Drinking Water Audit Report

County:	Galway	**Date of Audit:**	19th December 2016
Plant visited:	Kilconnell PWS Scheme code 1200PUB1030	**Date of issue of Audit Report:**	23rd December 2016
		File Reference:	DW2015/209
		Auditors:	Aoife Loughnane Criona Doyle
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *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 the EPA's previous audit report (9th December 2015).		

MAIN FINDINGS

i. **Significant upgrade works have been completed at Kilconnell PWS to improve the safety and security of the supply in order to ensure that consumers are receiving adequately disinfected water at all times. As a result, the boil water notice issued to consumers on 13th November 2015 was lifted on 22nd December 2016, with the agreement of the HSE.**

ii. **The EPA is satisfied that the Direction issued to Irish Water on 9th December 2015 has now been closed and Kilconnell PWS can be removed from the RAL in the Q4 2016 update.**

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. A boil water notice was placed on Kilconnell PWS on 13th November 2015 following the discovery that the UV disinfection system at the treatment plant was operating outside its validated range. Kilconnell was added to the EPA's Remedial Action List in Q4 2015 due to inadequate treatment for *Cryptosporidium*. This audit was carried out to assess the upgrade works carried out to improve the safety and security of Kilconnell PWS. The boil water notice was rescinded on 22nd December 2016, with the agreement of the HSE.

Kilconnell PWS provides approximately 134 m^3/day to a population of 233 people, including Ballyboggan group water scheme. Treatment consists of membrane cartridge filtration and disinfection by UV treatment and chlorination.

The opening meeting commenced at 10.30am at Kilconnell 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:

Patrick O'Sullivan, Drinking Water Compliance Specialist, Irish Water
Gerard Greally, SLA lead, Operations, Irish Water
Brian Boylan, Drinking Water Compliance Analyst, Irish Water
Adrian Raftery, Executive Engineer, Galway County Council
Tara Meehan, Technician, Galway County Council
Paul Leonard, Caretaker, Galway County Council
Pamela Bartley, Consultant Hydrogeologist

Representing the Health Service Executive:

Dr. Emer O'Connell, Consultant in Public Health Medicine
Shane Keane, Principal Environmental Health Officer
Seamus Mitchell, Senior Environmental Health Officer

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.

1.	**Source Protection** a. The remediation works on the plant borehole (BH1) were not successful because the borehole construction was sub-standard and the corroded steel casing was giving rise to elevated raw water turbidity. b. In September 2016, the source was switched from the plant borehole to an alternative existing borehole located approximately 200m north-east of the treatment plant, adjacent to the Arrabawn creamery waste water treatment plant. c. The alternative borehole source has been demonstrated to have much better raw water quality and is a more stable source than the plant borehole. The borehole was drilled in 1998 and meets the requirements of EPA Advice Note 14. It abstracts water from 31m in the unconsolidated sands & gravels above the karst limestone bedrock. d. The new wellhead protection works have been completed to a very high standard (see photo 1). Wellhead protection works have also been completed at 3 other boreholes in the vicinity, owned by the creamery. e. The zone of contribution to the borehole has not been delineated. f. Landowners in the vicinity of the borehole have not been notified of setback distances under the *European Communities (Good Agricultural Practice for the Protection of Waters) Regulations 2014*. g. Irish Water intends to decommission the plant borehole (see photo 2). A timeframe has not yet been identified for this work.
2.	**Disinfection** a. A new UV disinfection system was installed in early December 2016. The duty & standby Trojan Swift D03 units with automatic switchover are validated to operate at ≥ 70% UVT for a maximum flow of 30.7 m^3/hr. During the audit, the system was operating at 96% UVT and 8.9 m^3/hr which is within the validated operating range. b. Water cannot flow through the UV system until the lamps have fully warmed up and the unit is fully within validation. The warm up takes between 3-5 minutes.

3.	**Treated Water Storage and Distribution Network** a. Kilconnell reservoir was cleaned and the network was flushed in September 2016. b. An integrity assessment of the reservoir has not yet been carried out. This was specified in Recommendation No. 6 of the EPA's previous audit report. Irish Water confirmed that this will be done under the national reservoir refurbishment programme. A timeframe could not be confirmed during the audit.
4.	**Housekeeping** a. There is a grid over the outdoor chamber which contains the raw and treated water flow meters. Standing water has collected in the chamber and the flow meters are submerged. Galway County Council representatives confirmed that the equipment is sealed and not impacted by water. This issue was raised in the EPA's previous audit. Irish Water intends to replace the grid with a solid cover to seal the chamber.
5.	**Management and Control** a. A new run-to-waste facility has been installed at the plant to deal with periods of elevated raw water turbidity without compromising the treatment processes. When the pumps start-up, raw water is run-to-waste for 30 minutes to allow water quality to stabilise before treatment. b. Plant alarms and automatic shutdown controls are in place, including a high turbidity alarm of 0.8 NTU and plant shutdown at 1.0 NTU, a low UVT alarm at 77% and shutdown at 70%, and a low chlorine alarm and shutdown at 0.3 mg/l. Alarms are notified by text message to the caretaker and a cascade system is in place in the event the caretaker is unavailable to respond. This procedure is not documented. This was specified in Recommendation No. 10 of the EPA's previous audit report. c. The SCADA monitoring data from 01/09/2016 to 12/12/2016 showed the following anomalies: (1) A signal dropout occurred around 22/10/2016 which lasted for a number of days. Irish Water confirmed that they are putting in place a new service agreement with the SCADA provider to react to such events as soon as possible. (2) A number of treated water turbidity spikes (> 1 NTU) occurred which could not be explained during the audit. On 20th December 2016, Irish Water provided confirmation that the turbidity spikes occur when the treated water pumps have shut down. This suggests there is a disturbance in the rising main where the sample line is fed from for the turbidity bowl. However, water is not entering the distribution network during those occasions, and therefore it is accepted that the turbidity spikes are not compromising the performance of the UV disinfection system.

3. AUDITORS COMMENTS

The audit found that the upgrade works carried out at Kilconnell PWS have significantly improved the safety and security of the supply in order to ensure that consumers receive adequately disinfected water at all times. The alternative borehole source has been demonstrated to have much better raw water quality and is a more stable source than the borehole at the treatment plant. The new wellhead protection works have been completed to a very high standard. The new run-to-waste facility allows the plant to deal with periods of elevated raw water turbidity without compromising the treatment processes. And the installation of new UV duty & standby units and the associated operational controls has resulted in a more robust primary disinfection system.

The boil water notice issued to consumers on 13th November 2015 was lifted on 22nd December 2016, with the agreement of the HSE. However, Irish Water should have completed the upgrade works by 30th June 2016 in accordance with the action programme agreed by the EPA. The delay in completion of works meant that consumers were required to boil water for almost 6 months longer than intended.

The EPA is satisfied that the Direction issued to Irish Water on 9th December 2015 has now been closed and Kilconnell PWS can be removed from the RAL in the Q4 2016 update.

4. RECOMMENDATIONS

1. Irish Water should ensure that any problems with the SCADA system (including signal dropouts) are alerted to relevant personnel, investigated and resolved within the shortest possible timeframe.

2. Irish Water should ensure that a documented alarm response procedure is in place at the plant to ensure that all alarms are acknowledged, assessed and responded to appropriately, and all alarms are logged and any corrective action taken is formally recorded and reported.

3. Irish Water should delineate the zone of contribution to the groundwater borehole source.

4. Irish Water should liaise with Galway County Council to ensure that landowners in the vicinity of the groundwater borehole are written to under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)* to inform them of the required setback distances and to ensure, unless an alternative setback distance has been set as per Article 17 that:

    i. Organic fertiliser or soiled water is not applied to land within 200 m of the abstraction point; and
    ii. Farmyard manure held in a field prior to landspreading is not placed within 250 m of the abstraction point.

5. Irish Water should decommission the plant borehole (BH1) in accordance with best practice guidelines, to prevent the risk of presenting a preferential pathway for the entry of contaminants to the groundwater source.

6. Irish Water should remove the standing water from the underground chamber in front of the plant control building, and install a solid cover in order to protect the monitoring equipment in the chamber.

7. Irish Water should carry out an integrity assessment of the reservoir to ensure there is no ingress into the reservoir. Any repair works should be completed as soon as possible after the need has been identified.

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 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: Aoife Laghnaire **Date:** 23rd December 2016

Inspector

Photo 1: High standard of wellhead protection at the borehole source

Photo 2: Plant borehole needs to be decommissioned