

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	Dungarvan
Organisation	Irish Water
Scheme Code	3100PUB1039
County	Waterford
Site Visit Reference No.	SV20457

Report Detail	
Issue Date	25/08/2020
Prepared By	Criona Doyle

Site Visit Detail			
Date Of Inspection	19/08/2020	Announced	Yes
Time In	11:05	Time Out	11:56
EPA Inspector(s)	Criona Doyle		
Additional Visitors			

Company Personnel	<p>Irish Water: Pat Duggan*** Siobhan Clifford* Tara Foley* Niall O'Riordan***</p> <p>Waterford City and County Council Pat Mc Carthy* Ciaran Bourke*** Declan Halpin*** Paul Carroll* John Beecher**</p> <p>HSE: Laurence O'Connor*</p> <p>*Attended pre-site visit meeting 18/08/20 only. **Attended site visit 19/08/20 only. ***Attended pre-site visit meeting 18/08/20 and site visit 19/08/20.</p>
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> Summary of Key Findings

1. The Dungarvan public water supply sources water from 4 no. boreholes located in a limestone aquifer. During July and August 2020 the Dungarvan public water supply has experienced periods of elevated turbidity in the treated water ranging from a few minutes to several hours duration. Elevated turbidity levels greater than 1 NTU could compromise the effectiveness of the disinfection process and pose a risk of inadequately disinfected water being supplied to consumers. The investigation undertaken by Irish Water and Waterford City and County Council found that the elevated turbidity is linked to the switching on of the abstraction pumps and ramping up of the pumping rates combined with low water levels in the limestone aquifer.
2. The audit found that Irish Water and Waterford City and County Council have identified a programme of remedial works to address the elevated turbidity. Irish Water and Waterford City and County Council should undertake the proposed remedial works as a matter of urgency to ensure that the final treated water meets the turbidity parametric value.
3. The current information shows a protozoal compliance log deficit at Dungarvan water treatment plant, which means there is a risk of Cryptosporidium entering the water supply from the borehole sources and the current treatment at the plant does not provide a Cryptosporidium barrier. All sampling for Cryptosporidium to date has been clear. Irish Water needs to identify how the protozoal compliance log deficit is to be addressed at Dungarvan water treatment plant.

> Introduction

The Dungarvan public water supply (PWS) produces 5,236m³/d of water serving a population of 11,472 in Dungarvan town and the surrounding area including Ring Helvick. Raw water is abstracted from 4 no. boreholes located at the water treatment plant. Treatment includes chlorination and fluoridation.

This audit was carried out in response to the notifications by Irish Water of the failure to meet the turbidity parametric value in Dungarvan public water supply between 12/07/20 and 16/08/20.

> Supply Zones Areas Inspected

All areas of the treatment process at the water treatment plant were inspected during the audit. The offsite storage reservoirs were not inspected during this 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
Comment	
<p>On 15/07/20 the EPA was notified of an exceedance of the turbidity parametric value in the final treated water at Dungarvan WTP that occurred three days previously on 12/07/20. The exceedance was not promptly notified to the EPA.</p> <p>On 12/07/20 the maximum turbidity of the treated water supplied to the distribution network was 5.5 NTU which exceeds the limit of 1 NTU allowed under the 2014 Drinking Water Regulations. Irish Water became aware of the turbidity issue on 15/07/20 and informed the EPA and HSE. Elevated turbidity can compromise the disinfection system and indicate a risk of Cryptosporidium being present in a supply. The turbidity in the water supplied to the network exceeded the 1 NTU parametric value for 12.5 hours between 07:30 and 20:00 hours on 12/07/20.</p> <p>An investigation into the incident indicates a turbidity alarm was generated however the appropriate actions, in relation to the escalation of the incident by Waterford City and County Council operational staff, were not promptly carried out. On 15/07/20 the notification of the turbidity exceedance was submitted to the EPA. Irish Water and Waterford County Council consulted with the HSE on 15/07/20 in relation to the health advice as a result of the turbidity exceedance.</p> <p>The delay in the notification and escalation of the incident prevented any timely actions taking place to ensure the protection of consumers health. As a result the bacteriological and residual chlorine sampling in the network did not take place until 15/07/20, 3 days after the incident occurred. The Cryptosporidium sampling rig was mobilised to site and a sample taken off for analysis on 16/07/20. No Cryptosporidium was detected in the sample. Continuous residual chlorine monitoring data (SCADA print out) confirmed there was no increase in chlorine demand during the period of elevated turbidity and the chlorine levels leaving the network remained consistent. This indicates that the elevated turbidity levels were not caused by organic contamination of the raw water, but rather by inorganic material that did not impact on the chlorine demand.</p> <p>Prior to the audit, in response to the incident Irish Water indicated that appropriate training would be provided to the necessary personnel in relation to incident escalation and the notification process.</p> <p>Between the 15/07/20 and 16/08/20 there have been further intermittent turbidity exceedances on 15 no. days where the turbidity at the water treatment plant (combined raw water) has exceeded 1 NTU all of which have been notified to the EPA : 15/07/20; 16/07/20; 23/07/20; 25/07/20; 26/07/20; 28/07/20; 04/08/20; 05/08/20; 09/08/20; 11/08/20; 12/08/20; 13/08/20; 14/08/20; 15/08/20 and 16/08/20. The normal range of turbidity seen at the site is generally in the range of 0.3 to 0.4 NTU.</p> <p>Irish Water and Waterford City and County Council have continued to notify the EPA of further turbidity exceedances since the initial exceedance. The turbidity in the final water supplied from the reservoir to the public water supply has exceeded the 1 NTU parametric value on the following dates: 12/07/20; 16/07/20; 23/07/20; 25/07/20; 05/08/20; 12/08/20 and 14/08/20. These elevated turbidity levels greater than 1 NTU could compromise the effectiveness of the disinfection system and pose a risk of inadequately disinfected water being supplied to consumers. Irish Water's investigations have found that the elevated turbidity events are linked to the switching on of the abstraction pumps and the ramping up of the pumping rates combined with low water levels in the limestone aquifer.</p>	



2. Disinfection

		Answer
2.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
	Comment	
	<p>There are two residual chlorine monitors installed on site to monitor and record the level at the water treatment plant (CI001) and on the outlet from the Ballinamuck reservoir (CI002). The residual chlorine levels were available to view on the HMI at the water treatment plant on the day of the audit. The data can also be viewed remotely via the county wide SCADA.</p> <p>There are high and low level chlorine alarms in place. Level 1 plant shutdown alarms and Level 2 warning alarms are in place for both monitoring locations (CI001 WTP and CL002 outlet from reservoir) but there is no automatic shutdown of the supply linked to the low and high chlorine alarms. The caretaker responds to the alarms and a cascade system that involves 3 no. caretakers is in place. A text alert is generated for both the Level 1 and Level 2 alarms.</p>	
		Answer
2.2	Are duty and standby chlorine pumps/ UV units in operation?	Yes
	Comment	
	<p>Duty and standby chlorine dosing pumps are provided for the disinfection stage at the treatment plant at Ballinamuck. The pumps switch over every 6 hours. The Ring Helvick area is supplied by the Dungarvan supply. A separate set of chlorine dosing pumps (duty/standby) provide booster chlorination for the Ring Helvick area at the lower reservoir.</p>	
		Answer
2.3	Is the chlorine dosed appropriately?	Yes
	Comment	
	<p>The chlorine dosing at Ballinamuck Water treatment plant is constant dose with a residual trim at the outlet from the reservoir based on the residual chlorine level.</p> <p>The chlorine boosting at the lower reservoir for the Ring Helvick area is based on flow proportional dosing on the inlet of the reservoir plus trim on the outlet of the reservoir based on the residual chlorine level.</p>	
		Answer
2.4	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	Yes
	Comment	

The chlorine trend was viewed on site during the audit and indicated stable levels of disinfection.

		Answer
2.5	Is there adequate chlorine contact time before the first connection?	Yes
Comment		
The residual chlorine level is being monitored on the outlet from the Ballinamuck reservoir. A copy of the contact time was provided which indicated an effective contact time of 24.5 mg.min/l.		

		Answer
2.6	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes
Comment		
Monitoring of the residual chlorine in the network is undertaken daily.		



3. Site Specific Issues

		Answer
3.1	Is there a documented procedure for responding to turbidity alarms at the water treatment plant ?	No
Comment		
There is no documented procedure available at the water treatment plant outlining the actions required to be undertaken in response to turbidity alarms at the plant or the criteria under which sampling for Cryptosporidium is instigated in response to turbidity events.		

		Answer
3.2	Have remedial works been identified to address the cause of the increased level of turbidity at the water treatment plant ?	Yes
Comment		
A programme of works has been identified by Irish Water and Waterford County Council to address the elevated turbidity. The works include (1) installation of auto scour to facilitate the run to waste of high turbidity raw water (2) installation of continuous turbidity monitors on all four boreholes including works to the PLC and SCADA (3) cleaning out of 8m deep raw water sump by contractor. Funding has been approved to carry out the works but an estimated timeframe for completion could not be confirmed at the audit.		

		Answer
3.3	Has the site been assessed under the protozoal compliance log credit approach ?	No
Comment		
Irish Water has identified that the 4 no. boreholes serving the Dungarvan water supply have a log 5 treatment requirement in terms of protozoan compliance. The current treatment process comprises of chlorination only which does not provide a log reduction for protozoan compliance (e.g. Cryptosporidium). Irish Water outlined at the audit that the log deficit for the existing treatment process at Dungarvan had yet to be reviewed under the new Source Cryptosporidium Risk Assessment Methodology being developed by Irish Water. A hydrogeological report on the borehole has been completed by a consultant but was not available to view at the audit. The borehole linings and seals do not meet the requirements of EPA Advice Note 14: Borehole Construction and Wellhead Protection.		

Recommendations

Subject	Audit Dungarvan Turbidity	Due Date	25/09/2020
Action Text	<p data-bbox="279 398 544 432">Recommendation(s)</p> <ol data-bbox="279 454 1433 1122" style="list-style-type: none"><li data-bbox="279 454 1433 633">1. Irish Water should identify a timeframe for the completion of the planned remedial works (i) installation of auto scour with automated run to waste of high turbidity raw water, (ii) cleaning of the 8m deep raw water sump and (iii) installation of turbidity monitors on each of the individual boreholes and connection of the turbidity monitors to SCADA. These works should be completed as a matter of urgency to prevent further turbidity exceedances at the Dungarvan water treatment plant.<li data-bbox="279 663 1433 779">2. Irish Water should ensure a documented procedure is developed for responding to turbidity alarms at Dungarvan water treatment plant. The procedure should set out the criteria under which sampling for <i>Cryptosporidium</i> is instigated in response to turbidity incidents to ensure that reactive sampling for <i>Cryptosporidium</i> can be undertaken in a timely manner.<li data-bbox="279 808 1433 864">3. Irish Water should identify how the protozoal compliance log deficit is to be addressed at the Dungarvan water treatment plant.<li data-bbox="279 893 1433 949">4. Irish Water should install automatic shutdown of the Dungarvan public water supply, if a low or high level chlorine set point is reached, linked to the low and high-level chlorine alarm.<li data-bbox="279 978 1433 1034">5. Irish Water should forward a copy of the recently completed hydrogeological report on the borehole sources.<li data-bbox="279 1064 1433 1122">6. Irish Water should ensure that all borehole lining and seals are maintained in accordance with EPA Advice Note 14: Borehole Construction and Wellhead Protection. <p data-bbox="279 1151 810 1184">Follow-Up Actions required by Irish Water</p> <p data-bbox="279 1214 1433 1270">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 data-bbox="279 1299 1433 1332">This report has been reviewed and approved by Aoife Loughnane, Drinking Water Team Leader.</p> <p data-bbox="279 1361 1433 1417">Irish Water should submit a report to the Agency on or before 25/09/10 detailing how it has dealt with the issues of concern identified during this audit.</p> <p data-bbox="279 1447 1433 1503">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 data-bbox="279 1532 1433 1588">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 data-bbox="279 1617 1433 1673">Please quote the Action Reference Number DW2020/62 in any future correspondence in relation to this Report.</p>		