Drinking Water Audit Report

County:	Co. Galway	**Date of Audit:**	31st July 2015
Plant(s) visited:	Ballyconneely PWS, Scheme Code 1200PUB1005	**Date of issue of Audit Report:**	18th August 2015
		File Reference:	DW2009/176
		Auditors:	Mr Darragh Page Ms Ruth Barrington
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* • The recommendations specified in the EPA *Drinking Water Report*.		

MAIN FINDINGS

i. **The findings of the audit and the information supplied by Irish Water/ Galway County Council prior to the audit do not support the removal of the supply from the Remedial Action List (RAL) at present.**

ii. **There is poor control over chemical dosing at Ballyconneely WTP and a lack of understanding about how the plant should be operated. The main operational issues include:**
   - **a. A fixed coagulant dose regardless of fluctuations in raw water quality,**
   - **b. No routine jar testing to determine the optimum coagulant dose, and**
   - **c. No monitoring of the treated water for aluminium.**

iii. **The UV system is duty only and there are no provisions for primary disinfection in the case of failure or breakdown of the UV unit.**

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 verify the information provided by Irish Water to request the removal of the supply from the Remedial Action List (RAL).

The Ballyconneely PWS is supplied by water abstracted from Lough Anaserd. Approximately 150 people are served by the supply and the plant produces approximately 280 m3/day treated water. The supply is on the Remedial Action List due to exceedances of the trihalomethanes (THM) parametric value. An upgrade of the plant was nearing completion (at snag list stage) at the time of the audit, including the addition of a clarification step and pre-clarifier contact tank and filter upgrade. Information had been provided to the EPA in advance of the audit on TOC removal and THM values since the upgrade.

The opening meeting commenced at 10.00 a.m. at Ballyconneely 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 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: (* indicates that person was also present for the closing meeting) Mr Martin Lavelle – Senior Engineer, Galway County Council* Mr Tony Kelly – Senior Executive Engineer, Galway County Council* Mr Eoin Curran – A/ Engineer, Galway County Council* Mr Pat O'Sullivan – Compliance, Irish Water* Mr Richard Foley – EPS Contractor* Mr Jim O'Connell – Process Technician, Galway County Council* Mr Shay Walsh – Engineer, Irish Water* Mr John Connolly – Galway County Council* Representing the Health Service Executive: Dr Emer O'Connell – Consultant, Public Health Medicine, HSE* Representing the Environmental Protection Agency: Mr Darragh Page – Senior Inspector* Ms Ruth Barrington – 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.	**Source Protection** a. Catchment protection work including septic tank surveys is undertaken by the Environment Section of Galway County Council. b. The lake is sampled on a quarterly basis for Water Framework Directive purposes. c. The washwater supernatant discharge point was noted by the audit team immediately adjacent to the intake point, posing a risk to the intake in the event of a spillage.
2.	**Coagulation, Flocculation and Clarification** a. Turbidity in the raw water ranges from 0.4 to 1.2 NTU. The alum and poly dosage is fixed with manual adjustments possible. No algorithms or ready reckoner are in place to assist the plant operator in this step. b. EPS plan a training session prior to handover to Galway County Council of the upgraded plant. This session is said to involve information on dose changes based on jar testing. c. Neither colour nor turbidity is monitored on the raw water. d. There is a pH adjustment step prior to filtration at the plant. The audit team's concern is that an increased pH would bring aluminium back into solution allowing it to bypass the filters. EPS have stated that pH would have to rise above a value of 8 to cause this. e. An aluminium exceedance (239 µg/l vs. parametric value of 200 µg/l) was notified to the EPA on 29/05/2015. The investigation of this exceedance has been unsatisfactory given that at the time of the audit there was still no monitoring of aluminium in the final treated water. f. The clarifier is located at a height in an open location. It was windy during the audit and the wind across the clarifier may interfere with the clarification step.

3.	**Filtration** g. The pressure filters have been upgraded with replacement media and automatic backwash control. A ten minute run to waste facility has been added post-backwash.
4.	**Disinfection** a. Primary disinfection is achieved via a duty UV unit. There is no standby unit for use in the event of failure of the duty unit. This does not meet the minimum criteria for disinfection as specified in the EPA Water Treatment Manual: Disinfection. b. The UV unit is validated in accordance with the USEPA Ultraviolet Disinfection Guidance Manual. Based on the SCADA print out information (from 01/01/2015 to 29/07/2015) supplied to the audit team and the HMI trend viewed during the audit, the unit has been operating within its validated range since January 2015. c. UV spares are not maintained on-site. d. Secondary disinfection in the network is achieved via the use of sodium hypochlorite. An online Cl_{17} monitor for measuring residual chlorine at the reservoir has been installed but not yet commissioned. e. A sample taken at a consumer's premises on 15th June 2015 showed an inadequate chlorine residual of <0.01mg/l at the sample location. There was a discrepancy between this and the network sample result of 0.65 mg/l from a nearby sample location at the pump at Ballyconneely crossroads. f. The chlorine low level alarm is set at 0.5 mg/l which triggers a text to the caretaker and area supervisor.
5.	**Monitoring and Sampling Programme for treated water** a. The target for TOC removal by the upgraded plant is 45%. While this is an improvement, it is still within the range where THM may be formed. It was not possible to verify the upgraded plant for THM reduction, as the analysis results indicating THM less than the limit of detection provided to the EPA were obtained from samples taken on the rising main prior to full chlorine contact time. These samples are not valid for the purpose of assessing THM formation.
6.	**Management and Control** a. The caretaker and area supervisor at the Ballyconneely water treatment plant who receive plant alarms by text, do not have access to the SCADA on-site to assist in the management of the plant and the investigation of alarms. b. There is no monitoring done on final treated water aluminium residual at present. There is an EPS recommendation for daily aluminium monitoring on handover of the plant.

3. AUDITORS' COMMENTS

The Ballyconneely Public Water Supply is on the Remedial Action List due to exceedances of the trihalomethane parametric value. While the EPA acknowledges that the plant upgrade is in progress and provides improvements in treatment, particularly a reduction in TOC, it is not possible to remove the supply from the Remedial Action List at present.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should move the washwater discharge point so that it is located further from the raw water abstraction point.

Coagulation, Flocculation and Clarification

2. Irish Water should ensure that the coagulation / flocculation processes at the treatment plant are regularly inspected. Irish Water should implement routine jar testing of the raw and coagulated waters as outlined in Section 3.3.1 and Appendix C of the EPA publication "*Water Treatment Manual: Coagulation, Flocculation and Clarification*" to determine the optimum chemical coagulant dose and pH for the treatment of the water. The frequency of checks should be appropriate to the nature of supply and changing condition. Results should be recorded and used for control of the treatment plant.
3. Irish Water should commence a programme of operational monitoring of the treated water for aluminium. The results should be recorded and used to verify the operation of the treatment provided.
4. Irish Water should investigate the setting up of automated coagulant dosing controls at the water treatment plant, having regard to *EPA Drinking Water Advice Note No. 15: Optimisation of Chemical Coagulation Dosing at Water Treatment Works* available online at http://www.epa.ie/pubs/advice/drinkingwater/dwadvicenote15.html
5. Irish Water should investigate the feasibility of covering the clarifier to improve operational performance of the plant.

Disinfection

6. Irish Water should ensure that there are duty and standby UV disinfection arrangements with automatic changeover in the event of failure of one of the UV disinfection units.
7. Irish Water should ensure that there is adequate access to spare parts and replacement bulbs so that the UV unit is not bypassed during maintenance or repair.

Exceedences of the Parametric Values

8. Irish Water should investigate the discrepancy in chlorine residuals recorded on 15th June at the consumer's premises vs. that recorded in the network, and take appropriate action. A residual of at least 0.1 mg/l free chlorine is required for secondary disinfection throughout the network.
9. Samples for verification of the THM reduction provided by the upgraded plant should be taken by Irish Water in the network rather than the rising main. Such samples will be required for verification of the programme prior to removal of the supply from the RAL and should be taken once all remedial works have been complete.

Management and Control

10. Irish Water should ensure that caretakers and/or plant operators have full access to the data pertaining to the performance of the plant. Specifically, access should be provided to raw and treated water quality trends.

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 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:** 18th August 2015

Ruth Barrington

Inspector