Drinking Water Audit Report

County:	Wexford	**Date of Audit:**	18th July 2017
Plant visited:	Bree Water Treatment Plant Scheme Code 3300PUB1420	**Date of issue of Audit Report:**	25th July 2017
		File Reference:	DW2017/95
		Auditors:	Aoife Loughnane Darragh Page
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.		

MAIN FINDINGS

i. **An *E.coli* exceedance was detected in Bree public water supply on 11th July 2017. The audit team was satisfied that the disinfection system at Bree water treatment plant was not compromised in the days leading up to the *E.coli* exceedance.**
ii. **Irish Water should carry out further investigations into the cause of the *E.coli* excecedance and take action to prevent a reoccurence.**
iii. **The pH correction system at Bree water treatment plant is not operating due to an equipment malfunction. Irish Water must expedite the repair works without delay, to ensure compliance with the pH parametric value in treated water.**

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 in response to the notification by Irish Water on 12th July 2017 of the failure to meet the *E.coli* parametric value (as specified in Table A of Part 1 of the Schedule of the Regulations) and the subsequent imposition of a Boil Water Notice on the Bree public water supply.

Raw water is abstracted from a borehole located at Bree water treatment plant. Treatment consists of disinfection by chlorination and pH correction. The plant produces 187 m^3/day and serves a population of 400 people.

The opening meeting commenced at 1:30 pm at Bree 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. Photographs taken by Aoife Loughnane during the audit are attached to this report and are referred to in the text where relevant. The following were in attendance during the audit:

Representing Irish Water:

Patrick Duggan, Drinking Water Compliance Analyst

Deirdre O'Loughlin, Drinking Water Compliance Specialist

Representing Wexford County Council:

Fionnuala Callery, Senior Executive Engineer

Leonard Poole, Executive Engineer

Tadhg O'Corcora, Area Engineer

Terry Moore, Superviser

Tom Quigley, Caretaker

Representing the Environmental Protection Agency:

Aoife Loughnane, Inspector

Darragh Page, Senior 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. An *E.coli* failure detected in a sample taken on 11th July 2017 was notified to the EPA on 12th July. The sample contained two *E.coli* (per 100ml) and 26 Coliform Bacteria (per 100 ml). The sample contained 0.29 mg/l free chlorine and 0.36 mg/l total chlorine. The sample location was supplied by the Bree water treatment plant. b. Upon the advice of the HSE, a Boil Water Notice was issued to consumers on Bree public water supply on 12th July. c. The cause of the *E.coli* failure was under investigation by Irish Water at the time of the audit. Resampling was undertaken on 13th, 17th and 18th July. During the audit Irish Water advised that the results of sampling on 13th and 17th July had been received and were compliant. All samples had adequate levels of chlorine. d. Scouring of the distribution network commenced on 13th July. e. Irish Water notified the EPA that the Boil Water Notice was lifted on 19th July, with the agreement of the HSE.
2.	**Source Protection** a. The borehole is located in a locked concrete chamber at the water treatment plant. b. The borehole construction log was not available and the representatives present at the audit did not know details of the borehole age or depth. A visual inspection of the borehole showed that steel casing was present but there was no plastic liner or grouting. Plastic sheeting was being used to cover the top of the borehole (see photo 1). c. A concrete dome was installed in the borehole chamber in recent years to prevent ingress of surface water run-off. d. Land-use in the immediate vicinity is residential and Wexford County Council stated that houses are served by a public sewer. e. No details of raw water quality were available during the audit, however a raw water sample had been taken in recent days and results were awaited.

3.	**Chlorination** a. The raw water is disinfected by chlorination using sodium hypochlorite. b. The chlorination system consists of duty and standby chorine dosing pumps. There is no automatic switchover arrangement in the event of a pump failure. c. The chlorine dosing points are located at the inlet of the on-site reservoir, and the dose is flow proportional. d. A chlorine monitor and alarm is in place, with dial out facility to the caretaker's phone. A cascade system is in place to respond to alarms. The alarm set-points are 0.1 mg/l (low) and 0.8 mg/l (high). e. There is no automatic plant shut-off in the event of a failure of the chlorination system. This presents a risk of inadequately disinfected water entering the reservoir and being supplied to consumers. f. The Hach CL17 chlorine monitor was reading 0.52 mg/l during the audit. The monitor is linked to SCADA and the chlorine trend provided during the audit showed levels between 0.47 mg/l and 0.55 mg/l from 1st to 11th July. This demonstrates the disinfection system was operating satisfactorily in the days prior to the *E.coli* failure. g. The calibration label on the Hach CL17 chlorine monitor showed that it was overdue a calibration since 08/01/17 (see photo 2). h. A manual chlorine test carried out by the caretaker gave a result of 0.51 mg/l, which shows good correlation with the chlorine monitor.
4.	**Treated Water Storage** a. Disinfected water is stored in the on-site reservoir which has a storage capacity of approximately 45 m^3. b. The reservoir has not been inspected or cleaned in more than 16 years, and has not been included on Irish Water's reservoir cleaning programme.
5.	**pH Correction** c. There is a new pH correction system consisting of caustic dosing at the outlet from the reservoir, however it has not been operational since March 2017 due to a problem with the pH controller. d. Irish Water stated their intention to fix the pH controller under the National Disinfection Programme works in County Wexford, which are scheduled for Q1 or Q2 of 2018. e. The final water pH monitor was reading 5.87 pH during the audit, which is outside the range (6.5 to 9.5) specified in the Drinking Water Regulations.
6.	**Monitoring and Sampling Programme for treated water** a. The compliance monitoring results for Bree PWS for 2016 and 2017 (to date) were provided during the audit. The results show three pH failures which were not notified to the EPA: • 5.8 pH on 08/06/16; • 5.7 pH on 05/10/16; and • 5.8 pH on 15/02/17 Irish Water confirmed that no investigations have been carried out to determine if the low pH levels are causing pipework corrosion in the network and resulting in elevated levels of metals in the drinking water supply. However, samples taken on 05/04/2017 for the purposes of audit monitoring showed no metals exceedances on that occasion.
7.	**Chemical storage** a. Two drums of sodium hypochlorite were being stored in a bund in the chlorination building. The labels on the drums showed a date of 07/06/2017 (see photo 3). Irish Water could not confirm if this was a date of manufacture or expiry.

3. AUDITORS COMMENTS

There was no evidence of an issue with the operation of the disinfection system at Bree water treatment plant that might have contributed to the *E.coli* failure on 11th July 2017. Irish Water should complete their investigations into the cause of the *E.coli* failure and take action to prevent a reoccurrence.

The pH correction system at Bree water treatment plant is not operating due to an equipment malfunction. Irish Water's proposed timeframe of Q1 or Q2 of 2018 for fixing the pH controller under the National Disinfection Programme is not acceptable. The repair works must be expedited without delay, to ensure compliance with the pH parametric value in treated water.

4. RECOMMENDATIONS

General

1. Irish Water should carry out a full investigation to determine the cause of the *E.coli* failure in Bree public water supply and determine what actions should be taken to prevent a reoccurrence.

2. Irish Water should expedite the repair works on the pH correction system at Bree water treatment plant to ensure compliance with the pH parametric value in treated water.

Source Protection

3. Irish Water should carry out regular monitoring on the raw water source and should include monitoring for *E .coli* bacteria following heavy rainfall, as an indicator of trends in assessing water quality. This information should be considered during the review of the disinfection system under the National Disinfection Programme.

4. Irish Water should review the source protection around the borehole, and ensure the borehole is adequately lined and sealed.

Disinfection

5. Irish Water should ensure there is automatic switch over between the duty and standby chlorine dosing pumps, in the event of the failure of one of the pumps.

6. Irish Water should ensure that the chlorine monitor is regularly maintained and calibrated in accordance with the manufacturer's instructions.

7. Irish Water should review the arrangements for the management of chemicals at water treatment plants to ensure that sodium hypochlorite is not used once it has passed its expiry date.

8. Irish Water should assess the feasibility of installing an automatic shut-down of the plant in the event of a failure of the disinfection system, to safeguard against inadequately disinfected water entering the distribution network.

Treated Water Storage

9. 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.

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 to address the issues raised. This report has been reviewed and approved by Emer Cooney, 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: Aoife Laighnare **Date:** 25th July 2017

Inspector

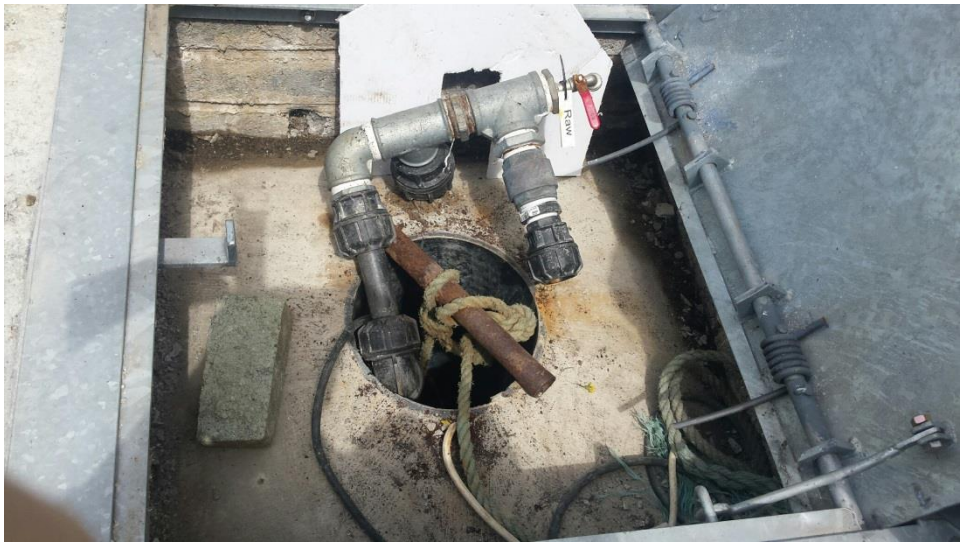

Photo 1: Borehole chamber

Photo 2: Label on chlorine monitor shows that calibration is overdue since 08/01/17.

Photo 3: Label on sodium hypochlorite drum showing date of 07/06/2017.