



# Drinking Water Audit Report

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|------------------------|---|---------------------------------------|-----------------|
| <b>County:</b>         | Kilkenny  | <b>Date of Audit:</b>                 | 19/6/2014       |
| <b>Plant visited:</b>  | Paulstown, County Kilkenny  | <b>Date of issue of Audit Report:</b> | 4/7/2014        |
|                        |   | <b>File Reference:</b>                | DW2014/258      |
|                        |   | <b>Auditors:</b>                      | Ms Yvonne Doris |
| <b>Audit Criteria:</b> | <ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>.</li> <li>• 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></li> <li>• The recommendations specified in the EPA Report on <i>The Provision and Quality of Drinking Water in Ireland</i>.</li> <li>• The recommendations in any previous audit reports.</li> </ul> |                                       |                 |

## MAIN FINDINGS

The Paulstown supply disinfection system is inadequate and Irish Water is required to upgrade the disinfection system to meet the appropriate criteria set out in *EPA Drinking Water Advice Note No. 3: E. coli in Drinking Water* without delay.

## 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. Where the text refers to the Water Service Authority this refers to Irish Water in accordance with Section 7 of the Water Services (No. 2) Act 2013.

The Paulstown supply serves ten houses in Paulstown, County Kilkenny. The source is a well drilled in 2006 or 2007. The volume supplied is unknown. Treatment is chlorination only. There is no storage in the network. Kilkenny County Council Water Services took the supply in charge in January 2014 from the developer of the housing estate.

Photographs taken by Yvonne Doris during the audit are attached to this report and are referred to in the text where relevant. The audit commenced at 10.00am at the Paulstown supply. The scope and purpose of the audit were outlined. 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)

Name – Job Title

Liam Brett, Water Engineer, Irish Water\*

Eamonn Morrissey, Kilkenny County Council\*

Dermot Ryan, caretaker, employee of Cantwells (contracted by Kilkenny County Council)\*

Representing the Environmental Protection Agency:

Name – Job Title

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.*

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|----|--|
| 1. | <b>Source Protection</b> <ul style="list-style-type: none"><li>a. The well was drilled in 2006 or 2007 and is located adjacent to the pumphouse in front of the housing estate it serves (photograph 1).</li><li>b. No records of the source were available at the audit (depth, drill logs, details of casing).</li><li>c. The cover on the well chamber was unlocked. The wellhead was unsealed and the top of the wellhead was below ground level (photograph 2).</li><li>d. Kilkenny County Council Environment Section is undertaking catchment work under the Good Agricultural Practice Regulations.</li><li>e. No raw water monitoring has been carried out on the Paulstown source.</li></ul> |
| 2. | <b>Disinfection</b> <ul style="list-style-type: none"><li>a. There is no flow meter on the supply. The disinfection system uses sodium hypochlorite. The chlorine dosing is fixed. The dose rate is unknown. There are duty and standby chlorine dosing pumps. There is no automatic switchover between the duty and standby pump. There is no chlorine monitor in place.</li><li>b. The caretaker puts 25litres of sodium hypochlorite into the chlorine day tank approximately every 6 months. About 25 litres is used every 6 months.</li><li>c. There is no monitoring of residual chlorine in the network</li><li>d. Chlorine contact time to the first customer is unknown.</li></ul>            |
| 3. | <b>Monitoring and Sampling Programme for treated water</b> <ul style="list-style-type: none"><li>a. No <i>Cryptosporidium</i> monitoring has been undertaken in the Paulstown supply.</li><li>b. Audit and check sampling has been scheduled but none had been carried out at the time of the audit.</li></ul>   |
| 4. | <b>Hygiene and Housekeeping</b> <ul style="list-style-type: none"><li>a. There was waste material deposited within the fenced area around the pumphouse (photograph 3).</li><li>b. Empty sodium hypochlorite drums were being stored in the pumphouse.</li></ul>   |
| 5. | <b>Management and Control</b> <ul style="list-style-type: none"><li>a. The caretaker has completed no training on disinfection of water.</li><li>b. There was no turbidity monitor on the supply.</li><li>c. There was no evidence of flushing and scouring of the network at the time of the audit.</li><li>d. No records were available at the pumphouse for inspection during the audit.</li></ul>  |

### 3. AUDITORS COMMENTS

The Paulstown supply disinfection system is inadequate and Irish Water is required to upgrade the disinfection system to meet the appropriate criteria set out in *EPA Drinking Water Advice Note No. 3: E. coli in Drinking Water* without delay. An appropriate disinfection system where chlorination is in place is one where the following exists:

- i. Duty/standby dosing arrangements, with automatic switch over in the event of one of the pumps failing, at all chlorine dosing points;
- ii. Flow proportional dosing and/or dosing linked to chlorine residual monitor;
- iii. Adequate effective contact time (15mg.min/l);
- iv. Automatic shut off of the supply in the event that chlorine level falls below an appropriate prescribed level;
- v. A continuous chlorine monitor and alarm, linked to a recording device.

### 4. RECOMMENDATIONS

#### Source Protection

1. The Water Services Authority should implement 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 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 50 m of the abstraction point.
2. The Water Services Authority should examine the appropriateness 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. The Water Services Authority should have regard to the EPA guidance on alternative setback distances.
3. The Water Services Authority should characterise the variability in raw water quality and compile a source water safety plan in order to mitigate any risks to the abstracted water ([http://whqlibdoc.who.int/publications/2009/9789241562638\\_eng\\_print.pdf](http://whqlibdoc.who.int/publications/2009/9789241562638_eng_print.pdf)). Trends in raw water quality should be analysed and used to determine the optimum treatment conditions for the water at the plant. Data should be used to identify whether rapid variations in raw water quality give rise to problems with the treatment process.
4. The Water Services Authority should install a continuous automatic turbidity monitor to alert plant operators of any changes in raw water quality.
5. The Water Services Authority should ensure that the wellhead is raised above ground level, borehole linings and seals are maintained and a lockable cover is installed.

#### Disinfection

6. The Water Services Authority should review the practice of topping up the chlorine day tank to minimise the effect of degradation of sodium hypochlorite and compromising the disinfection process.
7. The Water Services Authority should review the contact time for chlorine disinfection to ensure that the correct dose and time (0.5 mg/l for at least 30 mins) is being achieved as recommended by the World Health Organisation and that the first connections are receiving appropriately disinfected drinking water. The Water Services Authority should submit a calculation of the effective contact time to the Agency.
8. The Water Services Authority should install automatic switch over between duty and standby chlorine pumps in the event of the failure of one of the pumps.
9. The Water Services Authority should ensure that dosing of chlorine is flow proportional or is linked to the residual chlorine monitor. Where the dosing pump is fixed the Water Services Authority should

replace the pump(s) with flow proportional pumps or pumps capable of dosing based on the residual chlorine monitor.

10. The Water Services Authority should instigate chlorine residual testing and recording in the network in order to adequately manage the disinfection process and to ensure that records can be inspected during an audit.
11. The Water Services Authority should ensure that a record is kept each time a fresh batch of chlorine disinfectant is prepared. Records should include date of preparation, dilution factor used, quantity prepared, name of person who prepared disinfectant and details on whether the neat disinfectant used is produced in accordance with an appropriate IS:EN or BS:EN standard or are on the *List of Approved Products and Processes* as published by the Drinking Water Inspectorate of England and Wales ([www.dwi.gov.uk](http://www.dwi.gov.uk)).

#### **Chemical Storage and Bunds**

12. The Water Services Authority should put a system in place so that stocks of reagents and chemicals kept on-site are regularly checked to see if they are in date.

#### **Distribution System**

13. The Water Services Authority should investigate whether flushing and scouring of the mains is required and commence a programme of flushing and scouring if required.

#### **Hygiene and Housekeeping**

14. The Water Services Authority should undertake a complete review of housekeeping and waste storage at the plant and take measures to ensure that the plant is kept well maintained, clean and tidy.

#### **Management and Control**

15. The Water Services Authority should ensure that all caretakers and stand-in/relief caretakers are appropriately trained to operate the treatment systems in the supplies they have responsibility for.
16. The Water Services Authority should use the *Cryptosporidium Risk Screening Methodology* as outlined in *EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* to determine the relative risk of contamination of the supply with *Cryptosporidium*. Following the risk screening the Water Services Authority should identify and implement measures to reduce the risk at the plant.
17. A Drinking Water Safety Plan approach to the operation of all treatment plants should be developed by the Water Services Authority and to provide safe and secure drinking water the water supplier must have in place a management system that has identified all potential risks and implemented reduction measures to manage these risks.
18. The Water Services Authority should ensure that hazard mitigation plans, with timeframes, are in place for all hazards identified as high risk in the Drinking Water Safety Plan. Records of progress on these hazard mitigation plans should be kept updated and maintained for inspection by the EPA.
19. A documented system of regular internal auditing and supervision of the treatment plant by Senior experienced personnel in the Water Services Authority should be implemented and copies of quality assurance checks and audits records kept on site for inspection by the Agency.

#### **Monitoring and Sampling Programmes for Treated Water**

20. The Water Services Authority should prepare a programme of monitoring for *Cryptosporidium* in the raw and treated water.
21. If there has been an event in the catchment that may significantly increase the possibility of *Cryptosporidium* oocysts entering the raw water supply, or in the event of significant increases in the turbidity of the treated water, then continuous sampling of the final water for *Cryptosporidium* shall be

undertaken by the Water Services Authority in accordance with the guidelines in the *EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies* (ISBN: 978-1-84095-349-7).

### **FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER**

During the audit the Water Services Authority representatives were advised of the audit findings and that action must be taken as a priority by the Water Services Authority to address the issues raised. This report has been reviewed by Mr Nigel Hayes, Drinking Water Inspector.

The Water Services Authority 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:**

Yvonne Doris  
Yvonne Doris  
Inspector

**Date:**

4<sup>th</sup> July 2014





**Photograph 1: Paulstown Pumphouse**



**Photograph 3: Waste materials adjacent to Paulstown pumphouse**



**Photograph 2: Paulstown wellhead**