Drinking Water Audit Report

County:	Mayo	**Date of Audit:**	16th October 2018
Plant visited:	Ballycastle Water Treatment Plant (scheme code 2200PUB1005)	**Date of issue of Audit Report:**	24th October 2018
		File Reference:	DW2018/178
		Auditors:	Aoife Loughnane
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 the previous EPA Drinking Water Audit Report (dated 8th March 2013).		

MAIN FINDINGS

i. **There is no barrier to *Cryptosporidium* entering Ballycastle public water supply. The spring source is vulnerable to surface water influence and is susceptible to contamination, as evidenced by the detection of *Cryptosporidium* in the water supply on 08/10/18 and the subsequent issuing of a boil water notice to all consumers.**

ii. **Irish Water plans to rationalise Ballycastle public water supply and connect to Ballina - Lisglennon water supply scheme as an alternative source of clean and wholesome drinking water. Irish Water needs to submit an action plan and timeframe to the EPA for the connection to Ballina - Lisglennon public water supply.**

iii. **Ballycastle will be added to the EPA's Remedial Action List in the Q3 2018 update, due to inadequate treatment for *Cryptosporidium*.**

iv. **Irish water should take immediate action to improve the source protection measures at the spring source, and should continue with the weekly *Cryptosporidium* monitoring programme.**

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 in response to the notification by Irish Water of the detection of *Cryptosporidium* in Ballycastle public water supply on 08/10/18, and the subsequent issuing of a boil water notice to all consumers on the Ballycastle public water supply and consumers on the Corrower/Sea Road and Lisbrin group water schemes.

Water is abstracted from a spring source (Ballyknock Spring) and undergoes disinfection by chlorination at Ballycastle water treatment plant. Chlorine contact time is provided in a clear water tank at the plant. Chlorinated water is gravity fed to the Town Hall Reservoir in the centre of Ballycastle. The water supply provides 191 m^3/day to a population of 402 people. There are also two group water schemes served by Ballycastle public water supply; Corrower/Sea Road GWS and Lisbrin GWS.

The opening meeting commenced at 11:30 am at Ballycastle 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:

Ger Greally, Asset Operations Water Lead

Thomas Gibbons, Drinking Water Compliance Analyst

Representing Mayo County Council:

Iarla Moran, Head of Water Services

Eddie Munnelly, Senior Executive Engineer

Brian Conmy, Technician

Eileen Cavanagh, A/Executive Scientist

Martin McGuire, Plant Caretaker

Representing the Health Service Executive:

Dr. Regina Kiernan, Consultant in Public Health Medicine

Dr. Mark O'Loughlin, Specialist Registrar in Public Health Medicine

Dr. Treasa Kelleher, Specialist Registrar in Public Health Medicine

Maria Horkan, Principal Environmental Health Officer

Marie Tonra, Senior Environmental Health Officer

Representing the Environmental Protection Agency:

Aoife Loughnane, 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.	**Action Plan to deal with *Cryptosporidium***

a. *Cryptosporidium* (3 oocysts in 1482 litres or 0.02 occysts/10L) was detected in Ballycastle public water supply in a sample taken at the Town Hall Reservoir on 08/10/18. It was not possible to determine the *Crypto* genotype due to insufficient number of oocysts.

b. Following consultation with the HSE, a boil water notice was issued to all consumers served by Ballycastle PWS, including 2 group water schemes (Corrower/Sea Road GWS and Lisbrin GWS) on 12/10/18.

c. There is no barrier to *Cryptosporidium* entering Ballycastle public water supply. The spring source is vulnerable to surface water influence and is susceptible to contamination.

d. Irish Water has classified the source as a G5 groundwater source: "*High risk (with microbiological contamination) – spring or bored well, water drawn < 10m, in lowland catchment with high concentration of cattle, sheep, horses or humans in immediate vicinity or upstream or water treatment outfall upstream"*. The protozoal log credit requirement is 5 and the current log credit score is zero.

e. A monthly *Cryptosporidium* monitoring programme has been in place since January 2018. In 2017, *Crypto* monitoring was carried out in the seasonal months of February to May inclusive, September and October. There had been no *Crypto* detections prior to 08/10/18. The monitoring frequency has been increased to weekly following the recent detection.

	f. A follow up sample taken on 14/10/18 was clear of *Cryptosporidium*. g. **Immediate Actions:** Irish Water has agreed to take action to reduce the potential for surface water influence on the spring source by undertaking works to ensure the spring chamber is properly sealed, and will continue the weekly monitoring programme for *Cryptosporidium* in the water supply. h. **Medium Term Actions:** Irish Water has conducted a hydrogeological assessment of the source and determined that there is limited scope for developing a bored well (G1 source) solution due to the local geology. Irish Water now plans to rationalise the Ballycastle supply and connect to Ballina – Lisglennon water supply scheme. A framework contract is in place for these works and design works are to commence immediately. A timeframe for this rationalisation could not be confirmed during the audit but Irish Water will provide confirmation to the EPA as soon as it is available. i. On the day of the audit, the HSE representatives confirmed that there was no evidence of illness in the community associated with the detection of *Cryptosporidium* in the water supply. They are closely monitoring the situation.
2.	**Source Protection** a. Water is abstracted from a spring source (Ballyknock Spring) which has been in use since the 1940s. b. The spring abstraction is housed in a concrete chamber located on the side of a small rural road which leads to a farmyard (see photo 1). The access manhole to the spring chamber was securely locked. c. The spring chamber is very old and in poor condition. There was a gap in the concrete between the side and lid of the chamber (see photo 2) which presents a risk of surface water ingress to the chamber. d. The land surrounding the spring is non-intensive agricultural land. The zone of contribution (ZOC) to the spring source has been delineated in the EPA's *Water Framework Directive, Gorundwater Monitoring Programme, Site Information Report on Ballycastle PWS (August 2011)*. The ZOC measures 0.8 km^2 on lands to the north west of the spring chamber, which is made up of a steep hill and pasture land. The soil is poorly drained and is underlain by low permeability subsoil. The hydrogeological information identifies that this site is a *PI poor aquifer – bedrock which is generally unproductive except for local zones*. The groundwater vulnerability in the ZOC includes areas of extreme vulnerability (rock near surface or karst). e. There are two houses with septic tanks located within 200m of the spring abstraction. These septic tanks have not been inspected, however Mayo County Council has identified them as candidates for inspection under the National Inspection Plan for Domestic Waste Water Treatment Systems due to their proximity to a drinking water source. f. In December 2017, Mayo County Council met with and wrote to 10 landowners to advise them of the required setback distances for landspreading and storage of manure under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations* and the requirements of the *Sustainable Use of Pesticides Regulations*. g. There is a raw water monitoring programme for *E.coli* (twice monthly), coliform bacteria, turbidity, ammonium, colour, conductivity, pH and UVT (monthly). The 2018 results show that raw water *E.coli* levels are usually low (0 – 3 MPN/100mls) however there were large spikes on 3 occasions; 291 MPN/100mls on 10/05/18, 126 MPN/100mls on 19/07/18 and 248 MPN/100mls on 19/09/18 (this sample date corresponds to Storm Ali). These results demonstrate the source-pathway linkage for faecal contamination of the spring source, and confirms that the spring is vulnerable to surface water influence.
3.	**Disinfection - Chlorination** a. The raw water is disinfected by chlorination using sodium hypochlorite (10 – 12%). b. The chlorination system meets the requirements of EPA Advice Note 3; there are duty and standby chlorine dosing pumps with automatic switchover, flow proportional dosing linked to a chem-trim system, and a chlorine monitor and alarm in place. c. The target chlorine level at the outlet of the clear water tank is 0.9 mg/l. The CL17 chlorine monitor was reading 1.08 mg/l during the audit. d. The chlorine monitor was calibrated on 15/10/18 by EPS and the calibration label was clearly displayed.

	e. The low level chlorine alarm is 0.55 mg/l and the high level alarm is 1.5 mg/l. f. There are only two people in the cascade system for responding to alarms; the caretaker and relief caretaker. g. A baffle curtain was installed in the clear water tank in August 2017 to ensure adequate chlorine contact time before the water is supplied to the first consumers. This improvement was carried out under Irish Water's National Disinfection Programme. h. The effective chlorine contact time calculation was not available to review during the audit.
4.	**Treated Water Storage** a. The clear water tank has a capacity of approximately 90 m^3. The tank was inspected and cleaned in late 2016. Mesh covers have been installed on the vents since the previous EPA audit. b. Treated water flows by gravity to the Town Hall Reservoir in the centre of Ballycastle. The reservoir was built in 1985 and last cleaned in February 2018. **c.** One of the vents on the roof of the reservoir had no mesh cover on one side (see photo 3). The overflow pipe from the reservoir was not covered (see photo 4). These present a risk of ingress of vermin or deliberate introduction of contaminants or acts of vandalism. **d.** The access gate and fencing at the Town Hall Reservoir site was not secure and presents a risk of unauthorised access to the treated water reservoir.
5.	**Chemical storage and bunds** a. The sodium hypochlorite drums were stored on a bunded tray and clearly labelled with an expiry date.

3. AUDITORS COMMENTS

This audit was carried out in response to the detection of *Cryptosporidium* in Ballycastle public water supply and the subsequent issuing of a boil water notice to all consumers on 12/10/18. The audit found that the spring source is influenced by surface water and is extremely vulnerable due to the source-pathway linkage for faecal contamination. There is no barrier to *Cryptosporidium* entering Ballycastle public water supply. Irish Water must take immediate action to improve the source protection at the spring, in advance of the medium term solution to rationalise the Ballycastle supply and connect to Ballina-Lisglennon water supply scheme.

Ballycastle will be added to the EPA's Remedial Action List in the Q3 2018 update, due to inadequate treatment for *Cryptosporidium*. Irish Water needs to submit an action plan and timeframe to the EPA for the connection of Ballycastle to Ballina - Lisglennon public water supply, as an alternative source of clean and wholesome drinking water.

4. RECOMMENDATIONS

1. Irish Water should submit an action programme and timeframe for the rationalisation of Ballycastle public water supply and connection to Ballina - Lisglennon public water supply scheme as an alternative source of clean and wholesome drinking water.

2. Irish Water should take immediate action to improve the source protection measures at the spring chamber. Irish Water should ensure that the spring chamber is adequately sealed to prevent the ingress of surface water.

3. Irish Water should continue the weekly programme of *Cryptosporidium* monitoring in Ballycastle public water supply. If any oocysts are detected during the monitoring programme, Irish Water should immediately notify the HSE and EPA.

4. Irish Water should liaise with Mayo County Council to ensure that inspections are undertaken at the two septic tanks located within 200m of the spring source, and the owners are notified of any remedial actions necessary to prevent pollution of the spring source of Ballycastle public water supply.

5. Irish Water should submit a calculation of the effective chlorine contact time (taking the recently installed curtain baffle in the clear water tank into account), to demonstrate that the first connections are receiving appropriately disinfected drinking water.

6. Irish water should ensure there are at least three people in the cascade system for responding to alarms at the drinking water treatment plant.

7. Irish Water should take action to improve the site security at the Town Hall Reservoir, in particular the access gate and site fencing, to prevent any unauthorised access.

8. Irish Water should ensure that the vents and the overflow pipe outlet on the Town Hall Reservoir are secured against ingress of animals or deliberate introduction of any contaminant or acts of vandalism.

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: Aoife Loughnane **Date:** 24th October 2018

Aoife Loughnane

Photo 1: Spring chamber

Photo 2: Side of spring chamber showing gap in concrete (potential route of surface water ingress)

Photo 3: Vent on Town Hall Reservoir – mesh cover missing on one side

Photo 4: Overflow pipe on Town Hall Reservoir