

	<h1>Drinking Water Audit Report</h1>
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County:	Waterford	Date of Audit:	18/09/18
Plant(s) visited:	Strancally Water Treatment Plant (Scheme Code 3100PUB1094)	Date of issue of Audit Report:	04/10/18
		File Reference:	DW2018/155
		Auditors:	Regina Campbell
WAudit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014) as amended.</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> • The recommendations specified in the <i>EPA Drinking Water Report.</i> • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **Irish Water should undertake a review of procedures to ensure that proposed construction works are risk assessed and that suitable mitigation measures are in place to prevent damage or contamination of groundwater sources during construction works. The construction works and reinstatement of the network supply should be adequately supervised at all times. The quality of the raw water should be checked after construction works are completed and prior to reinstatement of the network supply. This recommendation should be considered and addressed at all other treatment plants operated and managed by Irish Water when undertaking construction works.**
- ii. **Irish Water should undertake a full review of the UV warning alarms and shutdown set-points to ensure that the UV disinfection system operates within its validated range at all times, to prevent inadequately disinfected water being supplied to consumers.**
- iii. **Irish Water should confirm when the pH correction unit is commissioned in order to ensure compliance with the pH parametric value.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014, as amended*, 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 following the placing of a Boil Water Notice (BWN) on the Strancally Public Water Supply (PWS) on 03/09/18. The Boil Water Notice was placed on the supply due to elevated turbidity in the raw water that coincided with excavation works carried out close to the borehole earlier that day. The Boil Water Notice was rescinded on 14/09/18 following satisfactory monitoring results and consultation with the HSE.

The raw water for the supply is obtained from a groundwater borehole at the water treatment plant. On average the volume of treated water produced is 10-11 m³/d and supplies a population of 36. Treatment at the plant includes disinfection by UV and chlorination.

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

The opening meeting commenced at 11.30am at the Strancally Water Treatment Plant. 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:

Pat Duggan, Compliance Specialist
 Brian O’ Leary, SLA Operations Lead
 Gearoid Webb, Compliance Support

Representing Waterford City & County Council (WCCC):

Richie Hayes, Caretaker
 Ciaran Bourke, Operations Engineer
 Declan Halpin, Technician

Representing the Environmental Protection Agency:

Regina Campbell, 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.	<p>Source Protection</p> <ol style="list-style-type: none"> a. A Boil Water Notice (BWN) was placed on the Strancally Public Water Supply (PWS) on the 03/09/2018. The Boil Water Notice was placed on the supply due to elevated turbidity in the raw water that coincided with excavation works carried out close to the groundwater borehole earlier that day. The excavation works were associated with upgrade works being undertaken on behalf of Irish Water within the Water Treatment Plant compound. b. The groundwater borehole is adjacent to the Water Treatment Plant and secure fencing surrounds the borehole and water treatment plant. A high turbidity alarm (>10 NTU) was triggered after the network supply was reinstated following completion of the construction works. c. Waterford City and County Council (WCCC) personnel responded to the alarm. Despite flushing the line at the WTP, no improvement in turbidity levels was noted and a decision was made to issue a BWN at approximately 8pm on 03/09/18. Twenty households (pop. 36) were affected. The HSE were also consulted in relation to the BWN. d. On the 04/09/18 Irish Water and WCCC began an investigation and concluded that the likely cause of elevated turbidity was damage to the borehole as a result of the excavation works. e. The excavation works were undertaken by a sub-contracted civils crew. At the audit it was outlined that the excavation works were not supervised by Irish Water or WCCC and that the borehole was put back into production without any pumping of water to waste. f. Remedial works began on 04/09/18 to restore the quality of water in the borehole. Turbidity levels at this point had begun to fall to <1.5 NTU. Remedial works continued on 05/09/18 and 06/09/18 as turbidity levels fell to < 0.2 NTU. g. The BWN was lifted on 14/09/18 following satisfactory follow up sampling results on the network. h. At the audit, it was observed that a new concrete base and concrete chamber were under construction around the well-head. A temporary cover was in place over the chamber and plastic was placed over the borehole head to prevent contamination (see Photo 1). I was
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	<p>advised that the construction works would be completed in the next three weeks.</p> <ul style="list-style-type: none"> i. A pH correction unit was also under construction (see Photo 2) j. The borehole is classified by Irish Water as a G3 (High Risk) Groundwater source. The borehole has a depth of 30m according to the Scheme Record Management Document. However WCCC said that no well drill logs are available. k. The land in the vicinity of the borehole is agricultural. Irish Water or WCCC did not know when farmers had last been contacted in relation to their obligations regarding the buffer zones required under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014). l. There is a continuous pH monitor in place. The pH of the raw water was observed to be 5.48 which is not in compliance with the pH parametric value in the Drinking Water Regulations. Irish Water said pH correction was being installed as part of the disinfection upgrade works.
<p>2.</p>	<p>Disinfection</p> <ul style="list-style-type: none"> a. Primary disinfection is by UV treatment. b. The UV Units (Wedeco Spektron 15) were installed in October 2017 as part of the disinfection upgrade of the WTP. Duty and standby UV units are in place, with automatic shut-down if the water quality falls outside the validated operating range of the UV system. The UV validation certificates were made available during the audit. c. The UV system warning and shutdown alarms were displayed on the HMI display screen, for turbidity, UVI, flow and UVT. However some of the alarms appear to be set at levels that are outside the validated operating range of the UV system, as follows: <ul style="list-style-type: none"> i. Both UV plates say the maximum validated flow rate is 3 m³/h, but the HMI display screen shows that the UV system will shut-down at a maximum flow rate of 3.5 m³/h. This parameter should be set no higher than 3 m³/h in line with the maximum flow capacity of the units. ii. Both UV plates say the minimum UVT is 80%, but the HMI display screen shows shutdown at 70% UVT. The UVT shut-down set point should be set no lower than 80% in line with the minimum UVT specification of the units. iii. The UVI shut-down set-point is set at 17.7 W/m² but it is unclear how this set-point has been calculated. Based on the validation criteria, the minimum required UVI is 52 W/m² for flows up to 6.6 m³/h according to the table on plate 2. iv. The UV Validation Warning Alarms (Level 2 Alarms) are set at various factors above the UV Validation Critical Shut-down Alarms (Level 1 Alarms). These factors are 1.062 for UVI, 1.072 for UVT and 0.857 for inlet flow. It is unclear how the warning levels have been calculated and if they give sufficient warning to the plant operators that there is a problem with the operation of the UV system. d. Irish Water said that the maintenance and servicing of the UV units is sub-contracted out at present until the disinfection upgrade works are fully complete and commissioned. e. Secondary disinfection consists of chlorination using 2% sodium hypochlorite. One 25 litre drum is kept on site in a bunded area and was within the expiry date. f. Duty and standby chlorine dosing pumps are in place and dosing is flow proportional. The pumps automatically switch over every 6 hours. g. The low level chlorine alarm was set at 0.2mg/l and the high level chlorine alarm was set at 1.2mg/l. h. The caretaker and relief caretaker receive an alarm in the event of the alarm being triggered.

3. AUDITORS COMMENTS

This audit was carried out in response to the placing of a Boil Water Notice on the Strancally Public Water Supply on 03/09/18. The Boil Water Notice was subsequently lifted on the 14/09/18. Irish Water should ensure that adequate source protection measures are put in place prior to, during and after construction works that may affect a groundwater source.

It is noted that this supply is undergoing significant upgrades as part of Irish Water's disinfection strategy. Irish Water should ensure that alarms are set so that the UV unit operates within its validated range at all times, to prevent inadequately disinfected water being supplied to consumers.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should undertake a review of procedures to ensure that proposed construction works are risk assessed and that suitable mitigation measures are in place to prevent damage or contamination of groundwater sources during construction works. The construction works and reinstatement of the network supply should be adequately supervised at all times. The quality of the raw water should be checked after construction works are completed and prior to reinstatement of the network supply. This recommendation should be considered and addressed at all other treatment plants operated and managed by Irish Water when undertaking construction works.
2. Irish Water should liaise with Waterford City and County Council to ensure that all landowners are made aware 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. Irish Water should confirm that the landowners have been informed of their obligations.
3. Irish Water should ensure that the borehole well-head is constructed, sealed and protected in accordance with EPA Drinking Water Advice Note No. 14: Borehole Construction and Wellhead Protection.
4. Irish Water should confirm when the pH correction unit is commissioned in order to ensure compliance with the pH parametric value.

Disinfection

5. Irish Water should undertake a full review of the UV warning alarms and shutdown set-points to ensure that the UV disinfection system operates within its validated range at all times.
6. Irish Water should confirm that the borehole pump rate is configured to take account of the maximum validated flow rate through the UV system.
7. Irish Water should ensure that records are kept of the repairs, maintenance and calibration of the UV system.

Distribution System

8. Irish Water should confirm the volume supplied by the Strancally supply and update EDEN.

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 Dr. Michelle Minihan, Senior Inspector.

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.

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

Report prepared by:



Date:

04/10/18

Regina Campbell

Inspector

Photo 1: Borehole wellhead chamber under construction at audit



Photo 2 pH correction unit partially constructed at audit

