Drinking Water Audit Report

County:	Cork	**Date of Audit:**	16/11/18
Plant(s) visited:	Bantry Cahernacrin (Scheme Code 0500PUB4111)	**Date of issue of Audit Report:**	26/11/2018
		File Reference:	DW2018/189
		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 treatment plant was found to be well operated.**
ii. **Irish Water should undertake a review of the treatment currently in place on this supply and provide confirmation as to whether UV disinfection is required or not in order to provide adequately disinfected water. It is noted that the current UV unit in operation at the water treatment plant is unvalidated.**

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.

The Bantry Cahernacrin public water supply provides a daily volume of approximately 877m^3/d and serves a population of 2,278. The supply is sourced from the Mealagh River and Drombrow Lake. Treatment at the plant includes coagulation, flocculation, clarification, filtration, disinfection and fluoridation. The plant was constructed in 2009.

The opening meeting commenced at 12:45pm at Cahernacrin 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 – Compliance Specialist

Salvador McNamara – Water Engineer

Representing Irish Water:

Michael Russell, Acting Senior Executive Engineer

Pauline Mc Aree – Executive Engineer

Seamus Sutton – Executive Engineer

Michael Sheehan - 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.	**Source Protection** a. Two surface water sources are used; the River Mealagh and Drumbrow Lake. The intakes were not examined as part of the audit due to time constraints. b. Farm inspections were undertaken in the catchment in 2017 by Cork County Council. c. Landowners with lands in the buffer zones were last written to in 2008 under the European Union (Good Agricultural Practice For Protection of Waters) Regulations 2017. d. The catchment comprises 40% grassland and 60% forestry.
2.	**Coagulation, Flocculation and Clarification** a. pH correction of raw water takes place with the addition of sodium hydroxide to ensure the correct pH prior to the addition of polyaluminium chloride (PAC) for coagulation. b. There is further pH correction at the splitter chamber for final pH correction prior to manganese removal. There are two sets of sodium hydroxide dosing pumps for pH correction. Both sets of dosing pumps operate on a duty / standby basis. The pumps automatically switch over every 8 hours. c. Jar testing is undertaken in response to changing raw water quality as required and undertaken typically once per month. PAC dosing is typically at a concentration of 30 to 35ppm. Duty and standby PAC dosing pumps are provided. The water passes through 3 no. mixing tanks. d. At the splitter chamber the water is spilt between the 3 no. hopper bottomed clarifiers. e. The decanting channels were level and clean and no floc carryover was visible. The furniture is cleaned and power washed every 3 to 4 weeks and walls washed down every 3 to 4 months.
3.	**Filtration** a. There are 3 no. rapid gravity filters on site. They were completely refurbished in December 2017. The filtration rate is 2.96m^3/m^2/hr. There was no depth gauge present to monitor sand depth. Manganese dioxide is included in the sand layer for manganese removal. b. Automatic backwashing can be instigated on the basis of turbidity reaching 0.2 NTU. Normally the filters are automatically backwashed every three days on a timed basis in advance of the measured turbidity triggering backwashing. c. A turbidity monitor is in place on each individual filter and on the combined filtered water. At the audit the following turbidity levels were observed Filter No. 1 0.07 NTU; Filter No. 2 0.05 NTU and Filter No. 3 0.07 NTU and combined filtered water 0.07 NTU. d. The combined turbidity monitor is not linked to the SCADA but can be viewed on site. e. There is no alarm generated in response to high turbidity. A turbidity level of 0.2 NTU triggers automatic backwashing of the filter.

	f. The automatic backwash sequence is 6 minutes air, 1 minute air and water, 8 minutes water only followed by 5 minutes settling. The filtered water is then discharged to waste for a 20 minute period. If the turbidity is still above 0.2 NTU backwashing will be triggered again.
4.	**Disinfection** a. Sodium hypochlorite 14-15% (ultra-low bromate) is used for chlorination. A 280 minute contact time calculation was provided. b. Bulk delivery of sodium hypochlorite takes place five times per annum. c. Duty and assist chlorine dosing pumps are in place and dosing is linked to the residual chlorine monitor in the reservoir. Both pumps can provide the full dose if required. The pumps automatically changeover every 3 hours. d. The residual chlorine target level is 1.0 to 1.1 mg/l leaving the treatment plant. A level of 1.05 mg/l was observed at the audit. e. The low level chlorine alarm is set at 0.50mg/l and the high level alarm is set at 1.80 mg/l. Both chlorine alarms trigger automatic plant shutdown. The alert system includes both the caretaker and relief caretaker. The chlorine residual trends are not examined off site but are reviewed daily on site by the caretaker. f. A single unvalidated Triogen UV unit is in operation at the site. g. As the UV system is unvalidated, monitoring for *Cryptosporidium* is undertaken in both the raw and treated water twice a year. h. The site has been prioritised for assessment under the Irish Water Disinfection Programme for County Cork. The site was surveyed on 16/05/18 and the Phase 1 report received on 29/06/18. The outputs of the value engineering workshop are to be available by end of 2018.
5.	**Treated Water Storage and Distribution Network** a. The single cell reservoir has a storage capacity of 1,150m^3. The reservoir was cleaned in December 2017 and the network was last flushed on January 2018. There were 4 no. vents in place at the reservoir with mesh. All reservoir access covers were locked and fitted with a watertight seal. b. The distance to the furthest extremity of the network is approximately 8km. It was outlined that monitoring of residual chlorine is undertaken once a week at the end of the line. c. There is also a chlorine monitor at the end of the network at the booster chlorination station which is used for monitoring residual chlorine levels at the end of the network.
6.	**Monitoring and Sampling Programme for treated water** a. The daily fluoride results were reviewed. b. The audit and check monitoring results were reviewed.
7.	**Chemical storage and bunds** a. All chemical storage tanks were bunded and provided with covered drip trays.
8.	**Management and Control** a. A detailed up to date plant manual was available. Good record keeping was observed. b. There was good signage and labelling of all equipment at the WTP.
9.	**Sludge Management** a. Automatic sludge bleeds are undertaken every two hours and the sludge is discharged to the sewer.

3. AUDITORS COMMENTS

The audit indicated that the plant is well operated and good record keeping was observed.

An unvalidated UV unit is in operation at the site. It was outlined at the audit that UV disinfection is not required as treatment includes coagulation, flocculation, clarification and rapid gravity filtration. An assessment should be undertaken by Irish Water to confirm whether UV disinfection is required or not in order to supply adequately disinfected water.

If the assessment indicates that UV disinfection is required the UV unit must be validated with appropriate alarms and continuous monitoring in place to demonstrate that the unit is operating within its validation range at all times.

4. RECOMMENDATIONS

Filtration

1. Irish Water should ensure that a sand level marker is provided or a procedure put in place to verify the media depth in the rapid gravity filter at regular frequencies.

2. Irish Water should ensure that an alarm is generated in the event of a deviation from the acceptable operating turbidity range of the filters.

3. Irish Water is requested to provide a print out of one months filtered water turbidity trend data for each of the individual filters and the final filtered water together with the corresponding flow data.

Disinfection

4. Irish Water is requested to provide a print out of one months residual chlorine trend data together with the corresponding flow data.

5. Irish Water should undertake an assessment to confirm that UV disinfection is not required in light of the current level of treatment and provide a report to the Agency on the findings of the assessment. If UV disinfection is required the unit should be validated in accordance with an appropriate internationally accepted validation system and be operated within its validated range at all times.

6. Irish Water should provide an update to the Agency on the outcome of the value engineering report from the Disinfection Programme with details of any proposed works and associated timeframes for completion.

Distribution System

7. Irish Water should ensure monitoring of the residual chlorine levels at the end of the distribution network is undertaken several times a week. Irish Water should provide a screen shot of the end of the line residual chlorine results from the booster chlorine station.

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:** 26/11/18

Inspector