

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	Rathangan
Organisation	Irish Water
Scheme Code	1400PUB1041
County	Kildare
Site Visit Reference No.	SV20409

Report Detail	
Issue Date	18/08/2020
Prepared By	Aoife Loughnane

Site Visit Detail			
Date Of Inspection	29/07/2020	Announced	Yes
Time In	10:00	Time Out	11:05
EPA Inspector(s)	Aoife Loughnane		
Additional Visitors			
Company Personnel	Irish Water: Andrew Boylan, Edward Haythornthwaite, Peter Thornton, Ger Brady, Mark Claffey*, Dara Chadwick*, Emily Mulqueen* Kildare County Council: Diarmuid Donoghue* Veolia: Charlotte O'Hare, Mark Robinson, John Fenlon HSE: Robbie Doyle, Rose McCaul*, Noelle O'Loughlin* * indicates presence at pre-site visit meeting only		

> Summary of Key Findings

1. A failure of the disinfection system and alarm system occurred at Rathangan water treatment plant on 14/07/20, which led to inadequate chlorination of the public water supply. The low chlorine alarm failed to activate to alert the plant operators to the fault, and the dropping chlorine trend was not noticed on the SCADA remote monitoring system by the DBO operator. The incident was only discovered on the morning of 16/07/20 when the DBO operator visited the plant and acted immediately to report and rectify the issue.
2. Once Irish Water became aware of the incident on 16/07/20, they acted swiftly to consult with the HSE and issue a Boil Water Notice to protect consumers health in the area served by Rathangan public water supply. The Boil Water Notice remained in place for 16 days until it was lifted on 31/07/20.
3. Irish Water and the DBO operator investigated the cause of the disinfection incident and undertook corrective actions to prevent a reoccurrence, including the installation of automatic plant shutdown if the chlorine levels drop below a critical level of 0.3 mg/l leaving the plant. This provides an additional safeguard to ensure the water supply is adequately disinfected at all times.
4. The audit found that the disinfection system and controls have been restored to satisfactory operation.

> Introduction

Rathangan water treatment plant is operated by Veolia on behalf of Irish Water. The raw water is sourced from 6 boreholes in the area. Treatment comprises of rapid gravity filtration, chlorination and fluoridation. The treatment plant produces approximately 2,303 m³/d and serves a population of 6,558 people in the Rathangan area.

A Boil Water Notice was issued to consumers served by Rathangan public water supply on 16/07/20 following a failure of the disinfection system and alarm system at Rathangan water treatment plant.

> Supply Zones Areas Inspected

This audit was carried out in response to the failure of the disinfection system and alarm system at Rathangan water treatment plant. The audit focussed on the disinfection system and associated controls.

In light of Covid-19 social distancing and enhanced hygiene measures, the audit comprised of a video conference meeting with all relevant parties on 28/07/2020, followed by a site visit with essential audit participants on 29/07/2020.



1. Incident Management

	Answer
1.1 Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?	No
Comment	

Irish Water provided the following timeline of the disinfection incident events and actions taken:

- 12/06/20: Low level chlorine alarm set-point defaulted to zero.
- 13/07/20: Duty chlorine pump inspected and noted faulty, standby chlorine pump is activated manually.
- 14/07/20: Standby pump begins to fail to deliver chlorine.
 - @ 09:00: Chlorine begins to fall below 1mg/l.
 - @ 16:00: Chlorine falls below 0.5mg/l, low level alarm is not triggered.
 - @ 23:40: Chlorine falls below 0.3mg/l.
- 16/07/20 @ 10:15: Veolia operator attends site, fixes issue and reports.
 - @ 10:45: Veolia notify Irish Water by phone that an issue has occurred.
 - Morning: Kildare County Council notice no chlorine in Redhills Reservoir, and call Veolia who identify and discuss issue.
 - @ 14:17: Veolia provides incident notification form to Irish Water.
 - @15:06: Irish Water requests clarification to enable risk assessment.
 - @16:00: Emergency conference call held, Irish Water decide to issue BWN. BWN put in place and communicated. Irish Water consults with HSE and notifies EPA by phone.
- 17/07/20: Kildare County Council begin flushing and measuring chlorine residual in the network, this work continues to 24/07/20.

In the aftermath of this incident, Irish Water and Veolia undertook the following corrective actions:

- 20/07/20: Low level chlorine alarm is reactivated, set at 0.5 mg/l.
- 22/07/20: Low-low chlorine alarm and automatic plant shutdown installed at 0.3 mg/l. Automatic switchover for dosing pumps installed.
- 23/07/20: Chlorine dosing pumps repaired, serviced and tested. Automatic switchover is activated.

On 29/07/20, Kildare County Council issued a BWN to 3 Group Water Schemes supplied by Rathangan WTP. This was 13 days after the BWN was placed on Rathangan PWS so the consumers served by the 3 group schemes may not have been aware of the need to boil their water – a measure which was put in place to protect public health. Irish Water and Kildare County Council should have clearly identified to those group schemes that they were included in the scope of the original BWN.

Rathangan WTP has a SCADA system which allows for remote monitoring of the plant operations. This incident occurred when the plant manager was on annual leave. At the audit, Veolia confirmed that in the absence of the plant manager, no one else was monitoring the SCADA system. The dropping chlorine trend should have been spotted and rectified before it reached a critically low level. During the audit, Veolia confirmed that the SCADA system is due to be upgraded by the end of August 2020, and the newer version will be more user-friendly for operators.

Rathangan WTP is usually visited 3 times per week (Monday, Wednesday & Friday), but it wasn't visited between Monday 13/07/20 and Thursday 16/07/20 because the plant manager was on annual leave. As a result, no-one noticed the chlorine was spilling into the bund from the corroded split on the dosing line. If the plant had been visited, the problem could have been spotted sooner and action could have been taken to avoid the incident.

The chlorine dosing pumps are serviced once per year. Veolia representatives could not confirm if this maintenance frequency is in accordance with the manufacturer's instructions. This incident occurred when the duty chlorine dosing pump was out of action due to an issue with the pump diaphragm. The standby chlorine dosing pump operated as it should, however a corroded fitting caused a split on the dosing line which resulted in chlorine spilling into the bund. This incident could have been avoided if the condition of the chlorine pumps and dosing equipment had been checked more regularly and maintained in accordance with the manufacturer's instructions.

The alarm system failure was caused by a fault with the analogue card in the PLC which controls the plant operations. Veolia maintenance staff carried out a service visit on 12/06/20 during which they rectified the analogue card fault. However, this action caused the low-level chlorine alarm set-point of 0.5 mg/L to default to zero. This error was not noticed or corrected between the service visit on 12/06/20 and the incident which occurred a month later on 14/07/20. This incident could have been avoided if the maintenance staff checked to confirm that critical plant alarms were verified in proper working order after servicing works were carried out at the plant on 12/06/20.



2. Filtration

	Answer
2.1 Was there visual indication that the filters were operating appropriately?	No
Comment	
<p>There was a significant build-up of algae on the inlet channels of both rapid gravity filters which are located inside the treatment plant building. This issue was also observed during the previous audit in July 2017. Veolia representatives confirmed that the filters are cleaned twice per year, however this appears to be inadequate considering the amount of algal growth on the filters. The presence of algae could result in problems with the organoleptic qualities of drinking water, such as taste or odour issues.</p>	



3.1

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

Answer

Yes

Comment

The audit found that the disinfection system and controls have been restored to satisfactory operation following the incident on 14/07/20. The following items were checked and verified during the audit:

- The duty & standby chlorine dosing pumps have been repaired and are working satisfactorily.
- The chlorine trend has been stable since the disinfection failure was discovered and chlorine dosing was re-established on 16/07/20.
- There is a new automatic switchover arrangement between the duty & standby chlorine dosing pumps.
- The chlorine monitor was reading 1.035 mg/l at the time of the audit. This is in line with the target of 0.9 to 1.0 mg/l chlorine leaving the plant.
- The low chlorine alarm is set to activate at 0.5. mg/l. This sends a text message to 3 Veolia staff; the plant manager, the plant operator, and the general manager.
- There is a new automatic shutdown of the plant if a low-low chlorine level of 0.3 mg/l is reached. This new safeguard was demonstrated and verified during the audit.
- There is a high chlorine alarm at 1.3 mg/l. Veolia stated that a further new safeguard to automatically shutdown the plant based on a high-high chlorine level will be installed in August, along with the upgrade to the SCADA system.

The chlorine monitor at Redhills Reservoir is not linked to an alarm with a dial out facility to alert relevant personnel to a critical drop in chlorine levels.



4. Site Specific Issues

	Answer
4.1 Does the drinking water quality meet the standards in the European Union (Drinking Water) Regulations 2014, as amended?	Yes
Comment	
<p>Following the incident, Irish Water undertook sampling of drinking water quality at eleven locations throughout the distribution network, including at the network extremities where the chlorine levels could be slower to recover to the required minimum level of 0.1. mg/l.</p> <p>At the time of the audit, the results of samples taken in the Rathangan PWS network on Monday 27th & Tuesday 28th July (including bacteriological analysis and chlorine levels) were not yet available. Subsequent to the audit, the sampling results were provided by Irish Water to the HSE and EPA. Following the confirmation of satisfactory drinking water quality results and with the agreement of the HSE, Irish Water lifted the Boil Water Notice on 31/07/20.</p>	

Recommendations

Subject	Rathangan Audit Recommendations	Due Date	14/09/2020
Action Text	<p>Recommendations</p> <ol style="list-style-type: none"> 1. As Rathangan water treatment plant is a remotely managed plant, Irish Water should ensure that it is visited by a plant operator at least three times per week. A deputy plant manager should be nominated to oversee the operational performance of Rathangan water treatment plant when the plant manager is on annual leave. 2. Irish Water should ensure there is a documented procedure in place at Rathangan water treatment plant that requires any contractors or maintenance personnel working on site to check and confirm that critical plant alarms and fail-safes are verified in proper working order after any works have been carried out, and prior to leaving the site. 3. Irish Water should review the maintenance schedule for chemical dosing pumps at Rathangan water treatment plant to ensure that pumps are serviced at an appropriate frequency in accordance with the manufacturer's instructions. 4. Irish Water should install a further safeguard on the disinfection system at Rathangan water treatment plant to automatically shutdown the plant if a high chlorine set-point is reached. 5. Irish Water should install an alarm on the chlorine monitor at Redhills Reservoir. The alarm should be linked to a dial out facility to alert relevant personnel to a critical drop in chlorine levels. 6. Irish Water should ensure that the filters are cleaned on a regular basis to prevent the build-up of algae on the inlet channels and filter walls. 7. Irish Water, in conjunction with Kildare County Council, should identify and keep a centralised record of each group water scheme (name, population and location map) supplied by Rathangan water treatment plant. <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. 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 14/09/20 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> <p>Please quote the file Reference Number DW2020/61 in any future correspondence in relation to this Report.</p>		