Drinking Water Audit Report

County:	Roscommon	**Date of Audit:**	07/08/2018
Plant(s) visited:	Cavetown Lake WTP Grangemore PWS Scheme Code 2600PUB1013	**Date of issue of Audit Report:**	13/08/2018
		File Reference:	DW2018/141
		Auditors:	Ms Ruth Barrington
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014), as amended*. • *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*. • EPA Drinking Water Advice Notes Nos. 1 to 15.		

MAIN FINDINGS

i. **Irish Water should ensure that timely response is in place to act on drinking water quality exceedances which may affect public health. In this case, there was a delay of one month between the coliform bacteria detections and low chlorine residuals detected in late June, and the Boil Water Notice being imposed on 27th July 2018, which is an unacceptable risk to public health.**

ii. **Irish Water should complete the programme of reservoir cleaning as planned. The network flushing should continue in the areas of the network where inadequate chlorine residual is detected under the ongoing chlorine residuals survey.**

iii. **Irish Water should ensure that the interim work on the controls of the disinfection system at Cavetown Water Treatment Plant is completed as planned, with the provision of a dial out alarm system to alert specific personnel of a disinfection failure at the plant and the provision of automatic plant shut down to prevent inadequately disinfected water being supplied to consumers.**

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 in response to the notifications by Irish Water dated 30/07/2018 of seven failures to meet the parametric value for coliform bacteria (as specified in Table C of Part 1 of the Schedule of the Regulations) in the Grangemore PWS on dates from 27/06/2018 to 04/07/2018, and the imposition of a Boil Water Notice on Grangemore PWS on 27/08/18.

The Grangemore Public Water Supply (PWS) serves a population of 1,532 people and produces approximately 985 m^3/day of treated water from the source at Cavetown Lake. The supply is on the EPA's Remedial Action List for elevated levels of trihalomethanes, and is due to be replaced by a pipeline connecting it to the Boyle PWS by December 2019. In the meantime, the Cavetown Water Treatment Plant (WTP) comprises primary filtration, ozone treatment for oxidation, two stages of

secondary filtration in pressure filters (one sand, one GAC), and disinfection using sodium hypochlorite. There are three reservoirs located within the Grangemore PWS.

The opening meeting commenced at 14.20 p.m. at Cavetown 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:

Pat O'Sullivan – Compliance Specialist

Mary O'Hara – Compliance Analyst

Ger Greally – Regional Water Lead

Representing Roscommon County Council:

Ann McHugh – Acting Senior Engineer

Morris Mulhearn – Executive Engineer

Representing Contractor:

Brendan Fay – General Manager Turbine

Representing the Environmental Protection Agency:

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. The abstraction source, Cavetown Lake, is located in a rural area outside Boyle Co. Roscommon. The adjacent land is in mainly agricultural use, and the lake is also used by anglers. b. No evidence of animal access to the lake was noted during the audit.
2.	**Coliform bacteria detections and Boil Water Notice** a. From 27/06/2018 to 04/07/2018, a sequence of samples were taken in the Grangemore PWS network which were found to contain coliform bacteria in breach of the parametric values. Investigative follow up monitoring included a check on the disinfection by monitoring residual chlorine. The disinfection was found to be inadequate at these sample locations, being less than the recommended minimum of 0.1 mg/l residual chlorine. b. Due to a period of staff annual leave, the notification protocols were not followed, and it was not until 26/07/2018 that the EPA was notified and 27/07/2018 that the HSE were consulted on the public health implications of the exceedances. A Boil Water Notice was imposed following HSE advice on 27/07/2018. c. The Boil Water Notice was placed on the entirety of Grangemore PWS (incorporating the former Ballinameen/Camlin Group Water Scheme) and affects a population of 1,532 people. d. A continuous chlorine monitor is in place at the Cavetown Water Treatment Plant. As the

	investigation into the coliform bacteria detections began, it was noted that the chlorine monitor at the plant was reading low (between 0.5 and 0.7 mg/l) when compared with manual chlorine residual testing (in excess of 1.5 mg/l). This discovery was supported by regular daily checks undertaken by the caretaker as well as the monitoring in the network. e. A new probe for the chlorine monitor was ordered and had been fitted on 03/08/2018 prior to the audit. Residual chlorine in final treated water during the audit was noted by the auditor as 1.3 mg/l. f. The exceedances and low or absent levels of residual chlorine were detected in three specific areas within the supply- at Boyle Golf Club towards the end of the network, and within two housing estates supplied from the Croghan Reservoir, Greenhills and Cois na hAbhainn. g. The corrective actions have focussed on the restoration of adequate disinfection throughout the network. At the time of the audit, the Croghan reservoir had been cleaned and cleaning of the remaining two reservoirs is planned for completion by 14/08/2018. A programme of network flushing is ongoing and was successful in restoring chlorine levels at some of the locations between 30/07/2018 and 01/08/2018, however on 02/08/2018 there were two further coliform bacteria detections at Greenhills and Cois na hAbhainn, accompanied by low chlorine residual at the same locations and again at the golf club. h. The daily sampling programme is scheduled to continue until the network chlorine residuals improve. From 13/08/2018, these will be carried out at a standard five locations to compare the effectiveness of works.
3.	**Disinfection** a. Disinfection is achieved using sodium hypochlorite, which is dosed using duty/ standby pumps with automatic switchover. The dose is linked to the chlorine residual leaving the water treatment plant. b. An issue with frequent switchovers due to air locking of the dosing pumps is being addressed by fitting a degassing head to each pump. Pump 1 was complete prior to the audit, and Pump 2 was to be completed later on the day of the audit. c. There was no facility for dial out of chlorine residual alarms, or for automatic plant shut down based on chlorine levels, at the time of the audit. Alarms were only visible on the SCADA system and thus would not be accessible by operators unless they were logged into SCADA. d. An upgrade of the chlorine controls is due to be provided by 10/08/2018 which will allow plant shutdown based on low and high chlorine alarms and a dial out function to inform the operators using a cascade system. e. The Irish Water Chlorination Validation Calculation was provided to the auditor by email after the audit. The calculation indicates that effective chlorine contact time is adequate to provide primary disinfection, but the auditor notes that a minimum of 0.9 mg/l residual chlorine is required at the validation point to ensure that primary disinfection is completed.

3. AUDITOR'S COMMENTS

Irish Water should ensure that adequate and timely response to drinking water quality exceedances is made. Training on notification requirements should be provided to staff including those who provide cover, to assist in the response to an exceedance or incident which may affect public health. In this case, there was a delay of one month between the initial sample result and the Boil Water Notice being put in place, which is an unacceptable risk to public health.

The Grangemore PWS is due to be replaced by the Boyle PWS by December 2019 under the RAL Action Programme for the supply to address elevated trihalomethanes levels. Thus the Cavetown WTP will be removed from service following the completion of the pipeline link to Boyle. However, in the interim period, Irish Water must ensure that treatment provided at the plant is robust enough to protect public health in the event of there being a failure at the plant, and that adequate disinfection is provided throughout the network. The auditor acknowledges that this incident appears to be linked to problems maintaining disinfection in the network and not to a plant failure.

4. RECOMMENDATIONS

Coliform bacteria detections and Boil Water Notice

1. Irish Water should ensure adequate and timely response to drinking water quality exceedances is made in accordance with the *European Union (Drinking Water) Regulations 2014 as amended*. Training on notification requirements should be provided to staff including those who provide temporary cover, to assist in the response to an exceedance or incident which may affect public health.

2. Irish Water should complete the reservoir cleaning programme by 14/08/2018 as scheduled, and should continue the network flushing programme to restore free residual chlorine levels to at least 0.1 mg/l throughout the network.

3. Irish Water should undertake the proposed verification sampling programme from 13/08/2018 at five network locations including those that have previously failed and at the final treated water from the plant. The verification tests should include chlorine (free and total), coliform bacteria, E. coli, pH, colour, turbidity.

Disinfection

4. Irish Water should complete the works to the disinfection system at Cavetown Water Treatment Plant to provide dial out alarms and plant shut downs programmed on the basis of low and high chlorine alarm settings. The requirement for a minimum of 0.9 mg/l residual chlorine at the validation point as highlighted in the Chlorination Validation Calculation should be used in programming the appropriate alarm triggers.

5. Irish Water should ensure that the remaining degassing head is fitted at chlorine dosing Pump 2 to prevent air locking.

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 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:** 13/08/2018

Ruth Barrington

Inspector