

Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, 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 water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

Water Supply Zone	
Name of Installation	Drumcondrath
Organisation	Irish Water
Scheme Code	2300PUB1005
County	Meath
Site Visit Reference No.	SV20533

Report Detail	
Issue Date	07/10/2020
Prepared By	Daryl Gunning

Site Visit Detail			
Date Of Inspection	11/09/2020	Announced	Yes
Time In	11:00	Time Out	11:50
EPA Inspector(s)	Daryl Gunning		
Additional Visitors			
Company Personnel	Irish Water: Francis Glancy, Mairead Conlon*, Michael Cunniffe Meath County Council: Helen McDonnell, Maeve Rowley, Paul McKown, Patrick Kinsella*, Norbert McMahon, Gerry McCormack** *Only attended the pre-site meeting (10.09.20) **Only attended the site visit (11.09.20)		

> Summary of Key Findings

1. The Drumcondrath public water supply (PWS) has been on the EPA's remedial action list (RAL) since October 2015 due to elevated levels of trihalomethanes (THMs) above the parametric limit (100 ug/l). Since then, Irish Water has tried to implement various solutions without success. Irish Water now propose a new solution to develop groundwater sources in Rolagh and Possexstown, subject to confirmation that these sources are sustainable. If these sources are not sustainable, Irish Water will proceed to install temporary, containerised coagulation, flocculation, and clarification (CFC) treatment at Drumcondrath water treatment plant (WTP). The projected completion date for either option is Q2 2023.
2. The pressure filters are not currently being operated in accordance with the EPA performance criteria for filtered water of <0.2 NTU (using turbidity approach) or <0.3 NTU (using log credit approach), in order to demonstrate an effective *Cryptosporidium* barrier at Drumcondrath WTP. The high turbidity levels (>0.3 NTU) after the filters indicates that the *Cryptosporidium* barrier is compromised. Irish Water should undertake *Cryptosporidium* sampling at Drumcondrath WTP and notify the EPA and HSE immediately if any oocysts are detected.
3. Monitoring data provided to the EPA after the audit shows turbidity exceedances (>1 NTU) in the final water. Meath County Council (operators of Drumcondrath WTP under service level agreement with Irish Water) did not follow procedures for the timely notification of these final water turbidity parametric exceedances to Irish Water, the EPA, and the HSE. The failure to notify the EPA of parametric value exceedances is an offence under Regulation 10(3) of the *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014), as amended*.

> Introduction

The Drumcondrath WTP produces approximately 589 m³/day of water serving a population of 1182 on the Drumcondrath PWS. Raw water is abstracted from two boreholes (located at the WTP site) and from Lough Bracken. The proportion of water supplied by the boreholes (BH 1 & 2) and the lake is seasonally dependent, with an approximately 30:70 BH:lake ratio in the spring/summer months and 70:30 BH:lake ratio during the autumn/winter months. At the time of the audit, approximately 70% of the water was being supplied from BH 1 (note: the two boreholes automatically switch over every 12 hours).

Treatment consists of sodium hypochlorite dosing prior to filtration for manganese and iron oxidation (borehole water only); pressure filtration (borehole and lake water supply filtered separately); granulated activated carbon (GAC) filtration (lake supply only & post pressure filtration); chlorination with sodium hypochlorite (primary disinfection); and fluoridation.

The audit was carried out to assess the progress of the RAL action programme to achieve compliance for trihalomethanes (THMs) in the Drumcondrath PWS distribution network.

> Supply Zones Areas Inspected

All areas of the treatment process at the water treatment plant were inspected during the audit.



1. Source Protection

	Answer
1.1	Is the abstraction source(s) adequately protected against contamination? Yes
Comment	
<p>Each source is inspected daily by the caretaker. Both boreholes and the lake abstraction point were inspected at the audit.</p> <p><u>Boreholes 1 & 2:</u></p> <ol style="list-style-type: none">1. Both boreholes were constructed in 2001.2. The pipework and well-heads were upgraded on both boreholes in 2017.3. Both boreholes was adequately capped and located in a lockable chamber.4. No ingress of surface water into the chamber was evident.5. Both boreholes have individual turbidity monitors. Raw water turbidity from borehole 1 was 0.531 NTU on the day of the audit. Raw water turbidity of both boreholes tends to be between 0.5 and 1.5 NTU, but can fluctuate between 0.5 and 4 NTU. <p><u>Lough Bracken:</u></p> <ol style="list-style-type: none">1. The screen on the raw water intake is inspected and cleaned regularly.2. The abstraction point is fenced off and is accessed through a locked gate.3. Raw water turbidity from Lough Bracken was 2.218 NTU on the day of the audit. Raw water turbidity tends to be between 1 and 2 NTU, but can fluctuate between 0.4 and 9 NTU.	

2.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	No
Comment	
<p><u>Borehole water supply:</u></p> <ol style="list-style-type: none"> 1. There is one pressure filter for the borehole water supply. This pressure filter was installed in 2017 in order to remove total organic carbon (TOC), a precursor to THM formation. 2. Filter media consists of gravel (330mm) and activated filter media (AFM) (900mm). 3. At the time of the audit, filter turbidity was recorded as 0.093 NTU. A filter turbidity of <0.2 NTU is achieved the majority of the time, however, occasionally it has been recorded at >0.2/0.3 NTU. 4. Filter turbidity is alarmed for shutdown at 10 NTU for 2 minutes. This turbidity shutdown set-point does not meet the EPA criteria for turbidity performance of pressure filters (turbidity of 0.3 NTU using the log credit approach; 0.2 NTU using the turbidity approach). 5. The pressure filter is backwashed every 24 hours and lasts for 8 minutes (rinse time: 5 minutes and idle time: 3 minutes). Backwash water flows to a sump, which then drains back to the lake. 6. The pressure filter is acid-washed once per year. <p><u>Lake water supply:</u></p> <ol style="list-style-type: none"> 1. There are two pressure filters for the lake supply. Water is split evenly between both filters. After the pressure filters, the combined filtered water then passes through a granulated activated carbon (GAC) filter. 2. Filter media in both pressure filters consists of gravel (330mm) and AFM (900mm). The filter media was replaced in both filters in 2017. AFM was added in order to remove TOC. 3. Within the GAC filter, the filter media is 1.59m in height with a void space of 1.11m above the media. The GAC media was replaced in 2017 and Meath County Council plan to replace it again within the next few months. 4. At the time of the audit, filter turbidity was recorded as 0.531 and 0.403 NTU for filter 1 and 2, respectively. Filter turbidity is >0.3 NTU for both filters the majority of the time. The WTPs <i>Cryptosporidium</i> barrier is compromised at a turbidity >0.3 NTU. 5. Filter turbidity is alarmed for shutdown as follows: (i) filter 1 - 10 NTU for 4 minutes and (ii) filter 2 - 10 NTU for 2 minutes. These turbidity shutdown set-points do not meet the EPA criteria for turbidity performance of pressure filters (turbidity of 0.3 NTU using the log credit approach; 0.2 NTU using the turbidity approach). 6. Both pressure filters are backwashed every 12 hours and lasts for 8 minutes (rinse time: 5 minutes and idle time: 3 minutes). The GAC filter is backwashed 3 times a week and lasts for 8 minutes (rinse time: 5 minutes and idle time: 3 minutes). Backwash water flows to a sump, which then drains back to the lake. 7. Both pressure filters are acid-washed once per year. <p><u>Combined post-filter water:</u></p> <ol style="list-style-type: none"> 1. Final water turbidity (combined water), monitored after the clearwater tank, was 0.642 NTU on the day of the audit. Final water turbidity is consistently >0.3 NTU, which means there is no effective barrier to <i>Cryptosporidium</i> entering the water supply. 2. On 03/08/20, 11/08/20, 21/08/20, and 31/08/20 final water turbidity levels were >1NTU for sustained periods, which exceeds the turbidity parametric value of 1 NTU in the Drinking Water Regulations. Following the audit, Irish Water reported these turbidity levels to the EPA on 06/10/20 in response to a request for turbidity data. Meath County Council did not report these turbidity levels to Irish Water, the EPA, or the HSE on the dates that they had occurred. The EPA has instructed Irish Water to notify the HSE of these final water turbidity exceedances. Irish Water began investigations into these turbidity levels on 06/10/20. 3. The final water turbidity is alarmed for shutdown at 5 NTU for 2 minutes. 	



3.1

	Answer
Is the chlorine dosed appropriately?	Yes
Comment	
<ol style="list-style-type: none">1. The borehole raw water supply is dosed with sodium hypochlorite (14-15%) prior to pressure filtration to oxidise the manganese and iron. Manganese and iron removal rates are approximately 98% for both borehole raw water supplies.2. Sodium hypochlorite (14-15%) (primary disinfection) is dosed in the combined water (borehole and lake supply) prior to entering the clear-water tank.3. Dosing is flow proportional. There is a duty and standby dosing pump, which automatically switchover every 12 hours.4. A chlorine residual of 0.7 mg/l is aimed for leaving the WTP. Chlorine residuals are monitored on the outlet of the reservoir and was recorded as 0.67 mg/l on the day of the audit. A chlorine residual of >0.1 mg/l is consistently achieved in the network.5. Chlorine contact time is 81 min.mg/l.6. Chlorine alarms are as follows:<ul style="list-style-type: none">• <i>Rising main - final water to reservoir:</i> (i) high alarm - 3mg/l for 15 minutes; (ii) low alarm - 0.5 mg/l for 30 minutes; (iii) high shutdown - 3.2 mg/l for 15 minutes; (iv) low shutdown - 0.3 mg/l for 30 minutes.• <i>Reservoir outlet:</i> (i) high alarm - 1.1 mg/l for 15 minutes; (ii) low alarm - 0.35 mg/l for 15 minutes; (iii) high shutdown: 1.25 mg/l for 10 minutes; (iv) low shutdown - 0.3 mg/l for 10 minutes.• Alarms are simultaneously received by the caretaker and a Meath County Council engineer.	



4. Reservoirs and Distribution Networks

		Answer
4.1	Are reservoirs adequately inspected and maintained?	Yes
Comment		
<ol style="list-style-type: none">1. The treated water reservoir has approximately 12-16 hours storage capacity.2. There are no water supply connections to consumers on the distribution network prior to the reservoir.3. The reservoir was last cleaned in October 2018.		

5. Supply on the Remedial Action List

5.1

	Answer
Do the audit findings support progress made with the Remedial Action List upgrades?	No
<p>Comment</p> <p>The Drumcondrath PWS was added to the EPA's Remedial Action List (RAL) in October 2015 due to elevated levels of trihalomethanes (THMs) above the parametric limit (100 ug/l) as per the <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014), as amended</i>.</p> <p>THM exceedances have been recorded in the Drumcondrath PWS distribution network since 2009. The most recent THM exceedance recorded in the distribution network was in September 2020 (130 ug/l). Although no THM exceedances were recorded in 2018 and 2019, a compliant sample (96 ug/l) close to the parametric limit was recorded in the distribution network in September 2018. Sampling for THMs is conducted once per year, as per regulatory sampling requirements (note: THM monitoring was carried out at a number of distribution network locations during summer and Autumn 2017).</p> <p>Since it was added to the RAL, a number of remedial actions were proposed, trialled or implemented. However, to date, the Drumcondrath PWS has not been returned to compliance for THMs.</p> <p>Detailed below is an overview of of planned, trialled, and completed RAL remedial actions for the Drumcondrath PWS (note: RAL supply updates are provided to the EPA by Irish Water on a quarterly basis):</p> <p><u>Q4 2015 - Q4 2016</u></p> <ul style="list-style-type: none"> The following upgrade works were proposed by Irish Water in Q4 2015: well head protection, upgrading of chorine dosing, and replacement of filter media. A completion date of September 2016 was proposed for these works in the Q1 2016 update. By Q3 2016, well head protection and chlorine dosing system upgrades were complete. However, a new filter process was proposed at this stage, extending the planned completion date to December 2016 (deadline was extended to March 2017 in Q4 2016). <p><u>Q1 2017 - Q4 2017:</u></p> <ul style="list-style-type: none"> A pressure filter for the borehole water supply was installed at the WTP during Q1 2017. Although verification data demonstrated an improvement in THM compliance, THM results obtained at the end of the distribution network during Q2 2017, were close to the parametric limit (95-98 ug/l). Subsequently, Irish Water progressed with a new option; the drilling of a new trial well in parallel with the testing and assessment of an existing trial well. The aim was to develop a secure groundwater source that would supplement the existing lake source. As this new action programme had a number of phases (i.e. procurement, testing, development, validation, and verification), the projected completion date was extended to June 2018. Well testing progressed throughout 2017, with a revised completion date of September 2018 proposed in the Q4 2017 update. THM and chlorine residual monitoring was carried out at a number of locations within the distribution network during the summer and autumn of 2017. Uni-directional mains flushing was carried out in November 2017. <p><u>Q1 2018 - Q4 2018:</u></p> <ul style="list-style-type: none"> Following extensive investigative work to assess groundwater quality and the potential yield of existing boreholes at Drumcondrath WTP, Irish Water deemed that the development of a new groundwater source was not a viable or sustainable option to sufficiently address the THM risk for the Drumcondrath PWS. In Q2 2018, Irish Water informed the EPA that they would be progressing with the rationalisation of the supply by connecting to the Ardee water supply zone (WSZ). Irish Water proposed a completion date of Q4 2020, with verification results to be submitted to the EPA in Q1 2021. <p><u>Q1 2019 - Q4 2019:</u></p>	

During 2019, a number of potential options were proposed by Irish Water:

1. To drill a further trial well in the vicinity of the Drumcondrath WTP site.
2. Installation of chloramination at Drumcondrath WTP (contingency plan if option 1 was not viable).
3. Development of a trial well in Ardee to facilitate rationalisation of Drumcondrath (if option 1 and 2 are not viable).
 - A completion date of December 2020 was proposed if option 1 was viable.
 - By the end of 2019, Irish Water reported that the trial well was not suitable and would not be progressed. Testing also concluded that Drumcondrath WTP is not a suitable candidate for chloramination.
 - Subsequently, Irish Water proposed a full chemical treatment process incorporating coagulation, flocculation, and clarification in order to ensure effective removal of total organic compounds.

Q1 2020 - Q2 2020:

A proposed completion of 2024+ was proposed by Irish Water in Q1 2020.

5.2

		Answer
	Is further information needed to assess completion of the Remedial Action List upgrade?	Yes
Comment		
<p>At the pre-audit meeting (10/09/20) and site visit (11/09/20), the EPA were informed that Irish Water are currently assessing the potential of securing a new water source for the Drumcondrath PWS, due to site access and size constraints that would limit the viability of coagulation, flocculation, and clarification (CFC) treatment at the Drumcondrath WTP. Further details were provided in the Q3 2020 update as detailed below:</p> <p>Irish Water proposes to develop a groundwater source in Rolagh (Nobber Townland) and Possexstown (Kingscourt Townland), subject to confirmation that these sources are sustainable. This is the preferred option identified in Irish Water's National Water Resources Plan. Confirmation of sustainability of proposed supplies is expected in Q4 2020. If these sources are not sustainable, Irish Water will proceed to install a temporary containerised CFC treatment process at the Drumcondrath WTP, with regard to the site's environmental constraints. The projected completion date for either option is Q2 2023.</p>		



6. Site Specific Issues

	Answer
6.1	Is the treated water fluoridated in accordance with the Code of Practice on the Fluoridation of Drinking Water?
	No
Comment	
<ol style="list-style-type: none">1. Fluoride is injected prior to the treated water entering the reservoir and is flow proportional.2. The fluoride dosing pump was not operational on the day of the audit and has been out of operation for approximately 1 month prior to the audit. The HSE have been informed and a replacement pump has been ordered.	

	Answer
6.2	Has the protozoal compliance log treatment requirement been identified for Drumcondrath water treatment plant?
	No
Comment	
<p>Irish Water is currently reviewing the protozoal compliance log treatment requirement at Drumcondrath WTP, as part of their overall drinking water safety plan approach. <i>Cryptosporidium</i> sampling is not taking place at Drumcondrath WTP at present. Irish Water is assessing the requirement for <i>Cryptosporidium</i> sampling in accordance with their <i>Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies</i>.</p>	

Recommendations

Subject	Drumcondrath Audit Recommendations	Due Date	07/11/2020
Action Text	<p>Recommendations</p> <ol style="list-style-type: none"> 1. Irish Water should complete the Remedial Action List (RAL) action programme to achieve THM compliance in Drumcondrath public water supply without further delay. Irish Water should provide progress updates to the EPA on a quarterly basis. 2. Irish Water should implement an enhanced THM monitoring programme for the Drumcondrath public water supply until the RAL action programme is complete. 3. Irish Water should ensure that the pressure filters meet the EPA turbidity performance criteria for filtered water of <0.2 NTU (using the turbidity approach) or <0.3 NTU (using the log credit approach), in order to demonstrate an effective <i>Cryptosporidium</i> barrier at Drumcondrath water treatment plant. 4. Irish Water should review the turbidity alarms and automatic plant shutdown set-points to ensure the filters meet the EPA turbidity performance criteria, and to ensure that plant operators are alerted when the filtered water turbidity rises to a critical level. 5. Irish Water should undertake <i>Cryptosporidium</i> monitoring at Drumcondrath public water supply in accordance with Irish Water's <i>Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies</i>, and notify the EPA and HSE immediately if any oocysts are detected. 6. Irish Water should identify the protozoal log treatment requirement for Drumcondrath water treatment plant. 7. Irish Water should complete the Drinking Water Safety Plan for Drumcondrath public water supply. 8. Irish Water and Meath County Council should ensure that all drinking water parametric exceedances are escalated to senior management within Meath County Council and notified to Irish Water, the EPA, and the HSE, in a timely manner. 9. Irish Water should ensure that chemical dosing equipment is serviced and maintained in accordance with manufacturer's instructions. <p>Follow-Up Actions required by Irish Water</p> <p>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.</p> <p>This report has been reviewed and approved by Aoife Loughnane, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency within one month of the issuing of this audit report detailing how it has dealt with the issues of concern identified during this audit.</p> <p>The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work.</p> <p>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.</p> <p>Please quote the Action Reference Number DW209/279 in any future correspondence in relation to this Report.</p>		

