

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	Wexford Town
Organisation	Irish Water
Scheme Code	3300PUB1669
County	Wexford
Site Visit Reference No.	SV20665

Report Detail	
Issue Date	29/10/2020
Prepared By	Daryl Gunning

Site Visit Detail			
Date Of Inspection	02/10/2020	Announced	Yes
Time In	11:00	Time Out	12:00
EPA Inspector(s)	Daryl Gunning		
Additional Visitors			
Company Personnel	Irish Water: Colin Cunningham; Patrick Duggan Wexford County Council: Ken Jones; Fionnuala Callery; Paul Delahunty; Noel Maguire*; Paul Darcy* *attended site visit (02/10/20) only [all other attendees also attended the pre-site meeting (01/10/20)]		

> Summary of Key Findings

1. There were exceedances of the drinking water parametric values for aluminium and turbidity in Wexford Town public water supply (PWS) between 25/08/20 and 31/08/20. These exceedances were caused by chemical dosing issues at the treatment plant during adverse weather conditions. The elevated aluminium and turbidity levels in the final treated water resulted in a temporary loss of the *Cryptosporidium* barrier at the treatment plant.
2. Wexford County Council (operators of Wexford Town water treatment plant (WTP) under service level agreement with Irish Water) did not follow procedures for the timely notification to Irish Water, the HSE and the EPA, of parametric value exceedances and of treatment process failures.
3. The filters at Wexford Town WTP are not currently being operated in accordance with the EPA's turbidity performance criteria for rapid gravity filters of 0.2 NTU (using the turbidity approach) or 0.3 NTU (using the log credit approach). This means the performance of the plant's *Cryptosporidium* barrier cannot be verified. Irish Water should review the filter turbidity alarm set-points, having regard to the EPA turbidity performance criteria.
4. A protozoal compliance log deficit exists at Wexford Town WTP, which means the level of treatment is currently not proportionate to the risk posed by the source waters. There is a sampling programme for *Cryptosporidium* in the water supply, and all results carried out to date have been clear. To ensure the ongoing safety of the water supply, Irish Water need to identify how the protozoal compliance log deficit is to be addressed.

> Introduction

The Wexford Town PWS produces approximately 220 m³/hour of water serving a population of 21,055. Raw water is abstracted from the Sow river (intake at Edenvale) (80% of supply) and the Coolree impoundment reservoir (20% of supply). Treatment consists of coagulation, flocculation, and clarification (CFC); rapid gravity filtration (RGF); chlorination with sodium hypochlorite; and fluoridation.

Irish Water has indicated that the sources require 5 log credit treatment to achieve protozoal compliance, as they are located in a lowland catchment with a high level of agricultural activity close to the abstraction points. The current CFC and RGF processes provide 3 log credit treatment, so the WTP is currently operating under a log 2 deficit for protozoal compliance. *Cryptosporidium* monitoring is conducted 6 times per annum in the Wexford Town PWS. Due to COVID-19 sampling restrictions, only 3 *Cryptosporidium* samples have been taken in 2020 to date. Irish Water will be reviewing the *Cryptosporidium* monitoring frequency for the Wexford Town PWS in 2021 to ensure it aligns fully with Irish Water's *Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies*.

The audit was carried out in response to: (i) an aluminium parametric failure (330 µg/l) in the Wexford Town PWS distribution network on 31/08/20; (ii) spikes in turbidity levels > 1NTU in the final water at the WTP in the days prior to the aluminium exceedance (25/08/20 to 31/08/20); and (iii) the failure to notify the EPA of parametric exceedances and treatment process failures, in a timely manner.

> Supply Zones Areas Inspected

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



1. Incident Management

1.1

	Answer
Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
<p>Comment</p> <p>An aluminium exceedance of 330 ug/l (compared to the parametric value of 200 ug/l) occurred in the Wexford Town PWS distribution network on 31/08/20. In response to elevated raw water turbidity levels in late August 2020 (> 50 NTU on 21/08/20, 25/08/20, and 27/08/20), resulting from adverse weather conditions, the relief caretaker manually increased the dose of the coagulant, aluminium sulphate, on 27/08/20. This resulted in carryover of aluminium into the final treated water.</p> <p>The relief caretaker was operating the Wexford Town WTP from 17/08/20 to 07/09/20 while the duty caretaker was on annual leave. The relief caretaker is fully trained (FETAC level 5 water treatment plant operations certification) and routinely performs WTP caretaking duties for Wexford County Council. A hand-over of the plant was carried out with the duty caretaker before going on leave. The relief caretaker was not present at the audit.</p> <p>On 03/09/20, Wexford County Council notified the HSE of the aluminium exceedance, and of elevated raw and final water turbidity levels in the days prior to the exceeding sample being taken. Wexford County Council also informed the HSE that these exceedances may have affected the <i>Cryptosporidium</i> barrier at the WTP. Following consultation with the HSE, the agreed action was to resample for aluminium, sample for <i>Cryptosporidium</i>, and to scour the impacted section of the distribution network. Scouring of the affected area took place during the week of 06/09/20 and further scouring of the distribution network took place in September 2020. All follow-up samples have been compliant. Wexford County Council informed Irish Water of the aluminium exceedance on 07/09/20, who in turn informed the EPA on the same day.</p> <p>Irish Water became aware of the elevated raw and final water turbidity levels in the days prior to the exceeding sample being taken, through the examination of trended data for the Wexford Town WTP. Irish Water examined this data following Wexford County Council's notification of the aluminium exceedance on 07/09/20. Irish Water informed the EPA that final water turbidity levels were elevated (>1 NTU on 25/08/20, 27/08/20 (x2 spikes), 29/08/20, and 30/08/20) when notifying the aluminium exceedance on 07/09/20. At the audit, Wexford County Council advised that they were not aware that Irish Water and the EPA had to be notified of final water turbidity levels >1 NTU. This is a significant concern because elevated turbidity levels of >0.3 NTU in final water indicate a temporary loss of the <i>Cryptosporidium</i> barrier at the plant, and present a risk of breakthrough of <i>Cryptosporidium</i> into the water supply.</p> <p>Although each individual filter has a turbidity monitor, prior to 02/10/20 there was no alarm on the turbidity monitors. The combined final water was alarmed for turbidity as follows: (i) high alarm: 0.8 NTU and (ii) high high alarm: 1 NTU. Neither of these alarms initiated automatic shutdown of the WTP. Both set-points also do not meet the EPA criteria for turbidity performance of rapid gravity filters of 0.2 NTU (turbidity approach) or 0.3 NTU (log credit approach) in order to demonstrate an effective <i>Cryptosporidium</i> barrier at the plant. Following the audit, Irish Water and Wexford County Council reviewed these alarms and new alarm set-points and shutdown procedures were put in place on 02/10/20 (see "filtration" section for more details). However, the new alarm set-points are still not in accordance with the EPA criteria for turbidity performance of the rapid gravity filters.</p> <p>Prior to the audit, no automatic shutdown procedures were in place at the Wexford Town WTP. However, revised alarms and shutdown set-points for turbidity and chlorine were put in place in early October 2020, the details of which can be found in section 4 & 5 of this audit report.</p>	



2. Source Protection

	Answer
2.1 Is the abstraction source(s) adequately protected against contamination?	Yes
Comment	
<ul style="list-style-type: none">• Water is abstracted from the Sow river (Edenvale) (80% of supply; approximately 5km from the WTP) and Coolree impoundment reservoir (20% of supply; approximately 1km from the WTP).• The caretaker inspects both abstraction points daily. The screen on the raw water intakes are inspected and cleaned regularly.	



3. Coagulation Clarification Flocculation (CFC) Stage

3.1

Is the pH within a suitable range for the coagulant used?

Answer

No

Comment

Raw water monitoring

1. Raw water turbidity is monitored in the balance tank (mix of both raw water supplies) on a continuous basis. From the period of 20/08/20 to 05/10/20, raw water turbidity in the balance tank was, for the majority of the time, <5 NTU. However, raw water turbidity spiked above 50 NTU on 21/08/20, 25/08/20, 27/08/20, 29/09/20, and 30/09/20, as a result of poor weather conditions.
2. The raw water at the Edenvale source is monitored for pH, turbidity, and ammonia. However, these raw water monitors have not been trending correctly for a number of months. Repairs of these monitors are due to be completed soon.
3. Raw water conditions at the Coolree source are not monitored.

CFC stage

1. Aluminium sulphate (alum) (8%) is added after the balancing tank. Dosing is flow proportional.
2. Alum dosing is controlled by a Coagsense Coagulation Control streaming current monitor. However, during periods of poor weather conditions the streaming current monitor does not operate correctly.
3. Manual control of dosing takes place during periods of adverse weather conditions. Jar tests are conducted on-site to determine the appropriate dose during manually controlled dosing.
4. No pH correction takes place prior to coagulation. At the site visit, the caretaker advised that raw water pH can reach 7.8 and that the coagulant used on site is not suitable for the raw water pH. The optimum coagulation is pH 5.8 to 6.5.
5. Automatic switchover of the alum duty and standby dosing pumps occurs every 24 hours.
6. There are three hopper bottomed clarifiers at the Wexford Town WTP.
7. The sludge bleeds operate for 1 minute every 15 minutes.
8. Sludge goes directly to the sewers, which are connected to a wastewater treatment plant.
9. There was no evidence of pin floc or rising sludge at the time of the audit.
10. The clarifier turbidity alarms were modified on 06/10/20 and are as follows: (i) high alarm: 1.8 NTU for 15 minutes and (ii) high high alarm: 2 NTU for 15 minutes. If turbidity is >2 NTU for longer than 30 minutes, run to waste is activated.
11. A cascade system is in place to alert staff in the event of an alarm being triggered.



4. Filtration

4.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	No
Comment	
<ol style="list-style-type: none"> 1. There are three rapid gravity filters (RGFs) at the Wexford Town WTP. 2. Filter media (gravel and sand) depth in each filter is approximately 690mm. The minimum depth recommended by the EPA is 800mm in the EPA's 1995 Filtration Manual, however, the revised filtration manual (soon to be published) recommends 1000 to 1200mm media depth above the support gravel. 3. Each RGF is backwashed once per day. The backwash procedure lasts 13 minutes (5 minutes of air scour and 8 minutes of water scour). The RGFs are run to waste post backwash for an appropriate length of time. 4. Backwash water goes directly to the sewers, which are connected to a wastewater treatment plant. 5. The RGFs are cleaned every 2-3 months. Cleaning frequency is altered as required. 6. There is a turbidity monitor on each of the RGFs. Prior to 02/10/20, these monitors were not alarmed. Filter turbidity levels were >0.3 NTU at the time of the audit, however, these were as a result of run-to-waste investigative works ongoing at the plant during the audit. Water from the WTP was running to waste when these elevated filter turbidity levels were recorded. 7. Filter turbidity alarms were modified on 02/10/20 and are as follows: (i) Medium alarm: 0.3 NTU for 15 minutes; (ii) High alarm: 0.5 NTU for 15 minutes; and (iii) High High alarm: 1 NTU for 3 minutes. These high and high high alarms do not meet the EPA criteria for turbidity performance of RGFs of 0.2 NTU (turbidity approach) or 0.3 NTU (log credit approach), in order to demonstrate an effective <i>Cryptosporidium</i> barrier at the plant. 8. The alarms detailed in point 7 are also in place for the combined filtered turbidity and final water turbidity. Work is currently underway to initiate automatic run to waste, which will be initiated on the high high alarm for final water turbidity. 9. A cascade system is in place to alert staff in the event of an alarm being triggered. 10. Final water turbidity was <0.2 NTU on the day of the audit. 	



5.1

	Answer
Is the chlorine dosed appropriately?	Yes
Comment	
<ol style="list-style-type: none"> 1. Chlorination at Wexford Town WTP was changed from chlorine gas to liquid chlorine in January 2020. 2. Sodium hypochlorite (10%) is dosed after the filters prior to entering the clear-water tank. Fluoride is also dosed prior to the clear-water tank (CWT). 3. Dosing is flow proportional. There is a duty and standby dosing pump, which automatically switchover every 24 hours. 4. Final water leaves the plant and goes to the Newtown and Coolcots reservoirs. 5. Chlorine residuals are monitored prior to entering the CWT and at the Newtown and Coolcots reservoirs. A chlorine residual of >0.5 mg/l is aimed for leaving both the Newtown and Coolcots reservoirs, which was being achieved on the day of the audit. 6. Chlorine contact time at the Newtown and Coolcots reservoirs are 27.44 and 52.48 mg.min/l, respectively. 7. Chlorine alarms prior to the CWT were modified on 02/10/20 and are as follows: (i) low alarm: 0.9 mg/l for 15 minutes; (ii) low low shutdown: 0.8 mg/l for 5 minutes; (iii) high alarm: 2.8 mg/l for 15 minutes; and (iv) high high shutdown: 3 mg/l for 5 minutes. 8. Chlorine alarms at the Newtown and Coolcots reservoirs were also modified on 02/10/20 and are as follows: (i) low alarm: 0.6 mg/l for 15 minutes; (ii) low low shutdown: 0.5 mg/l for 5 minutes; (iii) high alarm: 1 mg/l for 15 minutes and (iv) high high shutdown: 1.4 mg/l for 5 minutes. 9. A cascade system is in place to alert staff in the event of an alarm being triggered. 10. There are two chlorine booster stations in the network, one at the Shelmalier reservoir and one at the Knockbroad reservoir. A chlorine residual of 0.4 mg/l is aimed for leaving both booster stations. 11. Chlorine residuals of >0.1 mg/l are consistently achieved in the Wexford Town PWS network which demonstrates the water in the distribution network is adequately disinfected. 	



6. Reservoirs and Distribution Networks

		Answer
6.1	Are reservoirs adequately inspected and maintained?	Yes
Comment		
<ol style="list-style-type: none">1. There are two reservoir sites, Newtown and Coolcots, prior to water supply connections to consumers on the distribution network. There are 2 reservoirs at each location, with approximately 4,500 m³ and 3,400 m³ total storage at the Newtown and Coolcots reservoirs, respectively.2. Reservoirs in both Newtown and Coolcots were last inspected and cleaned in 2018.		

Recommendations

Subject	Wexford Town audit recommendations	Due Date	29/11/2020
Action Text	<p>Recommendations</p> <ol style="list-style-type: none"> 1. Irish Water and Wexford County Council should ensure that all drinking water parametric exceedances and treatment process failures are notified to Irish Water, the EPA, and the HSE, in a timely manner. 2. Irish Water and Wexford County Council should ensure that relief caretakers are appropriately trained to ensure an effective response to parametric failures and water treatment process failures. 3. Irish Water should ensure that raw water parameters (including pH, colour, and turbidity) are monitored prior to entering the CFC treatment stage to alert plant operators to changes in raw water quality. 4. Irish Water should ensure that the raw water monitors at the Edenvale source are repaired without delay. 5. Irish Water should install pH correction prior to coagulation at Wexford Town water treatment plant, to reduce the need to add excessive levels of coagulant to achieve the optimum coagulation pH. 6. Irish Water should optimise the automated control system for coagulant dosing at Wexford Town water treatment plant, to ensure it can respond effectively to variations in raw water quality. 7. Irish Water should review the filter turbidity alarm set-points to ensure the filters are operated to meet the EPA turbidity performance criteria 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 Wexford Town water treatment plant. 8. Irish Water should ensure that all filters at the Wexford Town water treatment plant have the minimum media depth of 1000-1200 mm. 9. Irish Water should identify how the protozoal compliance log deficit is to be addressed at Wexford Town water treatment plant. 10. Irish Water should undertake <i>Cryptosporidium</i> monitoring in Wexford Town public water supply in accordance with <i>Irish Water's Rationale for Determining the Frequency of Cryptosporidium in Public Water Supplies</i>. <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 DW2020/207 in any future correspondence in relation to this Report.</p>		

