



Drinking Water Audit Report

County:	Wexford	Date of Audit:	7 th May 2015
Plant(s) visited:	Craane 3300PUB1781	Date of issue of Audit Report:	25 th May 2015
		File Reference:	DW2014/347
		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>. • The <i>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 Water Treatment Manual: Disinfection</i> • The recommendations specified in the <i>EPA Drinking Water Report</i>. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. The Craane public water supply is served from a borehole abstraction which is not adequately treated or disinfected and which does not meet the minimum disinfection criteria set out in EPA Advice Note No. 3: E-coli in Drinking Water.
- ii. Provision of disinfection in this supply should be addressed by Irish Water. 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 to assess the completion of remedial works at the Craane public water supply, subsequent to a Boil Water Notice being issued on 08/10/14. The Boil Water Notice was issued to consumers of the supply following a failure to meet the coliforms parametric value (as specified in Table C of Part 1 of the Schedule of the Regulations) on 07/10/14. Remedial works were undertaken on the supply by Wexford County Council and the Boil Water Notice was lifted on 23/01/15. Remedial works included source investigations through agricultural and domestic wastewater surveys in the catchment, wellhead improvement works at the borehole abstraction and installation of basic chlorine disinfection.

The Craane public water supply serves 8 domestic houses at volume of approximately 2m³/day. All 8 houses were built as local authority housing in the late 1960s or early 1970s. The supply is served by a single borehole abstraction which was initially drilled to supply the first local authority house built in Craane. As the remaining 7 houses were built, the distribution network was further developed to incorporate each house into the supply. Presently, the distribution network extends 200m south-west from the pumphouse. Wexford County Council installed basic chlorine disinfection at the supply on

09/10/14, in response to the coliform exceedance. Prior to October 2014 no disinfection was in place at the supply. The disinfection consists of a single dosing pump with no standby component, control monitor, dial out alarm or automatic shut-off in place.

Irish Water dispute ownership of and responsibility for this 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 10.00am at the Craane 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 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.

<p>Representing Irish Water: (* indicates that person was also present for the closing meeting)</p> <p>Mr. Paul Delahunty – Quality Engineer, Wexford County Council*</p> <p>Mr. Tadhg O’Corcora, Senior Executive Engineer, Enniscorthy Municipal District*</p> <p>Mr. Tom Quigley - Caretaker, Wexford County Council*</p> <p>Representing the Environmental Protection Agency:</p> <p>Ms Michelle Roche – Inspector*</p> <p>Ms Yvonne Doris – Inspector*</p> <p>Mr. Darragh O’Connor (observer)*</p>
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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.

<p>1.</p>	<p>Source Protection</p> <ol style="list-style-type: none"> a. The surrounding land slopes towards the wellhead and occasionally some grazing activity occurs uphill from the borehole. No local landowners have been formally informed of the location of the borehole abstraction in proximity to their lands; however Wexford County Council advised that all local landowners would be aware of the presence of the borehole. b. The borehole is located directly adjacent to the pumphouse and in the garden of a property served by the supply. No details were available on the age or construction of the borehole. c. Borehole improvement works were completed on the borehole in November 2014. The top of the wellhead remains below ground level (Photograph 1); however a liner has been installed, the well head has been capped and sealed (Photograph 1) and a lockable manhole cover has been fitted (Photograph 2). The completed works were observed and confirmed during the audit. d. The garden where the borehole is located has open access by humans and animals. Dogs and chickens were observed in the vicinity of the borehole and animal faeces were noted on the grass close to the borehole cover. e. No raw water sampling is currently carried out at the supply.
<p>2.</p>	<p>Chlorination and Disinfection</p> <ol style="list-style-type: none"> a. The Craane public water supply has a chlorine disinfection system in place; however the system is not operated in accordance with the ‘EPA Water Treatment Manual:

	<p><i>Disinfection</i> and does not meet the minimum disinfection criteria set out in EPA Advice Note No. 3 – <i>E. coli</i> in Drinking Water. The system consists of a single dosing pump with no standby component, control monitor, dial out alarm or automatic shut-off.</p> <p>b. 10/11% Sodium Hypochlorite is dosed as a fixed, demand led dose from a bunded day tank. The day tank is topped up approximately every 3 to 4 weeks by the Caretaker, at a dilution factor of 1:20 Sodium Hypochlorite to water.</p> <p>c. One Sodium Hypochlorite drum was being stored on site within a bund (Photograph 3) at the time of the audit. The drum was found to be appropriately labelled with the PCS number and the manufacture date. The Caretaker checks the date on the drums prior to use and replaces the drum if date has passed.</p> <p>d. No effective chlorine contact time calculation has been calculated for the supply, but given the short distribution network (200m from the pumphouse) and lack of contact tank it is unlikely that EPA recommended minimum contact time of 15mg.min/l is achieved.</p> <p>e. The Caretaker takes weekly chlorine residual readings from the kitchen tap at the last house on the network. The Caretaker advised that the latest chlorine residual reading was 0.6mg/l.</p>
7.	<p>Exceedances of the Parametric Values</p> <p>a. There have been two exceedances of the parametric value range for hydrogen ion concentration (pH) since 2014. An exceedance on the 01/04/14 was 6.2 and an exceedance on 16/04/15 was 6.0. There is no pH adjustment on this supply.</p>
4.	<p>Management and Control</p> <p>a. Irish Water dispute ownership and responsibility for the Craane public water supply. Irish Water was notified of the audit but did not attend the audit. Wexford County Council have said that Irish Water will not provide funding for works required to bring this supply into compliance with the legal standards in the Drinking Water Regulations, 2014.</p>

3. AUDITORS COMMENTS

The Craane public water supply was found to lack an adequate disinfection system. Chlorine disinfection is in place at the supply; however it is not operating in accordance with the *'EPA Water Treatment Manual: Disinfection'* or the minimum criteria set out in *'EPA Advice Note No. 3: E-coli in Drinking Water'*. Provision of adequate disinfection in this supply should be reviewed and addressed by Irish Water. The security of the borehole abstraction should be improved through the addition of fencing around the borehole to prevent animal faeces entering the borehole from the surface.

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 liaise with the relevant local authority to ensure that local landowners are made aware of the location of the borehole abstraction point in relation to their lands.
2. Irish Water should install fencing around the borehole to improve the security of the borehole abstraction from animal faeces entering the borehole from the surface.
3. Irish Water should carry out regular monitoring on all raw water sources and should include monitoring for *E. coli* bacteria, as an indicator of trends in assessing water quality and to determine the degree of treatment and controls required in the supply.

Disinfection

4. 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.

Exceedances of the Parametric Values

- 5. Irish Water should include the Craane public water supply in the Irish Water pH Asset Strategy Programme and consider options for pH adjustment in the supply.

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 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:

25th May 2015

Inspector



Photograph 1: Well head capped and sealed



Photograph 2: Borehole cover with lock in place



Photograph 3: Sodium Hypochlorite drum within bund