

# 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	
<b>Name of Installation</b>	DLR Zone 6
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	1000PUB1006
<b>County</b>	Dublin
<b>Site Visit Reference No.</b>	SV22260

Report Detail	
<b>Issue Date</b>	26/03/2021
<b>Prepared By</b>	Aoife Loughnane

Site Visit Detail			
<b>Date Of Inspection</b>	16/03/2021	<b>Announced</b>	Yes
<b>Time In</b>	14:30	<b>Time Out</b>	15:30
<b>EPA Inspector(s)</b>	Aoife Loughnane Michelle Minihan		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	Irish Water: Andrew Boylan, Edward Haythornthwaite, Joe O'Reilly, Emily Mulqueen, John Leamy, Liliana Mereacre  Dublin City Council: Ned Fleming, Martin Hession  HSE: Dr. Helena Murray, Dr. Coilin O'hAiseadha, Niamh McGrath		

## > Summary of Key Findings

1. Irish Water notified the EPA of 16 detections of Giardia in Vartry final water between 08/02/21 and 10/03/21. This represents a significant increase on the intermittent low level protozoal detections which are typical in the Vartry water supply.
2. The cause of the recent increase in protozoal breakthrough at Vartry water treatment plant is likely to be a combination of landspreading in the catchment area, extremely high levels of rainfall in mid-February, and the age and condition of the existing water treatment plant which is 150 years old and at end-of-life.
3. The new Vartry water treatment plant is under construction on the site adjoining the existing plant, and is on track for completion in July 2021. The new plant will provide both a physical barrier (clarification & filtration) and inactivation barrier (ultraviolet disinfection) for protozoa.
4. In the meantime, Irish Water and Dublin City Council have taken action to mitigate the risk of further protozoal breakthrough at the existing plant, including reduction in overall plant throughput, increased sampling programme for Cryptosporidium & Giardia in final water, and increased vigilance in the operational performance of the slow sand filters.

## > Introduction

Vartry water treatment plant provides drinking water to over 200,000 people in Wicklow and Dublin. Treatment consists of slow sand filtration and disinfection by chlorination. A new water treatment plant is currently under construction on the site adjoining the existing plant.

There are 7 supplies on the EPA's Remedial Action List which are fed by Vartry water treatment plant. The RAL completion date for the upgrade of Vartry water treatment plant is July 2021.

This audit was carried out in response to a significant increase in the number of detections of Giardia in Vartry final water since 08/02/21.

## > Supply Zones Areas Inspected

The audit comprised of a video conference meeting on 16/03/21. A site visit was not undertaken due to Covid-19 risk.



1.1

	Answer
Have failures of the parametric values or the detection of pathogenic micro-organisms or parasites in the water supply been adequately investigated?	Yes
<b>Comment</b>	
<p>1. There has been 16 detections of Giardia in Vartry final water so far this year. Following each detection, Irish Water notified the EPA and consulted with the HSE regarding the risk to public health. The consultation and risk assessment undertaken by Irish Water, Dublin City Council and the HSE determined that consumers did not need to be informed of a risk to public health. Irish Water, Dublin City Council and the HSE have agreed to maintain open engagement on this matter. Cryptosporidium has not been detected in any samples this year. The details of the Giardia detections are as follows:</p> <ol style="list-style-type: none"> <li>1. Mon 08/02/21: 0.002 cysts/litre at Reservoir at Plant</li> <li>2. Sat 13/02/21: 2 cysts in 1,462 litres at Callow Hill</li> <li>3. Sat 13/02/21: 1 cyst in 1,000 litres at Reservoir at Plant</li> <li>4. Sun 14/02/21: 1 cyst in 820 litres at Reservoir at Plant</li> <li>5. Sun 21/02/21: 1 cyst in 1,100 litres at Callow Hill</li> <li>6. Mon 22/02/21: 5 cysts in 2,059 litres Callow Hill</li> <li>7. Mon 22/02/21: 1 cyst in 749 litres at Reservoir at Plant</li> <li>8. Weds 24/02/21: 2 cysts in 2,140 litres at Callow Hill</li> <li>9. Weds 24/02/21: 1 cyst in 733 litres at Reservoir at Plant</li> <li>10. Sat 27/02/21: 1 cyst in 991 litres at Reservoir at Plant</li> <li>11. Sat 27/02/21: 1 cyst in 2617 litres at Callow Hill</li> <li>12. Sun 28/02/21: 1 cyst in 831 litres at Reservoir at Plant</li> <li>13. Sun 28/02/21: 1 cyst in 2245 litres at Callow Hill</li> <li>14. Mon 01/03/21: 1 cyst in 1993 litres at Callow Hill</li> <li>15. Weds 03/03/21: 1 cyst in 1910 litres at Callow Hill</li> <li>16. Weds 10/03/21: 1 cyst in 535 litres at Reservoir at Plant</li> </ol> <p>2. Irish Water and Dublin City Council has taken the following actions in response to the increase in Giardia detections, in order to maintain water quality and protect public health:</p> <ul style="list-style-type: none"> <li>• Construction of the new Vartry water treatment plant is on track to meet the RAL completion date of July 2021;</li> <li>• Increased sampling frequency for Cryptosporidium and Giardia in Vartry final water (which is currently 5 successive days, running Saturday to Wednesday inclusive);</li> <li>• Installation of a 0.5 NTU turbidity alarm on the combined filtered water;</li> <li>• Removal of two slow sand filters (Filters 1 and 8) from service, on account of sub-optimal performance;</li> <li>• Reduction in overall plant throughput;</li> <li>• Increased vigilance on operational performance, and review of the effectiveness of actions taken; and</li> <li>• Regular engagement with the HSE, who have increased public health surveillance of the areas and communities served by Vartry water treatment plant.</li> </ul>	



## 2. Supply on the Remedial Action List

		Answer
2.1	Is the Action Programme on track to meet the Remedial Action List completion date?	Yes
<b>Comment</b>		
<p>1. Irish Water confirmed that the construction of the new Vartry water treatment plant is on track to meet the RAL completion date of July 2021, when the new plant is expected to begin its commissioning phase. The commissioning, validation and verification phase is expected to take up to six months before the 7 supplies fed by Vartry water treatment plant can be removed from the RAL.</p> <p>2. The new Vartry water treatment plant will provide a physical and inactivation barrier to protozoa. The Vartry Reservoir source requires 3 log treatment for protozoa. The log treatment capability of the new plant will be up to 6 log (99.9999%), providing up to a 3 log surplus of protection.</p> <p>3. The new water treatment plant will use the following technology:</p> <ul style="list-style-type: none"><li>• chemical coagulation;</li><li>• dissolved air flotation;</li><li>• rapid gravity filtration;</li><li>• pH correction;</li><li>• disinfection by chlorination and ultra violet treatment.</li></ul>		



### 3. Site Specific Issues

3.1

Has anything unusual occurred in the catchment that may have contributed to the increase in Giardia detections in Vartry final water?

Answer

Yes

**Comment**

1. Weather conditions were extremely wet in mid-February, with 182 mm rainfall between 13th and 23rd February, which is equivalent to 2 months rainfall in the space of 11 days.
2. There is anecdotal evidence of agricultural activities in the catchment in early February, when tractors with tankers were observed on local roads and the odour of slurry was detected. However, slurry spreading was not observed on land in the catchment. Irish Water has engaged with Wicklow County Council Environment Section and the Local Authorities Water Programme (LAWPRO) to raise concern about slurry spreading in general. Vartry Reservoir is not listed as a priority area for action under the current River Basin Management Plan. Nonetheless, Irish Water stated that adverts will be placed in local newspapers to remind farmers in Co. Wicklow of the precautions to take when slurry spreading.
3. There is an overflow from Roundwood waste water treatment plant (WWTP) into a drainage ditch that enters the Vartry River downstream of Vartry water treatment plant. However, Irish Water cannot rule out the possibility that the drainage ditch may have overflowed into the Vartry reservoir during heavy rainfall. There is a communications system in place between the operators of Roundwood WWTP and Vartry WTP in the event of an overflow, so that action can be taken to protect drinking water quality.
4. A review of daily E.coli and turbidity levels shows that raw water quality has improved since the elevated levels (E.coli > 500 MPN/100 ml) at the beginning of February. This trend does not correlate with the increase in Giardia detections in final water, which could indicate a possible lag time in the Vartry reservoir source.
5. A raw water sample on 11/03/21 was clear of Cryptosporidium and Giardia. Irish Water explained the practical difficulties of sampling raw water for Crypto/Giardia, whereby the sample filter becomes clogged after a short period. Irish Water will continue with the enhanced monitoring programme for Crypto/Giardia in the final water.
6. Irish Water representatives stated that their comparison of historical protozoal detections at Vartry shows that 2018 was comparable to this year, with 5 x Crypto and 9 x Giardia detections in Vartry final water. The Callow Hill tunnel was decommissioned in December 2018 when the new Callow Hill pipeline was completed. Irish Water stated that the reduction in protozoal detections in Vartry final water in 2019 (6 detections) & 2020 (4 detections) cannot be definitively linked to the decommissioning of the Callow Hill tunnel, as weather conditions could also have been a factor.
7. Irish Water representatives identified that for the 16 Giardia detections so far this year, 8 were detected during standard monitoring (Saturdays and Mondays) and 8 were detected during the enhanced monitoring programme (Sundays, Tuesdays and Wednesdays). There has been no detections of Cryptosporidium in final water so far this year, which is unusual compared to previous years.

3.2

Is there a possibility of ingress between Vartry water treatment plant and the Callow Hill sample point?

Answer

No

**Comment**

Ingress has been ruled out as a possible contributory factor to the Giardia detections at the Callow Hill sample point, on the basis that the pipework was newly installed and pressure tested in 2018, and the water pressure in the pipework is approximately 7 bar.

	<b>Answer</b>
<b>3.3</b>	Has the new turbidity alarm (0.5 NTU on combined filtered water) been activated since it was installed at the plant in early February?
	Yes
<b>Comment</b>	
The new turbidity alarm has been activated twice since its installation, both times during power cuts, which were not deemed to be genuine alerts to a deterioration in filtered water quality. The combined filtered water has not exceeded 0.5 NTU since the new alarm was installed.	

	<b>Answer</b>
<b>3.4</b>	Is Vartry water treatment plant currently operating at full production capacity?
	No
<b>Comment</b>	
<p>1. Vartry water treatment plant is currently producing approximately 42 ML/day compared to the full production capacity of 50 - 55 ML/day. The minimum sustainable throughput is 40 ML/d to ensure adequate pressure across the distribution network.</p> <p>2. Filters No. 1 &amp; 8 remain out of production since 19/02/21 due to sub-optimal turbidity performance. These filters are currently running to waste and are being monitored to determine when turbidity levels reach an acceptable threshold. Filter No. 7 was out of production on the day of the audit as it was being cleaned.</p> <p>3. Algae levels are being closely monitored in raw water at the plant because seasonal diatom growth causes problems by blinding the slow sand filters. This is a recurring issue at the Vartry Reservoir and typically arises in March/April. The plant operators manage the impact on the slow sand filters as follows:</p> <ul style="list-style-type: none"> <li>• At diatom counts &gt; 100/ml: the effect is noticeable. Filter run times are shortened.</li> <li>• At diatom counts &gt; 200/ml: a higher level of effect is noticeable. Filters need to be cleaned frequently.</li> </ul>	

## Recommendations

<b>Subject</b>	Vartry Virtual Audit Recommendations_March	<b>Due Date</b>	26/04/2021
<b>Action Text</b>	<p><b>Recommendations</b></p> <ol style="list-style-type: none"><li>1. Irish Water and Dublin City Council should continue the increased sampling programme for Cryptosporidium and Giardia in Vartry final water, and notify the EPA and HSE immediately if any cysts or oocysts are detected.</li><li>2. Irish Water should complete the upgrade of Vartry water treatment plant as soon as possible, to provide both a physical and inactivation barrier for protozoa.</li></ol> <p><b>Follow-Up Actions required by Irish Water</b></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 26/04/21 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 Compliance Plan DW20090397 in any future correspondence in relation to this Report.</p>		