Drinking Water Audit Report

County:	Tipperary	**Date of Audit:**	29/05/18
Plant(s) visited:	Tipperary Town Drinking Water Treatment Plant (Scheme Code 2900PUB0123)	**Date of issue of Audit Report:**	15/06/18
		File Reference:	DW2018/53
		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. **Irish Water should review the current UV disinfection system against the requirements of EPA Advice Note. No. 3 E.coli in Drinking Water. Irish Water should ensure that there are duty and standby UV units with automatic switchover in the event of the failure of one of the UV units.**
ii. **Irish Water should provide a SCADA print out of two months' online turbidity, flow and UVI monitoring data, since the turbidity exceedance on 22/3/18.**
iii. **Irish Water should undertake a review of the current UV and turbidity alarm settings and time delays to ensure appropriate alarms levels and response procedures are in place in the event that the raw water quality is compromised.**

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 following the exceedance of the turbidity parametric value in the Tipperary Town Public Water Supply on the 22/03/18.

The Tipperary Town Public Water Supply serves 4,993 people and produces 2,582m^3/d of water. The raw water for the supply is currently being obtained from 2 no. boreholes at Fawnagowan. Treatment includes UV disinfection, chlorination and fluoridation. The supply serves the area surrounding Tipperary Town. The Muskry Spring which is currently supplying the Galtee Regional Supply can also be switched over to serve the Tipperary Town area as required.

The opening meeting commenced at 12:45pm at the Fawnagowan Pump House and continued at the Tipperary Town 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 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: Patrick Duggan, Compliance Specialist, Irish Water. Tommy Roche, Compliance Analyst, Irish Water. Colin Cunningham, Regional Water Engineer Irish Water. **Representing Tipperary County Council:** John Fogarty, Acting Senior Executive Engineer, Tipperary County Council. Flan Real, Assistant Scientist, Tipperary County Council. John Fieven, Caretaker, Tipperary County Council. **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.	**Exceedance of the Parametric Value** a. On the 23/03/18 the EPA was notified of elevated turbidity at the Tipperary Town water treatment plant. A maximum level of 10 NTU was recorded on Thursday 22/03/18. The elevated turbidity event took place between 07:30 on the 22/03/18 to 21:00 on the 23/03/18. b. Under normal conditions the turbidity generally ranges from 0.06 to 0.11 NTU. c. The turbidity reduced to < 1 NTU on Friday 23/03/18. Following the incident the reservoir and network had to be scoured prior to the supply being brought back online. d. Monitoring of the water quality at the time did not indicate the presence of any pollutants and turbidity was the only elevated parameter. The cause of the elevated turbidity has not been identified but may be related to an underground collapse in the vicinity of the borehole. There was heavy rainfall in the week preceding the incident. e. In response to the incident remedial works were undertaken to allow water to be discharged to waste from the borehole in the event of a reoccurrence of elevated turbidity.
2.	**Source Protection** a. Raw water is obtained from two boreholes located at Fawnagowan. No borehole logs or construction details were available. The boreholes are reported to be 20 to 30 years old. b. The boreholes are located in secure locked chambers to the rear of the pump house. c. While the chamber provides protection from the ingress of surface water runoff the wellhead completion is not fully in accordance with EPA Advice Note 14: Borehole Construction and Wellhead Protection. A gap was visible around the power cables on one of the boreholes and the annular seal was not visible at the top of the borehole (Photograph No. 1). d. Tipperary County Council confirmed that the Zone of Contribution (ZOC) for the boreholes have been delineated. A map was presented at the audit showing the boundary of the ZOC. e. No details were available on when landowners within the setback distances were last informed of their obligations under the Good Agricultural Practice Regulations. f. Landuse in the vicinity of the boreholes includes the N24 national primary road and agricultural land. g. No details of the *Cryptosporidium* Risk Score were available at the audit. The caretaker visits

	the Fawnagowan pump house and treatment plant building on a daily basis and monitors activities in the zone of contribution. h. The raw water monitoring data for 2010 to 2013 was provided at the audit. The monitoring indicates good microbiological quality with no detections of coliforms or E. coli in the raw water. The highest turbidity measured was 0.34 NTU. The data did not indicate which source (Muskry Spring or Fawnagowan boreholes) the samples related to. The raw water monitoring data for 2014 and 2015 was not available at the audit. Raw water monitoring was not undertaken in 2016 or 2017. i. There is a continuous online raw water turbidity monitor. The turbidity alarm is set at 1 NTU. There is no automatic shut down of the source linked to the high turbidity alarm. A text alert is generated and a manual shutdown is required.
3.	**Disinfection** a. Primary disinfection is provided by the Aquafides UV unit. The UV unit is calibrated once per month with a maintenance check twice a year. b. A single UV unit is provided and UV disinfection takes place at the outlet from the reservoir. The UV validation cert was inspected on site and the unit was operating within its validated range. The plant operates at a maximum flow rate of 120m^3/hr and the validation cert indicated a minimum UV intensity (UVI) of 110.2 w/m^2 for this flow rate. c. The low level UVI alarm is set at 120w/m^2. An early warning message is sent to the caretaker when UVI drops below 150w/m^2. d. There is no standby UV unit in place to facilitate automatic changeover in the event of the failure of the UV lamp in accordance with the requirements of EPA Advice Note No. 3: E. Coli in Drinking Water. e. There is no auto shut down of the Fawnagowan boreholes in response to the low level UV alarm. f. Chlorination is undertaken using 14% sodium hypochlorite (with softener) to provide secondary disinfection. A use by date of 23/06/18 was displayed on the drum being used. The caretaker monitors stock control and any drums past their use by date are removed off site. g. Duty, standby and trim chlorine dosing pumps are installed on site. Dosing is flow proportional and linked to the residual chlorine monitor at the outlet from the reservoir. The duty and standby pumps switchover automatically on a 12 hour frequency. h. The target residual chlorine level is 0.5 mg/l leaving the reservoir. The level was 0.46mg/l on the day of the audit. i. The low-level chlorine alarm is set at 0.31mg/l and the high-level alarm is set at 0.8mg/l. The caretaker, relief caretaker and engineer receive the text alerts in the event of the alarm being triggered. j. There is no auto shut down of the supply linked to the chlorine alarm as the chlorine is considered to be the secondary disinfection system. k. It was reported that the chlorine dosing pumps had recently been serviced but no date sticker or log book record was available to confirm the exact date.
4.	**Treated Water Storage and Distribution Network** a. Residual chlorine levels are monitored at the end of the network normally 3 times a week and recorded in the plant log book. A residual chlorine level of 0.44 mg/l was recorded at the end of the network on the day of the audit. The distance to the end of the network is approximately 6km. b. No recent complaints or network issues were reported at the audit. c. The reservoir adjacent to the site was not inspected as part of the audit.
5.	**Chemical Storage and Bunds** a. The chlorine day tank was adequately bunded. b. A secure locked store is used for the storage of the sodium hypochlorite drums and a bunded chemical store is used for the storage of the empty containers.
6.	**Management and Control** a. Procedures were displayed on wall charts on site for (1) chlorine outage (2) chlorine dosing

		arrangement (3) high turbidity alarm response. b. The details on EDEN in relation to the supply and treatment provided were incorrect. c. The fluoride treatment for the Tipperary Town Supply is undertaken at a separate dosing house and was not inspected as part of the audit. The caretaker reported that he records the flow, dose and day tank weight on a daily basis in the log book at the dosing house. Monthly monitoring of the fluoride levels is undertaken by the process technician.

3. AUDITORS COMMENTS

Primary disinfection at the site is provided by the UV unit. Irish Water should ensure that the UV disinfection is in line with the EPA Advice note No. 3 on E.coli in Drinking Water. Irish Water should ensure that there are duty and standby UV units with automatic switchover in the event of the failure of one of the UV units.

The cause of the elevated turbidity in the raw water from the Fawnagowan boreholes has not been identified. The results of two months of continuous online turbidity monitoring should be provided to demonstrate that the raw water turbidity has remained within normal levels since the exceedance.

Irish Water should ensure that an appropriate alarm level is set on the raw water turbidity monitor to warn of potential raw water quality issues. Under normal conditions the raw water turbidity is < 0.2 NTU and the current alarm level of 1 NTU does not provide an adequate warning of turbidity issues.

No information was provided on the borehole construction details. A *Cryptosporidium* risk score is not currently provided on EDEN. An up to date *Cryptosporidium* risk score for the supply should be provided to the EPA together with the borehole construction details.

4. RECOMMENDATIONS

Disinfection

1. Irish Water should ensure that there are duty and standby UV disinfection arrangements with automatic changeover in the event of the failure of one of the UV disinfection units in accordance with EPA Advice Note 3: E. Coli in Drinking Water.

2. Irish Water should provide (a) 2 months of online turbidity/flow/UVI monitoring data, since the 22/03/18, to demonstrate that the turbidity has returned to within its normal range and that the UV unit has operated within its validated range at all times and (b) a copy of the validation certificate for the UV unit.

Source Protection

3. Irish Water should ensure that the source protection and catchment risk assessment score for the *Cryptosporidium* risk assessment is reviewed in detail and appropriate measures implemented to reduce the risk and a copy forwarded to the Agency.

4. Irish Water should liaise with Tipperary County Council to ensure that all landowners are made aware of the setback distances in the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No. 31 of 2014) for the source of the supply. Irish Water should confirm that the landowners have been written to inform them of their obligations.

5. Irish Water should forward details of the raw water monitoring for 2014 and 2015 and ensure that the sources are included in a programme of raw water characterisation. Irish Water should

confirm which source the historic raw water quality data relates to (Muskry Spring or Fawnagowan boreholes).

6. Irish Water should ensure that all borehole linings and seals are maintained in accordance with EPA Advice Note 14: Borehole Construction and Wellhead Protection. Irish Water should submit a copy of the borehole logs with the relevant construction details.

Management and Control

7. Irish Water should undertake a review of the current turbidity alarm settings and time delays to ensure appropriate alarm levels and response procedures are in place in the event that the raw water quality is compromised.

8. Irish Water should examine the options for auto shut down of the boreholes (i) linked to high turbidity and (ii) the UV unit operating outside of its validated range.

9. Irish Water should update the data on the EPA's EDEN portal in terms of the source of the supply and the treatment provided.

10. Irish Water should ensure records are available at the plant of the dates when calibration and servicing of equipment has taken place. Irish Water should provide confirmation of the date of the most recent service of the chlorine dosing pumps.

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: Fiona Doyle **Date:** 15/06/18

Inspector

Photograph No. 1: Well Head Completion