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	Fethard Regional PWSS
Organisation	Irish Water
Scheme Code	2900PUB0137
County	Tipperary
Site Visit Reference No.	SV25696

Report Detail

Issue Date	28/07/2022
Prepared By	Criona Doyle

Site Visit Detail

Date Of Inspection	13/07/2022	**Announced**	Yes
Time In	10:30	**Time Out**	12:30
EPA Inspector(s) **Additional Visitors**	Criona Doyle Lorcan Farrell		
Company Personnel	Irish Water: Pat Duggan, Samantha Keane, Michael Byrne. Glan Agua (acting under DBO contract to Irish Water): David Flanagan.		

Summary of Key Findings

1. A Boil Water Notice was placed on the Fethard Regional Public Water Supply (PWS) from 29/06/22 to 07/07/22 in response to the UV disinfection system operating outside of its validated range. Issues with the coagulant dosing system on 28/06/22 resulted in elevated turbidity which impacted on the operation of the UV disinfection system. The alarms on the UV unit had been bypassed and as a result the water treatment plant did not automatically shutdown in response to the UV unit dropping outside of its validated range.

2. Irish Water should ensure any lessons learned and remedial actions undertaken in response to the bypass of the UV alarm settings are applied to other sites and that spare parts are readily available for critical monitoring instrumentation to avoid delays in carrying out repairs.

3. The plant was operating satisfactorily on the day of the audit.

Introduction

The Fethard Regional Public Water Supply (PWS) supplies on average 2,966m3/d of treated water serving a population of 6,761 (EDEN figures). The raw water is obtained from 4 no. separate water sources (i) Walshbog stream (10m3/hr) (ii) Gortnapisha stream (50m3/hr) (iii) Cloran springs (55m3/hr) (iv) Anner River (200m3/hr). Treatment at the plant consists of coagulation, flocculation, clarification (DAF), rapid gravity filtration, UV disinfection, pH correction, chlorination and fluoridation.

The audit was carried out in response to the placing of a Boil Water Notice on the supply from 29/06/22 to 07/07/22.

Supply Zones Areas Inspected

The auditors examined the treatment processes at Fethard Regional WTP. The raw water abstractions and sludge treatment stage were not inspected.

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

On 26/06/22 the sample pump which provides water to the final water turbidity and residual chlorine monitors in the reservoir at the Fethard Regional WTP failed. A mechanical fitter was requested to come to site to replace the pump however there was a lead time of a few days to obtain a replacement pump and the monitors remained offline.

On the 28/06/22 an issue with the foot valve of the coagulant dosing pump affected the automatic coagulant (PAC) dosing. As the sample pump in the reservoir had not been replaced the final water chlorine and turbidity monitors were not operational at this time.

Between 17:00 hours and 18:00 hours on 28/06/22 the turbidity increased in Filter 3 and an automatic backwash was triggered. The turbidity in Filter 3 remained elevated and the filter remained in rinse phase as the turbidity did not drop below the 0.18 NTU return to service setpoint. The turbidity rose in the remaining filters (No. 1, 2 & 4) which were also added to the queue for backwashing but these filters remained in service as Filter 3 had not returned to service after backwashing. The filters automatically backwash when turbidity exceeds 0.20 NTU setpoint (600 second delay). No turbidity alarm (0.18 NTU high warning alarm & 0.20 NTU high high plant shutdown alarm) on the final water in the reservoir was generated to instigate automatic plant shutdown due to the issue with the sample pump. There are no turbidity alarms on the individual filters linked to plant shutdown.

At 08:30 hours on 29/06/22 the SCADA was remotely checked by Glan Agua and the turbidity issue identified. The Glan Agua plant operator was contacted and the WTP was shutdown at 09:30am. Irish Water stated that Tipperary County Council identified the low chlorine issue in the network at Ballinard Pumping Station around the same time as Glan Agua identified the low chlorine levels at the WTP. Information provided by Irish Water prior to the audit indicated that the chlorine residual levels leaving the WTP had decreased gradually overnight (28th to 29th) from approximately 1mg/l at 12 midnight to 0.15mg/l at 11am and 0.2mg/l at a reservoir in the network at 11am. The maximum turbidity from the filters was 0.8NTU.

Investigations were undertaken by Glan Agua on 29/06/22 which confirmed the UV reactor, which provides primary disinfection, was outside of the validated operational range for a 4 hour period (21:00 hours on 28/06/22 to 01:00 hours on 29/06/22) due to the elevated turbidity. The automatic plant shutdown linked to the UV alarms had not been instigated as the UV reactor was incorrectly set in bypass mode resulting in the alarms from the reactor panel being ignored by the alarm system on the plant HMI.

Following consultation with the HSE a BWN was placed on the supply on 29/06/22. The BWN was rescinded on 07/07/22 following the receipt of satisfactory monitoring results and consultation with the HSE.

The following actions were undertaken in response to the incident:

(1) The issue with the PAC dosing has been fixed and the valve replaced.

(2) A warning graphic has been added to the HMI screen that will visually warn staff if the bypass is enabled. Only management staff can now disable alarms.

(3) The following changes have been made to filter backwashing (a) if a filter does not meet the turbidity setpoint during its rinse after a set time (60 mins) has elapsed the filter will take itself out of service and notify the Operator; (b) if a filter backwash is triggered on turbidity when another filter is in a wash the filter will take itself out of service and idle until it is able to proceed with the backwash sequence; (c) If a third filter is triggered on turbidity i.e one filter being backwashed and 2 no. waiting to backwash the WTP will shut down

(4) New pump installed in reservoir to feed treated water monitors. Existing service pump has been repaired and is being kept as standby.

(5) It is also proposed to bring a signal from the chlorine analyser at the Ballinard pump station back to the Fethard WTP to provide data from the network to the Glan Agua operators.

The audit found that the bypassing of the alarms on the UV disinfection system put consumers at risk of receiving inadequately disinfected water and along with the lack of turbidity alarms on each filter resulted in a delay in the operator being alerted to the incident taking place. However, the incident had been appropriately escalated once the turbidity and disinfection issue was identified and public health was protected by the placing of a BWN on the supply.

2. Coagulation Flocculation and Clarification (CFC) Stage

		Answer
2.1	Is the CFC process optimised to respond to changes in raw water quality?	Yes

Comment

Automatic coagulant dosing (PAC) was in operation at the Fethard Regional WTP on the day of the audit. Automatic coagulant dosing is controlled by the UVT dose bands that were developed during the commissioning phase. The dose bands are cross checked against jar tests undertaken on an annual basis by the Glan Agua Process Team.

There is no pH correction prior to the coagulation stage. The infrastructure is installed but has not been required to date.

3. Filtration

		Answer
3.1	Are the filters designed and managed in accordance with EPA guidance?	Yes

Comment

Automatic backwashing is triggered based on pressure differential, turbidity or time period. Backwashing can also be manually triggered by the operator.

The dual filter media in the 4 no. rapid gravity filters was replaced in 2018. The filter media is composed of 450mm of anthracite and 550mm of quartz sand. The total depth of 1,000mm meets the minimum depth of media set out in the *EPA Water Treatment Manual: Filtration.*

There are continuous turbidity monitors on each of the individual filters and on the final water at the reservoir.

		Answer
3.2	Does monitoring indicate that the filters are operating effectively?	Yes

Comment

The following turbidities were observed: Filter 1 0.05 NTU; Filter 2 0.04 NTU; Filter 3 0.05 NTU; Filter 4 0.04 NTU and final filtered water 0.05 NTU. The trends for the previous week were reviewed onsite and indicated satisfactory turbidity (< 0.2 NTU excluding backwashing periods).

4. Disinfection

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

Comment

The UV unit provides primary disinfection for the Fethard Regional PWS. There were satisfactory UV alarms and shutdown setpoints in operation.

The chlorination system provides secondary disinfection for the network and satisfactory high and low chlorine alarms and shutdown setpoints were in operation.

		Answer
4.2	Are duty and standby chlorine pumps/ UV units in operation?	No

Comment

Duty and standby chlorine dosing pumps are provided. There is a duty UV unit in operation however there is no standby provision in case of failure or breakdown of the duty unit. There is 6,900m3 of treated water storage available on site (24 to 36 hours) to facilitate remedial works without supply interruption.

		Answer
4.3	Is the UV disinfection system operating within its validated range?	Yes

Comment

The UV unit is validated under USEPA Calculated Dose method. On the day of the audit the UV disinfection system was operating within its validated range. The UV intensity was 80.1 W/m2, UV dose 66.41 mJ/cm2, UVT 73.5% and flow 210.3m3/hr.

		Answer
4.4	Does the trend in chlorine residual at the treatment plant indicate adequate and stable levels of disinfection?	Yes

Comment

The trends for the previous week were reviewed onsite and indicated satisfactory residual chlorine level.

	Answer

4.5	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	Yes
	Comment	
	The residual chlorine monitoring records indicate monitoring of network residual chlorine levels is being undertaken several times per week. The records provided indicated the levels were satisfactory and a map was submitted subsequent to the audit to confirm the monitoring locations relative to the network extremities.	

5. Management and Control

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

Comment

There is no alarm on the combined filtered water immediately after the filtration stage. The final water turbidity alarm is linked to the turbidity monitor in the reservoir. The final water turbidity alarm set points are a high turbidity warning alarm at 0.18 NTU and a high high turbidity alarm at 0.2 NTU which instigates automatic plant shutdown.

There no automatic plant shutdown linked to the turbidity of the individual filters however a filter backwash is automatically triggered at 0.2 NTU (time delay 600 seconds). As a result of the automation changes an individual filter cannot continue to operate at a turbidity > 0.2 NTU (time delay 600 seconds) as outlined previously in Section 1.1.

There are no alarms on the individual filters to warn of elevated turbidity.

		Answer
5.2	Are instrument calibrations within date?	Yes

Comment

QR codes are displayed on monitors in place of stickers indicating the next calibration due date. A sticker on the HMI panel is provided to cover all monitors. This sticker indicated all instrument calibrations had been completed in July 2022 and were next due in August 2022. Calibrations are undertaken in house by Glan Agua on a monthly frequency.

Recommendations

Subject	Fethard Regional PWS - Audit 13 07 22	**Due Date**	28/08/2022
Action Text	**Recommendations** 1. Irish Water should ensure any lessons learned and remedial actions undertaken in response to the bypass of the UV alarm settings are applied to other sites. 2. Irish Water should ensure that spare parts are readily available for critical monitoring instrumentation including final water turbidity and chlorine monitors to ensure they remain operational at all times. 3. Irish Water should assess the feasibility of installing a standby UV unit to enable the UV disinfection system to operate in a duty and standby arrangement. 4. Irish Water should examine the feasibility of installing turbidity alarms on the individual filters and combined filtered water turbidity. **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 Regina Campbell, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 28/08/22 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. Please quote Compliance Plan DW20220079 in any future correspondence in relation to this Report.		