. Sand loss was visible during the backwashing process in the filter channel. d. A run to waste or delayed start is not in place following backwashing to allow for the filter ripening. e. There is continuous online monitoring of turbidity on each of the individual filters and on the combined filtered water. On the day of the audit the monitors indicated the following turbidity readings: Filter No. 1 0.03 NTU; Filter No. 2 0.03 NTU; Filter No. 3 0.03 NTU and combined filtered water 0.03 NTU.
4.	**Disinfection** a. Sodium hypochlorite (14-15%) is used for chlorination. b. Chlorine dosing is flow proportional. Duty, standby and assist chlorine dosing pumps are provided linked to the residual chlorine level in the clear water tank. The target level is 0.7mg/l leaving the WTP in good weather and 1.0mg/l in bad weather. On the day of the audit a level of 0.72 mg/l was observed. c. The low-level chlorine alarm is set at 0.5 mg/l and the high-level alarm at 1.0mg/l. A copy of the alarm procedure which operates from 8am to 8pm is displayed on site. The alarm generates a text alert to 3 staff members. There is no auto shut down of the plant linked to the chlorine alarm. In the event of a chlorine alarm occurring during out of hours (8pm to 8am) there is potential for inadequately disinfected water to be discharged to the network. d. A copy of the contact time calculation was provided at the audit which indicated a total effective Ct of 12.54 mg.min/l. It was reported that there is insufficient contact time provided to between 10 and 12 houses. e. The site has not been assessed yet under the Tipperary Disinfection Programme. f. Disinfected water from the clear water storage tank is discharged directly to a portion of the Clonmel town network in addition to supplying the reservoir.
5.	**Treated Water Storage and Distribution Network** a. A twin celled reservoir provides 22 hours storage at Scrothea. The reservoir was not visited on the day of the audit. The reservoir has never been emptied for cleaning. b. A clear 100m^3 baffled clear water tank is provided on site. The tank is fitted with vents and a secure locked cover.
6.	**Management and Control** a. There is currently no security fencing in place at the Glenary intake following the theft of the palisade fencing. b. The temporary fencing in the vicinity of the spring has been damaged.

3. AUDITORS COMMENTS

At the audit the EPA was informed that there was an issue with inadequate contact time at a number of houses on the network (10 to 12 houses). Irish Water should identify the properties affected and immediately seek the health advice of the HSE in relation to the inadequate contact time. Irish Water should undertake remedial works to ensure adequate contact time is provided to all consumers served by the supply.

An issue with the out of hours response to chlorine alarms at Glenary has been identified at the audit. It had previously been outlined to the Agency in November 2017, as part of an update on another file (DW2017/50: Springmount / Galtee), that Glenary would be prioritised within the Tipperary Disinfection Programme. At the Glenary audit it was outlined that the site assessment at Glenary has not been completed to date under the Tipperary Disinfection Programme. The EPA is concerned in relation to the delay in the commencement of the site assessment at this site which had previously been identified as a high priority site.

The settlement tanks need to be cleaned. On the day of the audit a build-up of material was visible on the walls, lamellae plates and underside of the channels.

The fact that the filters have not been resanded for 10 years is of concern. Irish Water should ensure that an assessment of the filters is undertaken as soon as possible. The assessment should also look at remedial options to (i) prevent the loss of sand during backwashing operations and (ii) ensure that the filters are run to waste for an appropriate period of time or that there is a slow start when the filter is brought back into use.

4. RECOMMENDATIONS

Disinfection

1. Irish Water should confirm the contact time, the properties affected by inadequate contact time and immediately seek the advice of the HSE. Irish Water should submit proposals, with timeframes, for the resolution of the contact time issue on this supply and forward details of the HSE advice to the Agency.

2. Irish Water should submit a report demonstrating that effective out of hours alarm response procedures are in place to provide safe and secure drinking water on a 24 hour basis taking into account the vulnerability of the supply in the absence of storage. Auto shutdown should be considered in the response. The EPA's Advice Note. No. 3 on E. coli in Drinking Water requires an immediate response in the event of inadequate levels of chlorine in the final water.

Coagulation, Flocculation and Clarification

3. Irish Water should ensure that regular cleaning of the settlement tanks is undertaken to prevent the build-up of material on the walls, channels and lamellae plates. The details of the works undertaken should be recorded.

4. Irish Water should ensure that the coagulation / flocculation processes at the water treatment works are regularly inspected. Jar testing of the raw and coagulated waters as outlined in Section 3.3.1 and Appendix C of the EPA publication "*Water Treatment Manual: Coagulation, Flocculation and Clarification*" to determine the optimum chemical coagulant dose and pH for the treatment of the water. The frequency of checks should be appropriate to the nature of supply and changing condition. Results should be recorded at the treatment works and used for control of the treatment plant.

Filtration

5. Irish Water should assess the depth of sand in the rapid gravity filters. The assessment should also look at remedial options to prevent the loss of media during backwashing operations. A depth gauge should be installed to facilitate monitoring of the depth of the filter media.

6. Irish Water should ensure that following backwashing that the filters are run to waste for an appropriate period of time or that there is a slow start when a filter is brought back into use.

7. Irish Water should ensure that a logbook is kept ("the filter logbook") for each filter containing the following:
   i. A record of all maintenance work and inspections carried out on the filter;
   ii. Details of the media depth and the condition of the filter when it is drained down;
   iii. Where appropriate, details of the operation of the backwashing / air scouring systems and underdrains;
   iv. Details of any changes or required changes to filters, the backwashing /air scoring systems or underdrains; and
   v. Details of any trial works carried out on the filters.

General

8. Irish Water should examine the fencing at both the spring source and main intake to ensure adequate fencing is provided for security purposes and to prevent access of livestock.

9. Irish Water should confirm that the reservoir is included on the Irish Water reservoir cleaning programme.

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.

The Agency request that Irish Water submit a response in relation to the Recommendations No. 1 and 2 relating to the inadequate contact time and out of hours alarm response procedure within one week of the date of this report.

Irish Water should submit a report to the Agency in response to the remainder of the audit recommendations 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: Fiona Doyle **Date:** 12/09/2018

Inspector