



Drinking Water Audit Report

County:	Galway	Date of Audit:	31 st August 2016
Plant visited:	Kilkerrin-Moylough Water Treatment Plant (scheme code 1200PUB1031)	Date of issue of Audit Report:	23 rd September 2016
		File Reference:	DW2010/106
		Auditors:	Aoife Loughnane Emer Cooney
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • The <i>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. **The UV disinfection system installed at Kilkerrin-Moylough water treatment plant provides 3-log inactivation of *Cryptosporidium*. Irish Water has provided 2 months satisfactory monitoring data to verify that the plant is operating within its validated range, thereby providing an effective *Cryptosporidium* barrier.**
- ii. **Irish Water should review the plant control settings to ensure there is minimum delay in automatic plant shutdown if the final water quality does not meet the required operating criteria.**

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 whether the upgrade works at Kilkerrin-Moylough water treatment plant are sufficient to enable the supply to be removed from the Remedial Action List (RAL).

Kilkerrin-Moylough PWS was added to the RAL in 2010 due to inadequate treatment for *Cryptosporidium*. On 26th September 2011 the EPA issued a Direction under Regulation 9(2) of the *Drinking Water Regulations*, which required the installation of a treatment barrier capable of at least 3-log *Cryptosporidium* removal or inactivation by 26th September 2012. A cartridge filtration system was installed however this did not meet the requirements of the EPA Direction. Irish Water subsequently proposed a further upgrade the plant to include the installation of a UV disinfection system to provide an effective barrier against *Cryptosporidium*.

Kilkerrin-Moylough water treatment plant serves a population of 1,932. The raw water source is the Marganure Spring which is influenced by surface water. Treatment at the plant consists of cartridge filtration followed by UV disinfection and chlorination. Irish Water's long term plan is to decommission this scheme and connect to Tuam Regional Water Supply Scheme in 2018.

The opening meeting commenced at 2.00 pm at Kilkerrin-Moylough 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. Photographs taken by Aoife Loughnane during the audit are attached to this report and are referred to in the text where relevant. 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
 Shay Walshe, Operations Engineer, Irish Water
 Peter Mitchell, Divisional Technician, Water Services, Galway County Council
 Pat McDermott, General Services Supervisor, Galway County Council
 Paddy Hughes, Caretaker, Galway County Council

Representing the Environmental Protection Agency:

Aoife Loughnane, Inspector
 Emer Cooney, 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.	<p>Filtration</p> <ul style="list-style-type: none"> a. Raw water is pre-treated in Amazon cartridge filters of 10 µm size firstly, followed by 1 µm size. The cartridges are housed in 2 units containing 30 cartridges each. b. The control criteria on the filters is pressure head, with plant shut-down at 9 bar pressure due to inadequate flow through the filters. This requires the cartridges to be replaced and can occur up to daily, depending on the raw water quality. c. A documented filter management procedure was not available to review on site during the audit.
2.	<p>UV Disinfection</p> <ul style="list-style-type: none"> a. Since the previous EPA audit on 25th May 2014, a new UV disinfection system has been installed at the plant comprising of duty & standby Trojan Swift SC B06 units. b. The validated operating range of the UV system was identified by Irish Water in correspondence on 30/11/2015 as flows up to 62 m³/hr and minimum UVT 69%. Subsequently on 01/02/2016, Irish Water submitted the UV certificate and validated operating characteristics table which identifies for flows up to 70 m³/hr, a minimum UVI of 12.1 W/m² is required. c. During the audit, the plant was operating at 54 m³/hr, 77.6 % UVT and a UV dose of 67.12 mJ/cm² which demonstrates that the UV system was operating within its validated range. d. There is no automatic switchover arrangement between the duty and standby UV units. However there is an automatic shutdown when the system drops below its validated range, to prevent inadequately disinfected water entering the distribution network.
3.	<p>Chlorination</p> <ul style="list-style-type: none"> a. Chlorination by sodium hypochlorite dosing is carried out in order to achieve residual disinfection in the distribution network. The chlorination system meets the requirements of EPA Advice Note No. 3 E.coli in Drinking Water.
4.	<p>Chemical storage and bunds</p> <ul style="list-style-type: none"> a. Three drums of sodium hypochlorite were stored in an unbunded area in the chlorination room (see photo 1).

5.	<p>Management and Control</p> <ol style="list-style-type: none"> a. Turbidity and UVT monitoring data for the period 8th June to 8th August 2016 demonstrates satisfactory plant performance and verifies the effectiveness of the plant upgrade works in providing a 3-log <i>Cryptosporidium</i> barrier. b. The control set-points which activate an automatic shut-down of the plant are final water turbidity > 1 NTU and UVT < 70%. The 15 minute delay in automatic plant shutdown triggered by elevated turbidity presents a risk of shielding of pathogens in the UV system. c. The label on the flow meter indicated that it has not been calibrated since it was commissioned in 2011 (see photo 2).
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3. AUDITORS COMMENTS

The UV disinfection system installed at Kilkerrin-Moylough water treatment plant provides 3-log inactivation of *Cryptosporidium*. Irish Water has provided 2 months satisfactory monitoring data to verify that the plant is operating within its validated range, thereby providing an effective *Cryptosporidium* barrier. On this basis, the EPA is satisfied that Kilkerrin-Moylough PWS will be proposed for removal from the RAL in the Q3 2016 update.

4. RECOMMENDATIONS

1. Irish Water should ensure there is a documented procedure for managing the filters to ensure that when the filters require replacement that there is no risk to the quality of the final water. This procedure should set out when the filters should be replaced and the protocol to be followed when replacing the filters to ensure that treatment is not bypassed at any stage.
2. Irish Water should ensure that the UV disinfection system operates within its validated range at all times. The validated operating criteria should be clearly displayed and a copy of the UV certificate and validated operating characteristics should be kept at the plant.
3. Irish Water should review the plant control settings to ensure there is minimum delay in automatic plant shutdown if the final water quality does not meet the required operating criteria.
4. Irish Water should ensure that all monitors at the plant are maintained and calibrated in accordance with the manufacturers' specifications.
5. Irish Water should review the chemical storage arrangements at the treatment plant to ensure that chemicals are stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

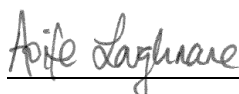
During the audit Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Mr Darragh Page, Senior Inspector, Drinking Water Team.

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:



Inspector

Date:

23rd September 2016



Photo 1: Sodium hypochlorite drums stored in an un-bunded area



Photo 2: Flow meter label - no record of calibration/service since it was commissioned in 2011