



Drinking Water Audit Report

County:	Tipperary	Date of Audit:	01/06/17
Plant(s) visited:	Springmount Water Supply (Scheme Code 2900PUB0153)	Date of issue of Audit Report:	14/06/17
		File Reference:	DW2017/50
		Auditors:	Ms. Criona Doyle Mr. Niall Dunne
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> • 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. **There are significant deficiencies at the Springmount Water Treatment Plant in relation to the response to the low level chlorine alarm. Despite a documented protocol being in place and a memo having been issued to all water treatment plant caretakers / operators the protocol was not being implemented. Irish Water should undertake a review of the current protocol for dealing with responses to chlorine alarms on a countywide basis in Tipperary and ensure that the documented procedures are being followed.**
- ii. **Record keeping at the Springmount Water Treatment Plant requires improvement.**

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.

The Springmount Spring Source is used to augment the Galtee Regional Water Supply. The uncovered spring is located adjacent to the water treatment plant building and is surrounded by a circular concrete collection chamber. The supply produces between 60 – 65m³/hour and serves 212 houses with an estimated population of 636. Treatment at the plant includes disinfection and fluoridation.

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

The opening meeting commenced at 10:40am at the Springmount 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

audit observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water:

Deirdre O'Loughlin, Compliance Monitoring Liaison Specialist, Irish Water.

Duane O'Brien, Operations, Irish Water.

Pat Duggan, Compliance Analyst, Irish Water.

Colette Moloney, Executive Chemist, Tipperary County Council.

Flan Real, Assistant Scientist, Tipperary County Council.

Aine Butler, Process Technician, Tipperary County Council.

Joe Burke, Executive Engineer, Tipperary County Council.

Anthony Phelan, Operations and Maintenance, Tipperary County Council.

Representing the Environmental Protection Agency:

Niall Dunne, Inspector.

Criona Doyle, 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. Chlorine Pump Failure – Investigations and Actions

- a. On Tuesday the 16th of May 2017 the EPA was notified that a precautionary boil water notice had been issued on the Springmount Supply as a result of a chlorine pump failure. This resulted in a potential lack of chlorine in the supply between 2.15pm on Saturday 13/05/17 and 4pm on Sunday 14/05/17.
- b. The breakdown of the duty pump was as a result of blocking of the chlorine injectors which may have been linked to cleaning of the spring on Saturday 13/05/17. The duty assist pump also failed to switch on and there was no facility for auto switch over between the duty and standby pump.
- c. The initial low level chlorine alarm (0.2mg/l) was generated at 2.15pm on 13/05/17. Repeat alarms were generated but the caretaker did not notice the alarms until 9pm that evening. There is no agreement between Irish Water and Tipperary County Council in relation to out of hours cover in Tipperary (8pm to 8am 7 days a week) therefore the caretaker did not visit the water treatment plant until 9am on the Sunday morning (14/05/17).
- d. The caretaker called a contractor to site on Sunday 14th May. The chlorine dosing system was brought back into operation at 4pm on 14th May. The failure of the chlorine dosing system was not escalated by the Caretaker to senior staff in Tipperary County Council or to Irish Water personnel. The text alarms are currently generated by the PMAC system. The alarm is directed to the caretaker to action. This system does not have the facility to include a cascade alert system but each generated alarm is copied to the Supervisor, Process Technician and Executive Scientist for information.
- e. During a routine review of the PMAC SCADA on Monday 15th of May the chlorine outage was noted by senior staff in Tipperary County Council. An investigation was undertaken by the Assistant Scientist and Process Technician to determine whether this was a genuine outage rather than a signal failure issue as the Caretaker had not notified them of an issue at the water treatment plant. The issue with the chlorine dosing was not confirmed until the morning of Tuesday 16th May, 3 days after the chlorine pump failure. The HSE were then consulted and a precautionary boil water notice was put in place on 16/05/17.

	<ul style="list-style-type: none"> f. The chlorine residual SCADA trend data from the 07/05/17 to 31/05/17 was reviewed at the audit. The data from Springmount indicated that the level dropped to 0mg/l from 2pm on Saturday 13/05/17 to 4pm on Sunday 14/05/17. The spring augments the Cashel Reservoir when the level in the reservoir falls below 2.0m and supplies the area around Springmount. The Cashel Reservoir serves the area surrounding Cashel town. The data from the Cashel Reservoir indicated that the chlorine level did not drop below 0.34 mg/l in response to the incident at Springmount. Irish Water confirmed on 13/06/17 that the low level chlorine alarm on the Cashel Reservoir is set at 0.25mg/l. Other areas on the Galtee Regional Scheme are not served by the spring. g. On Tuesday 16th May the distribution mains was scoured. Monitoring of chlorine residuals and microbiological sampling was undertaken in the network to ensure no pockets of unchlorinated water remained. h. No records were available for residual chlorine monitoring in the network on Sunday 14th or Monday the 15th of May. There was no record of the failure of the chlorine dosing pumps in the Springmount Plant Log Book. The Galtee Regional Water Supply Process Control Logbook included a note in relation to the data of the Precautionary Boil Water Notice along with the recording of weekly results for free chlorine, total chlorine, % UVT, turbidity, colour, conductivity, fluoride, pH and aluminium at the Springmount source final water and all other sources on the Galtee Regional Scheme. i. The precautionary boil water notice was rescinded on Friday 19/05/17 following the provision of 3 days (16th, 17th & 18th May) satisfactory monitoring results and adequate residual chlorine levels.
<p>2.</p>	<p>Source Protection</p> <ul style="list-style-type: none"> a. The landuse in the immediate vicinity of the spring is low intensity agricultural land. The area is susceptible to flooding. A shutoff mechanism is in place during flood conditions. Details of the Zone of Contribution were not available on site at the time of the audit. A copy of the Source Protection Map for Springmount was provided by Irish Water on 13/06/17. b. The Cryptosporidium Risk Screening Score is 55 (moderate risk). c. Tipperary County Council provided a copy of the general source protection activities undertaken in 2016 in County Tipperary. Activities included septic tank inspections. In 2010 landowners within 200m of all abstractions in South Tipperary were contacted and visited to inform them of their responsibilities under the GAP regulations. d. No raw water monitoring programme is in place due to resource issues. Historic raw water monitoring data from 2012 to 2015 was provided by Irish Water on 13/06/17 e. UVT monitoring of the raw water has been in operation at the site for the last 6 months as part of the Irish Water Monitoring Programme. A UVT reading of 99.14% and a turbidity of 0.06 NTU was observed during the audit. The high level turbidity alarm on the raw water is set at 1NTU. It generates a text alert but it is not linked to an automatic plant shutdown. f. The spring collection chamber is uncovered. The security fencing on site is poor (Photograph No. 1). It was reported that it is cleaned twice per year to remove weed growth. On the date of the audit a significant build-up of vegetation was evident (Photograph No. 2).
<p>3.</p>	<p>Disinfection</p> <ul style="list-style-type: none"> a. Sodium hypochlorite (14% with softener) is used for chlorination. b. Duty, standby and duty assist chlorine dosing pumps are installed on site. Manual changeover of the pumps between duty and standby is required. The duty and standby pumps are switched over on a daily basis. The assist pump provides boosting when the chlorine level drops below 0.2 mg/l. All pumps and monitoring equipment were within service dates. c. An auto shut off was installed on Friday 26/05/17 linked to the low level chlorine alarm level of 0.2mg/l. It is proposed that auto switchover between the duty, standby and duty assist pumps will be installed in the coming weeks. d. A locked bunded chemical store is provided for the storage of the 25 litre sodium hypochlorite containers. One months storage is provided on site.

	<ul style="list-style-type: none"> e. The caretaker undertakes monitoring of the residual chlorine levels on the distribution line. The required monitoring locations are specified in the procedure displayed at the treatment plant. f. The investigation into the recent exceedance identified an issue with inadequate contact time for one householder on the distribution main directly fed from the spring. It had been thought the house was on a different section of the distribution main. Irish Water propose to provide an alternative connection to the affected premises which will remedy the contact time issue at which point the Ct will be 19.62mg.min/L. g. The target chlorine dose is 0.5 mg/l to achieve a chlorine residual of 0.1mg/l at the end of the network. h. The labels on the sodium hypochlorite drums indicated a “use by” date of 01/05/17. Tipperary County Council outlined that they had previously been told by the supplier that the use by date was 3 months from the date of manufacture. i. The Irish Water Disinfection Programme is scheduled to commence in Tipperary during Quarter 3 2017. Irish Water outlined that the Disinfection Programme would address issues in relation to alarms and auto shut offs. The Agency outlined that where there are significant issues identified in relation to disinfection that these would need to be addressed in advance of the disinfection programme. The audit has identified the following significant issues in relation to disinfection: no automatic switchover between the duty and standby chlorine dosing pumps; the absence of an automatic shutdown in response to low chlorine levels and a failure to respond to the low residual chlorine alarm.
5.	<p>Monitoring and Sampling Programme for Treated Water</p> <ul style="list-style-type: none"> a. Sampling of the Springmount source is included under the compliance sampling plan for the Galtee Regional Scheme which includes 24 check samples and 2 no. audit samples. b. The results of historic treated water monitoring from the Springmount Supply were received from Irish Water on the 13/06/17. The data included audit monitoring from 2016 and check monitoring data from 2012, 2013 and 2016.
6.	<p>Chemical Storage and Bunds</p> <ul style="list-style-type: none"> a. The caretaker is on site during all chemical deliveries. Bulk storage of hydrofluosilicic acid (10.9%) is in a banded tank. The high level alarm sensor in the tank was not working on the day of the audit. There is no way to visually confirm the level in the tank. The tank is 10 years old and due to be integrity tested next year. b. The fluorine dosing and chlorine dosing were in the same store room.
7.	<p>Hygiene and Housekeeping</p> <ul style="list-style-type: none"> a. A build up of liquid was observed in the chlorine day tank bund and in the hydrofluosilic acid bund. A build up of liquid was visible on the floor of the dosing chamber which houses the chlorine injectors.
8.	<p>Management and Control</p> <ul style="list-style-type: none"> a. The Springmount source is part of the Galtee Regional Water Supply (Scheme Code 900PUB0130). The Springmount Spring augments the Galtee Regional Water Supply. The source feeds into the Cashel Reservoir when the reservoir level drops below 2.00m and supplies the area surrounding Cashel. The pipe network is set up to allow the spring to directly supply the local area of Springmount or alternatively the local area can be served from the Galtee Regional Scheme. b. The notification in relation to the precautionary boil notice was submitted on the Online Drinking Water Notification System via the Springmount Supply (Supply code 2900PUB0153) which has a scheme end date of 01/01/2014. In light of the information presented at the audit the notification should have been against the Galtee Regional Water Supply. c. A copy of the protocol for dealing with the receipt of chlorine alarms is kept on site. Tipperary County Council issued a memo to all water treatment plant caretakers / operators on the 29/09/16 outlining a list of parameters, including low chlorine levels, for which all exceedances are required to be notified to the Process Technician, Assistant Scientist or

	<p>Executive Chemist. The memo included a Corrective Action Log Sheet which is required to be filled out in the event of a chlorine dosing outage or very low levels of chlorine. The memo also outlined the personnel and contact numbers in relation to out of hours responses. The protocol indicates that alarms received between 8pm and 8am are to be responded to next working day unless there is an imminent risk to human health.</p> <p>d. There are a number of additional small sources which are occasionally used to augment the Galtee Supply if required including the Farranamagh Borehole and the Thomastown Borehole. These sources have not been utilised to date in 2017.</p>
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3. AUDITORS COMMENTS

The audit identified significant deficiencies in relation to the response to the low level chlorine alarm despite documented protocols being in place that outlined the appropriate responses and relevant contact details. A review of the current protocol for dealing with the response to chlorine alarms on a countywide basis in Tipperary is required as a priority.

Issues were identified with the disinfection system including (i) the requirement for manual switchover between the duty and standby chlorine dosing pumps and (ii) absence of auto shut down of the supply in response to low residual chlorine levels. The installation of manual switchover between the duty and standby chlorine dosing pumps is required to be implemented in advance of Irish Water Disinfection Programme.

Irish Water had taken some corrective action in advance of the audit including the completion of the installation of the automatic shutoff on the 26/05/17. At the audit Irish Water indicated that works were planned in relation to the installation of automatic changeover between the duty and standby chlorine dosing pumps.

4. RECOMMENDATIONS

Management of Chlorine Alarms

1. Irish Water are requested to undertake a review of the current protocol for dealing with the receipt of chlorine alarms in County Tipperary and provide an updated protocol to the Agency by the 28/06/17 in relation to alarm responses. The protocol should make reference to alarm procedures countywide to ensure alarms are responded to quickly and appropriately by relevant staff to ensure safe and wholesome water is delivered to consumers at all times. The protocol should detail the required out of hours response. This review should also take into account the vulnerability of supplies in the absence of storage.
2. Irish Water should ensure that all staff are familiar with the protocol for dealing with the receipt of chlorine alarms and that the documented procedures are being followed. Irish Water should ensure that record keeping at the Springmount source is improved to include records of all incidents, alarm events, alarm responses and results of monitoring of residual chlorine levels in the network and that alarms are escalated to senior staff quickly.

Source Protection

3. Irish Water should liaise with Tipperary County Council to ensure that all landowners are made aware of the set back distances as per the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No. 31 of 2014)* for the abstraction point.
4. Irish Water should take action to ensure the source is made secure and that the collection chamber is regularly cleaned. Irish Water should provide the Agency with an action plan for the installation of a cover on the spring collection chamber.

Disinfection

5. Irish Water are to inform the Agency when the installation of the automatic switchover between the duty, standby and assist pumps and the remedial works required to rectify the insufficient contact time for 1 no. householder have been completed.
6. Irish Water should seek clarification from the supplier in relation to the expiry date indicated on the sodium hypochlorite drums at the time of the audit and provide an update to the Agency.

Chemical Storage and Bunds

7. Irish Water should ensure the level sensor on the hydrofluosilicic acid bulk storage tank is repaired and an integrity test on the bulk tank is carried out. Irish Water should examine the options for separating the chlorine and flouride dosing systems into different rooms.

Hygiene and Housekeeping

8. Irish Water should ensure that all bunds are cleaned out and any build up of liquid in the bunds and dosing chamber is removed.

Management and Control

9. Irish Water should ensure that all notifications are made against the correct scheme code.

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 Regina Campbell, Drinking Water Team Leader.

The Agency request that Irish Water undertake a review of the current protocol for dealing with the receipt of chlorine alarms in County Tipperary and provide an updated protocol to the Agency by the 28/06/17 in relation to alarm responses. 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 remaining recommendations 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:

Grána Doyle

Date:

14/06/17

Inspector

Photo No. 1 – Security Fencing Issue At Spring Chamber



Photo No. 2 –Build Up of Vegetation in Spring Collection Chamber

