Drinking Water Audit Report

County:	Kerry	**Date of Audit:**	09/04/2019
Plant(s) visited:	Caragh Lake Public Water Supply (1300PUB1046)	**Date of issue of Audit Report:**	09/05/2019
		File Reference:	DW2007/544
		Auditors:	Cliona Ní Eidhin
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 No.s 1 to 15. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The Caragh Lake Public Water Supply (PWS) is included on the EPA's Remedial Action List (RAL) due to elevated levels of trihalomethanes (THMs) above the standard in the Drinking Water Regulations. Some upgrading works were completed at the plant and commissioned but were not successful in delivering a permanent solution to the issue of THMs in the supply. Further ancillary upgrades to ensure compliance have been identified as necessary by Irish Water and are due to be completed over the coming 2-3 months, including process-proving. Removal of the Caragh Lake PWS from the RAL can be considered by the EPA once commissioning has been completed and verification data demonstrating compliance with the THM parametric value have been collected.**

ii. **On the day of the audit, the DAF (Dissolved Air Flotation) unit was operating on a trial basis using polyaluminium chloride coagulant and running to waste. The containerised pressure filters were not in operation awaiting completion of the remaining upgrading works.**

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 suitability of the Caragh Lake Public Water Supply (PWS) for removal from the EPA's Remedial Action List (RAL).

The Caragh Lake PWS serves a population of 2,272. Raw water for the supply is sourced from the Lough Cummernamuck, an upland lake located a short distance to the south of the drinking water treatment plant. The plant operates 24 hours per day producing 50m^3 of treated water per hour. Treatment consists of pH adjustment (using sodium hydroxide), coagulation followed by dissolved air flotation (DAF) (installed in 2015), slow sand filtration, containerised pressure filtration (installed in

February 2019) and chlorination. The DAF unit was operating on a run to waste basis on the day of the audit and the containerised pressure filters were not operational.

The opening meeting commenced at 09:30 at Caragh Lake drinking water treatment plant (DWTP). 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 audits observations and recommendations are listed in Sections 2 and 4 of this report.

The following were in attendance during the audit.

Representing Irish Water: Kian Guihen – Drinking Water Compliance Analyst Ian O'Mahony – Water Lead Oliver Harney – Water Engineer
Representing Kerry County Council: Patrick Donegan – Caretaker Seamus O'Mahony – Executive Engineer Kathleen McSweeney Casey – Senior Executive Technician Brian Lennon – A/Senior Executive Engineer Niall O'Connor – LAPM Seamus King - Technician
Representing the Environmental Protection Agency: Cliona Ní Eidhin – 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.	**History of Upgrading work** a. When last audited by the EPA in 2009, treatment in place at Caragh Lake consisted of slow sand filtration and chlorination. THM non-compliances were a recognised issue in the supply at that time. Plans to upgrade the treatment plant were developed following the audit which were to include options to effectively manage and reduce colour and to prevent THM formation in final treated water. b. Irish Water informed the auditor that DAF was installed at Caragh Lake in 2015 with the intention that water be treated by DAF followed by slow sand filtration. Early issues with blinding of the slow sand filter beds with carried over floc particles were observed. The plant's treatment process was reverted to treatment by slow sand filtration followed by chlorination only, on a temporary basis, pending the installation of a further process to address the blinding issues observed. The DAF unit was switched off at this time. c. Irish Water identified containerised pressure filtration in addition to slow sand filtration as the solution and this was installed and commissioned at Caragh Lake in January and February 2019. On returning the DAF unit to operation, an issue with crystallised aluminium sulphate coagulant in the bulk storage tank became apparent to the plant operator. d. The auditor was informed by Irish Water that a trial using polyaluminium chloride as an alternative coagulant was under way as it may be better suited to the raw water characteristics at Caragh Lake. This trial was under way in the DAF unit on the day of the audit and running to waste. It was reported that initial observations and results were encouraging regarding the suitability of this coagulant for permanent use at this plant. **Upgrading Work outstanding** a. Irish Water reported to the auditor that the following works are scheduled to be completed to put in place a permanent treatment solution to THMs at Caragh lake: - Cleaning out of alum tank and dosing lines to remove any remaining crystallised coagulant.

	- Installation of a floc mixing tank (pre-cast) with static mixer to optimise the operation of the DAF unit and prevent any further filter blinding. - Completion of trial using polyaluminium chloride to determine its suitability for use as the primary coagulant at the plant on a permanent basis. - Installation of an online aluminium monitor. b. It was estimated by Irish Water that capital works could be completed by the end of June 2019, contingent on no delays in the procurement of the necessary plant. Process-proving will follow, subsequent to which verification data for THMs will be gathered.
2.	**Chlorination** a. The audit confirmed that the disinfection criteria for chlorination as set out in EPA guidance are met at the Caragh Lake Drinking Water Treatment Plant.
3.	**Management and Control** a. All monitors were verified to be calibrated with next calibration due dates clearly indicated by labels. b. An operating manual and standard operating procedures governing the treatment processes in place at Castlecove were not inspected as part of the audit.

3. AUDITORS COMMENTS

Significant upgrades have been progressed at the Caragh Lake DWTP since the previous EPA audit. There have been no THM exceedances in final water produced by the Caragh Lake plant since 2017. On detection of an aluminium exceedance in March 2019, the cause was quickly identified by Irish Water and a solution identified to prevent its reoccurrence. It was apparent from the audit that the remaining upgrading works are ancillary in nature and that their purpose is to optimise the core processes already in place.
In order to consider the Caragh Lake PWS for removal from the RAL the EPA requires that the remaining upgrading work be completed and commissioned followed by the capture of the necessary RAL verification data to demonstrate effectiveness. The continued security of the Caragh Lake supply, thereafter, will rely on continued effective management of the processes in place, facilitated by the necessary maintenance and operational duties and interventions.

4. RECOMMENDATIONS

Management and Control

1. Irish Water should ensure that the details pertaining to the Caragh Lake PWS on the EPA's EDEN portal are verified as correct.

2. Irish Water should progress the ancillary upgrade works as set out in detail during the audit and confirm to the EPA when commissioning has been completed. Any issues that may arise during commissioning should be communicated to the EPA.

3. Irish Water should ensure that, following completion of commissioning and process-proving, verification data, as set out in Section 6 of the EPA Handbook on the implementation of the Regulations for Water Service Authorities for Public Water Supplies, are gathered to support the removal of the Caragh Lake PWS from the Remedial Action List.

4. Irish Water should ensure that:

    a. A Water Treatment Plant manual is compiled for the upgraded and newly configured Caragh Lake Drinking Water Treatment Plant detailing technical specifications for all plant, structures, materials and consumables relevant to the plant's operation; and that

b. Standard operating procedures are developed for routine and periodic check and maintenance activities required to be undertaken by the plant operator. Template record sheets should be developed and maintained to record completion of daily/weekly/monthly (etc.) checks required in the operation of the plant.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit Irish Water representatives were advised of the audit findings. This report has been reviewed and approved by Regina Campbell, 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 DW2007/544 in any future correspondence in relation to this Report.

Report prepared by: CNE **Date:** 09/05/2019

Inspector