Drinking Water Audit Report

County:	Cork	**Date of Audit:**	15/10/18
Plant(s) visited:	Allihies PWS (Scheme Code 0500PUB4202)	**Date of issue of Audit Report:**	30/10/2018
		File Reference:	DW2016/148
		Auditors:	Ms. Criona Doyle
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 Allihies Water Treatment Plant has been upgraded and now includes an additional filtration stage to reduce the levels of trihalomethanes (THMs) in the final water. The monitoring results taken since the commissioning works were completed in August 2018 indicate the THM levels are compliant with the limit set by the *European Union (Drinking Water) Regulations 2014, as amended.* The supply can be removed from the EPA's Remedial Action List (RAL).

ii. Irish Water should install continuous online turbidity monitors on the filtered water from each of the slow sand filters and on the combined filtered water to inform the management of the treatment process. These monitors should be linked to a recording device and generate an alarm in the event of a deviation from the acceptable operating range of the filters.

iii. Irish Water should establish documented quality criteria to outline when the slow sand filters are due to be skimmed or resanded. An investigation should be undertaken to assess the condition of the filter media to determine if resanding is required.

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 performance of Irish Water in providing clean and wholesome drinking water and to determine progress with the commissioning of the new filtration system to ensure compliance with the trihalomethanes (THMs) parametric value.

The Allihies Water Treatment Plant (WTP) serves a population of up to 190 people (summer population). Treatment consist of slow sand filtration, granular activated carbon (GAC) filtration) and chlorination. The supply has been on the EPA's Remedial Action List (RAL) since January 2017 due to the presence of persistent elevated levels of THMs above the standard set in the Drinking Water Regulations. The GAC filtration system was commissioned in August 2018 to reduce the levels of THMs.

The opening meeting commenced at 10.30am at the Allihies 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:

Deirdre O'Loughlin, Drinking Water Compliance Specialist.

Kian Guihen, Drinking Water Compliance Analyst.

Representing Cork County Council:

Michael Russell, Acting Senior Executive Engineer

Seamus Sutton, Executive Engineer.

Alan Harrington, Curator

Eoin Harrington, Relief Curator.

Representing the Environmental Protection Agency:

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.

1.	**Remedial Works** a. The results of a sampling programme undertaken over three months (July to September 2018) were presented. Samples were taken of the raw water, pre GAC filter, post GAC filter and from the network to assess the performance of the GAC media for removal of THMs. b. The GAC filtration system consists of 2 no. Jacobi Aqua Flow AF2000 Carbon Filters with Aquasorb 5000 media. The units are rated for a maximum flow rate of $12m^3$/hr. The flow rate is currently $2.5m^3$/hr but rate of up to $5m^3$/hr would be expected to meet peak summer demand. c. The filter media was changed on 13/08/18 from Aquasorb 2000 to Aquasorb 5000. The plug and play GAC filtration system consists of 2 no. units which operate in series with the filtered water from the slow sand filters being passed through both GAC units. d. No backwashing of the filters or run to waste is required. e. An online UVT monitor has been installed on the outlet from the GAC units. The GAC units can operate to a lower limit of 85% UVT. It is proposed that the GAC filtration units will be replaced when the UVT goes below 90%. f. The UVT is monitored on site by the caretaker who visits the WTP six days per week. The caretaker records the UVT in the plant log sheet and also undertakes a review of the HMI trends. The SCADA data is also reviewed offsite by Cork County Council operations staff. g. The replacement GAC filters will be matured off site by the supplier and delivered to site and connected by the supplier as required. Both GAC filters will be replaced at the same time. h. The GAC filtration system (Aquasorb 5000) has been operational since 13/08/18. The GAC filters have not required replacement to date. On the day of the audit the monitor indicated 99.1% UVT. It is expected that the GAC filters will require replacing on a 3 to 4 month frequency. i. Trial drilling is due to take place during Quarter 4 2018 to determine if groundwater is a

	viable option for the scheme in the long term. This would allow decommissioning of the surface water source.
2.	**Source Protection** a. The source is an impounded lake. b. The intake was not visited during the audit. Due to access difficulties and health & safety issues the intake is typically inspected 2 to 3 times a year. c. The impoundment and supply were installed over 100 years ago as part of the historic mine works. d. A map was presented showing the buffer zones required under the GAP regulations. The land in the buffer zones is commonage and there are no registered owners. There is low intensity sheep grazing in the catchment. e. The *Cryptosporidium* risk assessment was updated in 2016 with an overall *Cryptosporidium* risk score of 52 (moderate risk).
3.	**Filtration** a. There are two slow sand filters on site. The sand was topped up on 28/08/18 but the filters have not been resanded since circa 2005. b. The plant records from 2012 to 2018 indicate that skimming typically takes place twice a year. c. The filters cannot be isolated and both need to be taken out of service when works are required on either filter requiring any works to be completed in a single day. d. There is no slow start procedure in place to allow maturation of filters following skimming operations. e. No turbidity data was available for the filters to assess the filter performance or to indicate when the filters require cleaning or are suitable to bring back into service.
4.	**Disinfection** a. The water is disinfected using 10-11% low bromate sodium hypochlorite. The contact time calculation indicated a CT of 19.5mg/min/l. b. Duty and assist chlorine dosing pumps are in place. The pumps automatically changeover every 12 hours. c. There is a residual chlorine monitor (CL17) on the inlet to the reservoir and outlet from the reservoir. Chlorine dosing is linked to the residual chlorine monitor on the outlet from the reservoir. d. The low level chlorine alarm is set at 0.25mg/l which triggers an instant shutdown of the supply. There is a low-level warning alarm at 0.55mg/l. The high-level alarm is currently set at 2.80mg/l. A cascade alert system is in place for alarms.
5.	**Treated Water Storage and Distribution Network** a. The final treated water is stored in a 46m^3 reservoir on site. The reservoir is reported to be > 100 years old. The reservoir is on the Irish Water Reservoir Cleaning Programme. The reservoir was last cleaned on 26/10/16 and the network was last flushed on 18/08/18. b. Monitoring of residual chlorine levels is undertaken on a daily basis from a tap in the village which is located close to the end of the network. On the day of the audit a level of 1.14mg/l for total chlorine and 1.04mg/l for residual chlorine had been measured. **c.** The distance to the furthest extremity of the network is approximately 1km.
6.	**Exceedances of the Parametric Values** a. The supply has a history of elevated trihalomethanes (THMs) above the 100 µg/l parametric value set by the Drinking Water Regulations. The results of monitoring since the commissioning of the new GAC filter on 13/08/18 show that all results are now below the parametric value.
7.	**Management and Control** a. A detailed up to date plant manual was available. Good record keeping was observed to be taking place on site.

3. AUDITORS COMMENTS

This audit was carried out to determine if the Allihies public water supply could be removed from the EPA's Remedial Action List (RAL) following the completion of the treatment plant upgrade works to achieve compliance with the trihalomethane (THM) parametric value. The monitoring results indicate that the supply has been in full compliance with the THM parametric value since the granular activated carbon filters were commissioned on 13/08/18. The audit confirmed that the works have been satisfactorily completed and the supply has been removed from the RAL.

A number of issues were identified with the slow sand filters. There are no turbidity monitors in place to confirm that the slow sand filters are correctly operating. The filter media was last fully replaced circa 2005. An assessment should be undertaken on the condition of the slow sand filter media to determine if resanding of the filters is required.

4. RECOMMENDATIONS

Slow Sand Filtration

1. Irish Water should install continuous turbidity monitors on each filter and on the combined filtered water at the water treatment plant. These monitors should be linked to a recording device and generate an alarm in the event of a deviation from the acceptable operating range of the filters.

2. Irish Water should establish documented quality criteria to outline when the filter is due to be skimmed or resanded. An investigation should be undertaken to assess the condition of the filter media to determine if resanding is required.

3. Irish Water should ensure that, following media replacement, the filters are run to waste for an appropriate period of time. This period of time should be determined on the basis of predetermined water quality criteria specific to the plant.

4. Irish Water should ensure that, following skimming (i.e. removal of the schmutzdecke), the filters are run to waste for an appropriate period of time. This period of time should be determined on the basis of predetermined water quality criteria specific to the plant.

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 in any future correspondence in relation to this Report.

Report prepared by: Fiona Doyle **Date:** 30/10/18

Inspector