



Drinking Water Audit Report

County:	Wexford	Date of Audit:	1 st October 2015
Plant(s) visited:	Ballykelly (Campile)	Date of issue of Audit Report:	5 th October 2015
		File Reference:	DW2015/164
		Auditors:	Ms Michelle Roche Ms Yvonne Doris
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • <i>The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i> • <i>EPA Drinking Water Advice Note No. 3: E. coli in Drinking Water</i> • The recommendations specified in the <i>EPA Drinking Water Report</i>. 		

MAIN FINDINGS

- i. **The Ballykelly (Campile) public water supply is served from a single borehole abstraction which does not meet the minimum disinfection criteria set out in the ‘EPA Advice Note No. 3: E. coli in Drinking Water’.**
- ii. **Provision of adequate disinfection in this supply should be addressed by Irish Water as a priority. The supply should be adequately disinfected prior to entering the distribution network and the efficiency of the disinfection system should be verifiable.**

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 the notification by Wexford County Council, dated 25/09/15, of the failure to meet the parametric value for *E. coli* (as specified in Table B of Part 1 of the Schedule of the Regulations) in the Ballykelly (Campile) public water supply and the subsequent issue of a boil water notice on consumers of the supply. Failure to meet the parametric value for Coliforms (as specified in Table C of Part 1 of the Schedule of Regulations) was also notified to the EPA on the same date, 25/09/15.

The Ballykelly (Campile) public water supply serves 3 domestic houses at a volume of approximately 2m³/day. The supply is also connected to a fourth domestic house, however this dwelling is currently unoccupied and has not been occupied since the house was constructed in 2009. The 3 houses currently supplied from the scheme were built as local authority houses in the late 1970’s to early 1980’s. The houses are served by a single borehole abstraction located in the back garden of one of the houses and the network extends approximately 0.7km to the last house.

Compliance monitoring samples taken on 23/09/15 detected *E. coli* of 17.8 per 100ml and Coliforms of 118.4 per 100ml. Wexford County Council immediately responded to the failures on receipt of the sample results on 24/09/15. A boil water notice was issued to consumers following consultation with

the HSE, emergency disinfection with sodium hypochlorite was installed and works to improve borehole protection were carried out. All works were completed by 25/09/15.

According to Wexford County Council, Irish Water dispute ownership of and responsibility for the Ballykelly (Campile) supply and did not attend the audit.

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

The opening meeting commenced at 10.45am at the Ballykelly (Campile) pumphouse. 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: (* indicates that person was also present for the closing meeting)

Mr. Paul Delahunty – Quality Engineer, Wexford County Council*

Mr. Daniel McCartan – Senior Executive Engineer, Wexford County Council*

Mr. Billy Harris – Caretaker, Wexford County Council*

Representing the Environmental Protection Agency:

Ms Michelle Roche – Inspector*

Ms Yvonne Doris – 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

- a. The borehole is located in the garden of one of the houses that it supplies. The borehole is located on a slightly elevated area of ground between two percolation areas and a graveyard. One percolation area is used by the house where the borehole is located and one percolation area is attached to a house that has not been occupied since the house was constructed in 2009.
- b. Some patches of burnt grass were noted in the garden where the borehole is located, and this may be an indication of pesticide use close to the borehole.
- c. The borehole is thought to be approximately 30 metres deep and installed with casing; however the depth of casing is unknown.
- d. A *Cryptosporidium* risk assessment has not been carried out for the supply.
- e. Prior to the *E. coli* and Coliforms failures the borehole chamber was covered with a rectangular concrete slab, the wellhead was uncapped (unsealed) and constructed below ground level and the area around the borehole was overgrown with scrub.
- f. Wexford County Council undertook borehole remediation works on 25/09/15 following the sample failures. The borehole is now located within a concrete chamber with a drain at the bottom to prevent surface water ingress and a metal cover on the top. At the time of the audit the borehole chamber was unlocked. Wexford County Council stated that a lock is to be installed on the metal cover. The wellhead is now raised above ground level (approximately 0.3m) and capped with a metal cap which extends down the sides of the wellhead (Photograph 1).

<p>2.</p>	<p>Chlorination and Disinfection</p> <ul style="list-style-type: none"> a. Prior to the <i>E. coli</i> and Coliforms failures no disinfection was in place at the Ballykelly (Campile) public water supply. b. Wexford County Council installed emergency disinfection on the 25/09/15, following the sample failures. c. 10/12% Sodium Hypochlorite is dosed flow proportionately from a bunded day tank when the water delivery pump is activated (Photograph 2). The day tank is to be topped up every week by the Caretaker, at a dilution factor of 1:40 Sodium Hypochlorite to water. No Sodium Hypochlorite drums are stored on site. d. The disinfection system has no standby chlorine dosing pump in the event of a failure of the duty dosing pump. e. There is no chlorine monitor or alarm on the supply to indicate to Irish Water or Wexford County Council that there are low levels or no chlorine in the network. f. The caretaker is currently recording the Sodium Hypochlorite usage on the supply and will adjust the level to which the day tank is filled accordingly, to ensure that Sodium Hypochlorite does not degrade significantly as a result of being stored in the day tank for a long period of time. g. No effective chlorine contact time calculation has been calculated for the supply, but given the short distribution network (700m from the pumphouse) and lack of contact tank it is unlikely that EPA recommended minimum effective chlorine contact time of 15mg.min/l is achieved. Wexford County Council estimated the contact time to the first consumer is likely to be less than one minute. h. The Caretaker has scheduled to take residual chlorine samples at the last house on the network every 2 weeks. The most recent residual chlorine sample taken recorded a concentration of 0.18mg/l free chlorine.
<p>3.</p>	<p>Exceedances of the Parametric Values</p> <ul style="list-style-type: none"> a. Compliance monitoring samples taken on 23/09/15 detected <i>E. coli</i> of 17.8 per 100ml and Coliforms of 118.4 per 100ml. This was the first sample taken in the Ballykelly (Campile) public water supply. b. Immediately following receipt of sample results on 24/09/15 Wexford County Council took action to deal with the exceedances. c. A boil water notice was issued to consumers following consultation with the HSE on 24/09/15 and remains in place. Emergency disinfection with Sodium Hypochlorite was installed and works to improve borehole protection were carried out on 25/09/15.
<p>4.</p>	<p>Management and Control</p> <ul style="list-style-type: none"> a. According to Wexford County Council, Irish Water dispute ownership and responsibility for the Ballykelly public water supply. Irish Water was notified of the audit but did not attend. Wexford County Council have stated that Irish Water will not provide the funding for works required to bring this supply into compliance with the legal standards in the Drinking Water Regulations, 2014.
<p>5.</p>	<p>Monitoring and Sampling Programmes for Treated Water</p> <ul style="list-style-type: none"> a. No monitoring programme for the raw or treated water was undertaken for the Ballykelly (Campile) public water supply prior to September 2015. b. Monitoring of the treated water has now been scheduled to occur every 6 months and will include microbiological parameters and UVT.

3. AUDITORS COMMENTS

The Ballykelly (Campile) public water supply does not have an adequate disinfection system in place. Disinfection with Sodium Hypochlorite is in place; however it does not satisfy the minimum disinfection criteria set out by the EPA in the 'EPA Advice Note No. 3: E- coli in Drinking Water'. Provision of an adequate disinfection system should be reviewed and addressed by Irish Water.

Irish Water disputes the ownership of and responsibility for this supply and Wexford County Council has stated that Irish Water will not provide funding for the necessary works to bring the supply into compliance with the legal standards.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should ensure that all potentially polluting discharges into the catchment of the water source are identified and assessed, including septic tanks and percolation areas in the vicinity of the borehole and pesticides usage in the garden where the borehole is located. Irish Water should implement mitigation measures, where appropriate, to reduce the potential impact of these discharges.
2. Irish Water should ensure that all borehole linings and seals are maintained.
3. Irish Water should ensure that a *Cryptosporidium* risk assessment is completed for this supply.

Disinfection

4. Irish Water should ensure that the disinfection system meets the minimum disinfection criteria set out in the 'EPA Drinking Water Advice Note No. 3: E. coli in Drinking Water'.

Adequate chlorination should comprise of the following as a minimum:

- i. A chlorine monitor must be installed at the appropriate location following disinfection (i.e. after the appropriate contact time). The chlorine monitor must be alarmed with a dial out to ensure that an immediate response can be made in the event of inadequate levels of chlorine in the final water. Furthermore the Irish Water must ensure that the data from the chlorine monitor is archived and reviewed on a regular basis to observe any trends in chlorine demand;
- ii. Ensure that there is adequate chlorine contact time before the water supply reaches the first consumers. The World Health Organisation guidelines recommendation of 30 minutes contact time at a minimum of 0.5 mg/l free chlorine must be achieved in all supplies before water is supplied to consumers. A calculation of contact time should be undertaken by Irish Water having regard to Chapter 5 of the 'EPA Water Treatment Manual: Disinfection'. A contact tank of suitable size should be provided to ensure that there is adequate chlorine contact time before the water supply reaches the first consumers. This may be a particular problem in small water supplies.
- iii. Duty and standby dosing arrangements should be in place at chlorine dosing points at the treatment plant and at rechlorination stations within the distribution network. There should be automatic changeover of pumps in the event of malfunction of the duty pump and the automatic changeover facility should be checked on a regular basis by Irish Water to ensure it is operating adequately. Dual duty pump arrangements may also be acceptable provided that if either pump fails there is sufficient flexibility in the pump arrangements to ensure that the other pump automatically increases to compensate for the malfunctioning pump; and
- iv. Chlorine dosing at the water treatment plant or rechlorination stations should, in the majority of cases, be flow proportional or preferably be linked to the residual chlorine monitor such that any changes in the chlorine demand of the treated water can be

responded to automatically by the dosing pumps. Fixed rate pumps may be permissible in certain limited circumstances (e.g. where the flow at the water treatment plant is constant and there is a low and stable chlorine demand such as in an unpolluted groundwater source).

Adequate UV disinfection should comprise of the following as a minimum:

- i. The UV treatment system must be validated to an appropriate international validation standard. Irish Water must maintain on record a copy of the validation certificate for the UV lamp including details of the validated range of the lamp;
 - ii. A UV Intensity (UVI) or UV Transmissivity (UVT) monitor must be installed on the UV lamp to verify that the UV treatment system is operating within its validated range (as outlined on the validation certificate) at all times. Furthermore Irish Water must ensure that the data from the monitor is archived and reviewed on a regular basis to observe any trends in the quality of the water to be treated;
 - iii. Verification that the UV has operated within its validated range at all times (i.e. a review of the print outs of the UVI or UVT readings from the monitor);
 - iv. Duty and standby UV lamps should be in place in all UV treatment units with automatic changeover in the event of failure of the UV lamp to operate within its validated range. This requirement may be waived if the supply is small (<50 persons) provided there is an automatic shutoff in the event of failure of the UV treatment unit (i.e. no undisinfecting water should enter the mains); and
 - v. Secondary disinfection capable of providing a residual disinfection in the network (e.g chlorination) will be required in the majority of supplies with the possible exception of supplies where the distribution network is very limited in extent and it can be demonstrated that ingress into the distribution network is not occurring.
5. Irish Water should increase the frequency of monitoring of the Ballykelly supply until the minimum disinfection criteria set out in the 'EPA Drinking Water Advice Note No. 3: E. coli in Drinking Water' have been met and the effectiveness of the disinfection is verified.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

This report has been reviewed and approved by Ms Yvonne Doris, 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:



Date:

5th October 2015

Inspector



Photograph 1: Borehole Chamber and Wellhead following Remediation Works



Photograph 2: Bunded day tank and single dosing pump