Drinking Water Audit Report

County:	Carlow	**Date of Audit:**	18/6/2014
Plant visited:	Tynock, County Carlow	**Date of issue of Audit Report:**	4/7/2014
		File Reference:	DW2014/257
		Auditors:	Ms Yvonne Doris
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)* • The recommendations specified in the EPA Report on *The Provision and Quality of Drinking Water in Ireland.* • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The Tynock 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 Tynock supply serves seven Council houses in Tynock. The source is a well drilled in 1974, serving 1.2-1.5m^3/day. The remainder of Tynock is served by private supplies. Treatment includes pH correction and chlorination. There is no storage in the network. Carlow County Council Water Services took the supply in charge in November 2013 from Carlow County Council Housing Department.

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 12.30am at the Tynock 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*

Michael Brennan, Water Quality Manager, Carlow County Council*

Tom Smithers, standby caretaker, Carlow 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.

1.	**Source Protection** a. The well was drilled in 1974 and is located adjacent to the pumphouse in front of the Council houses it serves. b. No records of the source were available at the audit (drill logs, details of casing). It is 52m deep. The pump was replaced 6 months ago. c. The cover on the well chamber was unlocked. The wellhead was unsealed and the top of the wellhead was about 50cm below ground level. There was standing water in the well chamber (photograph 1). d. There is no evidence to demonstrate that any work has been done in the catchment to inform farmers of their responsibilities under the Good Agricultural Practice Regulations. Carlow County Council produced a map of a 100m buffer zone around the well. e. No raw water monitoring has been carried out on the Curranree source. f. The source water pH is historically low (pH of about 6.2). pH correction was installed by Carlow County Council.
2.	**Disinfection** a. The disinfection system uses 14% H grade sodium hypochlorite. There is duty and standby chlorine dosing with automatic switchover. The dosing rate was unknown at the time of the audit. Dosing is not linked to the chlorine monitor. The low chlorine alarm is set at 0.1 and the high chlorine alarm is set at 0.8mg/l. There is a dial out facility on the alarm to the caretaker and to Michael Brennan. The low level chlorine alarm has triggered in the past. The effective chlorine contact time to the first customer was unknown. b. Sodium hypochlorite is dosed neat into a day tank. Between 1-2 litres of sodium hypochlorite is used per day. At the time of the audit the chlorine day tank contained 100litres of sodium hypochlorite, between 50 and 100 days storage. The chlorine day tank is topped up each month (photograph 2). c. Water and debris was observed in the chlorine day tank bund. d. A drum of sodium hypochlorite was not bunded. There was no date of manufacture or expiry on the drum. e. Residual chlorine readings are between 0.6 and 2mg/l. It was not clear from the records at the pumphouse where the chlorine residual readings had been taken (plant or network) and which readings were taken from the chlorine monitor or the HACH unit. There was no evidence of chlorine residual sampling at the end of the network.
3.	**Monitoring and Sampling Programme for treated water** a. No *Cryptosporidium* monitoring has been undertaken in the Tynock supply. b. While a number of historical sampling results (<10 samples) were available at the audit, few samples were tested for *E.coli*. It appeared that not all of the parameters from the drinking water regulations were being tested. There were no turbidity results available. Nitrate levels were around 28mg/l.
4.	**Exceedances of the Parametric Values** a. *E. coli* was detected in the Tynock supply two years ago. The Council suspected the cause was tap related.

5.	**Management and Control** a. The stand-in caretaker has completed no training on disinfection of water. b. There was no turbidity monitor on the supply. c. Flushing and scouring of the network is done once a month. d. The caretaker has not received any complaints about water quality

3. AUDITORS COMMENTS

The Tynock 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). 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 review the method and practice of chlorine residual testing and recording to adequately manage the disinfection process and to ensure that records can be interpreted during an audit.

9. 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).

Chemical Storage and Bunds

10. The Water Services Authority should review chemical storage arrangements at the treatment plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Fill points for storage tanks inside the bunds should be within the bunded area. Refer to EPA guidance document –"*IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities*".

11. 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.

Management and Control

12. 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.

13. 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.

14. 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.

15. 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 keep updated and maintained for inspection by the EPA.

16. 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

17. The Water Services Authority undertake monitoring for *Cryptosporidium* in the raw and treated water.

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 and approved 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.

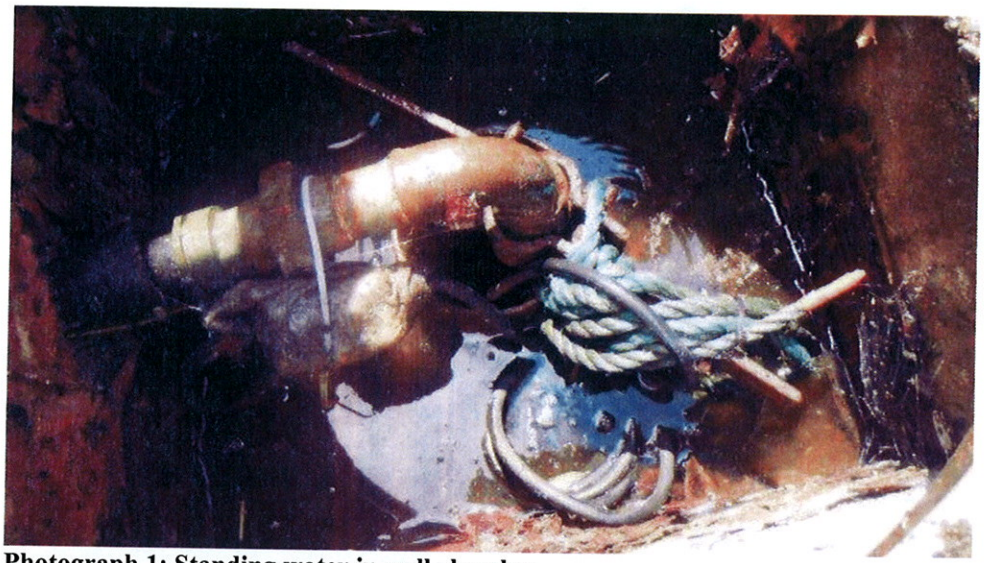
The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.

Please quote the File Reference Number in any future correspondence in relation to this Report.

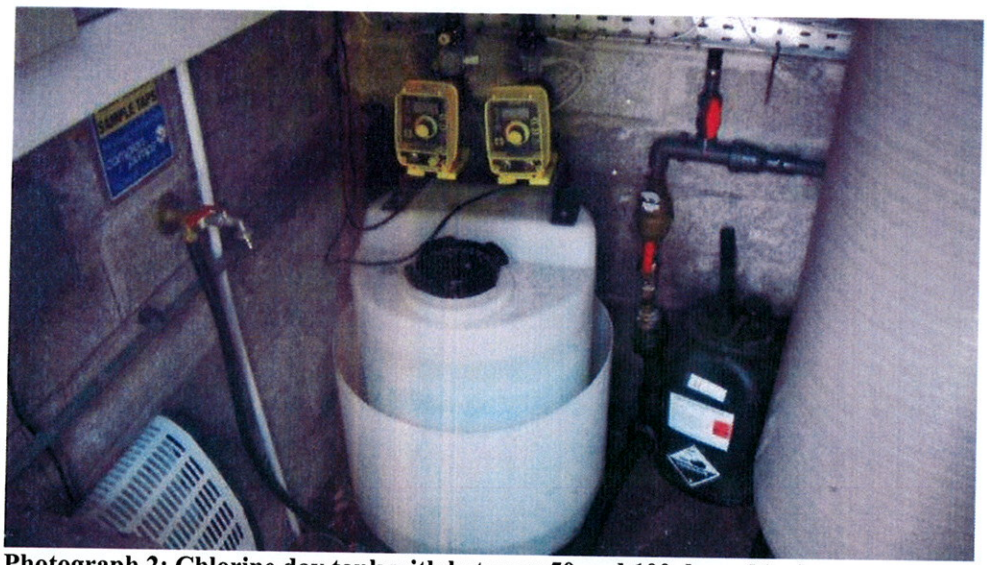
Report prepared by: Yvonne Doris **Date:** 4th July 2014

Yvonne Doris

Inspector



Photograph 1: Standing water in well chamber



Photograph 2: Chlorine day tank with between 50 and 100 days chlorine