Drinking Water Audit Report

County:	Kilkenny	**Date of Audit:**	15/11/2018
Plant(s) visited:	Piltown-Fiddown PWS (Scheme Code 1500PUB1013)	**Date of issue of Audit Report:**	14/12/2018
		File Reference:	DW2018/182
		Auditors:	Ms. Regina Campbell
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. **Cryptosporidium has been detected in the Piltown-Fiddown Public Water Supply. Irish Water should provide details on the remedial works, including timeframes to ensure an adequate barrier to Cryptosporidium in provided.**
ii. **Irish Water should undertake a review of the current turbidity alarm settings and time delays to ensure appropriate alarm levels and response procedures are in place in the event that the raw water quality is compromised.**

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 following the detection of Cryptosporidium in the Piltown-Fiddown Public Water Supply (PWS) on 09/10/2018.

The Piltown-Fiddown PWS serves a population of 2,955 and produces 1,000m^3/day. The raw water source is a mixture of spring water (supplies 30-40% depending on time of year) and a groundwater source. Treatment consists of pH correction, disinfection and fluoridation.

Photographs taken by Regina Campbell during the audit are attached to this report and are referred to in the text where relevant.

The audit commenced with a visit to Templeorum Springs at approximately 1.40pm before continuing to the Piltown-Fiddown 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:
Tommy Roche, Drinking Water Compliance
Michael Tuohy, Water/Wastewater Engineer

Representing Kilkenny County Council:
Niall Dwyer, Caretaker
Dave McArdle, Supervisor
Ken Boland, SEE

Representing the HSE:
Veronica Meaney, SEHO

Representing the Environmental Protection Agency:
Regina Campbell, 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

The raw water sources for this supply comprise of three springs known as the Templeorum Springs and a groundwater borehole. Approximately 1000m^3/day is produced with 30-40% sourced from the springs and the remainder sourced from the borehole.

Templeorum Springs
The Templeorum Springs are three springs located in a wooded area approximately a mile from the Piltown-Fiddown Water Treatment Plant. It is necessary to cross several fields and wade across a stream before reaching the wooded area where the three springs and collection chamber are located. On the day of the audit the ground underfoot in the wood was very soft and uneven and access was difficult in a few places due to fallen trees. The wooded area is fenced off from the adjacent agricultural land.

The springs were constructed in the 1930's. Each of the springs viewed consisted of a concrete ring approximately 1.5m deep set into the ground. Each of the springs was covered and locked. The springs feed into a collection chamber that also had a locked hatch.
There was a lot of standing water in the vicinity of Spring no. 1 (see Photo 1).
Cryptosporidium was detected in the Piltown-Fiddown Public Water Supply (PWS) on 09/10/2018. The initial notification from Irish Water indicated that the sample had been taken after heavy rain and that there was some local flooding in the surface water source. Resampling results to date have been clear. There was also a previous Cryptosporidium detection in 2016.

According to the EPA Groundwater Monitoring Programme Site Information Report (August 2011) for the springs, the estimated Zone of Contribution (ZOC) is 3.57 km^2. Groundwater vulnerability within the ZOC is extreme.

Groundwater Borehole
The groundwater borehole is located at the Piltown-Fiddown Water Treatment Plant. It was constructed in 2003. It is sampled regularly as part of the EPA Groundwater Monitoring Programme. EPA monitoring results of the raw groundwater show that it has naturally low pH (5 to 5.5 typically) and that it is free from microbiological contamination. The wellhead is below ground level.

The pH correction of the groundwater is undertaken by passing it through a calcium carbonate plant. Water is corrected to a pH of 7.3. The water is then mixed with the spring water and this reduces the pH to about 7.
During the summer 2018 drought, production went down on both the spring and the borehole.

	There is a turbidity monitor on the combined spring water only. Irish Water advised in correspondence that there is a a turbidity alarm set at 1 NTU but that there is no automatic shutdown of the plant in the case of high turbidity. On the day of the audit, Irish Water said that the turbidity alarm on the springs had been lowered to 0.75 NTU but this could not be confirmed during the audit. There is no continuous turbidity monitor on the borehole source. The overall Cryptosporidium Risk Screening Score provided by Irish Water on EDEN is 142 which is Very High Risk
2.	**Disinfection** a. Disinfection is undertaken using 10-12% low bromate sodium hypochlorite. The 25 litre drums are stored in bunds and have a date of manufacture displayed. b. Dosing is flow proportional and there are duty and assist pumps in place. The duty and assist chlorine dosing pumps are manually switched over by the caretaker on a weekly basis. c. According to the HMI display observed on the day, the low chlorine alarm is set at 0.5mg/l and the high chlorine alarm is set at 1.0mg/l. d. The target residual chlorine level leaving the reservoir is 0.65mg/l and a reading of 0.72mg/l was observed on the day of the audit. e. Irish Water stated that the supply is due to be assessed under the Disinfection Programme soon with a meeting scheduled for the end of November 2018. f. Irish Water did not provide a copy of the effective contact time calculation on the day of the audit. g. The caretaker, standby caretaker and supervisor all get alarms however it was not clear if there is an escalation of alarms if there is no response to the initial alarms.
3.	**Treated Water Storage and Distribution Network** a. The caretaker said that the reservoir was built in the 1930 and it has capacity of 450m^3. b. The caretaker takes free chlorine readings in the network several times a week and he said generally they are above the minimum required of 0.1mg/l.
4.	**Exceedances of the Parametric Values** a. Cryptosporidium was detected in the supply on 09/10/2018 and previously in July 2016. Resampling results to date have been clear.
5.	**Chemical storage and bunds** a. On the day of the audit, several pallets of calcium carbonate had just been delivered and were stored very near to the hatch covering the groundwater borehole. b. The current arrangement of the fill point for the fluorosilicic acid day tank presents a risk that any potential acid spillage or leakage may not be contained within the bund (see Photo 2).

3. AUDITORS COMMENTS

Cryptosporidium has been detected in the Piltown-Fiddown Public Water Supply in October 2018 and previously in July 2016. Irish Water should provide details on the remedial works, including timeframes to ensure an adequate barrier to Cryptosporidium is provided.

4. RECOMMENDATIONS

General

1. Cryptosporidium has been detected in the Piltown-Fiddown Public Water Supply. Irish Water should provide details on the remedial works, including timeframes to ensure an adequate barrier to Cryptosporidium is provided
2. Irish Water should ensure that additional monitoring is undertaken in line with Irish Water's Rationale in Determining Cryptosporidium Monitoring in Public Water Supplies.

Source Protection

3. Irish Water should consider the installation of a continuous automatic turbidity monitor on the groundwater borehole to alert plant operators of any changes in raw water quality.
4. Irish Water should confirm the current turbidity alarm setting on the raw water from the springs to ensure appropriate alarm levels and response procedures are in place in the event that the raw water quality is compromised.

Disinfection

5. Irish Water should confirm the effective contact time calculation to the first consumer.
6. Irish Water should review the current chlorine dosing arrangements at this plant (including frequency of manual switchover) to ensure that if either pump fails that there is sufficient flexibility in the pump arrangements to ensure that the other pump automatically increases to compensate for the malfunctioning pump.
7. Irish Water should review the current alarm response cascade system to ensure that alarms are responded to if the caretaker is unable to respond.

Treated Water Storage

8. Irish Water should ensure that the service reservoir is inspected and cleaned out on a regular basis and any maintenance and repairs completed as soon as possible after the need has been identified.

Chemical Storage and Bunds

9. Irish Water should review chemical storage arrangements at the treatment plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Fill points for storage tanks inside the bunds should be within the bunded area. Refer to EPA guidance document "*IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities*". The review should also have regard to the *Code of Practice on Fluoridation of Drinking Water*.

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 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: Regina Campbell **Date:** 14/12/18

Inspector

Appendix 1 Photos

Photo 1 Spring No. 1

Photo 2 Fill point of fluorosilicic acid day tank