Drinking Water Audit Report

County:	Cork	**Date of Audit:**	10/10/16
Plant(s) visited:	Millstreet PWS (Scheme Code 0500PUB1408)	**Date of issue of Audit Report:**	26/10/16
		File Reference:	DW2016/171
		Auditors:	Ms. Criona Doyle Ms. Cliona Ni Eidhin
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. ***Cryptosporidium* has been detected in the Millstreet Water Supply. At present there is no treatment barrier in place to prevent against *Cryptosporidium*. Irish Water should install an adequate barrier against *Cryptosporidium* in order to ensure the water supply is adequately disinfected at all times.**

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 the performance of Irish Water in providing clean and wholesome drinking water following the detection of *Cryptosporidium* in the Millstreet Public Water Supply (PWS) on the 20th and 28th of September 2016.

The Millstreet PWS provides a daily volume of 2,200m^3/d and serves a population of 3,800 people. The supply is mainly (90%) sourced from the Tubrid Spring which is an uncovered spring source. Members of the public have access to the spring as it is a Holy Well and it is located on land which is privately owned. There is a borehole located adjacent to the Water Treatment Plant (WTP) which is used to augment the spring source and provides approximately 10% of the supply volume. Treatment at the plant consists of disinfection, by chlorination, and fluoridation. Sodium hypochlorite is manufactured on-site by electro chlorination.

Photographs taken by Cliona Ni Eidhin during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 10:30am at the Millstreet Drinking Water Treatment Plant (WTP), adjacent to Tubrid Spring, approximately 1.5km north west of Millstreet. 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 audit

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 Duggan, Water Compliance Monitoring Analyst, Irish Water.
Jim Fitzgerald, SLA Lead Irish Water.
Pat Walsh, Senior Executive Engineer, Cork County Council.
Finbarr Jones, Executive Engineer, Cork County Council.
Dave Sheehan, Executive Scientist, Cork County Council.
John Enright, Water Curator, Cork County Council.
Patrick Kelly, Liaison Engineer Cork County Council.

Representing the HSE:
Bernadine Scanlan, Principal Environmental Health Officer HSE.

Representing the Environmental Protection Agency:
Criona Doyle, Inspector.
Cliona Ni Eidhin, 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.	**Disinfection** a. Disinfection is undertaken using an electro chlorination unit (Pro Sec 250). The unit was installed in 2005 and produces sodium hypochlorite through electrolysis of brine. b. Duty, standby and trim chlorine dosing pumps are in place with automatic switch over between pumps. Dosing is linked to the residual chlorine level with the level being maintained at approximately 0.60mg/l. All pumps were calibrated (last calibration date 04/08/16) with next calibration due in February 2017. There is no booster chlorination taking place. c. The continuous residual chlorine monitor is alarmed. The low level alarm is set at 0.25 mg/l and the high level alarm at 2 mg/l. In the event of the alarm setting being exceeded for 30 minutes automatic shutdown of the water supply takes place. d. The daily residual chlorine level at the WTP is recorded in the Chlorine Record Sheet. The residual chlorine levels in the network are very consistent typically ranging between 0.50 mg/l and 0.60mg/l. Daily residual chlorine level checks are also undertaken in the network and recorded on the Chlorine Record Sheet. e. There is no barrier for *Cryptosporidium* entering the drinking water supply. A UVT monitor was installed in May 2016 to collect background data as part of a county wide data gathering programme by Irish Water. Irish Water indicated that 1 year of UVT data is generally required for *Cryptosporidium* barrier design purposes. The UVT monitor has periodically been out of calibration and offline since it was installed. f. The disinfection Contact Time calculation for the Millstreet supply was not available at the audit. Irish Water advised that the CT achieved prior to the first consumer served exceeded the minimum required.
2.	**Exceedances of the Parametric Values** a. On the 28/09/16 the EPA was notified of the detection of *Cryptosporidium* (result 0.014 /

	10 L) in the treated water at Tubrid on the 20/09/16. The notification indicated that turbidity levels had been satisfactory in the 10 days prior to the sample date (< 0.5 NTU). Due to the low number of oocysts present the genotype could not be determined. b. Resampling undertaken on the 28/09/16 detected *Cryptosporidium* (result 0.006 / 10 L). c. The advice of the HSE was to retest and monitor the supply weekly. The HSE confirmed at the audit that there have been no reported cases of cryptosporidiosis in the area being served by the supply. A meeting is scheduled to take place between the HSE and Irish Water on the 04/11/16 to review the situation. d. Subsequent to the audit further notifications relating to the detection of *Cryptosporidium* were received on the following dates: 13/10/16 (result 0.003 / 10L sample date 06/10/16), 21/10/16 (result 0.007 / 10L sample date 11/10/16) and 25/10/16 (result 0.01 /10L sample date 18/10/16).
3.	**Source Protection** a. The main source for the Millstreet Supply is the Tubrid Spring which is an open spring located in an area accessible to the public and potentially birds and animals (Photo No. 1). b. The spring supply is augmented by a borehole located within the Water Treatment Plant Compound (supply volume 200 – 250m^3/d). The borehole was drilled in 2007 and was commissioned in 2012. A protective chamber has been installed and a sealed wellhead is provided. No borehole log or construction details were available to confirm that an adequate seal is present beneath the wellhead and in the annulus surrounding the borehole. c. A Zone of Contribution (ZOC) (1.95km^2) was delineated for the spring in 2007. Buffer zones have been delineated for the spring source and a map of the 200m and 250m buffer zones is displayed on site. d. Cork County Council confirmed that all landowners within the buffer zones were written to in 2008 to advise them of appropriate set-back distances for the prevention of water pollution from fertilisers and certain activities. e. The most recent *Cryptosporidium* Risk Assessment was completed in 2015 with a risk score of 135 (very high risk). This represented a significant increase from the previous risk score of 58 (moderate risk). f. Public toilet facilities are provided on site as it is a popular local amenity. Wastewater treatment is provided via a Biocycle unit. The treated wastewater is piped along the western site boundary and is discharged via a pipe to the Finnow River approximately 200m down gradient of the spring. g. Visitors to the holy well site would not be aware that the spring is the main source for the Millstreet PWS. h. The spring is located on private land. Cork County Council purchased some additional lands to the east of the WTP in 2010 – 2011. i. Landuse in the immediate vicinity of the spring includes coniferous forestry to the west and south west. There is a more recent broadleaf plantation to the south. There are a number of houses along the R582 south of the spring within the ZOC likely to be served private wastewater treatment systems (septic tanks). It is not known if any of these have been inspected as part of the National Inspection Plan. j. No unusual activities are reported in the surrounding catchment prior to the detection of *Cryptosporidium*. Irish Water indicated that investigative work in the catchment is to continue. k. The caretaker reports that there are no issues with elevated turbidity in response to rainfall in the catchment. The catchment is not flashy and demonstrates a very consistent water quality. There is no history of an increase in chlorine demand in response to rainfall events. l. The results of raw water monitoring data from Cork County Council and EPA Groundwater Monitoring Programme were provided and reviewed. A copy of the results was subsequently forwarded by Cork County Council on the 11/10/16 indicating a consistent water quality. m. The spring overflow discharges to the River Finnow approximately 200m north east of the spring. A gate has been installed to prevent the ingress of flood waters to the drinking water abstraction point during periods of flooding on the River Finnow.
4.	**Treated Water Storage and Distribution Network** a. Approximately 12 hours treated water storage is provided. The are 2 no. above ground

	round concrete storage reservoirs (509m^3 each) and 1 no. embanked service reservoir (volume 1,000m^3). The reservoirs were drained down and cleaned 6 months ago. b. Significant remedial works have been undertaken on the embanked service reservoir since the 2010 EPA Audit. Improvement works included the installation of new inspection hatches and vents. All hatches were locked on the date of the audit. **c.** There is no residual chlorine monitor present on the outlet from the reservoirs to verify chlorine levels following disinfection contact time.
5.	**Monitoring and Sampling Programme for treated water** a. The treated water monitoring programme includes 6 no. check samples and 1 no. audit sample. Results back to 2005 were available at the audit. The results indicate a consistent water quality. b. Monitoring of *Cryptosporidium* in the Millstreet PWS first commenced in August 2016. Irish Water's plan was for sampling to take place twice a year once in Spring and later in the year. *Cryptosporidium* was detected in the September sampling round and on each follow up sampling occasion as outlined under section 1 above.
7.	**Hygiene and Housekeeping** a. Both the caretaker and relief caretaker only work on the water treatment plant and water network and are not involved in the operation of any waste water treatment plants. b. A small hole in the floor over the clear water sump was noted under the UVT monitor presenting the potential for accidental ingress. (Photograph No. 2). c. A notice is in place on the entrance gate to the site indicating "Dogs Not Allowed". On the date of the audit the gate was open.
8.	**Management and Control** a. There is a turbidity alarm present with automatic shut down at the inlet to the plant when a level of 1 NTU is exceeded for 30 minutes. The caretaker gets a text alarm and the system restart requires a physical restart by the caretaker at the plant. b. There is a response cascade system in place with both the caretaker and relief caretaker getting text message alarms.

3. AUDITORS COMMENTS

Treatment at the Millstreet Water Treatment Plant is limited to disinfection and fluoridation. There is no barrier against *Cryptosporidium* entering the public water supply despite the very high risk score of 135. The *Cryptosporidium* monitoring programme which commenced in August 2016 has found *Cryptosporidium* oocysts in the treated water on each sampling occasion since the 20/09/16.

Irish Water needs to prioritise the installation of a *Cryptosporidium* barrier in order to ensure the safety and security of Millstreet public water supply. The Millstreet PWS will now be added to the EPA's Remedial Action List due to inadequate treatment for *Cryptosporidium*.

4. RECOMMENDATIONS

Disinfection

1. Irish Water should install a suitable barrier against *Cryptosporidium* on the Millstreet PWS as soon as possible in order to ensure the water supply is adequately disinfected.

Source Protection

2. Irish Water should liaise with Cork County Council to ensure that:
   (i) Farm and septic tank inspections are carried out, in particular the domestic wastewater treatment systems serving the houses to the south of the site within the

zone of contribution of the spring source.

(ii) All landowners are made aware of the setback distances in the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)* for the source of the supply.

(iii) The monitoring of potentially polluting activities within the zone of contribution should include examination of the area underlain by limestone bedrock.

3. Irish Water should provide a copy of the log of the supply borehole to demonstrate that a sufficient annular seal is present and confirm the depth from which groundwater is being abstracted.

Hygiene and Housekeeping

4. Irish Water should take action to ensure that the source is made secure and fenced off to prevent animal access and ensure that the gates are kept closed at all times.

5. Irish Water should ensure the small hole over the clear water sump is sufficiently sealed/protected to prevent ingress to the treated water.

Management and Control

6. Irish Water should ensure that the UVT monitor is operational at all times.

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 Ms Aoife Loughnane, Drinking Water Team Leader.

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: Fiona Doyle **Date:** 26/10/16

Photograph No.1: Tubrid Spring Emergence

Photograph No. 2: Hole Above Clear Water Sump