



County:	Roscommon	Date of Audit:	4 th April 2014
Plant(s) visited:	North East Regional Public Water Supply (serving Roosky, Strokestown/Elphin and Tarmonbarry water supply zones)	Date of issue of Audit Report:	9 th April 2014
		File Reference:	DW2011/39
		Auditors:	Ms Yvonne Doris Mr Darragh Page
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</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 EPA Report on <i>The Provision and Quality of Drinking Water in Ireland</i>. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **The North East Regional public water supply is vulnerable to the entry of *Cryptosporidium* if it is present in the raw water. It is currently on a precautionary Boil Water Notice following the detection of *Cryptosporidium* in the treated water.**
- ii. **The treatment at Lisheen lake pumphouse is not adequate to remove *Cryptosporidium*, if it is present in the raw water.**
- iii. **Adequate treatment to remove or inactivate *Cryptosporidium* and to ensure clean and wholesome drinking water is delivered to the consumers of the North East Regional public water supply is required 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 in response to the notification by Irish Water dated 27th March 2014 of the detection of *Cryptosporidium* in the North East Regional Public Water Supply on 18th March 2014 and the subsequent issue of a precautionary Boil Water Notice on the 3,908 consumers of the supply on 27th March 2014. 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 North East Regional Public Water Supply comprises three supply zones (Strokestown/Elphin, Tarmonbarry and Roosky) serving 3,908 persons. The source water is abstracted from Lisheen lake. Treatment consists of chlorination and fluoridation only. Treated water is pumped to an interim reservoir, then to a main reservoir and on to three outlying reservoirs at Elphin, Ballyfeeny and Knockhall. The supply is vulnerable to *Cryptosporidium* and has a risk score of 120. *Cryptosporidium* has been detected in the supply in 2011 and 2012. There is no barrier to *Cryptosporidium* in place and no timeframe for improvement works has been provided by Irish Water. The supply also has persistent exceedances of the Trihalomethane parametric value.

Photographs taken by Ms Yvonne Doris during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 13:00 at Lisheen pumphouse. 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: (* indicates that person was also present for the closing meeting)

- Anne Bonner, Waste Water Compliance Liaison Specialist, Irish Water*
- Shay Walsh, Waste Water O & M, Irish Water*
- Patrick Real, Process Optimisation Specialist, Irish Water*
- Vincent Walsh, Senior Executive Engineer, Roscommon County Council*
- Frank Flanagan, Area Engineer, Roscommon County Council
- Christy Harte, Supervisor – Strokestown area, Roscommon County Council*
- Tom Fox, Waterworks caretaker, Roscommon County Council*

Representing the Environmental Protection Agency:

- Yvonne Doris, Inspector *
- Darragh Page, Inspector *
- David O’Connor, intern *

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> <ul style="list-style-type: none"> a. The source of the North East Regional public water supply is Lisheen lake. The lake is fed by the Silverree river and is surrounded by agricultural land, mainly used for grazing (see Photograph 1). Roscommon County Council stated that there is fencing to prevent cattle directly accessing the lake, that landspreading occurs locally and that there are no landspreading buffer zones in place surrounding the lake. There has been no written communication with local farmers to either inform them of the drinking water abstraction at the lake or of their obligations under the Good Agricultural Practice regulations. Houses nearby are served by septic tanks and no survey or inspections of septic tanks have been undertaken locally. b. The <i>Cryptosporidium</i> Risk Assessment Score is 120 (very high risk). c. There is no barrier to the entry of <i>Cryptosporidium</i> if it is present in the raw water. d. Zebra mussels is the lake have fouled the intake and raw water storage tank in the past. e. The lake is used by fishermen using boats with outboard motors. f. The intake is 4 metres below the surface of the lake and two sets of fine screens remove solids prior to the water entering a raw water storage tank. The abstraction rate is 250m³/hour for 12 hours per day.
2.	<p>Monitoring and Sampling Programme for raw water</p> <ul style="list-style-type: none"> a. There are no automatic monitors (turbidity) on the raw water. b. The raw water has low UVT and high TOC. c. Raw water monitoring data was not available during the audit. d. The lake is prone to high turbidity after heavy rainfall.
3.	<p>Chlorination and Disinfection</p> <ul style="list-style-type: none"> a. Water from the raw water storage tank is disinfected using chlorine gas at Lisheen pumphouse. The chlorine dosing point is on the rising main just outside the pumphouse (see Photograph 2). Dosing is flow proportional with 4 duty cylinders and 4 standby

	<p>cylinders with automatic switchover (see Photograph 3). Chlorine dosing is adjusted manually by the caretaker and is typically 2.1mg/l to achieve 0.1-0.1mg/l at the end of the network.</p> <ul style="list-style-type: none"> b. A chlorine residual monitor is in place at the Kiltristan reservoir. The low alarm is set at 0.5mg/l and the high alarm at 2mg/l. The alarm dials out to the caretaker, the supervisor and the area engineer. The chlorine monitor was reading 1.47ppm at the time of the audit. c. Chlorine contact time in the supply is adequate but a calculation of the contact time was not available during the audit. d. The chlorine monitor readings recorded by the caretaker closely aligned those of the HACH meter used to cross-check the residual chlorine.
4.	<p>Treated Water Storage</p> <ul style="list-style-type: none"> a. Chlorinated and fluoridated water is pumped to the interim and main reservoirs at Kiltristan and from there to three outlying reservoirs at Elphin, Ballyfeeny and Knockhall where re-chlorination occurs. b. The main reservoir was visited during the audit. The final water turbidity meter at the main reservoir was reading 1.39NTU during the audit. The reservoir access hatch was locked but the mesh covering the vents would allow insects to access the reservoir. c. The reservoir at Elphin was visited during the audit. It was not inspected due to health and safety reasons (unsafe access ladder). The walls of the reservoir were visibly leaking (Photograph 6) d. Each of the reservoirs (interim, main, Elphin, Ballyfeeny and Knockhall) were last cleaned in 2005. They were inspected in 2013 and require cleaning (~10 cm sediment).
5.	<p>Monitoring and Sampling Programme for treated water</p> <ul style="list-style-type: none"> a. <i>Cryptosporidium</i> has been detected in the supply in 2011 and 2012. Genotyping of oocysts detected in 2012 showed <i>C. parvum</i>, a species pathogenic to humans. b. The treated water has on a number of occasions reached turbidity of greater than 4 NTU. c. At the time of the audit the final water turbidity reading was 1.39 NTU.
6.	<p>Exceedances of the Parametric Values</p> <ul style="list-style-type: none"> a. A <i>Cryptosporidium</i> sample taken on 18th March 2014 detected 5 oocysts (0.04/10L) which were subsequently typed as <i>C. muris</i> (pathogenic to mice). This was notified to the EPA on 27th March 2014. A sample on 27th March 2014 was clear for <i>Cryptosporidium</i>. A precautionary Boil Water Notice was placed on the 3,908 consumers of the supply on 27th March 2014 and was still in place at the time of the audit.
7.	<p>Chemical storage and bunds</p> <ul style="list-style-type: none"> a. The fluoride day tank had 3 days storage. b. All chemicals were adequately banded and secure.
8.	<p>Hygiene and Housekeeping</p> <ul style="list-style-type: none"> a. New water pipes at the pumphouse were being stored unsealed and at risk of contamination (see Photograph 5). b. Empty chloros drums were stored at the Kiltristan reservoir (see Photograph 4).
9.	<p>Management and Control</p> <ul style="list-style-type: none"> a. There is a quarterly contract for service and calibration of chlorine and turbidity meters. HACH meters are calibrated annually. b. The data logger at the Kiltristan (main) reservoir had a calibration sticker that suggested it was last calibrated on 5/4/2010.

3. AUDITORS COMMENTS

The NERWSS is vulnerable to *Cryptosporidium* if it is present in the raw water. There are no buffer zones in place to protect the source. Farm surveys and septic tank inspections have not been carried out. There is no barrier to *Cryptosporidium* in the supply and final water turbidity exceeds 4 NTU on occasion. An adequate barrier to prevent or inactivate *Cryptosporidium* is required urgently. Reservoirs require cleaning and the network requires uni-directional flushing.

4. RECOMMENDATIONS

Source Protection

1. The Water Services Authority should install an appropriate barrier to *Cryptosporidium* in the supply. The treatment to be installed should also be capable of securing compliance with the THM parametric value.
2. 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 200 m of the abstraction point; and
 - ii. Farmyard manure held in a field prior to landspreading is not placed within 250 m of the abstraction point.
3. 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.
4. Should the existing source be retained, or a new source be developed, 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.
5. Should the existing source be retained, or a new source be developed, the Water Services Authority should install the following continuous automatic monitors to alert plant operators of any changes in raw water quality; turbidity meter and an ammonia meter.

Treated Water Storage

6. The Water Services Authority should ensure that all reservoirs are inspected and cleaned out on a regular basis and any maintenance and repairs completed as soon as possible after the need has been identified.
7. The Water Services Authority should ensure that all vents on the reservoirs are secured against ingress of animals or insects or deliberate introduction of any contaminant or acts of vandalism.

Distribution System

8. The Water Services Authority should carry out a regular programme of uni-directional flushing and scouring of the mains.

Hygiene and Housekeeping

9. The Water Services Authority should ensure waste chloros drums are removed from the Kiltrustan reservoir.

Management and Control

10. The Water Services Authority should replace the supply with an alternative source of clean and

wholesome drinking water or implement the recommendations numbers 1 to 8 at the existing water treatment plant and network.

11. A Drinking Water Safety Plan approach to the operation of the North East Roscommon PWS should be implemented 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.
12. 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.

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 Darragh Page, Drinking Water Team Leader.

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:

9th April 2014

Inspector



Photograph 1: Lisheen lake and surrounding grazing land



Photograph 3: Duty and standby chlorine gas cylinders



Photograph 2: Chlorine and fluorine dosing points



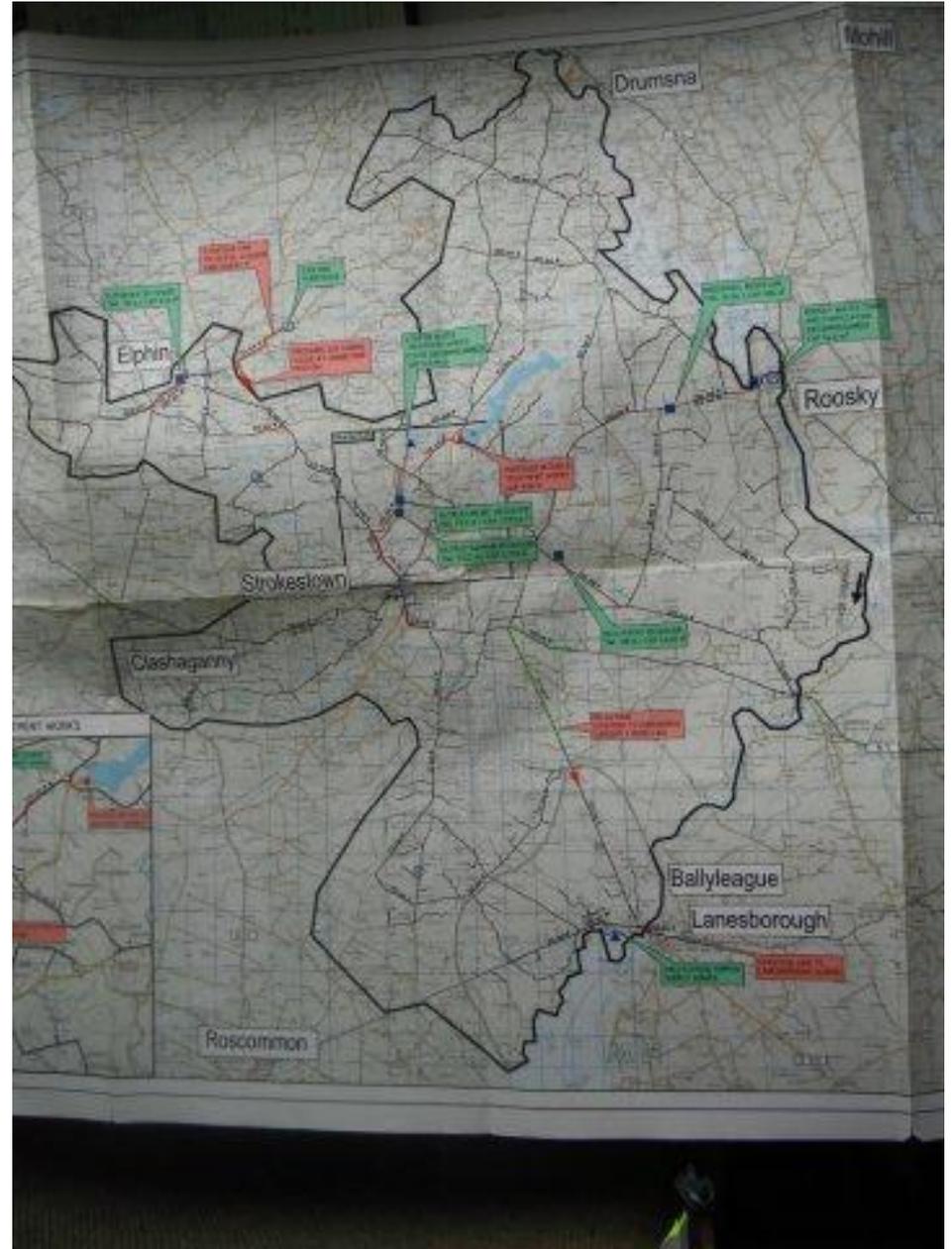
Photograph 4: Empty chlorine drums



Photograph 5: Unsealed water pipes at Lisheen pumphouse



Photograph 6: Elphin reservoir (leaking walls)



Photograph 7: Map of NERWSS with source, pumphouse and reservoirs indicated