Site Visit Report

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 water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

Water Supply Zone

Name of Installation	Bennettsbridge Regional PWS
Organisation	Irish Water
Scheme Code	1500PUB1002
County	Kilkenny
Site Visit Reference No.	SV18381

Report Detail

Issue Date	18/11/2019
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	15/10/2019	**Announced**	Yes
Time In	14:20	**Time Out**	16:00
EPA Inspector(s) **Additional Visitors**	Regina Campbell		
Company Personnel	Irish Water: Colin Cunningham, Patrick Duggan, Catherine Rice Kilkenny County Council: Andrew Flood, John Ormond, Philip Dunne, Martin Egan, Pat Clarke Ryan Hanley Engineering Consultants: John Goggin, Maebh Grace		

Summary of Key Findings

1. The Bennettsbridge Public Water Supply (PWS) has been on the EPA's Remedial Action List (RAL) since 2017 due to inadequate treatment for *Cryptosporidium.*

2. Upgrade works have taken place at the water treatment including the installation and commissioning of a containerised pressure filtration and UV treatment system. Two months verification data has been collated and indicates the system is working effectively as a barrier to *Cryptosporidium*. In view of the upgrading work completed and the verification data collated, the Bennettsbridge PWS will be removed from the Remdial Action List in the Q3 2019 review.

Introduction

The Bennettsbridge Public Water Supply (PWS) serves a population of 4,619. Current production is 2,100 m3/day based on 140 m3/hr for 15 hours. This volume rises during times of peak demand during the year. The sources are 4 groundwater boreholes and an infiltration gallery running alongside the adjacent River Nore. There was one *Cryptosporidium* detection in February 2017 and as a result this supply was placed on the EPA's Remedial Action List (RAL). The purpose of this audit was to inspect recently commissioned upgrade works, namely 6 No. pressure filtration vessels and UV unit.

Supply Zones Areas Inspected

The treatment plant facilities were examined as part of the audit.

1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	Yes

Comment

1. The previous EPA report for the audit undertaken on 15/11/2018, recommended that Irish Water should liaise with Kilkenny County Council and confirm that landowners have been written to in relation to the requirements of the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014). Kilkenny County Council personnel confirmed that this had been done.

2. All of the boreholes have had new turbidity monitors installed except for the new Borehole 4 which is outstanding. Magnetic flow meters have been installed in all of the boreholes. Further balancing of the well field is scheduled to take place by the end of November 2019.

3. Current production is approximately 2,200 m3/day with 80% sourced from the infiltration gallery and 20% from the boreholes. In summer, more demand is placed on the boreholes.

2. Filtration

		Answer
2.1	Are the filters designed and managed in accordance with EPA guidance?	Yes

Comment

Water from the boreholes and infiltration gallery is pumped to a raw water sump. The water is then pumped to the new 6 No. filtration vessels. The function of the filtration vessels is to prepare the water for UV disinfection. Flow to the filtration units is capped at 140 m3/hour based on power available at the plant. Six pressure filtration vesselshave been installed and these operate in parallel. Each filter unit can achieve a maximum velocity of 20 m/h (or 35.34 m3/hr). The media bed depth is 1.3m and comprises of activated filter media. One filter is backwashed per day with the backwash lasting 7 minutes. There is a raw water turbidity shutdown setpoint of 8 NTU to the filtration vessels. A combined filter water alarm is set at 0.9 NTU with shutdown at 1 NTU.

		Answer
2.2	Does monitoring indicate that the filters are operating effectively?	Yes

Comment

During the audit, the combined filter water turbidity monitor was reading 0.146 NTU. The turbidity of the combined raw water was 0.614 NTU. I was informed that the raw water is typically < 1 NTU.

3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes

Comment

1. The Wedeco (model type LBX850e) UV reactor is verified using monitors and alarms. Continuous UVT, flow, UVI and UV dose monitors were in operation during the audit. The UV reactor is validated to the following operating criteria: flow rate 155 m3/hr, minimum UVT of 40% and set to deliver a minimum UV dose of 440 J/m2. This dose provides broad spectrum disinfection. At the audit the UV control panel showed that the unit was operating at 141 m3/hr, UVT of 90.5% and delivering a UV dose of 2,914 J/m2 Trended data for the last two months indicates UVT of the filtered water to be consistently about 90%.The UV reactor alarms and shutdowns if operated outside of the validated range. The data on the plate attached to the reactor needs to be updated to display the design criteria at the plant.

2. After UV disinfection, the water is then further disinfected during chlorine gas. There are duty and standby chlorine dosing arrangements in place . The target residual chlorine level is 0.7mg/l after the Rathduff reservoir and 0.4mg/l after the Cherrymount reservoir. High and low chlorine alarms are in place.

		Answer
3.2	Are duty and standby chlorine pumps/ UV units in operation?	Yes

Comment

1. There is a duty only UV reactor. There is a minimum of 16 hours treated water storage in the reservoirs which Irish Water advised is adequate storage in the event of shutdown of the plant.

2. There are duty and standby chlorine dosing arrangements in place.

		Answer
3.3	Is the UV system suitably validated?	Yes

Comment

1. The unit has been validated to USEPA (UVDGM) standard.

		Answer
3.4	Is the UV disinfection system operating within its validated range?	Yes

Comment

1. The unit was operating within its validated range during the audit. The UVT monitor was displaying 90% and flow was 144m3/hr.

		Answer
3.5	Is the chlorine dosed appropriately?	Yes
	Comment	
	1. Chlorine dosing is linked to the residual chlorine monitor.	

		Answer
3.6	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes
	Comment	
	1. Residual chlorine monitors are located after the Rathduff and Cherrymount reservoirs and after contact time has been achieved..	

		Answer
3.7	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	Yes

		Answer
3.8	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes
	Comment	
	The residual chlorine levels in network are checked several times a week and noted in the plant logbook.	

		Answer
3.9	Is there a chlorine residual ≥0.1 mg/l throughout the network?	Yes
	Comment	

Records viewed at the audit were satisfactory.

4. Reservoirs and Distribution Networks

		Answer
4.1	Are reservoirs adequately inspected and maintained?	Yes
	Comment	
	There are two reservoirs on the supply: Rathduff reservoir (2,200m3 capacity) and Cherrymount reservoir (400m3 capacity). Since the last EPA audit, Cherrymount reservoir has been cleaned and Cell 1 of Rathduff Reservoir was cleaned in May 2019.	

5. Management and Control

		Answer
5.1	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	Yes

Comment

Warning and action alarms are in place for the filtration units, UV unit and chlorine dosing systems.

		Answer
5.2	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	Yes

		Answer
5.3	Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators?	Yes

		Answer
5.4	Is the data obtained from sampling and monitoring used to actively inform the processes on site and in the distribution network?	Yes

		Answer
5.5	Are instrument calibrations within date?	Yes

Comment

Calibration stickers viewed at the plant were in date. Irish Water need to confirm that the residual chlorine monitors at the two reservoirs are within calibration dates.

6. Sludge Management

		Answer
6.1	Is sludge arising from the treatment processes adequately managed?	Yes

Comment

Any sludge arising from the settled filter backwash water is transported off-site.

7. Supply on the Remedial Action List

		Answer
7.1	Do the audit findings support progress made with the Remedial Action List upgrades?	Yes

Comment

The audit found that a suitable *Cryptosporidium* barrier is now in place at the treatment plant. The findings of the audit, along with the verification submitted will allow the Bennettsbridge Water Treatment Plant to be removed from the Remedial Action List for Quarter 3 2019.

Recommendations

Subject	DW2017/13 Bennesttbridge Audit Recommendations	**Due Date**	18/12/2019
Action Text	Recommendation(s) 1. Irish Water should confirm that the residual chlorine monitors at the Rathduff and Cherrymount reservoirs are within calibration dates. 2. Irish Water should update the UV nameplate to show the Bennettsbridge design criteria. 3. Irish Water should confirm the timeframe for the inspection and cleaning of the Rathduff reservoir. 4. Irish Water should assess the water treatment plant using the Irish Water protozoal compliance criteria and address any log deficit that is identified. 5. Irish Water should provide a timeframe for the installation of a turbidity monitor in the new Borehole 4. **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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team. Irish Water should submit a report to the Agency on or before 18/12/2019 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 time frame 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 Action Reference Number in any future correspondence in relation to this Report.		