



Drinking Water Audit Report

County:	Meath	Date of Audit:	12/01/2017
Plant visited:	Lough Bane Water Treatment Plant (WTP)	Date of issue of Audit Report:	16/01/2017
	Kells-Oldcastle Public Water Supply	File Reference:	DW2008/364
	Scheme Code 2300PUB1011	Auditors:	Ms Ruth Barrington Ms Pauline Gillard
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • 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>. • EPA Regulation 16(1) Direction issued on 05/06/2015. 		

MAIN FINDINGS

- i. Irish Water has installed filtration and UV treatment at the Lough Bane Water Treatment Plant (WTP) to provide a *Cryptosporidium* barrier as required by the RAL Action Programme and the EPA's Regulation 16(1) Direction.
- ii. The audit team was satisfied that the filtration and UV systems were appropriately validated and operating in a satisfactory manner based on the information provided at the time of the audit.
- iii. Close out of the Regulation 16(1) Direction will be possible once Irish Water confirms the availability of the data from the new chlorine monitor at Seafin Reservoir within the Lough Bane SCADA 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. This audit was carried out to assess the performance of Irish Water in providing clean and wholesome drinking water following the completion of a plant upgrade comprising the addition of filtration and UV treatment stages at the Lough Bane plant.

The Kells-Oldcastle Public Water Supply is supplied from two water treatment plants, Clavin's Bridge and Lough Bane, the latter of which was the subject of this audit. The supply was placed on the Remedial Action List (RAL) by the EPA due to the lack of a *Cryptosporidium* barrier at the Lough Bane plant. A Direction was issued to Irish Water under Regulation 16(1) for the installation of such a barrier on 05/06/2015. An upgrade to the plant has now been provided comprising filtration and UV disinfection stages in order to comply with the Direction. Treatment at the Lough Bane plant now comprises screening, pressure filtration, UV disinfection and chlorine disinfection using sodium hypochlorite. The plant produces around 2,400 m³ treated water per day and the supply as a whole serves a population of 11,702.

The opening meeting commenced at 10.40 a.m. at Lough Bane 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:

Mr Gerard Brady – Engineer IW Operations

Mr Andrew Boylan – Compliance Specialist

Mr Fran Glancy – Compliance Analyst

Representing Meath County Council

Ms Helen McDonnell - Environmental Executive Technician

Mr Mark Woodhead – Senior Resident Engineer

Mr Joe McGarvey – Project Manager

Mr James Connell – Caretaker

Mr John Gilsenan – Engineer

Representing EPS Ltd. (Upgrade Contractor):

Mr Darragh McDermott – Project Manager

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.

1.	<p>Filtration</p> <ol style="list-style-type: none"> Three pressure filters with sand media have been added in the plant upgrade. There is no coagulation stage prior to these filters as per the plant design. Filter control and operation is mainly on the basis of time. Backwash and rinse (run to waste) cycles are time controlled. Online turbidity monitoring is provided on the raw water, on each filter outlet, and on combined filtered water. At the time of the audit, there was no turbidity alarm or control on either the raw water or the return of a filter to service after backwash. The audit team noted that raw water turbidity is generally low, between 0.3 and 0.4 NTU and the lake was not subject historically to variable turbidity.
2.	<p>UV Disinfection</p> <ol style="list-style-type: none"> Three Trojan UV units have been added in the plant upgrade. These operate with two units in duty mode and one in standby mode, with hours run now being used to inform which unit is in standby. The UV units are validated under the USEPA protocols, for a UVT in excess of 68.7% and flow rates between 11.1 and 689.8 m³/hour to achieve a Reduction Equivalent Dose (RED) of 40 mJ/cm². The plant was operating within validation with typical UVT at the plant around 90% and the flow through each unit capped at 175m³/hour. UV warm-up is initiated by water level in the treated water tank (sump). There is a 3 minute warm-up period on completion of which a “system ok” signal triggers the raw water

	pumps to start up. This prevents water which has not received UV treatment from entering service.
3.	Chlorine Disinfection <ol style="list-style-type: none"> Sodium hypochlorite is dosed on a flow proportional basis with duty and standby dosing provided. At the time of the audit, the online chlorine residual was obtained from sampling off the pipe running back to the Lough Bane plant from Seafin Reservoir. This was in place historically due to the lack of power at the reservoir. However power has now been provided at the reservoir and the audit team was informed that a new chlorine monitor has been commissioned at the reservoir. Some further work is required to pull the signal from the new monitor back to the plant.
4.	Management and Control <ol style="list-style-type: none"> Pipework bypassing the new plant remains in situ. This represents the original treatment at the plant where raw water was directed from the inlet sump to receive chlorine disinfection only. While this was still being used during construction, now that the new plant has been commissioned it is no longer considered appropriate. Plant alarms are communicated by text to a cascade system of three personnel for response. Alarms are set on the UV disinfection stage triggering operator response and plant shut down for major alarms. The trigger of alarm settings on high flow, low UVT, low UVI or low RED dose will force an immediate plant shutdown with no delay period. While there is no automatic switchover between the UV units in case of a fault, the plant shuts down immediately as above and switchover to the standby unit is then done manually when an operator is in attendance to attend to the fault. Alarms are set on the residual chlorine levels with high and low alarms triggering plant shut down. Automatic switchover between dosing pumps is in place. Alarms are also programmed on turbidity pre-UV treatment. A high turbidity of 0.5NTU triggers a plant shutdown. Chlorine monitoring for the water treated at Lough Bane and in the immediate network shows suitable levels of residual chlorine according to the records examined. However, staff could not verify the location and status of a monitor at Lloyd Reservoir. This was believed to be located prior to chlorine boosting at the reservoir but indicated a level higher than that post-boosting (0.77 mg/l and 0.58 mg/l respectively). A comprehensive system of check sheets for use by the operators has been provided at the plant. As this is a new system some of the templates are being reviewed for site specific reasons. Two points noted by the auditors included the double recording required for UVT at the UV unit inflows, and the lack of a prompt to note remedial works in response to identified issues.

3. AUDITORS' COMMENTS

The auditors were satisfied that the new filtration and UV systems at the Lough Bane WTP 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 0.5 NTU, or if UVT drops below 78%. Irish Water should ensure that the action requested under Recommendation No. 2 on the signal connection to the new chlorine monitor at Seafin Reservoir is completed to allow the close out of the Regulation 16(1) Direction.

4. RECOMMENDATIONS

Filtration

1. Irish Water should provide a turbidity trigger level for bringing filters back into service following backwashing. Consideration should be given to providing plant shutdown based on raw water turbidity.

Chlorine Disinfection

2. Irish Water should complete the commissioning of the new chlorine residual monitor at Seafin Reservoir without delay to enable the data signal to be received at the Lough Bane plant and to allow increased responsive control over changes in chlorine demand. Once the data from the monitor can be assessed, Irish Water should review it to determine whether the chlorine dosing may be linked to the residual to provide an increased level of control over the chlorine disinfection stage.

Management and Control

3. Irish Water should review the set-up of pipework at the plant which at present would allow the filtration and UV stages to be bypassed. This facility should be decommissioned unless a need for it can be demonstrated.
4. Irish Water should provide UV unit hours run trigger levels either on the SCADA or within the operator's check sheets to ensure duty/standby designation, system maintenance and bulb life is addressed proactively.
5. Irish Water should ensure that the review of the operator's check sheets is completed. The review should include format changes to the UV Units' UVT columns, and to the comment section to prompt noting of remedial actions completed in response to issues identified during the checks.
6. Irish Water should ensure that the location and performance of the chlorine monitors at Lloyd Reservoir are correctly identified, and that data gathered from them can be used to verify the performance of the disinfection system.

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 Emer Cooney, 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 in any future correspondence in relation to this Report.

Report prepared by:



Date:

16/01/2017

Ruth Barrington

Inspector