Drinking Water Audit Report

County:	Wexford	**Date of Audit:**	12th May 2015
Plant(s) visited:	Chestnut Grove, Holyfort 3300PUB1831	**Date of issue of Audit Report:**	19th May 2015
		File Reference:	DW2015/65
		Auditors:	Ms Michelle Roche
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)* • *EPA Water Treatment Manual: Disinfection* The recommendations specified in the EPA *Drinking Water Report*.		

MAIN FINDINGS

i. **The Chestnut Grove public water supply is served from two borehole abstractions within the housing estate of the same name. The supply is currently on a Boil Water Notice imposed following the detection of coliforms on 07/05/15. The supply has UV disinfection in place; however the system is not validated or operated in accordance with the '*EPA Water Treatment Manual: Disinfection*'.**

ii. **Provision of disinfection in this supply should be addressed by Irish Water. The water supply should be adequately disinfected prior to entering the distribution network and the efficiency of the disinfection system should be verifiable.**

iii. **Wellhead protection works to improve the security of the supply should be carried out without delay, in order to protect the health of consumers.**

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 08/05/15 of the failure to meet the coliforms parametric value (as specified in Table C of Part 1 of the Schedule of the Regulations) in the Chestnut Grove public water supply and the issuing of a Boil Water Notice to consumers on the supply on 07/05/15.

The Chestnut Grove public water supply serves 11 domestic houses, in the centre of Holyfort village, 10 houses located within the Chestnut Grove housing estate and a single house backing on to the estate. The Chestnut Grove public water supply was taken in charge by Wexford County Council in 2013 after the management of the supply was abandoned by the estate developer. The supply is served by two borehole abstractions located within the estate and no borehole construction or productivity details are available. The borehole located along the eastern boundary of the estate was constructed prior to the development of the estate and originally drilled to supply the single house backing on to the estate. Following construction of the estate this borehole was incorporated into the Chestnut Grove public water supply. The second borehole, located along the northern boundary of the estate, was drilled by the developer during the construction of the estate. Both boreholes are thought to pump simultaneously

to a Carlow Precast concrete sump (approximate volume 40m^3) located beneath the pumphouse. No details on pumping rates are available. Raw water is then pumped from the sump to a UV treatment system for disinfection. In 2014 Wexford County Council installed a new UV disinfection system at the supply to replace that installed by the developer. The UV system is not validated and consists of a single UV unit with no standby component, control monitor, dial out alarm or automatic shut–off in place.

Check samples (2 samples) taken on 06/05/15 detected coliforms of > 130 per 100ml and a Boil Water Notice was placed on the supply on 07/05/15.

Irish Water dispute ownership of and responsibility for this supply and did not attend the audit.

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

The opening meeting commenced at 11:10 at the Chestnut Grove pumphouse. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, and observations made during an inspection of the boreholes and pumphouse. The audit observations and recommendations are listed in Section 2 and 4 of this report.

The following were in attendance during the audit.

Representing Wexford County Council: (* indicates that person was also present for the closing meeting)

Mr Paul Delahunty – Quality Engineer, Wexford County Council*

Mr Tony Quirke – Area Engineer, Wexford County Council*

Mr Tom McLoughlin – Area Technician, Wexford County Council*

Mr Terry Moore – Supervisor, Wexford County Council*

Representing the Environmental Protection Agency:

Ms Michelle Roche – Inspector*

Ms Ruth Barrington – 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 surrounding land is agricultural and slopes down towards both boreholes within the Chestnut Grove housing estate. Currently no setback distances are in place under the Good Agricultural Practices Regulations; however Wexford County Council advised on the day of the audit that they plan to inform local landowners of the location of the supply boreholes and their subsequent obligations under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014* (SI No.31 of 2014) . b. Both borehole wellheads are below ground level with no capping and covered with manhole covers (Photograph 1 and 2). Wexford County Council advised that they have received quotations to improve the security of both boreholes through raising both well heads above ground level, providing adequate capping and seal, and installing locked covers with concrete plinth surrounds. c. Raw water from both boreholes is pumped to a Carlow Precast concrete sump (approximate volume 40m^3) located beneath the pumphouse. The sump has never been cleaned or

	inspected for integrity; however a quick visual inspection by Wexford County Council during the audit did not detect any obvious signs of leaking or cracking.
2.	**Chlorination and Disinfection** a. The Chestnut Grove public water supply has a UV disinfection unit in place; however the system is not operating in accordance with the '*EPA Water Treatment Manual: Disinfection*'. The UV system is not validated and consists of a single UV bulb with no standby component, control monitor, dial out alarm or automatic shut–off in place. b. As a short term measure, Wexford County Council plan to install an automatic shut-off at the supply to shut-off the raw water pumps when the UV bulb has blown. This will result in no water being supplied to consumers in the event that UV disinfection has failed due to a bulb blowing. Shut-off of the supply will not be alarmed via a dial out mechanism therefore the restoration of the supply will depend on a consumer reporting a lack of water to the council whereby the UV bulb can be replaced and the supply restored. Wexford County Council plan to communicate this situation to the consumers.
3.	**Exceedances of the Parametric Values** a. On 06/05/15 two check samples had coliform detections of 13.7 mpn/100ml and 129.8 mpn/100ml. As soon as these results were received on 07/05/15 Wexford County Council took action to deal with the exceedance. A Boil Water Notice was issued to consumers, the UV bulb, which was found to have blown, was replaced, all supply lines were flushed with chloros and the raw water sump was dosed with chloros. b. The cause of the coliform exceedance was thought to be a combination of heavy rains in the days prior to the exceedance (70mm over the course of the week), inadequate wellhead protection and no disinfection due to the failure of the UV bulb. c. Works to provide adequate wellhead protection were quoted for following the exceedance and a UV shut-off to prevent un disinfected water entering the distribution network is due to be installed. d. Results of re-sampling conducted on 11/05/15 detected 0 coliforms per 100ml; however the Boil Water Notice remains in place pending three consecutive clear samples and consultation with the HSE.
4.	**Management and Control** a. Irish Water dispute ownership and responsibility for the Chestnut Grove 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.

3. AUDITORS' COMMENTS

The Chestnut Grove public water supply was found to lack an adequate disinfection system. UV disinfection is in place at the supply; however it is not operating in accordance with the '*EPA Water Treatment Manual: Disinfection*'. Provision of adequate disinfection in this supply should be reviewed and addressed by Irish Water. The security of the two borehole abstractions should be improved through wellhead improvement works and implementation of the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014.*

Irish Water disputes the ownership of and responsibility for this supply and Wexford County Council have 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 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 (2) (c) that:

    i. Organic fertiliser or soiled water is not applied to land within 25 m of the abstraction point; and
    ii. Farmyard manure held in a field prior to landspreading is not placed within 25 m of the abstraction point.

2. Irish Water should ensure that the wellheads on the two supply boreholes are raised above ground level, the wellheads are capped and sealed and a locked cover is installed at both boreholes.

Disinfection

3. Irish Water should ensure that the disinfection system meets the appropriate criteria set out in the '*EPA Water Treatment Manual: Disinfection*' and 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 undisinfected 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.

Management and Control

4. The current management and alarm systems of disinfection at the Chestnut Grove public water supply are inadequate. Irish water should ensure that an appropriate alarm system with dial out to relevant personnel, in the event of any disinfection failure, is installed without delay.

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:** 19th May 2015

Inspector

Photograph 1: Wellhead of eastern borehole

Photograph 2: Wellhead of northern borehole