



Drinking Water Audit Report

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| County: | Offaly County Council | Date of Audit: | 18/11/16 |
| Plant(s) visited: | Tullamore Public Water Supply – Clonaslee WTP | Date of issue of Audit Report: | 23/11/16 |
| | | File Reference: | DW2007/343 |
| | | Auditors: | Ms. Aoife Loughnane Ms. Criona Doyle |
| 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. **There are a number of limitations to the existing clarification and filtration processes at Clonaslee WTP which, combined with sudden fluctuations in raw water quality from the Clodiagh and Gorragh Rivers, presents challenges to the plant operations and the quality of treated water produced at the plant. This has lead to intermittent aluminium exceedances in the treated water.**
- ii. **Irish Water’s planned upgrade works at the Clonaslee WTP will greatly improve the ability of the treatment plant to cope with rapid changes in raw water quality and provide a safer and more secure water supply.**

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 and to follow up on intermittent aluminium exceedances in the Tullamore public water supply.

The Clonaslee Water Treatment Plant (WTP) has been in operation since the 1920’s. The source water is a mixture of surface water (Clodiagh & Gorragh Rivers) and groundwater sources (5 no. production boreholes). The Clonaslee WTP produces 1,282m³/d and supplies the village of Clonasee and the southern area of Tullamore. Treatment at the plant consists of coagulation, flocculation, clarification, rapid gravity filtration, disinfection and fluoridation. The groundwater sources are only subjected to disinfection and fluoridation.

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

The opening meeting commenced at 10:30am at the Clonaslee 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:

Andrew Boylan, Compliance Monitoring Liaison Specialist, Irish Water.
 John Leamy, Drinking Water Compliance Specialist, Irish Water.
 Aoife Lambe, Compliance Analyst, Irish Water.
 Padraig Farrell, Minor Programmes, Irish Water.
 John Gavin, Asset Operation, Irish Water.
 Joseph Coleman, Senior Executive Engineer, Offaly County Council.
 Ber Doheny, Senior Executive Environmental Technician, Offaly County Council.
 Stephen Ryan, Caretaker, Offaly County Council.

Representing the Environmental Protection Agency:

Aoife Loughnane, Inspector.
 Criona Doyle, 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.

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| 1. | <p>Management and Control</p> <ul style="list-style-type: none"> a. Tullamore PWS is currently reported as one water supply zone in EDEN (Scheme Code 2500PUB1020, 13,080 population, 7,156 m³/d volume supplied). The existing water supply arrangements from both the Clonaslee WTP and Ardan WTP would be more accurately reported as two separate water supply zones. b. Irish Water intends to commence interim upgrade works at the plant in Q1 2017 which are scheduled for completion in Q2 2017. The interim works are to include: installation of new inlet screen, UVT monitors, pH probes, treated water aluminium monitor and an automatic coagulation dosing system. c. A major capital upgrade of Clonaslee WTP is planned to commence in late 2017. Works will include the conversion of the existing clarifier to a raw water balancing tank, new clarification/DAF system, addition of a third rapid gravity filter and a new UV disinfection system. |
| 2. | <p>Coagulation, Flocculation and Clarification</p> <ul style="list-style-type: none"> a. Raw water from the Clodiagh and Gorrach River undergoes coagulation, flocculation and clarification (CFC). b. Raw water at the inlet stack is dosed with liquid alum via a drip feed and flash mixed. c. The alum dosed water has a 6.5 minute contact time in the Contact Tank. d. pH correction is achieved via the addition of sulphuric acid or sodium hydroxide at the end of the contact tank. On the date of the audit sodium hydroxide was being dosed. The raw water alkalinity and pH are very variable due to the upland river sources and catchment characteristics. Automation of the coagulant dosing system and feedback loop from treated water pH and aluminium monitors will allow for greater control over the CFC process. e. Polyelectrolyte is injected after the contact tank at a concentration of 0.2 mg/l. f. The sludge blanket was visible on the day of the audit. However, floc had risen to the decanting channels at the surface of the clarifier. The caretaker stated that the problem with the rising floc was due to the heavy rainfall that occurred the previous day. g. The clarifier was last cleaned approximately 5 years ago. A build-up of sludge was |

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| | <p>observed on the outer sides of the decanting channels.</p> <ul style="list-style-type: none"> h. Leaves were visible on the surface of the clarifier at the time of the audit despite the caretaker have cleaned the top surface earlier that morning (Photograph No. 1). The leaves had passed through the large inlet screens and pipework. Irish Water indicated that the installation of a new fine screen (6mm) is proposed at the raw water inlet stack. i. There are 5 no. sludge bleed points in operation. The level of sludge in clarifier determines the frequency of bleeds. On date of the audit bleeds were occurring for 220 seconds every 15 minutes. |
| 3. | <p>Filtration</p> <ul style="list-style-type: none"> a. The clarified water is filtered via 2 no. rapid gravity filters. b. The filter sand media was replaced in September 2016. The media is composed of 800mm of silica sand above the drainage layers. c. There is no slow start system or run to waste taking place following filter backwash. Irish Water's plans to automate the backwash process and install slow start after backwash as part of the interim works contract will be a significant improvement in filter management at the plant. d. A backwash of Filter No. 1 was observed. The backwash is triggered by either loss of head, turbidity or time. There were areas of the filter bed where the air scour appeared less vigorous. e. The turbidity alarm set points on the filters are currently set at 1 NTU which is too high to provide a sufficient warning of filtration issues. |
| 4. | <p>Disinfection</p> <ul style="list-style-type: none"> a. Sodium hypochlorite (10%) is used for chlorination. Duty and standby chlorine dosing pumps are present which operate on a flow proportional system with trim chasing. b. Chlorine monitors and alarms are in place and the disinfection system meets the EPA criteria set out in Drinking Water Advice Note No. 3 E.coli in Drinking Water. |
| 5. | <p>Treated Water Storage and Distribution Network</p> <ul style="list-style-type: none"> a. Vermin bait traps are no longer used on site. b. The treated water is stored in 6 no. cells which were the original sand filters. The converted filters are covered by a corrugated iron roof structure. There are gaps in the cladding which may facilitate the entry of vermin and debris. Leaves were observed in the reservoir (Photograph No. 2). c. The reservoir was last cleaned in approximately 2008. |
| 6. | <p>Source Protection</p> <ul style="list-style-type: none"> a. Both the Plant Borehole and the Forest Borehole have an unsealed pipework connection at the wellhead but the chamber is sealed and domed with concrete at the ground surface. Mesh covers have been installed on the borehole vents. b. The recently drilled test borehole (not part of supply at present) in the Forest Park has a concrete plinth and locked cap but is not fenced off at present. c. The screen on the intake on Clodiagh River was inspected. It is subjected to an influx of leaves during the autumn months and requires daily checking and cleaning by the caretaker. The caretaker reports there is same issue at the intake on the Gorragh River. |
| 7. | <p>Chemical storage and bunds</p> <ul style="list-style-type: none"> a. There are 2 no. hydrofluorosilic acid storage tanks in the fluoride dosing room. A drainage grate is present on the floor of the bund through which any spills drain to the underground storage tank (Photo No. 3). The fill point is located outside the building and the tanks are fitted with automatic shut off valves. b. The aluminium sulphate is stored in a double skinned tank (internal bund). A double skinned day tank is also provided. The dosing lines are also banded. c. The sodium hypochlorite tank is also double skinned. |

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| 8. | <p>Sludge Management</p> <p>a. Supernatant from the sludge lagoons is discharged at two locations to the adjacent Clodiagh River. Irish Water stated that due to the high volume involved it is not possible to discharge to the local sewer due to the associated risk of flooding downstream.</p> <p>b. Settled sludge is transported to Tullamore WWTP. No sludge dewatering takes place on site.</p> |
| 9. | <p>Monitoring and Sampling Programme for treated water</p> <p>a. There is a monthly <i>Cryptosporidium</i> monitoring programme in place. There have been no detections in the raw or treated water to date.</p> |
| 10. | <p>Exceedances of the Parametric Values</p> <p>a. There were 2 no. aluminium exceedances notified to the EPA in 2016:</p> <ul style="list-style-type: none"> • 211 µg/l in a check sample in the network on 08/02/2016; and • 355 µg/l in a check sample in the network on 18/07/2016. |

3. AUDITORS COMMENTS

The audit found that Clonaslee WTP is being well operated by dedicated caretaking staff. However, there are a number of limitations to the existing clarification and filtration processes which, combined with sudden fluctuations in raw water quality from the Clodiagh and Gorragh Rivers present challenges to the plant operations. This has led to intermittent aluminium exceedances in the treated water. Irish Water's planned upgrade works are welcomed and will greatly improve the ability of the treatment plant to cope with rapid changes in raw water quality such as those experienced after heavy rainfall, as witnessed on the day of the audit.

The audit found that a number of the EPA recommendations of the previous audit in 2009 had not been implemented, in particular the filters are still brought back into service following backwashing without either a slow start or run to waste. There still remain issues in relation to the potential for vermin or debris to enter the treated water reservoir. Irish Water must ensure that these issues are addressed by the proposed interim works and capital upgrade works at Clonaslee WTP.

4. RECOMMENDATIONS

Management and Control

1. In the EDEN Drinking Water Returns information, Irish Water should report the Tullamore PWS as two separate water supply zones to reflect the existing water supply arrangements between Clonaslee WTP and Ardan WTP.
2. Irish Water should complete the planned interim upgrade works by Q2 2017 as outlined during the audit, to improve the management and control of the coagulation, flocculation, clarification and filtration processes at Clonaslee WTP. The upgrade works should include the installation of a fine inlet screen, inline static mixer, new pH probes, treated water aluminium monitor, automation of the coagulation dosing system and filter backwashing process, and the provision of a slow start on the filters following backwashing.

Coagulation, Flocculation and Clarification

3. Irish Water should ensure that the clarifier tank and decanting channels are cleaned regularly to prevent the build up of sludge. Irish Water should put measures in place to prevent leaves / debris entering the clarifier.

Filtration

4. Irish Water should ensure that a slow start is implemented when the filters are brought back into use following backwashing.
5. Irish Water should review the backwash process to ensure the air scour and washwater flow is even across the filter bed.
6. Irish Water should review the filtered water turbidity alarm set points to ensure they give sufficient warning in the event of a deviation from the acceptable operating range of the filters.

Treated Water Storage

7. Irish Water should undertake cleaning of the cells in the onsite reservoir. Remedial works should be undertaken to ensure there is no potential for the ingress of vermin, debris or other potential contaminants to the reservoir.

Source Protection

8. Irish Water should take action should to ensure that the new test borehole in the Forest Park is made secure and fenced off to prevent livestock access and made tamper proof to prevent contamination of the groundwater source.

Chemical Storage and Bunds

9. Irish Water should undertake integrity testing of the underground tank which collects spills from the hydrofluorosilic acid storage room.

Sludge Management

10. Irish Water should assess the options for the management and control of the supernatant discharge from the sludge lagoons to the Clodiagh River. Irish Water should ensure that the discharge is not having an adverse environmental impact on the river. Irish Water should consider monitoring of the discharge for appropriate parameters (e.g. turbidity, pH, aluminium and suspended solids) and setting trigger levels for the monitored parameters.

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:

Críona Doyle

Date:

23rd of November 2016

Photograph No. 1: Leaves on surface of Clarifier



Photograph No. 2: Leaves in the Treated Water Reservoir



Photograph No. 3: Drainage grate on floor of Hydrofluorosilic Acid Bund



