



Drinking Water Audit Report

County:	Laois	Date of Audit:	21 st October 2015
Plant visited:	Kilminchy Portlaoise PWS Scheme code 1600PUB1004	Date of issue of Audit Report:	10 th November 2015
		File Reference:	DW2009/315
		Auditor:	Aoife Loughnane
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 <i>EPA Drinking Water Report</i>. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **Portlaoise PWS is on the RAL due to inadequate treatment for *Cryptosporidium*. The audit found that very little progress has been made by Irish Water in undertaking works to remove this supply from the RAL. The action programme identified by Irish Water in December 2014 has been delayed, and the information provided by Irish Water in the latest RAL update (Q3 of 2015) shows no progress since the Q2 update. Irish Water needs to prioritise the works to remove this supply from the RAL without further delay.**
- ii. **The disinfection incident which occurred at Kilminchy WTP on 14th April 2015 was an isolated incident caused by works to replace the main plant control PLC. The EPA is satisfied that Irish Water undertook immediate corrective action and that appropriate controls and alarms are in place on the disinfection plant. The EPA's investigation file on this incident (DW2015/48) has now been closed.**

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. Portlaoise PWS was added to the EPA's Remedial Action List (RAL) in Q3 of 2014 due to inadequate treatment for *Cryptosporidium*. This audit was carried out to assess the performance of Irish Water in progressing works to remove Portlaoise PWS from the RAL.

Portlaoise PWS produces approximately 7,500 m³/day and serves 22,544 consumers. There are currently 8 boreholes sources at Eyne, Straboe, Cool Banagher, Derrygarran and Ballydavis. Treatment at Kilminchy water treatment plant consists of gas chlorination, rapid gravity sand filtration (for manganese removal), and fluoridation.

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

The opening meeting commenced at 1.30 pm at Kilminchy 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:

Andrew Boylan, Water Compliance Specialist, Irish Water

Aoife Lambe, Water Compliance Analyst, Irish Water

John Gavin, Operations & Maintenance Team Lead, Irish Water

Tselophile Tlou, Operations & Maintenance Team, Irish Water

Stan Cullen, Senior Executive Engineer, Laois County Council

Larry Gittens, Clerk of Works, Laois County Council

Michael Drennan, Network Caretaker, Caretaker, Laois County Council

Representing the Environmental Protection Agency:

Aoife Loughnane, 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>Progress of Action Programme to remove supply from the RAL</p> <ol style="list-style-type: none"> a. Portlaoise PWS was added to the RAL in Q3 of 2014 due to inadequate treatment for <i>Cryptosporidium</i>. b. On 2nd December 2014, Irish Water identified the following Action Programme: <ul style="list-style-type: none"> • Proposed Action Programme: Engage a consultant hydrogeologist to carry out a comprehensive <i>Cryptosporidium</i> risk assessment of all sources to Kilminchy WTP. • Interim Measures: Online UVT monitoring and monthly <i>Cryptosporidium</i> testing to determine the specification for a <i>Cryptosporidium</i> barrier (if required). This will be a 12 month programme, commencing in January 2015. • Proposed Date of Completion of Action Programme: Dependent on the outcome of risk assessment and UVT/<i>Cryptosporidium</i> monitoring programme. c. This Action Programme has been delayed. The consultant hydrogeologist that was due to be appointed in Q1 of 2015 was only appointed in October 2015. The proposed online raw water UVT monitoring programme had not commenced by the time of the audit, however daily manual UVT monitoring of the final water has been carried out since January 2015. d. The information provided by Irish Water in the latest RAL update (Q3 of 2015) shows no progress since the Q2 RAL update. e. During the audit, Irish Water confirmed that they are commencing a 12 month raw water monitoring programme (including online UVT monitoring and <i>Cryptosporidium</i> sampling units) for Portlaoise PWS along with 10 other supplies in County Laois under a Minor Works Programme to determine if a <i>Cryptosporidium</i> barrier is necessary. The proposed monitoring programme doesn't currently include microbiological monitoring (E.coli and Enterococci). Irish Water expects to have the first set of monitoring results in December 2015.
2.	<p>Source Protection</p> <ol style="list-style-type: none"> a. There are currently 8 borehole sources serving Portlaoise PWS: <ul style="list-style-type: none"> • Eyne (No. 1 & 3); • Straboe (No. 2); • Cool Banagher (No. 4); • Derrygarran (No. 1 & 2); and • Ballydavis (No. 3 & 4). b. The <i>Cryptosporidium</i> risk assessment score for this supply is very high (175). c. Irish Water believes that this risk score is overly conservative on the basis that the source protection zone is quite large and includes karst features. Irish Water has engaged a consultant hydrogeologist to undertake an expert assessment of the sources supplying Kilminchy WTP to determine the true <i>Cryptosporidium</i> risk. d. Laois County Council (LCC) confirmed that all <i>Cryptosporidium</i> sampling to date in 2015 has been clear.

	<p>e. The Eyne boreholes were selected to visit during the audit. These boreholes were constructed in 2008. The wellheads are above ground level, covered and housed within locked kiosks in secure compounds (see photos 1 to 4). The surrounding land use is mainly forestry. Septic tanks are also identified in the catchment.</p> <p>f. LCC outlined the source protection work that has been carried out. The zone of contribution (ZOC) for the Eyne boreholes has been delineated. Five septic tank inspections have been undertaken by LCC within the ZOC in 2014. Follow up visits have also been completed. Farm inspections were carried out in 2012 & 2013. LCC has written to all farmers with land within the setback distances under the <i>European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)</i> to ensure that they were aware of the setback requirements.</p> <p>g. Raw water is monitored continuously for turbidity, flow and pH at the WTP. The raw water turbidity reading was 0.103 NTU during the audit. There is no raw water turbidity alarm, however Irish Water stated that they intend to install one in the near future.</p>
<p>3.</p>	<p>Disinfection - Chlorination</p> <p>a. Chlorination is the first stage of treatment at Kilminchy WTP, in order to assist with manganese removal in the filters.</p> <p>b. Chlorine gas is dosed via duty and standby pumps with automatic switchover facilities. The dose is flow proportional.</p> <p>c. The on-site reservoir provides a chlorine contact time of 99 mg.min/l which satisfies EPA requirements.</p> <p>d. The residual chlorine concentration is monitored at the outlet of the on-site reservoir. The target concentration is 0.35 to 0.4 mg/l. The chlorine monitor was reading 0.39 mg/l during the audit. The low chlorine alarm set point is 0.2 mg/l.</p> <p>e. The network caretaker carries out daily chlorine testing at 2 locations (Meelick and Pallas) and monthly testing at 10 further locations on the distribution network. The results inspected during the audit demonstrate there is a difficulty maintaining the minimum recommended 0.1 mg/l residual chlorine at some extremities of the network (Ballyfin, Clonkeen and Oak View). When chlorine results are below 0.1 mg/l, the network caretaker immediately undertakes scouring until repeat chlorine test results show that the water is adequately disinfected.</p>
<p>4.</p>	<p>Filtration</p> <p>a. Following chlorination, water undergoes filtration in 3 rapid gravity filters. The filter media is 1.2 metres deep and contains 80% silica sand and 20% manganese dioxide to assist with manganese removal.</p> <p>b. Turbidity monitors are present at the outlet of each filter and on the combined final water. During the audit, the turbidity readings were:</p> <ul style="list-style-type: none"> • Filter No. 1: 0.025 NTU • Filter No. 2: 0.046 NTU • Filter No. 3: 0.035 NTU • Final Water: 0.048 NTU <p>c. Filter backwashing is triggered by headloss and is usually carried out once per week.</p> <p>d. The previous EPA audit on 30/11/2012 identified an issue with the filter backwash whereby the water wash appeared uneven with little flow at the rear of the filter compared to the front of the filter. Irish Water confirmed that remedial works have been carried out by the installation of a metal plate along the filter weirs to address this issue.</p> <p>e. A backwash of filter No. 3 was observed. The backwash was even across the filter and the water flow was even across the length of the weir.</p>
<p>5.</p>	<p>Management and Control</p> <p>a. The SCADA system at Kilminchy WTP is not fully operational. Some of the borehole sources are not yet linked to the SCADA system and it was not possible to view turbidity trends during the audit. Irish Water stated that an upgrade of the SCADA system is due to be completed within the next year.</p> <p>b. There is no formal out-of-hours response for drinking water incidents in county Laois.</p>

6.	<p>Disinfection Incident</p> <ol style="list-style-type: none"> a. A disinfection incident occurred at Kilminchy WTP earlier this year when the chlorine dosing system was shut down from 11.00 am on 14th April to 9.30 am on 15th April 2015. The low chlorine alarm did not activate to alert the plant operator to the problem. b. Irish Water's investigations found that this was an isolated incident caused by works being undertaken to replace the main plant control PLC in order to facilitate the integration of the site to the countywide SCADA system and centralised alarm management system. c. As a result of the failure of the chlorine dosing system, low chlorine residuals were recorded in parts of the network, however all follow up microbiological samples were clear. d. Once chlorine dosing had recommenced and investigative sampling demonstrated no microbiological failures, the HSE advised that a precautionary boil water notice was not necessary and no further action was required in order to protect public health. e. Following this incident, the chlorine dosing system was manually controlled and monitored until the PLC replacement works were completed on 27th April 2015. f. Irish Water confirmed that the low chlorine alarm is operating correctly since this incident. g. The EPA investigation file on this incident (DW2015/48) has now been closed.
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3. AUDITORS COMMENTS

Portlaoise PWS is on the RAL due to inadequate treatment for *Cryptosporidium*. This audit was carried out to assess the progress of Irish Water's action programme to remove this supply from the RAL. Based on the audit findings, the EPA is concerned by the lack of progress to date. The action programme identified by Irish Water in December 2014 has been delayed, and the information provided by Irish Water in the latest RAL update (Q3 of 2015) shows no progress since the Q2 update.

Irish Water needs to prioritise the works to remove this supply from the RAL without further delay. If any E.coli, Enterococci or *Cryptosporidium* oocysts are detected during the raw water monitoring programme, Irish Water must immediately proceed with the installation of a *Cryptosporidium* barrier on this supply.

4. RECOMMENDATIONS

Management and Control

1. Irish Water should complete the action programme to facilitate the removal of Portlaoise PWS from the RAL by December 2016.
2. Irish Water should ensure that the source protection and catchment risk score for the *Cryptosporidium* risk assessment is urgently reviewed in detail and appropriate measures implemented to reduce the risk. Irish Water should submit the revised *Cryptosporidium* risk assessment score to the EPA as soon as it is complete.
3. Irish Water should ensure that microbiological monitoring of E.coli and Enterococci is included in the raw water monitoring programme for Portlaoise PWS, along with the 10 other Laois supplies included in the Minor Works Programme - *East Midlands In-line UVT Monitor & Cryptosporidium Sampler installation with Raw Water Monitoring Programme*.
4. If any E.coli, Enterococci or *Cryptosporidium* oocysts are detected during the raw water monitoring programme, Irish Water must immediately proceed with the installation of a *Cryptosporidium* barrier on this supply.
5. Irish Water should ensure that the raw water turbidity monitor is linked to a recording device and generates an alarm in the event of a deterioration in raw water quality.
6. Irish Water should upgrade the SCADA system at Kilminchy WTP to ensure that plant operators have full access to the data pertaining to the performance of the plant. Specifically, access should be provided to raw and treated water quality trends.

7. Irish Water should ensure there is a formal out-of-hours response procedure in place for drinking water incidents in County Laois.

Disinfection

8. Irish Water should ensure that the continuous chlorine residual monitor on the final water is alarmed and linked to a recording device to ensure that either a sudden increase in chlorine demand or a failure of the chlorine dosing system is immediately detected.
9. Irish Water should ensure that residual chlorine levels at the end of the distribution network are maintained at 0.1mg/l. The network chlorine monitoring records should identify both the pre- and post-scouring concentrations when the initial results show a residual less than 0.1 mg/l free chlorine.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

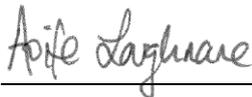
During the audit Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Mr Darragh Page, Senior Inspector, Drinking Water Team.

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.

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 DW2009/315 in any future correspondence in relation to this Report.

Report prepared by:



Date:

10th November 2015

Aoife Loughnane

Inspector



Photo 1: Security compound at Eyne No. 1



Photo 2: Locked borehole kiosk at Eyne No. 1



Photo 3: Borehole cover at Eyne No. 1



Photo 4: Borehole cover at Eyne No. 3