



# Drinking Water Audit Report

<b>County:</b>	Kerry	<b>Date of Audit:</b>	16/02/2015
<b>Plant(s) visited:</b>	Maulin PWSS 066H (1300PUB1115)	<b>Date of issue of Audit Report:</b>	09/03/2015
		<b>File Reference:</b>	DW2009/330
		<b>Auditors:</b>	Mr Niall Dunne
<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 <i>EPA Drinking Water Report</i>.</li> <li>• The recommendations in any previous audit reports.</li> </ul>		

## MAIN FINDINGS

- i. According to Kerry County Council, the UVT of the drinking water is on occasion outside the validation range of the UV units and UV results are not being trended. As a priority Irish Water must ensure that the UV units operate within their validation range at all times; that UV results are trended and reviewed to ensure that issues are noted and acted upon to ensure that adequately disinfected drinking water is supplied to customers at all times.
- ii. This supply is on the RAL for not having a *Cryptosporidium* barrier. There is now a barrier in place at this plant. Before this supply can be considered for removal from the RAL, Irish Water must submit the information as outlined in the recommendations of this report.

## 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 in the Maulin PWSS 066H and to assess progress in the removal of this supply from the RAL. Where the text refers to the Water Service Authority this refers to Irish Water in accordance with Section 7 of the Water Services (No. 2) Act 2013.

This plant serves a population of approximately 600. The design capacity of the plant is 30 m<sup>3</sup>/hr and on average produces approximately 25 m<sup>3</sup>/hr. Treatment consists of super chlorination prior to filtration, to assist in the removal of THMs. Filtration consists of two pressure filters and a GAC filter. Disinfection is by UV and chlorination.

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 14:20 at the Maulin 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: (\* indicates that person was also present for the closing meeting)

- Kevin Murphy - Water Engineer (Irish Water)\*;
- Deirdre O Loughlin - Compliance Analyst (Irish Water)\*;
- John Ahern - Acting Senior Executive Engineer (KCC)\*;
- John Sugrue - Area Engineer (KCC)\*;
- PJ McAuliffe - Executive Technician (KCC)\*;
- Representing the Environmental Protection Agency:
- Niall Dunne - 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>Source Protection</b></p> <ul style="list-style-type: none"> <li>a. There are two sources for this supply, a borehole and a mountain stream. Approximately 11m<sup>3</sup>/hr is abstracted from each. The mountain source was not visited as part of this audit.</li> <li>b. The borehole is located adjacent to the treatment plant. The head of the borehole was observed to be below ground level. There appeared to be no grouting between the inner and outer casings (see photograph 1). The depth of the borehole was not known.</li> </ul>
<b>2.</b>	<p><b>Super-chlorination</b></p> <ul style="list-style-type: none"> <li>a. Raw water is super chlorinated prior to filtration, to assist in the removal of THMs. Super chlorination dosing is based on colour; 2-3 mg/l of 10/15 % sodium hypochlorite below 15 Hazen and 3- 4 mg/l above 15 Hazen. The change in the chlorine dose is manually adjusted. The colour observed in the raw water and treated water was 4.7 Hazen and 3.1 Hazen respectively.</li> <li>b. Super chlorinated water is held in a contact tank prior to filtration. Chlorine levels are monitored before filtration.</li> </ul>
<b>3.</b>	<p><b>Filtration</b></p> <ul style="list-style-type: none"> <li>a. Filtration consists of two pressure filters followed by a GAC filter.</li> <li>b. The pressure filters are set to an automatic backwash every twenty four hours, with unchlorinated water. Backwash water is run to waste and discharged to an adjacent stream. Following backwash and prior to start up the filters are left idle for 2 minutes.</li> <li>c. The GAC filter is backwashed when the chlorine level post filtration is above 0.2 mg/l. The activity of the GAC was tested in October and was found to be adequate.</li> <li>d. There is one turbidity monitor after the GAC filter. On the day of the audit the treated water turbidity was observed to be 0.26 NTU.</li> </ul>
<b>4.</b>	<p><b>Chlorination and Disinfection</b></p> <ul style="list-style-type: none"> <li>a. There is a duty and standby UV unit with automatic switchover in place should one fail. The units are connected to a UVI / UVT monitor. KCC stated that there are issues with the SCADA and the UVT/UIVI readings are not trended.</li> <li>b. IW stated that the UV units are validated to 30 m<sup>3</sup>/h at 85% UVT, (see photograph 2), however, on occasion the UVT of the water is below 85% UVT. KCC is proposing to change the existing UV units to ones validated to 76% UVT. During the audit the UVT was observed to be 88.98%.</li> <li>c. Chlorine dosing is based on flow; with duty, standby and trim chlorine dosing pumps observed. The set point is 1 mg/l and the low level alarm is set to 0.4 mg/l.</li> <li>d. During the audit the chlorine monitor was reading 1.09 mg/l.</li> <li>e. Readings of 0.4 to 0.5 mg/l at the extremities of the network were noted from the caretaker's diary. The caretaker stated that he takes reading twice a month within the network.</li> <li>f. The supplier of the sodium hypochlorite is Brenntag,</li> </ul>

<b>5.</b>	<p><b>Treated Water Storage</b></p> <p>a. The capacity of the treated water tank is 45 m<sup>3</sup>, with an estimated retention time of 58 minutes.</p>
<b>6.</b>	<p><b>Monitoring and Sampling Programme for treated water</b></p> <p>a. The final turbidity was noted as 0.06 NTU.</p>
<b>7.</b>	<p><b>Hygiene and Housekeeping</b></p> <p>a. House keeping at this plant was of a high standard.</p> <p>b. The drip tray for the sodium hypochlorite bulk tank was observed to be full of liquid and not located under chemical deliver point. There was no lockable covers observed on the inlet of the tank (see picture 3).</p>
<b>8.</b>	<p><b>Management and Control</b></p> <p>a. The colour dial out alarm is set at 20 Hazen.</p> <p>b. Caustic soda is used for pH correction, the target pH is set at 6.8 -7.2.</p>

### 3. AUDITORS COMMENTS

This supply is on the RAL for not having a *Cryptosporidium* barrier. A *Cryptosporidium* barrier has now been installed; and at the time of the audit was undergoing the commissioning phase. Super-chlorination is being used to treat for THMs. Disinfection is by UV and chlorination; however, according to Kerry County Council (KCC) the UV units are not adequate as the UVT of the raw water is on occasion below the validated range of the UV units. KCC also stated that there are issues with the SCADA and that results are not trended. Irish Water must ensure that the UV units operate within their validation range at all times and that results are recorded and properly trended.

As this supply is on the RAL for not having a *Cryptosporidium* barrier, Irish Water must ensure that all data required in Section 6, Appendix 3 of the EPA handbook and information detailed in the recommendations below is submitted, before the supply can be considered for removal from the RAL.

Irish Water must ensure that the efficiency of the treatment works in removing THMs is regularly reviewed and the review is carried out in accordance with EPA Drinking Water Advice Note - Advice Note No 4; and that the effectiveness of GAC filters is continually monitored as its efficiency can reduce over time.

### 4. RECOMMENDATIONS

1. The Water Services Authority should submit the following information to assist in the supply being removed from the RAL;
  - a. A copy of the validation certificate for the UV lamps including details of the validated range of the lamp, showing validated flow and % UVT/UVI.
  - b. Confirmation that there is a UVI or UVT monitor on the UV lamp; that this is connected to a recording device and results are being trended to verify the UV units are operating within their validated range.
  - c. Confirmation that there are UV dial out alarms, specify the alarm levels, to ensure that any failure of the UV disinfection system is immediately detected.
  - d. Verification that the new UV unit, when installed, has operated within its validated range at all times (i.e. a print out for the past two months in graph form of the UVI or UVT readings; include flow through the plant on the graph).
  - e. Two months turbidity results for the final water in graph form.
  - f. The following monitoring results to demonstrate that the actions to reduce THMs have been adequate; from the raw and treated water at least three TOC (mg/L) and SUVA (L/mg-m) monitoring results taken on different dates; and from the treated water at least three consecutive compliant THM monitoring results taken on different dates.

2. The Water Services Authority must ensure, until such time as the existing UV units have been replaced, that measures are in place to ensure that consumers receive adequately disinfected water at all times.
3. The Water Services Authority should undertake a review of the effectiveness of the treatment works in treating THMs. As part of this review the Water Services Authority should;
  - a. Take account of the *EPA Advice Note No 4. Version 2: Disinfection By-Products in Drinking Water*.
  - b. Initiate a monitoring program, for each stage of the process to evaluate critical parameters in THM formation.
4. The Water Services Authority should ensure that the borehole and wellhead is constructed in accordance with *EPA Drinking Water Advice Note - No. 14 Borehole Construction and Wellhead Protection* and that grouting is installed between the inner casing and the outer borehole casing.
5. The Water Services Authority should review use of disinfectants at the Maulin 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*).
6. The Water Services Authority should examine the option of installing residual based dosing for the super chlorination, to increase/ decrease in line with specified target colour bands. The Water Services Authority should also review the low level colour alarm so that it is in line with the colour bands.
7. The Water Service Authority should investigate whether the water from the backwash cycle has an impact on the stream it is being discharged to.

### **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 Ms Yvonne Doris, 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 DW2009/330 in any future correspondence in relation to this Report.

**Report prepared by:**



**Date:**

**09/03/2015**

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Niall Dunne

Inspector

**Photograph 1: There appeared to be no grouting between the inner and outer casing.**



**Photograph 2: UV unit validated to 30 m<sup>3</sup>/hr and 85% UVT. KCC stated that the UVT of the water can be below 85% UVT.**



**Photograph 3: Drip tray was full of liquid and not directly below the inlet delivery point.**

