Drinking Water Audit Report

County:	Waterford	**Date of Audit:**	05/12/2017
Plant(s) visited:	Stradbally Water Treatment Plant (3100PUB1093)	**Date of issue of Audit Report:**	18/12/2017
		File Reference:	DW2015/77
		Auditors:	Mr Niall Dunne
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *The European Union (Drinking Water) (Amendment) Regulations 2017 (S.I 464 of 2017).* • *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. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The EPA issued a direction to Irish Water requiring upgrade works at the Stradbally water treatment plant to be completed by the 30th September 2017, to ensure compliance with the aluminium parametric value. At the time of the audit the works were not complete but were scheduled to be by the end of 2017. Irish Water must ensure works are completed soon as possible to ensure compliance with the aluminium parametric value.**

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 complying with a direction issued on the 20th February 2017, directing Irish Water to carryout improvement works at the Stradbally water treatment plant to ensure compliance with the aluminium parametric value.

The Stradbally public water supply serves a population of approximately 570 people producing an approximate volume of 240 m^3/day of treated water. The supply is served by the River Tay. Treatment at the Stradbally water treatment plant consists of the following;

- Coagulation with Aluminium Sulphate;
- Coagulant mixing and contact time in a flocculation tank;
- Clarification;
- Filtration by 2 rapid gravity filters; and
- Disinfection with Sodium Hypochlorite.

The water treatment plant currently operates for a period of between 12 to 14 hours a day.

The opening meeting commenced at 2:00 pm at the Stradbally 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 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:

Deirdre O'Loughlin - DW Compliance Specialist - Irish Water.

Siobhan Clifford - DW Compliance Analyst - Irish Water.

Colin Cunningham- Regional Water Engineer - Irish Water.

John Carey - Resident Engineer - Irish Water.

Representing Waterford City and County Council:

Alan Kirwan - Area Engineer -Waterford City and County Council.

Paul Carroll - Scientific Officer- Waterford City and County Council.

Declan Halpin - Water Services Technician - Waterford City and County Council

Representing the Environmental Protection Agency:

Niall Dunne - 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. Waterford City and County Council (WCCC) stated that the alkalinity of the river is low and this can impact on coagulation and flocculation.
2.	**Coagulation, Flocculation and Clarification** a. At the time of the audit, Irish Water was in the process of installing pH dosing, changing from solid to liquid aluminium sulphate dosing, upgrading the Chemtrac streaming current dosing system and linking it to a new control panel. b. WCCC stated that pH dosing was not previously used at the plant and aluminium dosing was determined by jar tests on site. c. WCCC stated that if the aluminium dose levels go above 55 mg/l, the plant shuts down. d. Ponding of water was observed in the aluminium dosing chamber.
3.	**Filtration** a. There are two rapid gravity filters at the plant. One filter has a glass media, the other a sand media. b. WCCC stated that there is a preferential flow through the glass media filter. c. The glass media filter is currently not operational due to the upgrade works. It is proposed to bring both filters into operation by the end of 2017. d. WCCC stated that filters are backwashed every second day, with backwash initiated on headloss and not turbidity. e. There are turbidity monitors on each filter. These are not alarmed. The treated water turbidity is alarmed. At the time of the audit the filtered water turbidity was 0.79 NTU and the final water turbidity was 0.41 NTU. f. There was no media depth gauge in one of the filters.

4.	**Disinfection** a. Chlorine is dosed flow proportionally via duty standby dosing pumps, set to automatic switch over. Currently chorine is dosed from 5 litre drums, as part of the upgrade works it is proposed to install a chlorine day tank. b. There is a continuous chlorine residual monitor after the reservoir. There are no consumers prior to the reservoir. c. The plant does not shut down on low residual chlorine levels but supply from the reservoir stops on low residual chlorine levels. d. The caretaker samples residual chlorine levels daily within the network and receives low-level chlorine alarms when activated.
5.	**Monitoring and Sampling Programme for treated water** a. WCCC stated that they take daily water samples at the plant and these are analysed for aluminium every Friday. b. WCCC propose to continue to carry out daily jar tests to ensure the reliability of the Chemtrac monitor.
6.	**Exceedances of the Parametric Values** a. Since September there have been two exceedances on this supply. The highest was 500 µg/l on the 22/09/2017.
7.	**Management and Control** a. This plant currently runs for 12 to14 hours a day. It is proposed to increase this to 20 hours a day. According to WCCC regular shut downs impact the clarification process. b. WCCC stated that alarms are to be installed on the filter turbidity monitors. c. IW stated that they propose to review all alarm and shut down levels once the control panel is installed and works complete. d. Currently the plant shuts down on raw water ammonia of 0.2 mg/l and a final water turbidity of 1 NTU. e. There is no alarm cascade system in place.

3. AUDITORS COMMENTS

A direction was issued on the 20th February 2017 to Irish Water to undertake works at this plant to ensure no further aluminium exceedances beyond September 2017. Since September 2017 there have been two notified aluminium exceedances. Works are to be completed by end of December 2017. The upgrade works consist of the installation of pH/alkalinity dosing, conversion to liquid coagulant dosing and the installation of a process management control panel.

One of the main issues with treatment at this plant is the inability to adjust pH / alkalinity dosing. A certain level of alkalinity is required to ensure the coagulation process works efficiently and effectively. Without the ability to dose alkalinity or to adjust pH it is difficult to control the coagulation process and levels of aluminium in the treated water.

The proposed works should see an improvement in compliance with the aluminium parametric value. Irish Water should endeavour to complete the works by the end of 2017 and should submit the required monitoring data to demonstrate compliance.

4. RECOMMENDATIONS

Coagulation, Flocculation and Clarification

1. Irish Water should continue with the upgrade woks to ensure compliance with the aluminium parametric value. On completion of the works and to ensure the supply can be removed from the remedial action list, Irish Water should submit;

    a. two months' compliant aluminium samples taken from the treated water.
    b. three consecutive compliant samples, taken on different dates, from within the distribution network.

2. Irish Water should ensure that there is no ponding of water in the dosing chambers.

Filtration (General)

3. Irish Water should review the operation of the filters;
    a. to ensure that the continuous turbidity monitors on each filter generate an alarm in the event of a deviation from the acceptable operating range of the filters.
    b. to ensure turbidity levels of the filtered water are as low as possible and no greater than 0.5 NTU.
    c. to ensure that filter backwash initiated on turbidity is considered.

4. Irish Water should investigate the cause of the preferential flow through the glass media filter to ensure that there is no filter breakthrough.

5. Irish Water should ensure that media depth gauges are installed in the filters.

Disinfection

6. Irish Water should investigate the option of installing auto shut down of the plant based on low residual chlorine levels.

Management and Control

7. Irish Water should review all alarm and shut down levels of the plant to ensure the quality of the treated water is maintained and is clean and wholesome.

8. Irish Water should set up an alarm cascade system to ensure that alarms are responded to in an appropriate timeframe.

Monitoring and Sampling Programmes for Treated Water

9. Irish Water should test daily for aluminium in the treated water until the upgrade works are complete. Any exceedances should be notified to the EPA.

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 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 number DW2015/77 in any future correspondence in relation to this report.

Report prepared by:  **Date:** 18/12/2017

Inspector