Drinking Water Audit Report

County:	Co. Meath	**Date of Audit:**	14/03/2018
Plant(s) visited:	Trim Water Treatment Plant, Scheme Code 2300PUB1009	**Date of issue of Audit Report:**	16/03/2018
		File Reference:	DW2016/163 and DW2017/7
		Auditor:	Ms Ruth Barrington
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014) as amended*. • EPA Drinking Water Advice Notes Nos. 4 and 15. • The recommendations in a previous EPA audit report dated 14/09/2009.		

MAIN FINDINGS

i. **The DAFF filter bed was in very poor condition at the time of the audit, with holes visible through the media allowing preferential flow through the filter. This presents a risk to the integrity of the plant's *Cryptosporidium* barrier.**
ii. **The SCADA system in place at Trim water treatment plant does not allow for full analysis of trends on treatment plant performance or for automatic shutdown in the event of raw water contamination. This is of immediate concern due to the location of emergency and storm water overflows from the Trim wastewater network into the River Boyne upstream of the drinking water abstraction point.**

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 to assess the performance of Irish Water in providing clean and wholesome drinking water to the Trim public water supply.

The Trim public water supply serves a population of 10,879 people in Trim, Summerhill and environs, Co. Meath. The water treatment plant at Trim produces approx. 2,836 m^3/day of treated water. Water for the supply is abstracted from the River Boyne (90%) and an on-site borehole (10%). The treatment for the river source comprises coagulation, flocculation, clarification and filtration, with two adsorption clarifiers/ filters and one DAFF operating in parallel. The treatment on the borehole source comprises pre-chlorination and pressure filtration for the removal of iron and manganese. Disinfection is achieved on the combined treated surface and groundwater using sodium hypochlorite.

The opening meeting commenced at 11.30 a.m. at Trim 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 Fran Glancy – Compliance Analyst Mr Michael Cunniffe – Asset Operations Lead Representing Meath County Council: Mr Séamus Quinn – Caretaker Ms Helen McDonnell - Executive Environmental Technician Mr John Gilsenan – Engineer Ms Maeve Rowley – Environmental Technician Representing the Environmental Protection Agency: Ms Ruth Barrington – Inspector Ms Mary Gurrie – Programme Manager (Observer)

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. The raw water from the Boyne is abstracted downstream of the Trim wastewater treatment plant emergency overflow and stormwater overflow discharge points. An alarm system has been set up at the wastewater treatment plant which alarms to the operators at the drinking water treatment plant in the event of discharges at the emergency or stormwater overflows. There is approximately 10 minutes travel time for a wastewater discharge within the river between the overflows and the drinking water abstraction point.
2.	**Filtration** a. Filtration is achieved using two adsorption clarifiers/filters and a dissolved air flotation filter (DAFF). Flow is evenly split between the three filters which operate in parallel. b. Aluminium sulphate and polyelectrolyte are used in the coagulation process. The dose rates are adjusted manually based on a range of daily tests carried out at the plant and influenced by raw water quality. c. The sand media in the DAFF was replaced in 2016. d. A backwash of the DAFF was observed during the audit followed by full drain down of the DAFF to sand level. The backwash was very uneven, and on drain down, the sand level was also uneven with large holes right through the sand bed in places. e. In the auditor's opinion, the condition of the filter and media in the DAFF was a risk both to the integrity of the *Cryptosporidium* barrier and to the efficacy of removal of residual organics and coagulation metal remaining after clarification/ flotation. f. No run to waste or slow start is possible on any of the filters at present, they are returned to service immediately following backwash. g. During the audit, the final treated water turbidity monitor was not operational. The DAFF outlet turbidity monitor was said to require frequent cleaning due to scaling or fouling of the probe to maintain accurate results. h. A final treated water turbidity test on the day before the audit was recorded in the site log book as 0.47 NTU. i. The site log book records daily aluminium manual tests on the combined outflow of the adsorption clarifiers/ filters and on the DAFF outflow as well as final treated water. Records for March were examined as part of the audit. The final treated water was compliant with the aluminium parametric value on each date tested, however the auditor noted that the residual aluminium results for the DAFF outflow were consistently higher than those recorded for the adsorption clarifiers/ filters combined outflow.

3.	**Disinfection** a. Sodium hypochlorite is used for disinfection of the blended surface water and groundwater, dosed into the rising main leaving the plant. b. The primary chlorine dose is based on residual feedback from the chlorine monitor at the outlet of Brayhill Reservoir which is located 3.5 km from the treatment plant. There are no connections prior to the reservoir. c. The chlorine contact time C_t was not examined as part of the audit, however staff expressed concern in relation to the variability of chlorine dose required due to high chlorine demand following plant shut down periods (usually overnight).
4.	**Management and Control** d. The SCADA and PLC controls over Trim water treatment plant are outdated. There is limited facility for trend analysis, and automatic plant shutdowns based on alarm settings are not currently possible. Any shutdown must be done manually with an operator attending the site. This is a particular concern given the wastewater treatment overflows immediately upstream.
5.	**Monitoring and Sampling Programme for treated water** a. The potential for formation of trihalomethanes as disinfection by-products has not been re-assessed since the borehole was brought back into service during Quarter 3 2017. A three week programme of monitoring for this assessment in raw, in-process and final water as well as in the reservoirs and network was discussed and agreed with the auditor during the audit. b. There is an open EPA file relating to three exceedances of the aluminium parametric value at network locations in Trim public water supply during 2017. It was noted during the audit that all ten compliance samples at network locations since April 2017 were well within the parametric value for aluminium. c. It was noted during the audit that the final water aluminium results for 1st to 13th March 2018 recorded in the site log book were compliant and well within the parametric value for aluminium. d. As part of the investigation of the aluminium exceedances, the EPA has previously requested final water aluminium results from operational sampling at the plant.
6.	**Chemical storage and bunds** a. Tank fill points at the sulphuric acid and aluminium sulphate bulk storage areas are located on bund walls. A spill from the fill points would not be contained within the bund.

3. AUDITOR'S COMMENTS

The poor condition of the DAFF filter bed poses a risk both to the integrity of the *Cryptosporidium* barrier and to the efficacy of removal of residual organics or coagulation metal remaining after clarification/ flotation. The lack of an efficient SCADA system with operator access to trends, alarm levels and programmable automatic shutdown also presents a risk to the safety and security of the supply as the raw water may be influenced by overflows from the wastewater network serving Trim.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should ensure that timely action is taken to protect the safety and security of the drinking water supply in the event of emergency and storm water overflows from the Trim wastewater network. The provision of automatic shutdown of the River Boyne drinking water abstraction should be considered within this action.

DAFF Operation

2. Irish Water should as a matter of urgency investigate and carry out appropriate corrective action to ensure that the DAFF filter bed is operating correctly. This investigation should include assessments of the coagulant and polyelectrolyte dosing processes, the design and actual flow rate through the DAFF, the pipework under the filter, the flow rates for air and water scour, and the ongoing formation of holes and preferential flows through the filter bed. Irish Water should carry out any relevant monitoring to support the investigation (such as *Cryptosporidium* sampling).

Disinfection

3. Irish Water should review the chlorine dosing process to ensure that the location of the residual based control (on Brayhill Reservoir outlet) is not leading to excessively variable chlorine dose rates each time the plant starts up. The sample point for a solely residual based dosing system should be located as close as possible to the point at which the required chlorine contact time C_t is achieved.

Chemical Storage and Bunds

4. Irish Water should ensure that fill points for storage tanks inside the bunds are located within the bunded area.

Management and Control

5. Irish Water should assess the feasibility and report to the EPA on the provision of updated SCADA system access for Trim water treatment plant. Consideration should be given in this assessment to the risks posed to this public water supply due to the lack of access to trends in raw water quality and online process monitoring, and the absence of automatic shutdown of the abstraction in the event of deteriorating raw water quality.
6. Irish Water should ensure that the final treated water turbidity monitor is returned to service without delay, and that maintenance checks are provided for the DAFF outlet turbidity monitor at a suitable frequency.

Monitoring and Sampling Programmes for Treated Water

7. Irish Water should provide results to the EPA of the planned monitoring programme assessing THM formation potential, as soon as the assessment has been completed. Irish Water should also provide the final treated water aluminium levels for February and March 2018 to support the close out of the 2017 aluminium exceedances in the network.

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:** 16/03/2018

Ruth Barrington

Inspector