



# Drinking Water Audit Report

<b>County:</b>	Roscommon	<b>Date of Audit:</b>	29/09/2016
<b>Plant(s) visited:</b>	NERWSS Water Treatment Plant at Lisheen Lake  Scheme Code: 2600PUB1030	<b>Date of issue of Audit Report:</b>	04/10/2016
		<b>File Reference:</b>	DW2011/39
		<b>Auditors:</b>	Ms Ruth Barrington Ms Pauline Gillard
<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>• <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 <i>EPA Drinking Water Report</i>.</li> <li>• Irish Water's Process Proving Report for Containerised Filtration &amp; UV System dated August 2016, received by the EPA on 26/09/2016.</li> </ul>		

## MAIN FINDINGS

- i. **Irish Water has installed containerised filtration and UV systems at the plant to provide a *Cryptosporidium* barrier in advance of the construction of a new water treatment plant for the North East Roscommon Regional Water Supply Scheme.**
- ii. **The audit team was satisfied that the filtration and UV systems are appropriately validated and operating in a satisfactory manner based on the information provided at the time of the audit.**
- iii. **The NERWSS will remain on the EPA's Remedial Action List until the completion and verification of the new plant which will address trihalomethane formation in the supply.**

## 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 following the installation and commissioning of additional treatment at the plant, comprising filtration and UV systems, which is intended to address the Boil Water Notice in place on this supply since 27/03/2014.

The North East Regional Public Water Supply serves a population of approximately 3,000. The source water is abstracted from Lisheen Lake. Treatment previously consisted of chlorination and fluoridation only. An additional containerised plant has now been added, providing a barrier to *Cryptosporidium* entry to the treated water through filtration and UV treatment. The plant operates between 16-18 hours per day and is then shut down for 6 to 8 consecutive hours.

Treated water is pumped to an interim reservoir, then to a main reservoir and on to three outlying reservoirs at Elphin, Ballyfeeny and Knockhall. Neither the source nor reservoirs were examined during this audit, which focussed on the verification of the new filtration and UV processes on site (i.e. the *Cryptosporidium* barrier).

The NERWSS is on the EPA’s Remedial Action List (RAL) for trihalomethanes above the standard in the Drinking Water Regulations. A new plant is being constructed by Irish Water to address this matter, with completion scheduled for the first half of 2017. The supply will remain on the RAL until the new plant is completed and its performance verified.

The opening meeting commenced at 10.30 a.m. at the treatment plant adjacent to Lisheen Lake. 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. A UV Validation Report was also viewed by the EPA following the audit in support of the summary information contained in the Process Proving Report.

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:

Mr Anthony Skeffington – Lead Engineer, Irish Water

Ms Anne Bonner - Compliance, Irish Water

Representing Roscommon County Council

Mr Christy Harte – Supervisor

Mr Thomas Fox – Water Works

Mr Joe McDermott – Water Works

Mr Michael O’Boyle – Senior Executive Engineer

Representing EPS:

Mr Owen McGreevy – EPS Operator

Mr Lance Flannery – EPS Site Agent

Representing the Environmental Protection Agency:

Ms Ruth Barrington – Inspector

Ms Pauline Gillard – 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.*

<p><b>1.</b></p>	<p><b>Filtration</b></p> <ol style="list-style-type: none"> <li>a. Filtration has been provided in the interim upgrade by way of eight pressure filters utilising Activated Filter Media (a glass media product). These filters were installed to provide a turbidity &lt;1 NTU, as raw water from the lake has a background range of 1-5 NTU, with occasional higher spikes.</li> <li>b. Only one filter is programmed to backwash at any one time.</li> <li>c. A run to waste facility following filter backwash has been provided for 3 minutes after each wash cycle.</li> <li>d. Run to waste has also been programmed for 15 minutes following plant start-up, as during the commissioning phase turbidity spikes were observed during start-up.</li> <li>e. During the audit the raw water turbidity was observed at 0.7 NTU and the combined treated water at 0.1 NTU. Over the two weeks prior to the audit the treated water turbidity during plant operation was &lt;0.5 NTU at all times.</li> </ol>
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2.	<p><b>Disinfection (UV System)</b></p> <ol style="list-style-type: none"> <li>a. The interim containerised plant has provided a validated barrier to <i>Cryptosporidium</i>.</li> <li>b. The UV unit installed has been operated in general within its validated range for flow, UV dose and UVT during the periods examined by the EPA during the audit (i.e. the Process Proving from 22/07/2016 to 25/08/2016 and the two weeks prior to the audit).</li> <li>c. During the Process Proving period there were some commissioning works continued such as the implementation of post-startup run to waste and pump variable speed drive adjustments which impacted on plant performance with frequent starts and stops of the plant.</li> <li>d. The UV reactor is programmed to start up 10 minutes prior to the raw water pumps to ensure full UV disinfection of all water presented to the unit. The reactor then continues for 5 minutes post-shutdown of the raw water pumps for the same reason.</li> </ol>
3.	<p><b>Treated Water Storage and Distribution Network</b></p> <ol style="list-style-type: none"> <li>a. It was reported that there is sufficient storage at Kiltristan Reservoir for one day's demand, without resulting in water outages in any area of the network. Therefore short term plant shutdown in response to out of specification water can be accommodated.</li> </ol>
4.	<p><b>Management and Control</b></p> <ol style="list-style-type: none"> <li>a. Alarms have been set on the new containerised plant to ensure control over the filtration and UV system and to maintain treated water which has been adequately disinfected.</li> <li>b. There are two levels of alarms, Low Priority (a warning alarm) and High Priority (a shutdown alarm). These are dialled out to up to four operators using a cascade system. The EPS personnel on the cascade list operate an on-call system.</li> <li>c. The alarms and their settings were tested on behalf of Irish Water as part of the commissioning process.</li> <li>d. High Priority alarms have been set on treated water &gt;1 NTU, UVT &lt;40%; flow rate above validated range of 441m<sup>3</sup>/h and UV dose too low of 17.16 mJ/cm<sup>2</sup>. These settings inhibit the raw water and high lift pumps and for the latter three settings, shut down the UV reactor if continued for longer than a 3-minute debounce period. These alarms prevent the entry of water inadequately treated for <i>Cryptosporidium</i> entering the network. The site specific alarm settings have a conservative safety margin built in and are more stringent than the system validation.</li> <li>e. The auditors observed from the SCADA trends that there was a spike in combined treated water turbidity (1.5 NTU) at 06.56 a.m. on 29/09/2016. This spike occurred while the plant was shut down and does not represent treated water in the network. The reason for the spike could not be identified by Irish Water or their representatives during the audit.</li> <li>f. The auditors observed from the SCADA trends that there was a period from 12/09/2016 to the 23/09/2016 where the online measurement of turbidity was 0 NTU. This was in contrast to the plant log book which recorded positive daily turbidity readings. It appeared that this discrepancy was not immediately picked up but once it was identified, fouling of the probes was discovered. Cleaning and recalibration returned the turbidity readings (raw and treated water) to normal, and a revised maintenance schedule has been set up.</li> <li>g. The audit team observed that pipework outside the plant building has not been lagged to protect against winter weather. It was stated during the audit that pipework insulation forms part of the installation contract and has been scheduled.</li> </ol>

### 3. AUDITORS' COMMENTS

The auditors were satisfied that the new filtration and UV systems at the NERWSS plant at Lisheen Lake were operating in a satisfactory manner, based on the information provided at the time of the audit. It was noted that the plant shuts down if filtered water turbidity exceeds 1 NTU, or if UVT drops below 40%, for longer than 3 minutes, and that there is 24 hours storage capacity at Kiltristan Reservoir.

#### 4. RECOMMENDATIONS

##### Management and Control

1. Irish Water should ensure that results of continuous monitoring are used to assess and manage plant operations. Specifically, the following items should be addressed from the SCADA trends on turbidity.
  - (i) Irish Water should review the response time to the incident where online turbidity was reading at 0 NTU, contradicting the daily records of manual turbidity tests. A procedure for identifying and escalating abnormal or unusual results should be implemented.
  - (ii) Irish Water should investigate the cause of the turbidity spike which occurred on the morning of 29/09/2016 during plant shut down, and should implement appropriate corrective action.
2. Irish Water should ensure that the contracted works on insulation of the pipework at the plant are completed as soon as possible to ensure security of supply during the winter.

##### 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 Mr Darragh Page, Senior Inspector.

Irish Water is recommended to put such measures in place as are necessary to implement the recommendations listed in this report. The actions by Irish Water to address the recommendations taken will be verified by the Agency during any future audits.

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:**



**Date:**

04/10/2016

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Ruth Barrington

Inspector