# Drinking Water Audit Report

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| **County:** | Clare | **Date of Audit:** | 23/03/2017 |
| **Plant visited:** | Turlough Public Water Supply (0300PUB1068) | **Date of issue of Audit Report:** | 12/04/2016 |
| | | **File Reference:** | DW2016/30 |
| | | **Auditors:** | Mr Niall Dunne<br>Ms Criona Doyle |
| **Audit Criteria:** | • The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).*<br>• *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)*<br>• The recommendations specified in the EPA *Drinking Water Report*.<br>• EPA Drinking Water Advice Notes No.s 1 to 15.<br>• The recommendations in any previous audit reports. | | |

**MAIN FINDINGS**

i. **A UV disinfection system has been installed at Turlough water treatment plant following the detection of *Cryptosporidium* in the treated water in June & July 2016.**

ii. **At the start of the audit the residual chlorine monitor was displaying low residual chlorine levels in the final water and that, due to commissioning works, the dial out chlorine alarm was not operating. Irish Water should investigate the reason for the low residual chlorine levels and put remedial measures in place to ensure that consumers receive adequately disinfected water at all times. Irish Water must also ensure that dial out chlorine alarms are commissioned as a priority to ensure that low chlorine levels are immediately notified to the caretaker.**

iii. **The auditor noted once the duty and standby chlorine dosing pumps were manually switched over during the audit that turbidity levels rose. As elevated turbidity levels may impact on the effectiveness of the UV disinfection system Irish Water need to put safeguards in place to ensure that elevated turbidity levels do not compromise the effectiveness of the disinfection system.**

## 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. Turlough public water supply is on the EPA's remedial action list (RAL) since Q2 2016 due to inadequate treatment for *Cryptosporidium*. This audit was carried out to assess the performance of Irish Water in providing clean and wholesome drinking water and to assess whether this supply could be removed from the RAL.

Turlough water treatment plant serves a population of approximately 780. The supply is fed from a borehole. Treatment consists of chlorination and UV disinfection, which was installed following the detection of *Cryptosporidium* in the treated water in June and July 2016.

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

The opening meeting commenced at 15.00 at Turlough 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 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**:

Deirdre O'Loughlin - Compliance Specialist;

**Representing the Local Authority:**

Maeve Lait- Senior Executive Technician :

Roisin Breheny - Executive Technician:

John Hogan - Caretaker:

**Representing the Environmental Protection Agency:**

Niall Dunne - Inspector:

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.*

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| **1.** | **Source Protection**<br>a. A recommendation of a previous audit, undertaken on 11/02/2016, was that the borehole should be properly grouted. Since then a new borehole has been drilled and the old borehole decommissioned. The housing and the well head of the new borehole are constructed to a very good standard, (see photograph 1).<br>b. Irish Water (IW) stated that there are eight farmers within the catchment and that these farmers have been written to outlining their obligations under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014. |
| **2.** | **Disinfection**<br>a. At the commencement of the audit the reading on the chlorine residual monitor was 0.03 mg/l, there was a low chlorine alarm showing on the monitor. IW stated that the caretaker did not get the alarm as the dial out alarm system was not yet configured. The reason for the low residual chlorine levels was unknown. Chlorine readings observed in the caretaker's diary showed that chlorine readings taken that morning at the plant were 0.5 mg/l and 0.13 mg/l at the end of the network.<br>b. Clare County Council (CCC) stated that the chlorine dosing pumps are set to auto switch over every thirty minutes; however the pumps only switch from duty pump 1 to standby pump 2 and do not switch back. The pumps have to be manually switched over. CCC confirmed that the dosing pumps were new, as it was a finding of the last audit, 11/02/2016, that one of the pumps was not operational. |

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| | c. In this instance when the caretaker manually switched over between the pumps the chlorine levels rose from 0.03 mg/l to 1.14 mg/l, turbidity levels also rose from 0.15 NTU to 2.30 NTU, which may impact on UV disinfection. Why the turbidity levels rose could not be explained. Manual chlorine readings were undertaken as a check, the readings obtained were comparable with the readings on the residual chlorine monitor.<br>d. Duty and standby UV units have been installed since the last audit. These are connected to a UVI/ UVT monitor with dial out alarms, which the caretaker receives. The units are set to auto shutdown at an intensity of 68.8 $W/m^2$. The validation certificate stated that the UV units are validated to an intensity of 68.8 $W/m^2$ and 74.1 % UVT. The readings on the UVI/UVT monitors were 205.2 $W/m^2$ and 94.6% UVT which demonstrated that the UV system was operating within its validated range at the time of the audit. |
| **3.** | **Exceedances of the Parametric Values**<br>a. There have been two *Cryptosporidium* detections in the treated water since the previous audit, 0.01 /10 L on the 29/06/2016 and 0.02 /10 L on the 06/07/2016. IW stated that on foot of these exceedances the UV units were installed.<br>b. IW committed to resubmitting a revised *Cryptosporidium* risk assessment to reflect the recent installation of the UV system. |
| **4.** | **Management and Control**<br>a. Clare County Council (CCC) stated that the water is hard water and that this may have impacted on the automatic switch over between the two chlorine dosing pumps. No raw monitoring results were available at the time of the audit.<br>b. It was noted in the on-site records that turbidity levels of 38 NTU was reported, this should have been reported as 0.38 NTU. It is also noted that residual chlorine readings were similarly misreported in the plant daily log book. |

## 3. AUDITORS COMMENTS

Duty and standby UV units were installed following the detection of *Cryptosporidium* in the treated water in June and July 2016, 0.01 and 0.02 oocysts/ 10 L respectively. The UV units are connected to UVI and UVT monitors but the system is not configured so as to allow historical results to be trended or viewed. IW needs to ensure that the system is configured as a priority and that two months plant operational performance data in graph form (to include UVI, UVT, flow, chlorine and turbidity), is submitted to support the removal of the supply from the RAL.

At the start of the audit low residual chlorine readings were observed on the chlorine monitor. The auditor noted that there was an issue with the automatic switchover between the duty and standby chlorine dosing pumps. When the duty and standby pumps were manually switched over the chlorine levels rose, as did the turbidity levels. Elevated turbidity levels could impact on the effectiveness of the UV disinfection system. Irish Water also stated that the dial out chlorine alarm was not yet operational, due to commissioning works, and so the caretaker was not receiving any low residual chlorine alerts. Irish Water should identify the causes of the fluctuations of the chlorine and turbidity levels and the cause as to why the automatic switchover between the dosing pumps does not work and in all cases put remedial measures in place as a priority. Irish Water should also expedite the commissioning of the chlorine alarms.

A recommendation of a previous audit was that the borehole be properly grouted. Irish Water replaced the old borehole and constructed a new borehole to high standard. This standard of borehole construction should be replicated in other ground water sources under the remit of Irish Water.

## 4. RECOMMENDATIONS

1. Irish Water should investigate why the duty and the standby chlorine dosing pumps will not automatically switch over and put remedial measures in place, to ensure the water supply is adequately disinfected at all times.

2. Irish Water should ensure that the reasons for the fluctuation in chlorine and turbidity levels are fully investigated and that remedial measures are put in place as a priority.

3. Irish Water must put appropriate safeguards in place to ensure that elevated turbidity levels do not compromise the performance of the UV disinfection system and consumers receive adequately disinfected water at all times.

4. Irish Water should ensure that the chlorine residual dial out alarms are installed so as to ensure that the plant operators are immediately alerted to either a sudden increase in chlorine demand or a failure of the chlorine dosing system.

5. Irish Water should submit two months operational performance data in graph form (to include UVT, UVI, flow, turbidity and residual chlorine) to demonstrate satisfactory plant performance.

6. Irish Water should ensure that record keeping is consistent and accurate.

## 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 Aoife Loughnane, 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 DW2016/30 in any future correspondence in relation to this Report.

**report prepared by:**  **Date:** **12/04/2017**

**Niall Dunne**

**Inspector**

**Photograph 1: New borehole constructed to a high standard.**