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	Spiddal PWSS
Organisation	Irish Water
Scheme Code	1200PUB1045
County	Galway
Site Visit Reference No.	SV26073

Report Detail

Issue Date	24/10/2022
Prepared By	Ruth Barrington

Site Visit Detail

Date Of Inspection	12/10/2022	**Announced**	Yes
Time In	10:55	**Time Out**	14:00
EPA Inspector(s)	Ruth Barrington		
Additional Visitors	HSE: Emer O'Connell, Maria Horkan, Peter Gaffey, Kathleen McDonnell, James O' Connell, Cian Dowling- Cullen		
Company Personnel	Irish Water: Thomas Gibbons, Eoin Hughes, Vinny McGrath, Shay Walsh Galway County Council (operating under Sevice Level Agreement to Irish Water): Pierce Faherty, Alan Walsh, Tony Kelly, Jim O'Connell, Nicky Faherty		

Summary of Key Findings

1. The Do Not Consume Notice remains in place on Spiddal Public Water Supply since 16/09/2022, to protect public health against high levels of manganese built up within the distribution network. Irish Water's programme of flushing the network continues, to reduce the manganese levels. Daily sampling accompanies this flushing programme.

2. The ongoing sampling programme has also identified the area supplied by Rossaveel Reservoir as having levels of residual chlorine below the minimum required to ensure adequate disinfection. Irish Water are carrying out additional work to improve disinfection in that area of the Spiddal PWS.

Introduction

The Spiddal Public Water Supply (PWS) serves a population of over 5,600 people with water abstracted from Lough Boliska and treated at Spiddal Water Treatment Plant. Treatment processes include coagulation, flocculation and clarification (CFC), rapid gravity filtration and disinfection using chlorination. The WTP was upgraded recently, in 2019, and further work is planned by Irish Water on improving the process controls at the WTP to improve organics removal and protect critical treatment processes.

In mid-September Irish Water received consumer complaints about discoloured water in Spiddal PWS. Samples were taken on 15/09/2022 which were found to have high levels of manganese. Irish Water consulted with the HSE in relation to the results and placed a Do Not Consume Notice on the supply on 16/09/2022 to protect public health against high levels of manganese. This audit was carried out by the EPA to assess Irish Water's progress in restoring manganese compliance.

Supply Zones Areas Inspected

The audit included an inspection of coagulation, flocculation and clarification (CFC) and filtration processes on-site as well as an assessment of records, sampling results and data relating to manganese and disinfection.

1. Coagulation Flocculation and Clarification (CFC) Stage

		Answer
1.1	Is the CFC process optimised to respond to changes in raw water quality?	No

Comment

1. Irish Water are in the process of enhancing the coagulation processes with the addition of a streaming current monitor to improve coagulant dose control. At the time of the audit this monitor was in the 6-month data gathering period prior to its introduction for dose control.

2. In conjunction with the streaming current monitor, an additional static mixer is planned between the pH correction dose point and the coagulant dose point to improve mixing of soda ash prior to coagulant dose addition.

3. Current coagulant dose control is on the basis of colour and informed by UVT. A previous upgrade including UVT dose control bands was designed for a 4-log removal process in the filters, which was found not to be achievable on the basis of filter turbidities. The revised scheme with streaming current monitor control is designed for 3-log removal which matches the calculated 3-log credit requirement of the source water.

4. During the audit the clarification processes was observed to be working adequately, with clean clarification channels and no floc carry over into the channels.

2. Filtration

		Answer
2.1	Are the filters designed and managed in accordance with EPA guidance?	No

Comment

1. The upgrade of Spiddal water treatment plant completed in 2019 was designed for 4-log removal with coagulant dose regime based on defined UVT bands. Galway County Council staff described that the use of this regime was not sustainable in practice due to the filter's inability to meet a 0.1 NTU turbidity limit. The revised control system currently being provided will enable a 3-log removal with enhanced filter controls to meet the EPA *Water Treatment Manual- Filtration* standard of 0.3 NTU on filter outlets. Irish Water staff stated that the filter control works would be complete by the end of 2023.

2. In the interim, the individual filter turbidity monitors are trended, but the controls and inhibits are on the combined filtered water.

3. The filter upgrade in 2019 included provision of a green sand layer in the filters for the removal of manganese present in the raw water. That was accompanied by a pH adjustment pre-filter. The pH adjustment was discontinued shortly after the upgrade, as it was contributing to aluminium carryover into treated water.

4. The final water manganese levels are sampled approximately daily and recorded at the WTP. The records showed that final water manganese was largely compliant with the 50 ug/l limit specified in the *European Union (Drinking Water) Regulations 2014 as amended*, with the exception of one result of 52ug/l obtained on 18/09/2022.

5. The run to waste facility installed on the filters as part of the 2019 upgrade had been unused for some time due to problems with flooding around the outlet. This had been restored at the time of the audit according to Galway County Council staff, enabling run to waste to be part of the filter backwash procedure.

6. Monthly *Cryptosporidium* monitoring is in place at Spiddal water treatment plant to mitigate against the log deficit in accordance with Irish Water's *Cryptosporidium* Monitoring Rationale.

3. Disinfection

		Answer
3.1	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No

Comment

1. Routine monitoring of chlorine residual in the network is carried out approximately weekly, at a number of network locations. This frequency is inadequate to verify maintenance of chlorine residuals in the network and should be increased. According to Galway County Council, staff shortages have impacted on the frequency of monitoring.

2. Since the imposition of the Do Not Consume Notice, the deficiency in routine network monitoring is being addressed by additional operational sampling (including residual chlorine testing) undertaken throughout the Spiddal PWS network.

		Answer
3.2	Is there a chlorine residual ≥0.1 mg/l throughout the network?	No

Comment

1. The area of the Spiddal PWS network served by the Rossaveel Reservoir has been identified by Irish Water and Galway County Council as having frequent inadequate levels of residual chlorine for maintaining disinfection. This is due to seasonally relatively low levels of water usage in that area and to the large volume of water stored in the reservoir.

2. Irish Water have a programme of work to be carried out at Rossaveel Reservoir to improve disinfection in that area. The reservoir was cleaned on 28/09/2022 and the installation of a chlorine booster and controls on the amount of water stored in the reservoir, due to be complete by the end of November 2022, should improve the maintenance of chlorine residual.

4. Management and Control

		Answer
4.1	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	No

Comment

1. Irish Water are providing additional controls on CFC and filtration processes at Spiddal WTP. These will need to be accompanied by additional alarms and inhibits (for example at individual filter outlets) to verify the systems in accordance with the EPA *Water Treatment Manual: Filtration*.

2. Alarm and inhibit settings were viewed on the HMI screen during the audit. The levels of these alarms and inhibits should be reviewed by Irish Water as current settings may not alert operators to deteriorating water quality or the failure of a critical treatment process in time to take action. For example, the time delay for all WTP inhibits was set at fifteen minutes, where a 3-minute delay is more appropriate for certain processes. The treated water pH inhibit was set at pH 5.5, which is outside the compliant range specified in the *European Union (Drinking Water) Regulations 2014 as amended*.

5. Site Specific Issues

		Answer
5.1	Has adequate action been taken to restore network manganese compliance?	No

Comment

1. A Do Not Consume Notice has been in place on the Spiddal PWS since 16/09/2022. This Notice was placed by Irish Water in consultation with the HSE following manganese exceedances in samples taken on 15/09/2022 in response to complaints of discoloured water from consumers.

2. An assessment of manganese results at the WTP and in the network showed that treated water leaving the WTP was largely compliant (one exceedance of the parametric value in September). The immediate action required was to remove manganese within the distribution network, carried over from the compliant levels leaving the plant and possibly not adequately addressed in network maintenance over the years.

3. Irish Water and Galway County Council have undertaken a substantial programme of network flushing and re-sampling since the Do Not Consume Notice was placed. This programme remains active, as manganese levels at some locations remain a public health risk according to the HSE.

4. The design of the flushing programme was discussed at the audit. Spiddal PWS distribution network includes many branches off the water main which runs parallel with the coast. Some of these branches have scour valves or hydrants which can be accessed to flush that length of mains. Others do not have this infrastructure in place so there are flushed and unflushed areas of the network. Samples have been taken in both the flushed and unflushed areas.

5. At the time of the audit a number of sample results were still awaited by Irish Water and a full visual representation of areas which were flushed, unflushed or may remain at high risk of manganese exceedance were not available.

6. In follow up to the audit, the EPA has requested additional information from Irish Water in relation to (i) risk assessment of the flushing programme; and (ii) visual representation and mapping of flushed, unflushed, and sampled areas so that any remaining at high risk of manganese exceedance can be identified and prioritised for corrective action. In some cases, this corrective action may involve installation of additional scouring infrastructure to enable the relevant area to be flushed.

Recommendations

Subject	Spiddal Audit 12/10/2022	Due Date	24/11/2022
Action Text	**Recommendations** **Irish Water is responsible for ensuring a safe and secure supply of drinking water. To address these issues Irish Water should implement the following recommendations without delay.** 1. Irish Water should provide the additional information requested by the EPA on the design, risk assessment and outcomes of the scouring programme and accompanying sampling and analysis, including a visualisation of the data on maps of the supply. 2. Irish Water should provide an action programme for the restoration and maintenance of compliance with the manganese parametric value, to include options for future flushing regime and the feasibility of providing additional processes for manganese removal at Spiddal WTP. 3. Irish Water should proceed with the works at Spiddal WTP to enhance CFC and filtration controls for organics removal and safeguarding of critical treatment processes. 4. Irish Water should complete the proposed works at Rossaveel Reservoir to ensure that adequate chlorine residuals are maintained in that area. 5. Irish Water should review the alarm and inhibit settings at Spiddal WTP to ensure that critical treatment processes and statutory limits are protected. 6. Irish Water should ensure that routine monitoring of chlorine residuals is carried out at suitable locations within the network at a frequency at least several times per week, with actions being taken if results are detected below the minimum 0.1 mg/l for adequate disinfection. **Follow-Up Actions required by Irish Water** 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 Michelle Minihan, Senior Inspector, Drinking Water Team. Irish Water should submit a report to the Agency on or before 24/11/2022 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. 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.		