



Drinking Water Audit Report

County:	Galway	Date of Audit:	19 August 2014
Plant(s) visited:	Portumna	Date of issue of Audit Report:	29 August 2014
		File Reference:	DW2008/146
		Auditors:	Mr. Darragh Page Ms. Aoife Loughnane
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 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 recent THM failure in the Portumna PWS highlights that further process optimisation needs to be carried out at the water treatment plant and in the network. Optimisation should focus on the intake, management of flow through the plant, coagulation pH and disinfectant dosing to minimise the potential for THM formation.
- ii. The disinfection system does not meet the minimum requirements and Irish Water need to ensure that actions are taken to improve the security of the disinfection system by ensuring that recommendations in EPA Advice Note No.3 – *E. coli* in Drinking Water are implemented.

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 Portumna water treatment plant supplies water to approx. 2,000 persons. The source of the water supply is Lough Derg and it is treated using coagulation, clarification, rapid gravity filtration, chlorination and fluoridation.

The opening meeting commenced at 10.00 am at the Portumna 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: (* indicates that person was also present for the closing meeting)

Gerard Greally – SLA Lead, Irish Water*

Eunan Canavan – Engineer, O&M, Irish Water*

Martin Lavelle – Senior Engineer, Galway County Council*

Tara Meehan – Technician*, Galway County Council*

Adrian Raftery – Executive Engineer, Galway County Council*

Diarmuid Craughan – Senior Executive Engineer, Galway County Council*

Ann Dolan – Senior Executive Scientist, Galway County Council*

Gerry Fallon – Caretaker, Galway County Council*

Representing the Environmental Protection Agency:

Darragh Page – Inspector

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.	Source Protection <ul style="list-style-type: none">a. The source of the supply is an intake pipe approx. 50 m out from the shore at Portumna Marina. IW stated that the pipe extends 200 m but is damaged and taking in water from 50 m at a shallow depth.b. IW stated that they are considering a proposal to extend the pipe back to 200 m to move it away from the inshore area (where there are reeds). It was hoped to complete this assessment in the next two weeks.c. The marina is also used by a number of motorised boats and there is a risk of hydrocarbon contamination that needs to be managed.
2.	Coagulation, Flocculation and Clarification <ul style="list-style-type: none">a. The first stage of the treatment is pH correction of the raw water to reduce the pH to a target of 6.6 – 6.7. This is automatically controlled by monitoring the pH post coagulant addition and adjusting the pH dose accordingly.b. Coagulant (aluminium sulphate - 160 ppm) and poly (Poly 910 – 0.19 mg/l) are dosed prior to the 2 no. clarifiers. There is approx. 12 mins contact time between the alum dose and the poly.c. The plant does not run continuously and GCC stated that it runs for approx. 15 hours a day depending on demand. The plant was not running at any time during the audit and therefore it was not possible to observe the performance of the clarifiers.
3.	Filtration <ul style="list-style-type: none">a. The clarified water then passes into 2 no. circular tank rapid gravity filters.b. The filters are backwashed daily. A backwash is not initiated on head loss (there is no headloss monitor) or turbidity.c. A backwash of one of the filters was initiated and the air cycle was completed. However, the subsequent wash cycle did not commence due to a malfunction and it was therefore not possible to observe a complete backwash cycle.

	<ul style="list-style-type: none"> d. There is a turbidity monitor after each filter and these results are recorded on the SCADA. However, the caretaker does not have access to the SCADA at the Portumna plant. e. The results of the turbidity monitors for the period 12 – 19 August 2014 were forwarded to the EPA subsequent to the audit. The results from filters no. 1 and 2 were generally low (<0.2 NTU) but occasional spikes were noted. IW stated that these spikes were associated with shutdown/start-up of the treatment plant.
4.	<p>Chlorination and Disinfection</p> <ul style="list-style-type: none"> a. The filtered water is chlorinated using sodium hypochlorite supplied by Micro-Bio. This is supplied in bulk. 50 L drums of sodium hypochlorite are also kept on site (15 no. at the time of the audit) as a backup. b. Compliance with the labelling requirements of the Biocides Product Regulation (528/2012) was assessed. The 15 no. drums of sodium hypochlorite did not contain any expiry dates as required by Article 69. It was not clear how long the drums had been stored on site and whether they were being stored beyond the recommended storage period. c. Duty and standby dosing pumps were in place, however, changeover was not automated and must be done manually. This was a recommendation of the previous EPA audit (29 September 2009) and has still not been implemented. d. There is a chlorine monitor on the final water leaving the clear water tank on site. This monitor is alarmed and there is a dial out alarm on the monitor with a cascade system. There was a documented procedure for dealing with the alarm, however the procedure did not address the scenario whereby the cause of the alarm could not be rectified quickly. e. As the clear water tank has approximately 4 to 5 hours storage any changes made to the dosing levels will take 4 to 5 hours to impact on the final water. The dosing is not automatically linked to the chlorine monitor. f. IW stated that they are considering installing a secondary chlorination station at the outlet of the reservoir in the network to enable the primary dose to be reduced but did not provide a timetable for completion.
5.	<p>Treated Water Storage</p> <ul style="list-style-type: none"> a. There is a 100,000 gallon clear water tank on site following which the water is pumped to a reservoir in the network. This reservoir was not inspected as part of this audit. b. The treated water from this reservoir is to feed the Killimor PWS but minor works are outstanding on this. IW stated that this would take a few weeks.
6.	<p>Monitoring and Sampling Programme</p> <ul style="list-style-type: none"> a. There are online raw water monitors for pH, turbidity, ammonium and potassium. b. The ammonium/potassium monitor appeared to be malfunctioning at the time of the audit as it was reporting a concentration of 469 mg/l and 611 mg/l respectively. IW or GCC did not give an explanation for this. c. Daily monitoring of the treated water is undertaken for colour, turbidity, fluoride, aluminium and chlorine. d. Two aluminium failures in distribution network in 2013 were examined. The results at the plant on the day of these failures indicate that there was a storm and marginally elevated levels of aluminium were recorded at the plant. e. The results of the SCADA were forwarded to the EPA subsequent to the audit. The following observations were noted from the SCADA results: <ul style="list-style-type: none"> i. The final water pH was below the required level of 6.5 from 12th to 18th August 2014 and was between 5 and 6. IW stated that this reflected raw water pH changes. pH correction using sulphuric acid is in place at the Portumna, however during this period the raw water pH was averaging 6.4. Under such circumstances acid dosing is not appropriate and it is likely that the optimum coagulant pH will not be achievable. The plant is not equipped to manage low raw water pH levels as there is no facility to raise the raw water pH. ii. The turbidity results appear to indicate a link between pump rates and turbidity

	<p>levels in the raw water as the plant is operated on an intermittent basis.</p> <p>iii. There was a significant drop in chlorine levels on 13th August where the levels dropped from 2.4 mg/l to 1.2 mg/l. IW could not provide an explanation for this.</p>
7.	<p>Management and Control</p> <p>a. IW stated that a process optimisation review had recently been carried out by Ryan Hanley on behalf of IW. The report from this review had not been finalised at the time of the audit.</p>

3. AUDITORS COMMENTS

Though there have been improvements at the Portumna water treatment plant that have reduced THM concentrations in the final water, the supply is still at risk of non-compliance as demonstrated by the recent THM failure of 22 July 2014 (130 µg/l). This risk may be increased in the autumn due to the proximity of the intake to the reeds where there will be some die back and consequent increases in raw water organic content. Furthermore, the stop-start nature of the operation of the Portumna plant may also be contributing to the final water TOC levels and the feasibility of running the plant continuously should be examined.

The disinfection system does not meet the EPA minimum recommendations and the plant is at risk of supplying inadequately disinfected water. This is illustrated by the drop in chlorine levels of 13th August 2014 for which no explanation was provided. This deficiency needs to be addressed as a matter of urgency.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should submit a timeframe for the remedial works to be carried out on the intake point.
2. Irish Water should assess the risk of hydrocarbon contamination in the vicinity of the intake point and implement mitigation measures to reduce this risk.

Filtration

3. Irish Water should prepare a documented procedure for the management of the filter back wash cycle to ensure that the filters are backwashed in the event of the filtered water turbidity exceeding a trigger level.

Disinfection

4. Irish Water should install auto changeover on the duty and standby chlorine pump so that failure of the pumps does not lead to inadequate levels of disinfectant in the treated water.
5. Irish Water should review the controls over the chlorine dose to ensure that the risk of inadequately disinfected water entering the distribution network is minimised. In particular, Irish Water should assess whether the chlorine dose can be linked to the chlorine residual monitor. As part of this assessment, Irish Water should consider the feasibility of moving the chlorine monitor to a location closer to the dosing point (but after an effective chlorine contact time of 15 mg.min/l has been achieved).
6. Irish Water should ensure that a record is kept each time a bulk delivery of sodium hypochlorite is delivered. Records should include date of delivery, quantity delivered and the expiry date.

7. Irish Water should review use of disinfectants at the Portumna PWS and all other public water supplies to ensure that all disinfectants are authorised and labelled in accordance with the EU Biocides Products Regulation (528/2012) and associated Irish regulations (*European Union (Biocidal Products) Regulations, 2013*). In particular, Irish Water should ensure that each drum of sodium hypochlorite contains an expiry date.
8. Irish Water should review the documented procedure for responding to chlorine alarms to ensure that it includes what action are to be taken in the event that the short term actions taken do not result in satisfactory chlorine residuals in the network.
9. Irish Water should clarify whether a secondary chlorination point is to be installed at the Portumna reservoir and if so submit a timeframe for the completion of same.

Monitoring and Sampling Programmes for Treated Water

10. Irish Water should investigate the cause of the elevated readings of ammonium and potassium on the raw water monitor and take the necessary remedial action to rectify the issues identified.

Management and Control

11. Irish Water should submit a summary of the actions that it proposes to take following the recommendations of the process optimisation audit recently carried out. Such actions should focus on the reduction of THMs and THM precursors.
12. Irish Water should ensure that the SCADA is accessible to the caretaker at the Portumna water treatment plant.
13. Irish Water should assess the adequacy of the pH correction arrangements of the Portumna PWS and in particular should outline what actions are to be taken to manage low raw water pH levels in the future to ensure that the optimum coagulant pH is achieved.

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 Ms Yvonne Doris, 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:


Darragh Page
Inspector

Date:

29/8/14

