Drinking Water Audit Report

County:	Co. Louth	**Date of Audit:**	02/02/2018
Plant(s) visited:	Cavanhill Water Treatment Plant Scheme Code 2100PUB1018	**Date of issue of Audit Report:**	16/02/2018
		File Reference:	DW2017/192
		Auditor:	Ms Ruth Barrington
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 as amended*. • EPA Drinking Water Advice Note No 15 *Optimisation of Chemical Coagulant Dosing at Water Treatment Works*. • *EPA Water Treatment Manuals: Coagulation, Flocculation and Clarification*.		

MAIN FINDINGS

i. **Operational monitoring at Cavanhill water treatment plant is not currently undertaken at a frequency and range of sampling locations to allow a complete assessment of plant performance. Irish Water should review the frequency and location of monitoring to ensure that it is adequate to verify plant performance in accordance with EPA guidance.**

ii. **The routine daily analysis of aluminium in final water at the plant has not been compared with analysis undertaken by accredited laboratories using split samples. Irish Water should ensure that this comparison is carried out and any relevant amendments made to methods used at the on-site laboratory.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014 as amended*, 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 after the notifications by Irish Water dated 18/12/2017 of the failure to meet the aluminium parametric value (as specified in Table C of Part 1 of the Schedule of the Regulations) at the Cavanhill final treated water sampling point on dates in October, November and December 2017.

Cavanhill Public Water Supply serves a population of 44,438 and is the water supply for Dundalk and environs. Approximately 15,900 m^3 of treated water per day is produced by the plant. The plant was designed for 30,000 m^3/day during a period when Dundalk had a number of industries with a high requirement for water. The plant is currently being upgraded, with the contractor Murphy Process Engineering, who have been on-site since 19/12/2017, operating the plant on behalf of Irish Water during the upgrade works which are due to be complete by March 2019.

The opening meeting commenced at 10.30 a.m. at Cavanhill 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:

Mr Andrew Boylan – Compliance Specialist
Mr Fran Glancy – Compliance Analyst

Representing Louth County Council
Mr David Hanratty – Water Services

Representing upgrade contractors
Mr Andrew McCourt – MPE Operations Plant Manager
Mr Sean Devoy – MPE Laboratory/ Process Manager
Mr Danny Byrne – RPS Resident Engineer
Mr Michael McArdle - RPS

Representing the Environmental Protection Agency:

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.	**Coagulation, Flocculation and Clarification** a. Coagulation is achieved using aluminium sulphate after which polyelectrolyte is dosed as a flocculant aid. b. The coagulation, flocculation and clarification stages of treatment are included in the upgrade which will address the plant infrastructure, dosing and dosing control. c. During the audit, pin floc was observed rising in the clarifier tanks. d. No sampling is carried out currently to assess the operation of individual stages of the process, for instance aluminium levels in the clarified water which would indicate whether or not pin floc was resulting in any aluminium carry over into the filtration stage. e. The clarifier tanks were observed to have a build-up of algal growth on the tank walls. The channels were clean.
2.	**Filtration** a. While the rapid gravity filters were not examined individually as part of the audit, it was noted that a full refurbishment of each filter will be carried out as part of the plant upgrade.
3.	**Disinfection** a. The final water pH was observed to be slightly low during the audit, at pH 7.29. While lime is added to adjust to the optimum of pH 8 for chlorine disinfection, it was acknowledged that work is needed on the lime slurry auger to more accurately control the lime dose. b. UV disinfection will be added as part of the plant upgrade to enhance the treatment and the *Cryptosporidium* barriers provided.
4.	**Management and Control** a. The parametric value specified in the Regulations for aluminium is 200 µg/l. During October- December 2017, four exceedances of the aluminium parametric value were detected in the plant final water in samples analysed by an external accredited laboratory.

	The aluminium concentrations were 602 µg/l on 31/10/2017, 538 µg/l on 07/11/2017, 426 µg/l on 15/11/2017 and 510 µg/l on 05/12/2017. b. As part of the follow up investigations to the aluminium exceedances, a split sample was taken and analysed by two separate accredited laboratories. The results were compliant, and comparable. c. A portion of the split sample was not analysed in the on-site laboratory to indicate whether it would have been comparable with the two external laboratories. d. Based on the results examined during the audit, all other samples taken subsequent to the exceedances both at the plant and in the network, were compliant. This includes samples analysed in the on-site laboratory and by accredited laboratories. e. The auditor considered that the monitoring programmes, while sufficient to meet the statutory requirements for regulatory sampling, were not adequate to track operational performance at the plant. In particular, the effectiveness of the coagulation, flocculation, clarification and filtration stages is not fully assessed by measuring the levels of aluminium in clarified and filtered water as well as in the final water. f. The EPA recommendations for routine checks on the coagulation, flocculation and clarification stages are not documented at the plant, so plant operators can not readily relate results of analysis back to plant conditions. g. The upgrade in progress at the site involves refurbishment of existing facilities, meaning that individual clarifiers and filters will be taken out of service in sequence while the work is being completed. The monitoring currently in place is not considered robust enough to assess or identify the impact of changing pressures on areas of the plant. h. A review of the alarm set points showed that the final water pH low level alarm is set below the parametric range, at pH 6.00. The compliant range is pH 6.5 to pH 9.5.

3. AUDITOR'S COMMENTS

The operational sampling undertaken at Cavanhill water treatment plant should be reviewed, as the current frequency and sampling locations are not considered adequate to allow an assessment of the operation of the coagulation, flocculation and clarification stages of treatment at the plant. The recommendations below should also be applied by Irish Water at the Staleen Water Treatment Plant (South Louth East Meath public water supply) which is undergoing a similar upgrade and has also an open EPA file on aluminium exceedances.

4. RECOMMENDATIONS

Coagulation, Flocculation and Clarification

1. Irish Water should ensure that routine checks and operational sampling at Cavanhill water treatment plant are undertaken at suitable frequencies and locations to allow assessment of the optimisation of the coagulation, flocculation,clarification and filtration stages of treatment and prevent carryover of aluminium into final water. Guidance on the scope and frequency of this monitoring is set out in the EPA Water Treatment Manual: Coagulation, Flocculation and Clarification and in EPA Advice Note No. 15: Optimisation of Chemical Coagulant Dosing.

2. Irish Water should ensure that analysis carried out at the plant is representative and subject to suitable quality checks (e.g. by split samples with an accredited laboratory) to allow the use of the data in the verification of plant operations and processes.

Management and Control

3. Irish Water should ensure that the final water pH is optimised for chlorine dosing at the plant to ensure adequate disinfection of the water supply. This work may be incorporated as part of the plant upgrade.
4. Irish Water should ensure that the low level pH alarm set point on final water is changed to provide an alert if pH is outside the compliant parametric range.

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 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 in any future correspondence in relation to this Report.

Report prepared by:  **Date:** 16/02/2018

Ruth Barrington

Inspector

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