

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	Lyreacrompane RWSS 057E
Organisation	Irish Water
Scheme Code	1300PUB1009
County	Kerry
Site Visit Reference No.	SV24393

Report Detail	
Issue Date	08/03/2022
Prepared By	Regina Campbell

Site Visit Detail			
Date Of Inspection	25/02/2022	Announced	Yes
Time In	11:00	Time Out	13:45
EPA Inspector(s)	Regina Campbell		
Additional Visitors			
Company Personnel	Irish Water: Kian Guihen, Derek O' Toole Kerry County Council (acting under service level agreement to Irish Water): John O' Sullivan, Owen O' Sullivan, Seamus O' Mahony, Paul Neary.		

> Summary of Key Findings

1. There have been 5 no. exceedances of the THM (trihalomethanes) parametric value of 100 ug/l notified to the EPA for November and December 2021, January and February 2022 in the Lyreacrompane PWS. The EPA will consider adding this supply to the Remedial Action List (RAL) under the category of elevated THMs above the Drinking Water Regulations if there are persistent THM exceedances. Irish Water should submit a programme of works to address the risk of THM formation in the Lyreacrompane PWS.
2. Irish Water should ensure that the combined filter water turbidity alarm setpoints are in accordance with the log performance criteria as specified in the EPA Water Treatment Manual: Filtration and that an assessment of the filters is undertaken in order to address issues found at the audit.
3. The audit found that the Lyreacrompane Water Treatment Plant (WTP) is well managed and was producing satisfactory water on the day of the audit as evidenced by the chlorine and turbidity results viewed. However the plant is old and in need of refurbishment and the recommendations of the audit should be addressed to ensure the continued safety of the supply.

> Introduction

The Lyreacrompane Public Water Supply (PWS) serves a population of 2,575 and the supply volume is 2,248 m³/day (EDEN figures). The source of the supply is the River Smearlagh.

The raw water is treated at the plant as follows: pH correction using caustic soda, coagulation using aluminium sulphate and poly, clarification, rapid gravity filtration, chlorination using sodium hypochlorite and final water pH correction using soda ash. There has been no fluoridation at the plant since October 2019 as fluoridation dosing facilities are currently being upgraded.

The plant produces water for about 16-17 hours/day and is visited daily.

The audit was undertaken to assess the general operation and management of the plant in response to 5 no. THM exceedances notified to the EPA in 2021 and 2022 to date.

> Supply Zones Areas Inspected

All treatment processes were inspected at the plant.



1. Coagulation Clarification Flocculation (CFC) Stage

		Answer
1.1	Is the CFC process optimised to respond to changes in raw water quality?	Yes
Comment		
<p>The source of the supply is the River Smearlagh. The river has a lot of forestry, wind-farms and bogland in the catchment. Kerry County Council said that the river quality is variable with very high organic loadings at certain times of the year and corresponding very low UVT levels.</p> <p>Daily raw monitoring results and jar tests are undertaken and recorded. Raw water pH correction takes place using caustic soda followed by aluminium sulphate and poly dosing. Static mixers are in place after the caustic soda and aluminium sulphate dosing points.</p> <p>The target coagulation pH is 6.4 which is monitored at the floc tank and at the audit the pH monitor was reading 6.4.</p> <p>The plant shuts down at low pH of 5.8 and a high pH 6.6 at the floc tank. There is also a plant shut down setpoint of 1.0 NTU on the settled water. Settled water turbidity at the audit was 0.183 NTU.</p> <p>Records of aluminium residuals in final water were satisfactory.</p> <p>Kerry County Council said trials will be undertaken to see if PACL is a more efficient coagulant than aluminium sulphate.</p>		

		Answer
1.2	Are the CFC processes appropriately controlled?	No
Comment		
<p>There is a duty only caustic soda pump.</p> <p>There are duty/standby poly pumps with no automatic changeover in the event of the failure of the duty pump.</p>		

		Answer
1.3	Were the CFC tanks, channels and weirs observed to be clean, level and well maintained during the audit?	No
Comment		
<p>There are 2 no. hopper bottomed clarification tanks with lamella plates at the plant. The tanks are deep cleaned twice/year. The CFC channels and weirs were observed to be clean with no floc carryover into channels.</p> <p>There were a number of broken lamella plates which should be repaired.</p>		

> 2. Filtration

		Answer
2.1	Are the filters designed and managed in accordance with EPA guidance?	No
Comment		
<p>There are 3 no. rapid gravity sand filters at the plant. However Filter no. 2 was not in operation at the audit. Kerry County Council said that a replacement valve for Filter No. 2 had been ordered and will be replaced shortly. Kerry County Council said that the sand had not been replaced since 2008 and that it was not known when the filters were last assessed. Kerry County Council said that the media depths range between 600 mm and 700 mm which are less than the minimum filter media depth of 1000 mm recommended in the EPA Water Treatment Manual: Filtration. Media depth gauges are in place at each filter.</p> <p>Kerry County Council said that each filter is backwashed every 48 hours, or if turbidity > 0.1 NTU or if headloss is > 15% but backwashing is not triggered automatically. A slow start is used when returning each filter to operation.</p> <p>There is a turbidity monitor on each filter with an alarm and shutdown setpoint of 0.2 NTU (after 15 minutes). There is also a turbidity shutdown setpoint of 1 NTU after 3 minutes at the combined filters monitoring point at the clear water tank. There should be an additional lower turbidity alarm installed at the clear water monitoring point in order to demonstrate compliance with the turbidity log performance criteria as outlined in the EPA Water Treatment Manual: Filtration.</p>		

		Answer
2.2	Does monitoring indicate that the filters are operating effectively?	Yes
Comment		
<p>At the audit the turbidities from Filter 1 and Filter 2 were 0.025 NTU and 0.027 NTU respectively. Turbidity at the clear water tank was 0.082 NTU and post reservoir was 0.056 NTU. All readings were satisfactory.</p> <p>Trends for 4 weeks submitted prior to the audit also showed stable and low turbidity readings from each filter.</p> <p>Several spikes in the post reservoir turbidity trend were noted including a reading of 1.27 NTU on 25/01/22 and 4.2 NTU on 13/02/21. Kerry County Council said that these spikes are due to manganese build up in the sample lines and on both occasions the sample lines were flushed and turbidity readings returned to normal. Kerry County Council are investigating to see if the sample line distance from the reservoir can be reduced to lower the risk of fouling from manganese.</p> <p>Turbidity levels in the clear water tank monitor are also more elevated (but < 1 NTU) on occasions. Kerry County Council attributed the raised turbidity to precipitation of manganese caused by addition of chlorine to the clear water tank. Kerry County Council said that the sample line is also regularly flushed to reduce fouling and that it is intended to clean the clear water tank shortly.</p>		



3. Disinfection

		Answer
3.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
Comment		
<p>The Lyreacrompane plant was upgraded under the Irish Water Disinfection Programme with works completed in 2017. The filtered water is disinfected using sodium hypochlorite. Dosing is flow proportional with residual trim and takes place at the clear water tank. There are duty and standby chlorine pumps with automatic changeover in the event of a failure.</p> <p>Chlorine dosing is monitored by monitor CL001 and there is a low chlorine alarm and shutdown setpoint of 1.5 mg/l. There is a high chlorine alarm setpoint of 3.4 mg/l but no shutdown based on high chlorine.</p> <p>Contact time is achieved at the on-site reservoir with dual validation chlorine monitors (CL002/CL003) after the reservoir. There is a low chlorine alarm of 1 mg/l and a high chlorine alarm of 2.75 mg/l with no shutdowns based on high or low chlorine at this point.</p> <p>Trended data is recorded and accessible for all monitors CL001 to CL003. Chlorine residual post chlorine contact time was 1.6 mg/l. Four weeks of trends submitted of the chlorine monitors showed adequate and stable levels of chlorination.</p>		

		Answer
3.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes
Comment		
Chlorine alarms are dialled out and there is a cascade system in place.		

		Answer
3.3	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No
Comment		
Records of residual chlorine monitoring submitted showed gaps of up to 9 days between sampling rounds. Chlorine residuals were ≥ 0.1 mg/l which is satisfactory.		

		Answer
3.4	Is there adequate chlorine contact time before the first connection?	Yes

Comment

Chlorine contact time calculations submitted by Irish Water show that the site has a total effective contact time of 38.06 mg.min/l, at a residual chlorine concentration of 0.5 mg/l and this is greater than the target contact time of 26.4 mg.min/l. Monitors CL002/CL003 which monitor after the reservoir were both reading 1.6 mg/l residual chlorine at the audit which demonstrates that target contact time is being achieved.



4. Reservoirs and Distribution Networks

	Answer
4.1 Are reservoirs adequately inspected and maintained?	Yes
Comment	
There are 3 no. reservoirs fed by the plant and these were all cleaned during 2018 and 2019.	



5. Treatment Process Chemicals

	Answer
5.1 Are treatment process chemicals appropriately managed and stored?	No
Comment	
The sodium hydroxide tank fill point is not locked and the fill point should be enclosed so that any spillages are directed into the bund.	



6. Management and Control

	Answer	
6.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
Comment		
<p>Irish Water said that the protozoal compliance log treatment requirement for the plant has been provisionally determined as log 3 but that the sanitary survey needs to be completed to confirm this.</p> <p><i>Cryptosporidium</i> monitoring is being carried out in accordance with Irish Water's 'Rationale for Determining the Frequency of <i>Cryptosporidium</i> Monitoring in Public Water Supplies'.</p>		

	Answer	
6.2	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	No
Comment		
<p>There are no high or low pH alarms for the final water.</p>		

	Answer	
6.3	Are relevant alarms dialled out via a cascade system to allow a timely response by plant operators?	No
Comment		
<p>While the chlorine alarms and inhibits are dialled out via a cascade system, other alarms at the plant are only sent to the plant caretaker and are not on a cascade system.</p>		

	Answer	
6.4	Are instrument calibrations within date?	No
Comment		
<p>The aluminium sulphate and soda ash dosing pumps are overdue a service since February 2021.</p>		



7. Drinking Water Quality

	Answer
7.1	Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2014, as amended, been notified to the EPA? Yes
Comment	
<p>There have been 5 no. exceedances of the THM parametric value of 100 ug/l notified to the EPA since November 2021. Failures have ranged from 108 ug/l to 148 ug/l Kerry County Council believe that the THM formation may be caused by the source, which contains very high dissolved organics, and low flows and long retention times in the network.</p> <p>Kerry County Council are continuing to investigate the reasons for the THM exceedances and identify possible corrective actions.</p>	

Recommendations

Subject	Lyreacrompane Audit Recommendations	Due Date	08/04/2022
Action Text	<p>Recommendations</p> <p>Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues, Irish Water should implement the following recommendations without delay.</p> <ol style="list-style-type: none"> 1. Irish Water should a) investigate the reasons for the THM exceedances and submit a programme of works to address the issue in the supply and b) continue to monitor THMs in the extremities of the network on a monthly basis. Irish Water should ensure that monitoring points are representative of the quality of the water in that area of the network. 2. Irish Water should ensure that the turbidity alarm and shutdown setpoints are reviewed and operated in accordance with turbidity log performance criteria as per the EPA Water Treatment Manual: Filtration in order to demonstrate an effective <i>Cryptosporidium</i> barrier at the water treatment plant. 3. Irish Water should a) confirm when filter no. 2 is back in operation b) undertake an assessment of the filters c) replace the sand media in the rapid gravity filters to a minimum of 1000m, where feasible, in accordance with the EPA Water Treatment Manual: Filtration d) automate backwashing so that it is triggered on turbidity, headloss and time e) repair the broken lamella plates in the settlement tanks. 4. Irish Water should a) confirm the protozoal log treatment requirement for the plant b) continue monitoring for <i>Cryptosporidium</i> in accordance with the Irish Water Rationale for Monitoring <i>Cryptosporidium</i> in Public Water Supplies. 5. Irish Water should ensure that monitoring of residual chlorine is undertaken in the network, including extremities, several times a week. 6. Irish Water should a) ensure that all alarms at the plant are on a cascade system and b) connect the plant to the Countywide SCADA system. 7. IW should a) confirm when the clear water tank has been cleaned b) investigate moving the location of the post reservoir turbidity monitor in order to reduce problems caused by fouling of the sampling line. 8. Irish Water should a) install shutdown based on high and low chlorine in the final water b) install high and low alarms based on final water pH. 9. Irish Water should a) ensure that the alum and soda ash pumps are serviced b) install duty/standby pump arrangements for caustic soda c) install automatic changeover to the standby pump in the event that the duty poly pump fails. 10. Irish Water should ensure that the fill point of the sodium hydroxide tank is locked and that the fill point is located within the bunded area. <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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team.</p> <p>Irish Water should submit a report to the Agency on or before 08/04/22 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 time frame 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 Compliance Plan DW20210174 in any future correspondence in relation to this Report.</p>		