



# Drinking Water Audit Report

<b>County:</b>	Wicklow	<b>Date of Audit:</b>	19 <sup>th</sup> September 2014
<b>Plant(s) visited:</b>	Glenealy PWS 3400PUB1021	<b>Date of issue of Audit Report:</b>	3 <sup>rd</sup> October 2014
		<b>File Reference:</b>	DW2014/319
		<b>Auditors:</b>	Mr Darragh Page Ms Aoife Loughnane
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>.</li> <li>• The <i>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 Report on <i>The Provision and Quality of Drinking Water in Ireland</i>.</li> <li>• The recommendations in any previous audit reports.</li> </ul>		

## MAIN FINDINGS

- i. **The Barnbawn water treatment plant was found to be operating without basic operational control equipment and was heavily reliant on caretaker experience and knowledge of the plant.**
- ii. **There is a risk of un-disinfected water entering the distribution network in the event of a power failure.**
- iii. **Improvements are required at Barnbawn water treatment plant in order to ensure the safety and security of the Glenealy PWS, including:**
  - **better operational control of the slow sand filters;**
  - **the installation of turbidity monitors on each filter, linked to a recording device which will indicate when the filters require cleaning and are suitable to bring back into service;**
  - **the fitting of alarms on the disinfection system to ensure adequate disinfection of the water entering supply; and**
  - **ensuring an appropriate alarm response procedure is in place.**

## 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.

The public water supply in Glenealy is divided into two separate water supply zones, Barnbawn and Cronroe (Wicklow Regional Public Supply). This audit was carried out on the Barnbawn water treatment plant which supplies approximately 105 m<sup>3</sup>/day of water to Glenealy public water supply serving around 320 consumers. The plant abstracts water from an adjacent stream, and provides treatment by slow sand filtration and disinfection prior to entering the public supply.

Photographs taken by Aoife Loughnane during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 10.00 am at Barnbawn 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.

<p>Representing Irish Water: (* indicates that person was also present for the closing meeting)</p> <p>John Leamy – Drinking Water Compliance Specialist, Irish Water*</p> <p>Tselophile Tlou – Water Engineer, Irish Water*</p> <p>Larry Wolohan – Senior Engineer, Wicklow County Council*</p> <p>Kevin Scanlon – Area Engineer, Wicklow County Council*</p> <p>Reuben O’Neill – Caretaker, Wicklow County Council*</p> <p>Representing the Environmental Protection Agency:</p> <p>Darragh Page – Inspector</p> <p>Aoife Loughnane - Inspector</p>
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## 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.*

<p><b>1.</b></p>	<p><b>Source Protection</b></p> <p>a. The stream adjacent to Barnbawn water treatment plant is the source for the Glenealy public water supply (see photo 1). The stream is fast flowing and the raw water quality can deteriorate after heavy rainfall. Raw water monitoring results show that colour can be high on occasion (60 mg/l Hazen true colour was recorded on 11/10/2012 and 44 mg/l Hazen apparent colour was recorded on 20/03/2014). Wicklow County Council’s representatives confirmed that no complaints have been received regarding the aesthetic quality of the treated water.</p> <p>b. The neighbouring land use is predominantly woodland. It is considered that the requirements under the <i>European Communities (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No. 31 of 2014)</i> are satisfied in this case.</p>
<p><b>2.</b></p>	<p><b>Filtration</b></p> <p>a. There are two slow sand filters at the plant, each measuring 3.8 m x 6.1 m plan area with a liquid depth of approximately 1.3m (see photo 2).</p> <p>b. There are no turbidity monitors on the filters.</p> <p>c. The filters are normally cleaned at intervals based on the observations of the plant caretaker, e.g a lowering of the water level in the clear water tank.</p> <p>d. Replacement filter media (sand) is stored in a stockpile adjacent to the filters. The spent filter media is removed to Varray water treatment plant for washing &amp; reuse.</p> <p>e. There is no facility to run the filters to waste after cleaning.</p>

3.	<p><b>Chlorination and Disinfection</b></p> <ul style="list-style-type: none"> <li>a. The supply is disinfected by dosing sodium hypochlorite (14 – 15%) at the plant control room. Dosing is achieved using a recirculation loop with a set point of 0.61 mg/l. There is a duty and standby chlorine pump with automatic switch over in the event of the failure of one of the pumps (see photo 3).</li> <li>b. Chlorine contact time calculations were submitted by Irish Water following the audit. There appears to be adequate contact time for chlorine disinfection to ensure the first connections are receiving appropriately disinfected drinking water.</li> <li>c. In the event of a power failure, water keeps flowing through the treatment plant but it is not chlorinated due to loss of power to the chlorine dosing pumps.</li> <li>d. There are no alarm settings on the disinfection system which creates a significant risk of un-disinfected or inadequately disinfected water entering supply.</li> <li>e. There is no documented response procedure in the event that the caretaker observes a problem with the disinfection system.</li> <li>f. The sodium hypochlorite disinfectant is supplied by Brenntag, which is not on the list of authorised suppliers of biocides <a href="http://www.pcs.agriculture.gov.ie/biocides/Biocidal%20Product%20Register%20-%202012%20May%202014.pdf">http://www.pcs.agriculture.gov.ie/biocides/Biocidal%20Product%20Register%20-%202012%20May%202014.pdf</a> and therefore Irish Water are not in compliance with the EU Biocidal Products Regulations (528/2012) and associated Irish regulations (the <i>European Union (Biocidal Products) Regulations, 2013</i>).</li> </ul>
4.	<p><b>Treated Water Storage</b></p> <ul style="list-style-type: none"> <li>a. There is a covered clear water tank at the plant (storage capacity 47 m<sup>3</sup>) which provides approximately 10 hours storage. There are two locked manholes on the roof of the tank.</li> </ul>
5.	<p><b>Monitoring and Sampling Programme for treated water</b></p> <ul style="list-style-type: none"> <li>a. There is no treated water sampling point at the plant. Treated water quality is sampled at households on the distribution network.</li> <li>b. Irish Water stated that chlorine residual monitoring is carried out in the distribution network but no records were available during the audit.</li> <li>c. Historical monitoring for THMs in 2013 and 2014 (8 samples) were all compliant.</li> </ul>
6.	<p><b>Chemical storage and bunds</b></p> <ul style="list-style-type: none"> <li>a. The date on the label of the sodium hypochlorite drum was 20/06/2014. It was not clear if this represents the date of manufacture or expiry date.</li> </ul>
7.	<p><b>Management and Control</b></p> <ul style="list-style-type: none"> <li>a. There is a lack of operational control of the slow sand filters at the plant. The current filter maintenance regime relies on the caretakers observations, which is not a robust system.</li> <li>b. There are no alarm settings on the disinfection system which creates a significant risk of un-disinfected or inadequately disinfected water entering supply.</li> <li>c. Irish Water stated that the long term strategy for Glenealy PWS is to connect to the Wicklow Regional Public Supply.</li> </ul>

### **3. AUDITORS COMMENTS**

Glenealy PWS is on the remedial action list due to elevated levels of THMs above the standard in the Drinking Water Regulations. However, recent monitoring results have been compliant and the audit team is satisfied that THMs do not appear to be an issue in the water supply from Barnbawn water treatment plant.

Considerable improvements are required at Barnbawn water treatment plant in order to ensure the safety and security of the Glenealy PWS, including better operational control of the slow sand filters, the installation of turbidity monitors on each filter and on the final treated water, the fitting of alarms on the disinfection system to ensure adequate disinfection of the water entering supply, and ensuring an appropriate alarm response procedure is in place.

The audit team considers that Glenealy PWS should remain on the RAL due to the operational management issues at the plant.

### **4. RECOMMENDATIONS**

#### **Filtration**

1. Irish Water should install continuous turbidity monitors on each slow sand filter and the final treated water at the water treatment plant. These monitors should be linked to a recording device and generate an alarm in the event of a deviation from the acceptable operating range of the filters.
2. Irish Water should establish documented quality criteria to outline when the slow sand filters are due to be skimmed or resanded and when they can be brought back into service following cleaning.
3. Irish Water should review procedures for the maintenance of the slow sand filters such that it is in accordance with the recommend procedure as specified in the *Water Treatment Manual: Filtration*.
4. Irish Water should ensure that, following skimming (i.e. removal of the schmutzdecke) or media replacement, the filters are run to waste for an appropriate period of time. This period of time should be determined on the basis of predetermined water quality criteria specific to the plant.

#### **Disinfection**

5. Irish Water should ensure that the chlorine residual monitor on the final water is alarmed and linked to a recording device to ensure that either a sudden increase in chlorine demand or a failure of the chlorine dosing system is immediately detected.
6. Irish Water should review the use of disinfectants at the Glenealy PWS and all other public water supplies to ensure that all disinfectants are authorised in accordance with the EU Biocides Products Regulation (528/2012) and associated Irish regulations (*European Union (Biocidal Products) Regulations, 2013*).

#### **Treated Water Storage**

7. The Water Services Authority should ensure that there is a complete mixing (i.e. no preferential flows through the tank) in the reservoir and that no stagnant areas exist.

#### **Chemical Storage and Bunds**

8. Irish Water should put a system in place so that stocks of reagents and chemicals kept on-site are regularly checked to see if they are in date.

#### **Management and Control**

9. Irish Water should ensure that all monitors are linked to recording devices and, where appropriate, alarmed. A procedure should also be put in place defining the actions to be taken in response to the different levels of alarm.

## **FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER**

During the audit the Water Services Authority representatives were advised of the audit findings and that action must be taken as a priority by the Water Services Authority to address the issues raised. This report has been reviewed and approved by Darragh Page, Drinking Water Team Leader.

The Water Services Authority 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 Loughnane      **Date:** 3<sup>rd</sup> October 2014  
Aoife Loughnane  
Inspector



**Photo 1: Stream source and intake manhole adjacent to Barnbawn water treatment plant.**



**Photo 2: Two slow sand filters and plant control room.**



**Photo 3: Duty and standby chlorine dosing pumps.**