



Drinking Water Audit Report

County:	Offaly	Date of Audit:	8 th May 2017
Plant visited:	Clara water treatment Plant Scheme code: 2500PUB1003	Date of issue of Audit Report:	24 th May 2017
		File Reference:	DW2015/205
		Auditors:	Aoife Loughnane
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • <i>The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i> • The recommendations specified in the <i>EPA Drinking Water Report</i>. • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **Clara water treatment plant was found to be very well operated and maintained.**
- ii. **The installation of chlorine analyser feedback from Aughamore reservoir has allowed for improved controls over chlorine dosing at the plant. The planned upgrade to residually controlled booster chlorination systems at Corr Hill & Moyclare reservoirs will further optimise the chlorine dose, which will assist in reducing the risk of THM formation in the Clara/Ferbane RWSS.**
- iii. **Irish Water should progress the planned automation of the coagulation and filtration processes which will provide improved operational control at the plant.**

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 in the Clara/Ferbane Regional Water Supply.

Clara water treatment plant was constructed in 1998 and serves a population of approximately 5,225. The plant design capacity is 5,000 m³/day and current output is 2,700 m³/day. Raw water is abstracted from the Gageborough river and a plant borehole. Treatment at the plant consists of pH correction, coagulation, flocculation, clarification, rapid gravity sand filtration, disinfection by chlorination, and fluoridation.

The opening meeting commenced at 10.00 am at Clara 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. Photographs taken by Aoife Loughnane during the audit are attached to this report and are referred to in the text where relevant. 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 and Offaly County Council:

Aoife Lambe - Drinking Water Compliance Analyst, Irish Water
 Andrew Boylan - Compliance Monitoring Liaison Specialist, Irish Water
 Tselophile Tlou - Operations & Maintenance Engineer, Irish Water
 Jean Ryan - Senior Engineer, Offaly County Council
 Joseph Coleman - Senior Executive Engineer, Offaly County Council
 Ber Doheny - Senior Executive Environmental Technician, Offaly County Council
 Catherine Casey - Environmental Technician, Offaly County Council
 John Daly - Clerk of Works, Offaly County Council
 Vincent Heaton - Caretaker, Offaly County Council
 Pius Larkin – Caretaker, Offaly County Council

Representing the Environmental Protection Agency:

Aoife Loughnane - 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.	<p>Source Protection</p> <ol style="list-style-type: none"> a. Raw water is abstracted from the Gageborough River and from a plant borehole. b. Landuse in the surrounding catchment is predominantly agricultural. Offaly County Council confirmed that landowners have been written to regarding the location of the drinking water abstraction point and the required set-back distances under the <i>European Union (Good Agricultural Practice for the Protection of Waters) Regulations</i>. c. After heavy rainfall, the raw water contains high colour and organic matter. d. The raw water is monitored continuously for pH, turbidity and dissolved oxygen. At the time of the audit, raw water pH was 7.05 and turbidity was 0.79 NTU. e. The operators stated that the 8mm inlet screens regularly get blocked with limescale due to the hard water. The screens are cleaned manually. Chicken wire is being used as an additional form of screening at the abstraction point.
2.	<p>Coagulation, Flocculation and Clarification</p> <ol style="list-style-type: none"> a. Sulphuric acid is dosed on occasion to achieve the target coagulation pH of 6.9. The acid dosing system is manually controlled based on the level of organic matter in the raw water, which is determined using a daily UV254 light absorbance test. b. Poly Aluminium Chloride (PAC) coagulant is injected into the gravity feed line from the raw water balance tank to the contact tank. Polyelectrolyte is injected into the contact tank. c. A jar testing programme is being carried out to evaluate the acid dosing and coagulant use over a range of raw water conditions at the plant. One round of jar tests has been completed on a normal/clean sample and a coloured/dirty sample is awaited, when weather conditions deteriorate. d. The two clarifiers appeared to be in excellent condition with evidence of a stable sludge blanket and good clarification of the coagulated water. The settled water turbidity was 0.055 NTU. e. There are 6 sludge bleed points on each clarifier, which operate for 1 minute every 20 minutes. The clarifiers are emptied and cleaned four times a year. f. Irish Water has identified a number of improvement works for Clara WTP under a 'Statement of Needs' as follows: <ul style="list-style-type: none"> • A flow proportional fully automated acid dosing system in order to enhance the CFC processes; • A static mixer to be installed on the gravity feed line from the raw water balance tank;

	<ul style="list-style-type: none"> • Installation of inline UVT monitors on the raw and final water; • Works to enable automatic backwashing of the rapid gravity filters. <p>These works are subject to approval by Irish Water's Asset Strategy section, and may be dependent on the outcomes of the jar testing and on-site trials. Timeframes for these works are not yet available.</p>
3.	<p>Filtration</p> <ol style="list-style-type: none"> a. The sand in the 3 rapid gravity filters was last replaced in 2007. The plant operators confirmed that the filter media is due to be replaced soon. b. The filter backwash process is manually controlled and usually carried out 3 times weekly. Irish Water plans to automate the backwash process as part of the planned improvement works at the plant. c. There is no run-to-waste facility after filter backwashing, with the filters normally left to rest for approximately an hour before being brought back into service. d. A backwash of Filter No. 3 was observed during the audit and the following was noted: <ol style="list-style-type: none"> (i) There appeared to be a lack of air scour (dead zone) near the filter wall (see photo 1). (ii) At the end of the backwash, the water in the central area of the filter did not appear to run fully clean. e. The filtered water turbidity readings during the audit were; 0.038 NTU (Filter 1), 0.040 NTU (Filter 2), 0.063 (Filter 3) and 0.01 NTU (Combined filtered water).
4.	<p>Disinfection</p> <ol style="list-style-type: none"> a. The chlorination system at Clara WTP meets the criteria in EPA Advice Note No. 3. b. Chlorine dosing at the plant is managed via a signal from a chlorine monitor located at the inlet to Aughamore reservoir. c. The chlorine monitor displayed 1.03 mg/l at the outlet of the clearwater tank. d. The chlorine alarm settings are 0.5 mg/l (low) and 2 mg/l (high) at the outlet of the clearwater tank. e. The booster chlorination systems at Corr Hill and Moyclare reservoirs are currently manually controlled, however Irish Water plans to upgrade these to residually controlled chlorine dosing systems by Q3 2017.
5.	<p>Treated Water Storage and Distribution Network</p> <ol style="list-style-type: none"> a. The reservoirs at Aughamore, Corr Hill and Moyclare were last cleaned in March 2009 and are due to be cleaned again, however no timeframe has been identified. b. Offaly County Council outlined the difficulties with scouring of the large distribution network (183 km), including limited resources. c. Automatic flushing trials have recently been carried out, along with improvements to scouring operations at Aughaboy where THM exceedances have previously been detected.
6.	<p>Exceedances of the Parametric Values</p> <ol style="list-style-type: none"> a. The following THM exceedances have been notified to the EPA since the closure of the previous Clara/Ferbane THM file in November 2014: <ul style="list-style-type: none"> • 115.27 µg/l THM at Aughaboy on 02/11/2015; • 102.02 µg/l THM at Ballinahowen on 04/11/2015. b. The cause of the exceedances was attributed to an increase in the chlorine dose at Clara WTP as a precautionary measure following poor weather forecast. c. The compliance monitoring data for 2016 & 2017 (to date) for Clara/Ferbane RWSS was reviewed during the audit and was found to be satisfactory. A monthly monitoring programme is in place for THMs and there has been no further exceedances since November 2015.

3. AUDITORS COMMENTS

Clara water treatment plant was found to be very well operated and maintained. The installation of chlorine analyser feedback from Aughamore reservoir has allowed for improved controls over chlorine dosing at the plant. The planned upgrade to residually controlled booster chlorination systems at Corr Hill & Moyclare reservoirs will further optimise the chlorine dose, which will assist in reducing the risk of THM formation in the Clara/Ferbane RWSS.

The planned automation of the coagulation and filtration processes will lead to improved operational controls at the plant.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should ensure that the inlet screens at the abstraction point on the Gageborough River are appropriately sized.

Coagulation, Flocculation and Clarification

2. Irish Water should continue the jar testing programme to evaluate the optimum acid and coagulant dose over a range of raw water conditions at the plant. Jar testing should be in accordance with Section 3.3.1 and Appendix C of the EPA publication "*Water Treatment Manual: Coagulation, Flocculation and Clarification*". The results of the jar testing should be recorded at the treatment works and used for control of the treatment plant.
3. Irish Water should progress the planned automation of the coagulation process to allow an immediate response to changes in raw water characteristics and to improve the operational controls at the plant.

Filtration

4. Irish Water should replace the sand filter media in the three rapid gravity filters as planned operational maintenance at the plant.
5. Filter backwashing
 - a. Irish Water should progress the planned automation of the filter backwash process to improve the operational controls at the plant.
 - b. Irish Water should ensure that following backwashing, the filters are run to waste for an appropriate period of time or that there is a slow start when the filter is brought back into use.
 - c. Irish Water should ensure that the air/water backwash is even across each filter and that air nozzles are fully functional and not blocked or damaged.
 - d. Irish Water should ensure that the entire filter has been adequately cleaned during the backwash process.

Disinfection

6. At the booster chlorination stations, Irish Water should ensure that dosing of chlorine is flow proportional or is linked to the residual chlorine monitor. Where the dosing pumps are fixed, Irish Water should replace the pumps with flow proportional pumps or pumps capable of dosing based on the residual chlorine monitor.

Treated Water Storage

7. Irish Water should ensure that service reservoirs are inspected and cleaned out on a regular basis and any maintenance and repairs completed as soon as possible after the need has been identified.

Distribution System

8. Irish Water should continue its regular programme of flushing and scouring of the mains.

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 Darragh Page, Senior Inspector, Drinking Water Team.

Irish Water is recommended to put such measures in place as are necessary to implement the recommendations listed in this report. The actions taken by Irish Water to address the recommendations will be verified by the Agency during any future audits.

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.

Report prepared by: Aife Laghane Date: 24th May 2017
Inspector



Photo 1: Backwash of Filter No. 3 showing lack of air scour close to filter wall