

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	Navan Mid-Meath Liscarton PWS
Organisation	Irish Water
Scheme Code	2300PUB1016
County	Meath
Site Visit Reference No.	SV22617

Report Detail	
Issue Date	25/08/2021
Prepared By	Derval Devaney

Site Visit Detail			
Date Of Inspection	27/07/2021	Announced	Yes
Time In	10:00	Time Out	12:30
EPA Inspector(s)	Derval Devaney Aoife Loughnane		
Additional Visitors			

Company Personnel	Virtual Audit attendees: Irish Water: Diane Carroll Denise Tracey (also present at site audit) John Paul Diamond (also present at site audit) Morgan Cox John Hand (also present at site audit) Francis Glancy (also present at site audit) Veolia: Gary Lee (also present at site audit) Mark Rooney (also present at site audit) Tom O'Reilly (also present at site audit) Larry Phelan
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> Summary of Key Findings

1. Irish Water delineated the Navan Mid-Meath public water supply (PWS) into two distinct water supply zones during Quarter 1, 2021; namely Navan Mid-Meath Liscarton PWS and Navan Mid-Meath Kilcarn PWS. This was to enable the Navan Mid-Meath Liscarton PWS to be removed from the EPA's Remedial Action List (RAL) following the upgrade of Liscarton water treatment plant.

2. Irish Water upgraded a number of treatment processes at Liscarton water treatment plant in line with its RAL action programme. The upgrade included new intake screens; enhanced coagulation, flocculation and clarification; an upgrade of the existing filters and the provision of an additional filter and the provision of sludge and wash water treatment facilities. These processes were assessed during the EPA's audit in addition to an assessment of raw and final water quality data trends and THM and Manganese (Mn) results taken at the final water and in the distribution network.

3. The audit found that the upgrade of Liscarton water treatment plant was effective in ensuring adequate treatment and controls are in place and THM levels remain below the drinking water quality limit. The Navan Mid-Meath Liscarton PWS was subsequently removed from the EPA's RAL in the Q2, 2021. However, Navan Mid-Meath Kilcarn PWS remains on the RAL due to elevated levels of THMs, and Irish Water is due to submit a RAL action programme to the EPA to address the THM issues in the water supply from Kilcarn water treatment plant.

> Introduction

The Navan Mid-Meath Liscarton public water supply serves approximately 31,979 people in County Meath and the Liscarton water treatment plant is currently treating an approximate volume of 10,447 m³/day. Water is abstracted from the River Blackwater and receives the following treatment at Liscarton water treatment plant:

- raw water pH adjustment using sulphuric acid;
- coagulation and flocculation with aluminium sulphate coagulant and polyelectrolyte coagulant aid;
- clarification in four upward flow clarifiers,
- filtration across four rapid gravity filters,
- disinfection is provided with sodium hypochlorite, and
- final water is pH corrected with caustic soda followed by fluoridation.

The supply was added to the EPA's RAL in June 2009 due to 'EPA Audit Observations'. The purpose of the audit was to assess the treatment upgrade works and improved process controls that had been implemented under the RAL action programme and to verify if Liscarton public water supply could be removed from the RAL.

> Supply Zones Areas Inspected

The audit consisted of a video conference with Irish Water and Veolia (the plant contractor and current operator) on 23 July 2021 with EPA inspectors Derval Devaney and Aoife Loughnane.

The water treatment plant was then visited by Aoife Loughnane on 27 July 2021. The audit assessed each step of the the water treatment process from the raw water intake area though to the final stages of treatment (disinfection, pH correction and fluoridation) before entering the distribution network. Water treatment plant alarm and automatic shutdown set-points and process verification data from continuous online monitors were also inspected and final water quality data and THM and manganese results from the network.



1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	No
Comment		
<p>There is a hydrocarbon monitor on the raw water intake which alarms and shutdown the plant when concentrations exceed 0.3 ppm. During the site visit the monitor was observed to be situated below the surface water level of the Blackwater River. The audit attendees could not confirm if this monitor is located at the correct height to detect any hydrocarbon contamination at the raw water abstraction point.</p>		



2. Filtration

		Answer
2.1	Was there visual indication that the filters were operating appropriately?	Yes
Comment		
<p>There are four rapid gravity filters. Three filters were fully refurbished as part of the upgrade and are located indoors. An additional filter was installed as part of the upgrade works and is located outdoors. This new filter (Filter No. 4) had a build-up of algae on its walls. Veolia confirmed that the filter had been fully cleaned two months ago and that algal growth is very difficult to prevent due to its location outdoors. The presence of algae could result in problems with the organoleptic qualities of drinking water, such as taste and odour issues.</p> <p>A backwash of Filter No. 4 was observed during the audit and no issues of concern were identified during the backwash process.</p>		



3. Drinking Water Quality

3.1

	Answer
Have relevant failures to comply with the requirements of the European Union (Drinking Water) Regulations 2014, as amended, been notified to the EPA?	No
<p>Comment</p> <p>Irish Water notified the EPA of manganese failures which occurred in operational samples taken at the final water at the Liscarton Water treatment Plant on 07/12/20 (83 ug/l), 12/12/20 (53 ug/l), 13/12/20 (55 ug/l), and 20/12/20 (63 ug/l). As a result, there is an open manganese compliance file (Compliance Plan Number DW20210006) associated with the Navan Mid-Meath Liscarton PWS.</p> <p>An investigation report submitted by Irish Water on 16/03/21 outlined that since the 24/11/20, 13 manganese exceedances occurred in the treated water samples taken from the high lift pump sampling line. The manganese exceedances ranged from 50 to 70 µg/l mainly, with two results above 100 ug/l at 121 ug/l and 198 µg/l. These results were not formally notified to the EPA, as required, nor was the EPA informed of any HSE consultation regarding these failures.</p> <p>The report provided the results of investigative sampling which was carried out from 05/02/21 - 11/02/21 where manganese samples were taken in the raw, clarified water, filtered and final water. Raw water concentrations ranged from 42 ug/l - 100 ug/l showing evidence of elevated raw water manganese conditions. Final water manganese concentrations taken from a continuous sample line during this investigation period showed total manganese levels ranging from 27 - 48 ug/l (just below the parametric limit of 50 ug/l). Grab samples taken from the final water tap within this period were elevated and ranged from 62 ug/l - 139 ug/l; much higher than the manganese concentrations found in the raw water.</p> <p>The investigation report concluded that the tap sample point results in a sample flow that is not continuous and therefore is not representative of the water quality and was the cause for manganese failures. The report states that a continuous flow or different sampling line is being used since the 18/01/21.</p> <p>To satisfy itself that manganese is not an issue at this water treatment plant, the EPA requested that Irish Water submit further information regarding this manganese compliance plan to inform its assessment for the supply's RAL removal. As part of the audit assessment process, manganese results were submitted for raw, final and treated water.</p> <p>Data submitted by Irish Water illustrate raw water manganese levels as high as 147 ug/l in July 2021; the daily results in the final water, taken and analysed at the plant, were below the limit of 50 ug/l (but it was noted that in many incidents concentrations were just below it, at 49 ug/l). Irish Water also submitted daily manganese final water results from January 2021 – June 2021 analysed at the plant and these too, while compliant, were often just below the limit of 50 ug/l.</p> <p>In addition, three samples taken by an accredited lab (ALS) for April, May and July 2021 in the network were compliant for Manganese (5 u/l on 13/04/21; 5 ug/l on 11/05/21 and 21.6 ug/l on 07/07/21). There appears to be a difference in results for those manganese samples taken by the plant's lab and the external accredited lab (ALS). On 12 May 2021 manganese analysed at the plants laboratory was 39 ug/l and ALS's result was 21.5 ug/l. Similarly on 02 June 2021 manganese analysed at the plants laboratory was 48 ug/l and ALS's result was 61 ug/l.</p> <p>The failed accredited manganese result taken on 02 June 2021 was not notified to the EPA as required. Irish Water stated that this sample "was taken at the final water pH sensor tank, in order to ensure a representative sample is taken the probes have to be removed and most likely were not removed as part of sampling on this date. The continuous flow tap which is currently being used as a final water sample point is to be replaced with a clarity jar in the plant's lab and this upgrade will be completed shortly. The final water sample point is on the final water rising main that pumps to Proudstown reservoir. It is not planned to change the current sampling point, only to install a clarity jar when the on site lab upgrade is fully commissioned."</p> <p>In addition to the above failure of 02 June 2021, Irish Water also refer in its communications with the EPA in March 2021 of a manganese failure in the final water on 12 March 2021. Despite the EPA's requests for further detail on this failure, this information remains outstanding since March 2021.</p>	



4. Sludge Management

4.1

Is sludge arising from the treatment processes adequately managed?

Answer

Yes

Comment

Historically, dirty backwash water was sent to 2 No. sludge lagoons. The settled sludge from the clarifiers was also sent to the sludge lagoons without any thickening or dewatering treatment. There was no treatment process for the sludge and dirty backwash water other than gravity settlement in existing sludge lagoons. There was no backwash water balancing tanks to regulate the flow to the sludge lagoons; as a result, each time there was a backwash the backwash water arrives to the lagoon and de-stabilizes the settlement process resulting in a turbulence that moved settled sludge upwards towards the supernatant discharge. The lagoons are adjacent to the River Blackwater (downstream of the intake works). Sludge was removed from the lagoon via tanker every two weeks with residual liquid discharged to the River Blackwater.

The sludge and backwash water management system have been completely upgraded. Sludge from the clarifiers enters a sludge balance tank where the sludge is balanced, then thickened via two picket fence thickeners and stored in a sludge holding tank prior to off site disposal to Navan waste water treatment plant. The sludge holding tank has a 14 day storage capacity.

The backwash water from the filtration process (which is chlorinated water) and the resulting supernatant and liquors from sludge thickening process are balanced in wash water equalisation tanks and allowed to settle further with the aid of a polymer in wash water settlement tanks. The supernatant from this process is discharged to the River Blackwater. There is an online turbidity and flow monitor on this discharge. The turbidity monitor is alarmed. Irish Water was unable to confirm if there is a discharge licence in place for this discharge to the River Blackwater.



5. Supply on the Remedial Action List

	Answer
5.1 Do the audit findings support progress made with the Remedial Action List upgrades?	Yes
Comment	

Irish Water has upgraded Liscarton water treatment plant to include the following treatment:

- two new manual coarse screens at the raw water intake and duty/stand-by automatic fine screens;
- new raw water inlet pumping station;
- new chemical dosing system for automated pH adjustment of the raw water using sulphuric acid;
- new aluminium sulphate dosing system with automatic switchover of duty and standby pumps for enhanced coagulation;
- new flocculation tank to ensure adequate flocculation mixing rate and retention time is achieved prior to clarification;
- a new standby-by polyelectrolyte make-up and dosing system;
- clarification in the existing upward flow lamella clarifiers;
- the installation of an additional rapid gravity filter (RGF) and entire refurbishment of existing 3 RGFs;
- new sand filter media to a depth of 1200 mm on all 4 RGFs;
- installation of a backwash system on the RGFs which is automatically initiated based on time, head loss and filter turbidity;
- installation of a run to waste facility on rapid gravity filters following backwash based on time and filter turbidity;
- disinfection system upgraded to Irish Water disinfection specifications (chlorine gas replaced with liquid sodium hypochlorite);
- final water pH correction with caustic soda followed by fluoridation;
- existing high lift pumps for the treated water have been replaced to address inefficiency and cavitation issues;
- provision of sludge and wash water treatment facilities;
- replacement of existing electrical installations. Replacement/upgrade/repair of existing civil infrastructure as appropriate;
- repair and refurbishment of existing water treatment building, including upgrades to the existing site roads and security fences.

Irish Water has improved the operational management and control of the treatment processes to include the following controls:

- Alarm and plant shutdown based on raw water pH, turbidity, UVT, ammonium, conductivity and hydrocarbon concentrations;
- Alarm and plant shutdown based clarified water pH and turbidity;
- Alarm and plant shutdown based on turbidity from each individual filter;
- Alarm and plant shutdown based on combined filtered water turbidity;
- Alarm and plant shutdown based on final water turbidity, chlorine residual, pH, fluoride, UVT, low flow and aluminium;
- Daily water quality checks at the plant recorded in an Excel spreadsheet. Checks include weather conditions, river conditions, raw water temperature, pH, turbidity, colour, alkalinity, ammonia, UVT, iron manganese, TOC, Conductivity. Final water checks include pH, turbidity, ammonia, residual iron, residual aluminium, manganese, colour, UVT, chlorine residual and chlorine demand;
- Daily checks on online pH, chlorine residual, turbidity, ammonia, aluminium and UVT monitor performance against handheld monitor.

Five rounds of network THM verification sampling (taken from March to May 2021 at seven locations from the water treatment plant to the extremities of the distribution network) have shown that the upgrade works have been successful, resulting in THM compliance on the Navan Mid-Meath Liscarton public water supply. The supply was removed from the EPA Remedial Action List in Q2, 2021.

This upgraded treatment plant was commissioned and has been delivering water to the Navan Mid-Meath Liscarton PWS since December 2020. The process proving stage is due to be completed by the contractors in December 2021. Training of Meath County Council staff and plant handover is due to take place in January 2022.

Recommendations

Subject	Navan Mid-Meath Liscarton Audit Recommendations 27 07 2021	Due Date	27/09/2021
Action Text	<p>Recommendation(s)</p> <ol style="list-style-type: none"> 1. Irish Water should inform the EPA when the process proving stage of the upgrade works is complete and training and handover of Liscarton water treatment plant has been provided to Meath County Council. 2. Irish Water should provide detail on how the installation of a clarity jar at the plant's laboratory, as a final water sampling point for manganese, will address the discrepancies in manganese sampling results. Irish Water should arrange for three consecutive split samples to be taken at the new sampling point and analysis to be undertaken at the water treatment plant's laboratory and in an accredited laboratory. The outcome of these results should be submitted to the EPA once results are available. 3. Irish Water should ensure the hydrocarbon monitor is installed correctly, in order to detect any hydrocarbon contamination at the raw water abstraction point on the River Blackwater. 4. Irish Water should take action to prevent the build-up of algae on the walls of Filter No. 4. 5. In relation to the discharge of supernatant from the filter backwash water settlement tanks to the River Blackwater, Irish Water should: <ul style="list-style-type: none"> • Confirm if there is a discharge consent, including details of any specified emission limit values. • Routinely measure the chlorine concentration in the discharge, along with pH, suspended solids, aluminium and turbidity levels. • Assess the impact of the discharge on the river, and determine if it is necessary to de-chlorinate the discharge to prevent an adverse effect on the aquatic ecosystem in the receiving water. <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 Aoife Loughnane, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 27 September 2021 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 Action Reference Number in any future correspondence in relation to this Report.</p>		