Drinking Water Audit Report

County:	County Kerry	**Date of Audit:**	23/06/2016
Plant(s) visited:	Caherdaniel PWSS 019H (1300PUB1051)	**Date of issue of Audit Report:**	07/07/2013
		File Reference:	DW2009/204
		Auditors:	Mr Niall Dunne
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.* • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **This supply has been on the RAL since 2008 for having an inadequate barrier against *Cryptosporidium*. A new plant was commissioned in 2014. Since commissioned there have been aluminium exceedances and issues with floc formation at this plant. As a result, KCC stopped the coagulation process at the beginning of June 2016. Remedial works to improve coagulation / flocculation process are scheduled to be completed by end of September 2016. KCC stated that the coagulation process will not resume until the remedial works are complete. During this time, Irish Water must ensure that any potential risk to consumers is assessed, measures to reduce this risk are implemented and the advice of the HSE sought. IW must ensure that the proposed works are completed without delay ensuring water quality is maintained and the supply is removed from the RAL.**

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 assess the performance of Irish Water in providing clean and wholesome drinking water.

This supply serves a population of approximately 330 and supplies 440 m^3/day. The main source for the treatment plant is a mountain stream, and is occasionally supplemented by a second stream source. Treatment consists of coagulation, flocculation, two rapid gravity filters with chlorine disinfection. There have been THM exceedances in 2012 and 2013 and aluminium exceedances in 2015 and 2016 in this supply.

Photographs taken by Niall Dunne during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 14.20 at Caherdaniel 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 audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water (IW): Deirdre O'Loughlin – Compliance Specialist – IW Patrick Duggan – Compliance Analyst – IW Kevin Murphy – Water Engineer- IW Representing Kerry County Council (KCC): John Ahern –Senior Executive Engineer - KCC Raymond Lyne- Water Capital Engineer- KCC John Horgan – Technician – KCC Representing the Environmental Protection Agency: Niall Dunne – Inspector – EPA

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 source for this supply is a mountain stream, a second stream supplements supply during high demand, this second stream was not visited during this audit. b. The land surrounding the source is used primarily for sheep grazing. The source was observed to be adequately fenced off and protected. c. The Crypto risk score was not available at the time of the audit. d. KCC stated that there are colour and pH monitors on the raw water and these are alarmed. The colour alarm was set to 30 Hazens. e. It was observed from documented raw water data that turbidity results are not documented daily. f. Documented colour readings varied from 43.0. to 3.0 Hazen. g. There is no raw water turbidity monitor in place. h. Water from both streams is blended prior to treatment.
2.	**Coagulation, Flocculation and Clarification** a. KCC stated that since the plant was commissioned in 2014, there have been problems with floc formation. This, according to KCC, is due to good raw water quality and inadequate chemical dosing and mixing. b. KCC stated that they have not done any additional remedial work to this plant as they were awaiting outcomes of trials being undertaken at the Castlecove WTP, which has the same design and issues re flocculation and chemical mixing. c. KCC stated that as a result of the trials it is proposed to install a permanent chemical mixing tank and a pH probe which should assist with flocculation. The remedial works are scheduled to be completed by end of September 2016. d. KCC stated that due to issues with flocculation and elevated aluminium in the final water, coagulant dosing was stopped at the beginning of June 2016. e. KCC stated that coagulant dosing will not be restarted until after the upgrade works are complete in September 2016.

3.	**Filtration** a. KCC stated that even though there is no coagulant dosing, the clarifiers and the filters are still in operation. b. KCC stated that the filters backwash automatically every 24 hours. KCC confirmed that as part of the upgrade a run to waste facility is being considered. c. There are turbidity monitors after each filter, and on the final water. Alarm levels are set to 0.3 NTU. d. The observed turbidity readings after the filters were 0.61 and 0.58 NTU. The combined turbidity reading in the contact tank was 0.53 NTU, (see photograph 1). e. KCC stated that the filtered turbidity is not measured directly from the filter outlet but from open holding tanks, (see photograph 2). KCC stated that this could result in a time lag of up to 20 min in turbidity readings. KCC also expressed concerns regarding the open tanks and their potential for contamination.
4.	**Disinfection** a. There are duty, standby and trim residual chlorine dosing pumps in place. The chlorine monitors are alarmed, the target dose is set at 0.7 mg/l and the low level alarm is set to 0.4 mg/l. b. KCC stated that the caretaker takes chlorine reading within the network once a week. Network chlorine readings varied from 0.25 to 0.72 mg/l. c. The chlorine contact time was not available at the time of the audit. d. IW stated that this plant is included on IW's disinfection programme.
5.	**Monitoring and Sampling Programme for treated water** a. KCC stated that *Cryptosporidium* was not monitored for on a weekly basis since the coagulant dosing had ceased. KCC also confirmed that they had not sought the advice of the HSE in supplying water from a plant without an effective barrier in place. b. The final treated turbidity monitor displayed a reading of 0.175 NTU, which differed from the contact tank turbidity reading, (0.53 NTU).
6.	**Exceedances of the Parametric Values** a. There have been aluminium exceedances on this supply in 2016, with a highest recorded value of 570 µg/l. 15/04/2016. Chemical dosing has been stopped two weeks prior to this audit due to aluminium exceedances. b. KCC stated that an aluminium exceedance of 342 µg/l on the 16/11/2015 was incorrectly attributed to this supply.
7.	**Hygiene and Housekeeping** a. All equipment, monitors and dosing pumps were calibrated and had visible calibration stickers.
8.	**Management and Control** a. KCC stated that the technician that works on this plant also works on waste water treatment plants. b. KCC indicated that the upgrade works to this plant will be completed by September 2016.

3. AUDITORS COMMENTS

This supply is on the RAL for having an inadequate barrier against *Cryptosporidium*. In 2014 a new plant with coagulation, flocculation, clarification and rapid gravity filtration was commissioned. Since commissioned the plant has had aluminium exceedances and floc formation issues. This, according to KCC, is due to good raw water quality and inadequate chemical dosing and mixing.

KCC stated that at the beginning of June 2016 they stopped dosing coagulant chemicals due to issues with persistent aluminium exceedances and floc formation, making the Crypto barrier ineffective. At the time of the audit, KCC had just completed a trial at a plant similar in design and with similar flocculation issues, the Castlecove WTP. Following the trials, which have resulted in improved water quality, it is now proposed to install permanent coagulant mixing and pH control in both plants. This work is scheduled to be completed by the end of September 2016. KCC stated that they would not dose coagulant chemicals at this plant until the permanent works were complete.

There exists a potential health risk at this plant as the coagulation process will not be operational until September 2016. During this time there will not be an effective *Cryptosporidium* barrier in place. IW must put measures in place to ensure that any potential risks to consumers are mitigated against, that regular *Cryptosporidium* monitoring is carried out and that the advice of the HSE is sought.

IW must ensure that works are progressed as planned, water quality is maintained and that the supply is removed from the RAL.

KCC stated that aluminium exceedances have been notified in error on this supply. IW should correct these errors and should put procedures in place to ensure exceedances are properly notified to the EPA.

4. RECOMMENDATIONS

Management and Control

1. Irish Water must ensure that the potential risk of *Cryptosporidium* contamination is fully assessed and minimised and that regular *Cryptosporidium* monitoring is carried out to determine the health risk to consumers.

Coagulation, Flocculation and Clarification

2. Irish Water should ensure that the proposed upgrade works to assist with coagulation and flocculation are carried out as scheduled so as to reduce any contamination potential and ensure the drinking water quality of the Caherdaniel supply is in compliance with the European *Union (Drinking Water) Regulation 2014*.

3. Irish Water should investigate the option of using variable automated chemical dosing in the upgrade works.

Filtration (General)

4. Irish Water should progress the installation of the run to waste facility following backwash of the filters.

5. Irish Water should review the alarm levels of the filters to ensure that filtered turbidity does not exceed 0.2 NTU. Alarm levels should also allow adequate time for the caretaker to respond appropriately.

6. Irish Water should review the current location of the turbidity sampling points to ensure that accurate turbidity results are recorded and that the risk of contamination from open tanks is eliminated.

Disinfection

7. Irish Water should submit the chlorine contact time calculation to the Agency.

Exceedance of the Parametric Values

8. Irish Water must ensure that all exceedances of the parametric values are properly notified to the EPA in a timely manner and should submit clarification on the 290 µg/exceedance dated 19/01/2016 that was attributed incorrectly to this supply.

Management and Control

9. Irish Water should review the practice of staff working on both water and waste water treatment plants.

10. Irish Water should investigate the reason for the difference in turbidity readings in the contact tank and in the final water.

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 Emer Cooney, 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 DW2009/206 in any future correspondence in relation to this Report.

Report prepared by:  **Date:** 07/07/2016

Inspector

Photograph 1: Turbidity monitors, with results > 0.2 NTU. Readings from filters 0.61 NTU, 0.58 NTU and reading in contact tank, 0.53 NTU.

Photograph 2: Open tanks where turbidity readings are taken from. (Picture cropped for clarity).