



Drinking Water Audit Report

County:	Roscommon	Date of Audit:	3 rd September 2014
Plant(s) visited:	Rockingham treatment plant - Boyle PWS and Boyle Ardcarne PWS (also serves Killaraght PWS, County Sligo)	Date of issue of Audit Report:	15 th September 2014
		File Reference:	DW2008/87; DW2009/370; DW2012/174
		Auditors:	Ms Yvonne Doris
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 EPA Direction issued to Roscommon County Council on 5th September 2013 to install a barrier to *Cryptosporidium* has not been complied with by the deadline of 30th August 2014. Works are ongoing on site and new coagulation, filtration and UV treatment is due to be completed and commissioned by 9th December 2014.**

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 determine compliance with the EPA direction issued to Roscommon County Council (RCC) on 5th September 2013 to install a barrier to *Cryptosporidium* by 30th August 2014.

The Rockingham source serves the Boyle PWS (4,300 people), comprising part of Boyle town. The Hughestown source serves the Boyle/Ardcarne PWS (1,700 people) comprising a part of Boyle town and surrounding areas. It also serves the Killaraght public water supply in County Sligo. Both sources are boreholes drilled in highly karstified limestone which is extremely vulnerable. Exceedances of coliforms, turbidity and *Cryptosporidium* have been notified to the EPA. The supplies are on the EPA Remedial Action List for inadequate treatment for *Cryptosporidium*. A boil water notice has been in place on both supplies since March 2012. When the treatment upgrade works are completed at Rockingham the two public water supplies will be connected by a 6km pipeline and raw water will be blended and treated at Rockingham and served via two reservoirs to the two supplies.

The Site Manager did a site safety induction prior to the audit as it is a construction site with open excavations and moving machinery and ensured hard hats, boots and high-vis jackets were worn. The chlorine disinfection system was not inspected as part of this audit. Photographs taken by Yvonne Doris during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 12.20 pm at the Rockingham treatment plant. 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

Anthony Skeffington, Irish Water SLA Above Ground Lead Engineer for Roscommon and Mayo

Vincent Walsh, Senior Executive Engineer, Roscommon County Council

Anne McHugh, Senior Resident Engineer for the 4-Regional Schemes, Roscommon County Council

Neil Geraghty, Resident Engineer for the 4-Regional Schemes, Roscommon County Council

John Fox, Operations Manager, Glan Agua

Alan Flynn, Water Operator, Glan Agua

Barry Butler, Site Manager, MEIC, Glan Agua

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.	<p>Source Protection</p> <ul style="list-style-type: none">a. There are three boreholes at the Rockingham treatment plant which are designed to abstract 125 m³/hr for 18-20 hrs/day. The Wynnes borehole at Rockingham is no longer used to supplement the supply but has not been decommissioned.b. The Hughestown borehole is still in use abstracting 58 m³/hr for 18-20 hrs/day and supplying to the Boyle/Ardcarne PWS. A further two boreholes will be drilled at Hughestown supplying 63 m³/hr and 68 m³/hr respectively for 18-20 hrs/day.c. When the upgrade works are complete Irish Water plan to have 6 boreholes supplying water for treatment – three in Rockingham and three in Hughestown.d. 6km of pipework has been laid by P&D Lydon contractors to connect the Hughtown boreholes and the Rockingham boreholes. Testing, leak detection and leak repair was ongoing at the time of the audit.e. Continuous online raw water monitors will be in place for turbidity, colour, pH and UVT.f. Catchment protection works have been undertaken since the boil notice of March 2012. Farm inspections, under the Good Agricultural Practice regulations were conducted on approximately 110 farm surveys within the zone of contribution to the source boreholes. Issues were identified on 5 - 6 farms, mainly in relation to farmyard runoff. Information on these farms was forwarded to the Department of Agriculture and deductions in the single farm payment were made in respect of these farms. Follow up inspections on these farms have not been carried out. Farmers within 250 metres of the source were written to in 2013. RCC identified no risks from the open or closed quarries within the zone of contribution.
2.	<p>Description of treatment specification</p> <ul style="list-style-type: none">a. The contract for the new treatment plant is a 20 year Design-Build-Operate contract operated by Glan Aqua comprising raw water blending, flocculation, clarification, filtration, UV treatment, chlorination and fluoridation. Works were ongoing at the time of the audit (photograph 1). Glan Agua will operate the treatment plant and RCC will be responsible for the management of the reservoirs and distribution network.b. The treatment plant is designed with an inlet flow rate of 250 m³/hr for a maximum of 22 hours per day; 5,500 m³/day. The current demand is 5,300 m³/day. The final plant is designed to treat up to 46 NTU, 200 Hazen, 2,883 µg/l iron and 1,800 µg/l manganese.c. A new 82 m³ blending tank is in place at Rockingham (photograph 2). Two Corix adsorption clarification filters are installed on site and associated pipework was being connected at the time of the audit. Each unit consists of a clarifier and a separate filter. It was not possible to gain access to view the inside of the units.

	<p>d. The chemical dosing regime was not available during the audit. According to Glan Agua Operations Manager, Jar tests were carried out to inform the dosing regime for the treatment plant. Chemical dosing is based on colour as per the project design specification.</p> <p>e. The filter will consist of 450mm 1.0mm anthracite and 450mm 0.45-0.55 sand. The filtration rate proposed is 8.8 m³/m²/hr. Backwashing will be based on 3m headloss, time (24 hours), on a spike in turbidity (media breakthrough) or manually controlled. The backwash sequence is an air scour at 40-45m/hr followed by a combined air and water wash at 10-15m/hr. The timings of each were not provided at the audit or in the process design submission document. After a backwash, the filters will be run to waste for an unspecified period of time.</p> <p>f. The single UV disinfection unit was installed but access to the system was not possible due to works on site. A UVT monitor will be installed on the inlet and outlet to the unit. The UV unit is designed for 3-log removal of <i>Cryptosporidium</i> and validated for 2-log removal. The overall plant (clarification/filtration/UV) is designed to provide a 5.5 log removal and a validated 4.5 log removal. The UVT monitor will alarm to the caretaker and to the Glan Agua cascade system and to Scada if UVT drops below 90%.</p> <p>g. The existing gas chlorine dosing system will be phased out during commissioning and replaced with sodium hypochlorite (14%) dosing. The existing treatment with fluoride will remain in place.</p> <p>h. The plant will automatically shut down if chlorine drops below a specified set point (not decided yet), if UVT drops below 90%, if final water turbidity rises above a certain set point (not decided yet) and if colour rises above a certain setpoint (not decided yet). A final water turbidity meter will be alarmed to the caretaker and further cascade system operated by Glan Agua and to a Scada.</p> <p>i. Mechanical installation is ongoing. The clarification/filtration unit is installed and associated pipework is being installed at the moment. It was not known when the filter media would be in place. The Operations Manager said they were approximately 2 weeks ahead of schedule.</p> <p>j. Information provided by Glan Agua on 4th September stated that the Commissioning and Process Proving phase would commence on 18 November 2014 and be completed on 9th December 2014 (three weeks).</p>
<p>3.</p>	<p>Treated Water Storage and Distribution Network</p> <p>a. The existing raw water tank at Rockingham will be used as a (treated) clear water tank.</p> <p>b. Two reservoirs, Carrickmore (5,000m³) serving Boyle town and Ardcarne (1,200m³) serving the Ardcarne area were cleaned 7 or 8 years ago. Prior to the project commissioning phase RCC plans to clean both reservoirs. A camera survey of both reservoirs one year ago showed that the integrity of both reservoirs was good.</p> <p>c. The Carrickmore reservoir was visited. It is overgrown with vegetation and shrubs and small trees are growing on the top of the reservoir (photograph 3). The mesh on the reservoir vents was not sufficiently fine to prevent the entry of insects.</p>
<p>4.</p>	<p>Exceedances of the Parametric Values and Boil Notice</p> <p>a. Reminders of the boil water notice are issued via RCC's website and mapalarter (email and SMS) a few times a week.</p> <p>b. RCC meet quarterly with the HSE and reports on the progress of the upgrade works. According to RCC, the HSE has not detected illness (cryptosporidiosis) in the population.</p>
<p>5.</p>	<p>Management and Control</p> <p>a. There are chlorine and turbidity monitors at the Carrickmore and Ardcarne reservoirs. RCC will be reliant on the control of chlorine dosing by Glan Agua/Irish Water to ensure adequate residual chlorine at the extremities of the network.</p>
<p>12.</p>	<p>Sludge Management</p> <p>a. The Operations Manager stated that sludge bleeds will be collected in a holding tank on site and will be transported to the Kileglan dewatering facility. Infrastructure for a mobile dewatering rig is provided at Rockingham, should excessive sludge be produced due to very poor raw water quality. The supernatant will be discharged to the river (name unknown) and this river is likely to flow into Lough Key.</p>

3. AUDITORS COMMENTS

The EPA Direction issued to Roscommon County Council on 5th September 2013 to install a barrier to *Cryptosporidium* has not been complied with by the deadline of 30th August 2014. Works are ongoing on site and new coagulation, filtration and UV treatment is due to be completed and commissioned by 9th December 2014.

4. RECOMMENDATIONS

Source Protection

1. The Water Services Authority should revisit the 5-6 farms to ensure that remedial measures have been taken in relation to farmyard runoff and any other risks to the drinking water sources.
2. The Water Services Authority should ensure that the source protection and catchment risk assessment score for the *Cryptosporidium* risk assessment is reviewed following completion of the upgrade works.
3. The Water Services Authority should ensure that the Wynnes borehole at Rockingham is decommissioned.
4. The Water Services Authority should consider the installation of a continuous automatic raw water DOC monitor to assist in the optimisation of chemical dosing.

Disinfection

5. The Water Services Authority should ensure that the UV disinfection system is not bypassed at any time and that appropriate procedures are in place to ensure the UV system is not bypassed including times when maintenance or emergency repairs are being carried out. .

Filtration (General)

6. The Water Services Authority should install continuous turbidity monitors on each filter and the final treated water at the water treatment plant. These monitors should be linked to a recording device and generate an alarm in the event of a deviation from the acceptable operating range of the filters.

Treated Water Storage and Distribution Network

7. The Water Services Authority should ensure that the Carrickmore reservoir is cleared of trees and shrubs.
8. The Water Services Authority should ensure that all vents on the reservoirs are secured against ingress of insects, animals or deliberate introduction of any contaminant or acts of vandalism.
9. The Water Services Authority should remove all vegetation from the sides and cover of the reservoir to ensure that the reservoir can be visually inspected on all sides and also prevent damage to the integrity of the reservoir.

Management and Control

10. The Water Services Authority should consider the installation of an alarmed chlorine monitor at the end of the network and that there is adequate communication between Glan Agua/Irish Water and RCC to ensure residual chlorine at the ends of the network is maintained.
11. The Water Services Authority should consider the amalgamation of the Boyle, the Boyle/Ardcarne and Killaraght supplies into a single scheme and code for the purposes of management and reporting.

Distribution System

12. The Water Services Authority should instigate a regular programme of flushing and scouring of the mains.

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:

15th September 2014

Yvonne Doris
Inspector



Photograph 1: Ongoing construction works at Rockingham to serve Boyle and Boyle/Ardcarne supplies



Photograph 3: Vegetation covering Carrickmore reservoir, serving Boyle Ardcarne supply



Photograph 2: Newly constructed raw water blending tank