



# Drinking Water Audit Report

<b>County:</b>	Wicklow	<b>Date of Audit:</b>	9 <sup>th</sup> May 2018
<b>Plant visited:</b>	Aughrim Annacurra PWS  (scheme code 3400PUB1023)	<b>Date of issue of Audit Report:</b>	22 <sup>nd</sup> May 2018
		<b>File Reference:</b>	DW2018/88
		<b>Auditors:</b>	Aoife Loughnane Michelle Minihan
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014) as amended.</i></li> <li>• <i>The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i></li> <li>• The recommendations specified in the EPA <i>Drinking Water Report.</i></li> <li>• EPA Drinking Water Advice Notes No.s 1 to 15.</li> <li>• The recommendations in the previous EPA audit report dated 29/09/15.</li> </ul>		

## MAIN FINDINGS

- i. A Boil Water Notice was issued to consumers in Aughrim Annacurra public water supply on 02/05/18 following the detection of *Enterococci* in treated water. Further *Enterococci* exceedances were found in follow up samples at several locations in the distribution network.
- ii. Irish Water confirmed there were no incidents at the water treatment plant or in the network which may have contributed to the *Enterococci* detections. The sampling results are unusual because there were adequate levels of residual chlorine in each sample where *Enterococci* was detected.
- iii. The disinfection system at Aughrim water treatment plant was upgraded in 2017 under Irish Water’s National Disinfection Programme. However, there is no pH control and the elevated pH of the final water may affect disinfection performance.
- iv. Irish Water should continue the investigation into the cause of the *Enterococci* exceedances, and implement corrective actions to ensure compliance with the Drinking Water Regulations.

## 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 in response to the notification by Irish Water dated 27/04/18 of the failure to meet the *Enterococci* 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 in the Aughrim Annacurra public water supply (PWS).

The source of Aughrim Annacurra PWS is the Three Wells Stream at Tinakilly Upper. The raw water is treated at Aughrim Annacurra water treatment plant by slow sand filtration. The filtered water is then

pumped to Aughrim Reservoir, where it undergoes disinfection using sodium hypochlorite. The plant supplies 285 m<sup>3</sup>/day and serves a population of 1,588 people.

The opening meeting commenced at 10:30 at Aughrim Annacurra 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:**

Andrew Boylan – Drinking Water Compliance Specialist  
 Aoife Lambe – Drinking Water Compliance Analyst  
 Peter Thornton – SLA Lead

**Representing Wicklow County Council:**

Mary Cahill – Senior Executive Engineer  
 Tom Griffin – Senior Executive Chemist  
 Tom O’Leary – Senior Executive Engineer  
 Tony McManus – Executive Engineer  
 Shane Kinsella – Relief Caretaker

**Representing the Environmental Protection Agency:**

Aoife Loughnane – Inspector  
 Michelle Minihan – 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.*

<b>1.</b>	<p><b>Exceedances of the Parametric Values</b></p> <ol style="list-style-type: none"> <li>a. On 27/04/18 Irish Water notified the EPA of an <i>Enterococci</i> exceedance (1/100 ml) in an audit sample taken in Aughrim Annacurra PWS on 24/04/18. Further <i>Enterococci</i> exceedances have been found in follow up samples taken between 30/04/18 and 16/05/18 at several locations in the distribution network.</li> <li>b. The sampling results are unusual because there were adequate levels of residual chlorine in each sample where <i>Enterococci</i> was detected.</li> <li>c. Following consultation with the HSE, Irish Water issued a Boil Water Notice to consumers in Aughrim Annacurra PWS on 02/05/18.</li> <li>d. Irish Water confirmed there were no incidents at the water treatment plant or in the network which may have contributed to the <i>Enterococci</i> detections.</li> <li>e. At the beginning of April, Irish Water changed the contract laboratory for sampling &amp; analysis of drinking water supplies in County Wicklow.</li> <li>f. An investigative programme of sampling &amp; analysis is underway to examine the microbiological exceedances in this supply. Split samples are being tested at different laboratories using two different methods for <i>Enterococci</i> analysis (membrane filtration versus Enterolert).</li> </ol>
<b>2.</b>	<p><b>Filtration</b></p> <ol style="list-style-type: none"> <li>a. There are 6 slow sand filters at the treatment plant, with 2 in operation on the day of the audit. The original 2 slow sand filters were decommissioned in January 2018.</li> <li>b. The filtered water turbidity trends were observed on SCADA and did not indicate any issues with the operation of the filters.</li> </ol>

3.	<p><b>Disinfection</b></p> <ul style="list-style-type: none"> <li>a. The water supply is disinfected at the outlet of Aughrim reservoir using sodium hypochlorite (10/11% ultra low bromate solution).</li> <li>b. The chlorination system was upgraded under Irish Water’s National Disinfection Programme in 2017. Chlorine dosing is now flow proportional and linked to the target residual of 1.3 mg/l leaving the reservoir.</li> <li>c. The disinfection system meets the criteria in EPA <i>Drinking Water Advice Note 3: E.Coli in Drinking Water</i>.</li> <li>d. The PLC download of chlorine residuals in the final water leaving Aughrim reservoir shows that the large fluctuations observed during the previous EPA audit have been stabilised. The daily fluctuations for the month of April were in the range 0.8 to 1.2 mg/l compared to previous range of 0.3 to 1.5 mg/l within a short space of time.</li> </ul>
4.	<p><b>pH correction</b></p> <ul style="list-style-type: none"> <li>a. There is no pH correction at Aughrim Annacurra WTP. Irish Water has carried out investigations into the pH issues identified during previous EPA audits. These investigations have found that the water is extremely aggressive and pH correction may not be possible.</li> <li>b. On the day of the audit, the raw water pH was 5.5 and the final water pH was 8.2. No explanation could be provided for the increase in pH throughout the treatment process, which is not thought to be affected by the filter media. Elevated pH may affect disinfection performance because disinfection is more effective at neutral to acidic pH than at alkaline pH.</li> <li>c. Irish Water confirmed that pH adjustment is not being considered for this supply.</li> </ul>
5.	<p><b>Chemical storage and bunds</b></p> <ul style="list-style-type: none"> <li>a. The labels on the drums of sodium hypochlorite showed that 5 of the 6 drums had a manufacture date of 15/03/18, a delivery date of 05/04/18 and a use by date of 15/06/17. The use by date appears to be a typo on the label.</li> </ul>
6.	<p><b>Management and Control</b></p> <ul style="list-style-type: none"> <li>a. Aughrim Annacurra PWS is on the EPA’s Remedial Action List due to persistent THM exceedances and HSE concerns about the water supply. The long term solution had been to replace this supply with a connection to the upgraded Vartry WTP by December 2020. The revised solution is to connect to a borehole at Woodenbridge (with new treatment to be installed) by December 2020.</li> <li>b. The calibration stickers on the two CL17 chlorine monitors (inlet &amp; outlet chlorine) showed they were overdue a service since 09/12/17. Wicklow County Council representatives confirmed that the monitors are serviced annually. No recent service record could be found in the plant log book.</li> <li>c. The map of the area affected by the Boil Water Notice includes the area served by Kilballyowen (Annacurra) WTP. During the audit, Wicklow County Council representatives stated that particular area is not affected by the Boil Water Notice.</li> </ul>

### 3. AUDITORS COMMENTS

The audit found satisfactory operation and control of the disinfection system and a stable chlorine residual in the final water in Aughrim Annacurra PWS. However, the lack of pH control resulting in the elevated pH of the final water may affect disinfection performance. The *Enterococci* sampling results are unusual because there were adequate levels of residual chlorine in each sample where *Enterococci* has been detected. Irish Water is currently investigating the timing of these unsatisfactory results having regard to the introduction of a new contract laboratory for sampling and analysis of drinking water supplies in Wicklow. Irish Water should continue to investigate the cause of the *Enterococci* exceedances, and implement corrective actions to ensure compliance with the Drinking Water Regulations.

#### 4. RECOMMENDATIONS

1. Irish Water should continue to investigate the cause of the *Enterococci* exceedances in Aughrim Annacurra public water supply, and implement corrective actions to ensure compliance with the Drinking Water Regulations.
2. Irish Water should assess the feasibility of installing pH correction on the final water at Aughrim Annacurra PWS to ensure that disinfection performance is not compromised.
3. Irish Water should ensure that the expiry date on stocks of sodium hypochlorite are accurately labelled.
4. Irish Water should ensure that service/calibration stickers on monitoring equipment are displayed and kept up to date.
5. Irish Water should ensure the accuracy of the area affected by the Boil Water Notice on the map published on [www.water.ie](http://www.water.ie).

#### 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 Michelle Minihan, Senior Inspector, Drinking Water Team.

Irish Water should submit a report to the Agency within **two weeks 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: Aife Laghuane Date: 22<sup>nd</sup> May 2018  
Inspector