Drinking Water Audit Report

County:	Waterford	**Date of Audit:**	17/02/2017
Plant(s) visited:	Kilmacthomas PWS (3100PUB1064)	**Date of issue of Audit Report:**	09/03/2017
		File Reference:	DW2017/17
		Auditors:	Mr Niall Dunne Ms 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 any previous audit reports.		

MAIN FINDINGS

i. **This supply is at risk of contaminated water entering the supply as there are no automatic shutdowns in place for either low UV dose or low chlorine residual levels in the treated water. IW should endeavour to expedite the installation of automatic shutdowns to prevent contaminated water entering the supply.**

ii. **The current location of the residual chlorine sampling point is adjacent to the dosing point, as a result the residual chlorine levels recorded on the chlorine residual monitor are not reliable or consistent. IW should also expedite the relocation of the chlorine sampling point to a location after the treated water reservoir, where an adequate residual chlorine contact time will be achieved.**

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 in response to a precautionary boil water notice (PBWN) that was placed on this supply on the 15/02/2017.

The Kilmacthomas supply is fed by three main spring sources, serves a population of 552 and supplies a volume of approximately 155 m^3/day. Treatment consists of chlorination and UV. A secondary school is supplied directly from the raw water tank, but the school has its own UV system in place.

The opening meeting commenced at 10.30 am at the Kilmacthomas 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 (IW):

Brian O'Leary; IW SLA Operations Lead.

Deirdre O'Loughlin; IW Compliance Specialist.

Pat Duggan; IW Compliance.

Representing The Local Authority;

Alan Kirwan; Water Engineer, Waterford City & Council (WCC).

James Power, Caretaker, Waterford City & Council (WCC).

Representing the EPA:

Criona Doyle; Inspector.

Niall Dunne; 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.	**Exceedances of the Parametric Values** a. On the 14/02/2017 at 17:20 the caretaker received a complaint from a consumer relating to taste in the water. The caretaker noted that slurry was recently spread on the field adjacent to an old disused spring. The spring was connected to the treated water reservoir; it was noted that a valve on the connection had leaked. Water from the spring was observed to be discoloured and a smell of slurry was detected within the treated water tank. b. Chlorine levels within the network were recorded as 0.1 mg/l as opposed to the usual 0.4 mg/l. c. Supply from the Kilmacthomas source was shut off at 17:50 with water fed through the distribution system from the Ballyogarty supply. d. On the night of the 14/02/2017 a primary school, which is fed from the treated water tank, was also informed of the incident. e. On the 15/02/2017 the reservoir was cleaned and scoured; the connection to the spring was disconnected and a precautionary boil water notice (pBWN) was placed on this supply. There was a leaflet drop undertaken in the morning informing residents of the pBWN. f. On the 15/02/2017 at 22.15 the Kilmacthomas supply was brought back into service, with the pBWN in place.
2.	**Source Protection** a. WCC stated that this supply is served by three springs; however, during the audit it was observed that a fourth spring was feeding into a manhole of one of the main springs. b. The springs are located on the grounds of the secondary school. The secondary school is fed from the raw water tank of this supply, according to WCC the school has its own UV system in place, WCC were unsure whether the school had chlorination in place. c. WCC stated that there is one farmer within the catchment and were unsure whether the farmer was written to regarding their obligations under the GAP regulations. d. Water is held in a raw water reservoir prior to disinfection and prior to being pumped to the treated water reservoir.

3.	**Disinfection** a. Disinfection at the plant consists of chlorination and UV. b. There are duty standby chlorine dosing pumps in place with automatic switch over between the two pumps, however, one pump is consistently set to duty, there is no alternation between the pumps. There are no dial out residual chlorine alarms in place. Chlorine is dosed at a pre-set pump dosing rate, dosing is not based on readings from the chlorine residual monitor. c. The residual chlorine sampling point is located adjacent to the chlorine dosing point, prior to an adequate chlorine contact time being achieved. d. WCC stated that chlorine residuals are taken within the network on a daily basis. e. IW stated that there is a proposal to place a chlorine monitor after the reservoir, and expediting the installation can be examined. f. There is a single UV unit in place; the unit is validated to 400 J/m^2, however, the monitor was reading 536.2 W/m^2, the units on the monitor differ to those on the validation certificate. WCC stated that the caretaker gets an alarm but were unsure of the alarm settings. There is no automatic UV shutdown in place. g. There was a UVI monitor on site though dose trends could not be displayed on the monitor.
4.	**Treated Water Storage and Distribution Network** a. WCC stated that there is approximately 16 hours storage within the treated water tank and water levels within the tank are alarmed.
5.	**Monitoring and Sampling Programme for treated water** a. Samples were tested for *Cryptosporidium* on the 16/02/17, these samples were clear. b. On the 16 & 17/02/2017 chlorine samples were taken in the town, the lowest recorded results were 0.6 mg/l and 0.9 mg/l respectively. c. Bacterial samples taken on the 15, 16 & 17/02/17 were also clear.
6.	**Management and Control** a. WCC stated that the caretaker visits the site daily. b. IW stated that the site inspection report, part of the disinfection strategy, had been undertaken and it is expected that a work order will be issued in Q1 2017; a contractor is expected to be appointed in Q2 2017 with upgrade works to be completed by Q3 2017. These works are to include the upgrade of the chlorine monitor and the installation of alarms. c. There were no service labels on any disinfection or dosing equipment. d. It was noted that there was a discrepancy in populations between those submitted by IW as part of their annual monitoring submissions, EDEN, and the population noted on site.

3. AUDITORS COMMENTS

The precautionary boil water notice (pBWN) incident occurred as contaminated water entered the treated water reservoir via a connection from an old disused spring. This connection has now been severed and the risk of further contamination from this source eliminated. It must be noted that eventhought the caretaker in this instance did act quickly to rectify the situation; there was still a delay of approximately 30 minutes where contaminated water was potentially getting into supply, this is of significant concern to the health of consumers.

There is one UV unit in place at this plant, it is validated to a dose of 400 J/m^2, however, during the audit it could not be demonstrated whether the UV unit had stayed within its validation zone, as dose was not trended and the monitor was displaying units different to the validation certificate. There is also no UV auto shut down in place in the event that the UV unit breaches it's validation limits, during the audit there also appeared to be uncertainty around UV dial out alarm levels.

This supply is chlorinated, however, the chlorine monitor is located too close to the chlorine dosing point, where contact time is not achieved and as a result dosing is not based on the chlorine monitor readings. The chlorine sampling point should be located after the treated water tank to ensure residual chlorine dosing is based on water with an adequate chlorine contact time. There is also no plant shut off in the event of low chlorine levels.

Irish Water should install automatic shutdown of the plant based on UV validation levels and low chlorine residual levels to ensure any potential contamination incidents are quickly contained. IW should expedite the installation of a UV auto shutdown and the relocation of the chlorine sampling point to a location after contact time has been achieved to ensure consistent and appropriate residual chlorine levels are maintained.

4. RECOMMENDATIONS

General

Source Protection

1. Irish Water should ensure that the potential for additional springs to contaminate the main springs is eliminated.

2. Irish Water should liaise with the relevant local authority in relation to the requirements of the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)* 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.

Disinfection

3. Irish Water should ensure that auto shut down of the plant is installed on low chlorine levels and when the UV unit operates outside its validation zone.

4. Irish Water should expedite the installation of a continuous chlorine residual monitor on the final water with a sampling location after an adequate residual chlorine contact time has been achieved.

5. Irish Water should ensure that the UV disinfection system operates within its validated range at all times and that it is linked to a recording device which is visible from the treatment plant.

6. Irish Water should review the UV alarm levels to ensure that they are appropriate giving the caretaker adequate time to respond.

7. IW should ensure that the display units on the UV monitor are consistent with the units of the validation certificate.

Management and Control

8. Irish Water should ensure that the population levels recorded within EDEN are consistent with actual populations.

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.

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:  **Date:** 09/03/2017

Inspector