

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	DCC Zone 6
Organisation	Irish Water
Scheme Code	0700PUB1007
County	Dublin
Site Visit Reference No.	SV22716

Report Detail	
Issue Date	07/10/2021
Prepared By	Aoife Loughnane

Site Visit Detail			
Date Of Inspection	06/09/2021	Announced	Yes
Time In	14:00	Time Out	16:00
EPA Inspector(s)	Aoife Loughnane Michelle Minihan		
Additional Visitors			
Company Personnel	Irish Water: Andrew Boylan, Paul McLoughlin, John Leamy*, Emily Mulqueen*, Joe O'Reilly*, Geoff O'Sullivan* Dublin City Council (operating under SLA to Irish Water): Stephen Burke, Niall Armstrong* Nicholas O'Dwyer Ltd.: Daniel Wrafter, Cathal Kinsella**, Stephen Fagan**, Alistair Cussen*, Graham Reynolds* HSE: Helena Murray, Ruth McDermott, Alannah Goggins, Lucinda Ryan* * attended the pre-site visit meeting only. ** attended the site visit only.		

> Summary of Key Findings

1. Irish Water has built a new covered storage reservoir at Stillorgan to eliminate the contamination risk presented by open storage of treated water. The new covered reservoir has been in operation since 26/08/21 and will significantly improve the safety and security of the drinking water supply to approximately 200,000 people in Dublin City and Dun Laoghaire Rathdown.
2. Irish Water informed the EPA and HSE on 27/08/21 that the new covered storage reservoir at Stillorgan was complete and the UV disinfection system on the open storage reservoir had been switched off on 26/08/21. There was an internal communication breakdown within Irish Water which meant that neither the EPA or HSE were given advance notice of the plan to cease UV disinfection and to verify the risk reduction to public health before the new reservoir was brought into service. Irish Water must ensure to communicate in advance with both the EPA and HSE regarding any changes to water treatment processes associated with major water supply projects.
3. Irish Water did not undertake a comprehensive risk assessment in advance of introducing the new covered storage reservoir into service on 26/08/21.

> Introduction

Stillorgan Reservoir supplies water to approximately 200,000 people in Dublin City and Dun Laoghaire Rathdown. The reservoir receives treated water from Ballymore Eustace and Vartry water treatment plants and supplies the following water supply zones: DCC Zones 5, 6 & 7 and DLR Zone 1.

Under the Stillorgan Reservoir Upgrade Project, Irish Water has constructed a new covered reservoir on the site of the former Gray Reservoir, to eliminate the risk to drinking water quality posed by open storage of treated water. The new reservoir provides 160 ML of treated water storage in 3 cells; cells 1 and 2 (50 ML storage each) and cell 3 (60 ML storage). The residence time in the new reservoir depends on water demand but is typically 1.5 days.

The water entering the covered reservoir has already received full treatment at Ballymore Eustace and Vartry water treatment plants. The only water treatment at Stillorgan Reservoir is chlorine boosting which takes place at the reservoir inlet and outlet to achieve the target level of residual disinfection in water leaving the reservoir.

The existing UV disinfection system at Stillorgan Reservoir ceased operating on 26/08/21 following the switch from the open storage ponds to the covered reservoir.

This audit was carried out in response to the notification by Irish Water of the cessation of UV disinfection at Stillorgan Reservoir.

> Supply Zones Areas Inspected

The audit comprised of a virtual meeting on 02/09/21 and a site visit to the new covered reservoir on 06/09/21.



1. Disinfection

1.1

Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?

Answer

Yes

Comment

1. Booster chlorination of the water supply is carried out at the new covered reservoir.

2. Sodium hypochlorite (0.8% concentration) is generated on-site in two electrolytic chlorination (OSEC) units. The product is stored for a maximum of 1.5 days before use.

3. There are 5 sets of chlorine dosing pumps, all operating in duty and standby arrangement with automatic switchover.

4. Chlorine is dosed at each of the four inlet pipes and at the reservoir outlet pipe. The chlorine dose is flow proportional with feedback trim. The chlorine target is 0.8 mg/l at the reservoir outlet.

5. There are 3 chlorine monitors (for triple validation) on the reservoir outlet pipe. During the audit the monitors were reading:

- Chlorine monitor No. 1: 0.83 mg/l
- Chlorine monitor No. 2: 0.79 mg/l
- Chlorine monitor No. 3: 0.80 mg/l.

6. The outlet chlorine alarm set-points are:

- Low: 0.65 mg/l;
- Low-low: 0.5 mg/l;
- High: 1 mg/l;
- High-High: 1.2 mg/l.

7. The inlet chlorine alarm set-points are:

- Low: 0.8 mg/l on the two pipes from Ballymore Eustace/Saggart, 0.65 mg/l on the two pipes from Vartry;
- Low-low: 0.6 mg/l on the two pipes from Ballymore Eustace/Saggart, 0.4 mg/l on the two lines from Vartry;
- High: 1.3 mg/l on all four inlet pipes;
- High-High: 1.8 mg/l on all four inlet pipes.

8. There is no automatic shutdown of flow based on low or high chlorine levels. There is an alarm response system in place and Irish Water and Dublin City Council deems it essential to maintain the supply of water to the areas fed by Stillorgan Reservoir.

9. If a chlorine alarm is activated during normal hours, the operators on site will respond. When an alarm activates, a text message alert is sent to the operator and up to 10 other staff. If an alarm is activated outside of normal hours, an operator can dial in remotely to check what has happened.

10. The auditors review of final water chlorine levels on the SCADA system found a stable trend at the 0.8 mg/l target level.



2. Reservoirs and Distribution Networks

2.1

	Answer
Is treated water in tanks and reservoirs suitably protected against contamination?	Yes
Comment	
<p>1. The new covered reservoir has eliminated the risk to drinking water quality posed by the previous configuration of open storage of treated water.</p> <p>2. Nicholas O'Dwyer Ltd. Engineers confirmed that the new reservoir cells and all new pipelines were super-chlorinated before the reservoir was filled. Bacteriological samples were taken as the cells were filled, to monitor and verify water quality. The super-chlorinated water was then treated in a de-chlorination unit prior to discharge to the site's surface water drainage system.</p>	



3. Drinking Water Quality

		Answer
3.1	Is <i>Cryptosporidium</i> monitoring being carried out in accordance with Irish Water's 'Rationale for Determining the Frequency of <i>Cryptosporidium</i> Monitoring in Public Water Supplies'?	Yes
Comment		
<p>1. Irish Water ceased the monitoring programme for <i>Cryptosporidium</i> and <i>Giardia</i> in the final water at Stillorgan Reservoir in May 2021.</p> <p>2. The EPA is satisfied that monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in the final water at Stillorgan Reservoir is no longer warranted, given that the water entering the covered storage reservoir has already been treated to achieve 3 Log protozoal removal/inactivation at Ballymore Eustace and Vartry water treatment plants.</p>		



4. Site Specific Issues

4.1

	Answer
Did Irish Water engage with the EPA and HSE in advance of the cessation of UV disinfection at Stillorgan Reservoir?	No
<p>Comment</p> <p>1. Irish Water informed the EPA and HSE on 27/08/21 that the new covered storage reservoir at Stillorgan was complete and the UV disinfection system on the open storage reservoir had been switched off on 26/08/21. Irish Water failed to follow due process by not:</p> <ul style="list-style-type: none"> • Engaging with the EPA and HSE in advance of ceasing UV disinfection, • Providing details of any risk assessment undertaken to inform the decision to cease UV disinfection, • Providing data to verify the safety of the water supply from the new covered reservoir. <p>Irish Water acknowledged that they had an internal communication breakdown which meant that neither the EPA or HSE were given advance notice of the plan to cease UV disinfection, and to verify the risk reduction to public health before the new reservoir was brought into service.</p> <p>2. On 27/08/21, the EPA asked Irish Water to recommence UV disinfection until a comprehensive risk assessment was carried out. However, Irish Water confirmed that it was not possible to switch the UV disinfection system back on because the pipework from the new covered reservoir is not connected to the UV system.</p> <p>3. The EPA called a meeting with Irish Water, Dublin City Council and the HSE on 02/09/21 to discuss the matter. At the meeting, Irish Water provided an overview of the commissioning timeline and drinking water quality data which showed that turbidity levels from the new covered reservoir were lower than those from the open storage reservoir. The level of residual chlorine at the outlet of the new reservoir showed a stable trend at the 0.8 mg/l target level.</p> <p>4. Irish Water's risk assessment in advance of the cessation of UV disinfection was not comprehensive and did not ensure that any risks to drinking water quality supplied by Ballymore Eustace and Vartry water treatment plants were mitigated appropriately. After the new reservoir was filled, it subsequently emerged that there was an incident at Ballymore Eustace water treatment plant on 20/08/21 that should have been factored into Irish Water's risk assessment prior to switching off the UV disinfection system.</p>	

Recommendations

Subject	Stillorgan Reservoir Audit Recommendations	Due Date	04/11/2021
Action Text	<p>Recommendations</p> <ol style="list-style-type: none">1. Irish Water should ensure to engage in advance with both the EPA and HSE regarding any changes to water treatment processes associated with major water supply projects.2. Irish Water should undertake a comprehensive risk assessment prior to making changes to water treatment processes associated with major water supply projects.3. Irish Water should ensure that the operators of Stillorgan Reservoir are fully trained in the operation, management and control of the on-site electrolytic chlorination (OSEC) disinfection system before it is formally handed over from the contractor. <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 04/11/21 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.</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>		