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	Whitegate Regional
Organisation	Irish Water
Scheme Code	0500PUB2407
County	Cork
Site Visit Reference No.	SV22211

Report Detail

Issue Date	02/03/2021
Prepared By	Criona Doyle

Site Visit Detail

Date Of Inspection	11/02/2021	**Announced**	Yes
Time In	11:00	**Time Out**	11:45
EPA Inspector(s)	Criona Doyle Regina Campbell		
Additional Visitors	Orla Harrington HSE: Catherine McCarthy		
Company Personnel	Irish Water: Tommy Roche, Deirdre O'Loughlin, Oliver Harney. Cork County Council: Eimer O'Riordan, Graham Whittaker.		

Summary of Key Findings

(1) A Boil Water Notice (BWN) was issued to 6,500 consumers served by the Whitegate Regional Public Water Supply (PWS) on 31/01/21 due to elevated turbidity in the final treated water.

(2) The current level of treatment at the Kilva Water Treatment Plant (WTP) cannot adequately treat the elevated raw water turbidity that occurs in response to heavy rainfall events. Irish Water are currently investigating a programme of interim and long term works to improve the resilience of the supply.

(3) Irish Water have not complied with the Regulation 16 (1) Direction issued by the EPA on 23/12/19 for the Whitegate Public Water Supply (PWS) and have failed to commission a suitable coagulation dosing system before the filtration stage at the Kilva WTP by the specified date of 28/02/20 and further enforcement action may be considered by the EPA.

(4) The Whitegate Regional PWS will be added to the EPA's Remedial Action List at the end of Quarter 1 2021 under the category of poor turbidity removal.

Introduction

The Whitegate Regional Public Water Supply produces 6,191m3/d and normally serves a population of 9,508. On the day of the audit a Boil Water Notice remained in place on the supply. A portion of the usual supply area was being served by adjacent schemes resulting in the population under the boil water notice being reduced to 6,500 consumers.

The source of the supply is the Dower Spring. The raw water is subject to periods of elevated turbidity due to heavy rainfall events. Treatment at the Kilva WTP includes microfiltration followed by UV disinfection, fluoridation and chlorination (secondary disinfection).

A turbidity incident occurred on 30/01/21 which resulted in the imposition of a boil water notice on 31/01/21. The boil water notice remained in place on the date of the audit. This is the sixth BWN to have been placed on the supply since 2016.

Supply Zones Areas Inspected

The purpose of the audit was to (i) investigate the recent turbidity incident which resulted in the issuing of a Boil Water Notice on 31/01/21 and (ii) examine progress with the Regulation 16(1) Direction issued by the EPA on 23/12/19 which required the installation and commissioning of a suitable coagulation dosing system before the filtration stage at the plant by 28/02/20.

The audit comprised of a video conference meeting. A site visit was not undertaken due to COVID-19 risk. The site was previously audited on 12/03/20.

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

The timeline of events which resulted in the Boil Water Notice is as follows:

On Saturday 30/01/21 a deterioration in the raw water quality resulted in the shut down of the Kilva WTP at 03:40 hours. The UVT level, prior to the UV unit, dropped below the low low UVT alarm setpoint of 84% which automatically shut down the WTP.

Over the course of the day the WTP remained shut down and the raw water turbidity continued to drop. The Whitegate Refinery was rezoned to the adjacent Cloyne supply at 11:30 hours to reduce demand in order to maintain storage in the reservoir. Production at the Kilva WTP was restarted at 17:00 hours. At 19:30 hours the supply was fully back in operation and the Whitegate Refinery was switched back to the Whitegate supply.

At 22:30 hours on 30/01/21 the plant automatically shut down when the high high pre UV turbidity alarm setpoint of 0.9 NTU was exceeded. The incident was not suitability alerted to the plant operators as an alarm did not go to the Caretaker. Further details in relation to the investigation of the alarm issue are provided in Section 3.3 below. The Kilva WTP remained shut down over night and storage in the reservoir continued to be depleted.

On Sunday 31/01/21 the Caretaker arrived on site at 06:30 hours to find the plant had shut down due to the high pre UV turbidity levels. The Caretaker contacted the Engineer via text at 06:40 hours to instigate the protocol to increase the pre UV turbidity set point to 1.8 NTU due to concern over the low reservoir level and the high turbidity.

This protocol was previously agreed with the EPA and HSE in December 2019 for the short term operation of the supply in response to elevated raw water turbidity subject to the following criteria (i) the treated water turbidity must be kept < 1.8 NTU; (ii) the microfilters and UV disinfection unit must be operational and (iii) the demand must be reduced by switching customers to alternative supplies where possible.

The plant was restarted at 06:45 hours by the Caretaker and approval was granted at 07:30 hours by the Engineer to operate up to a pre UV turbidity limit of 1.8 NTU. To maintain storage the Whitegate Refinery was switched over to the Cloyne PWS. The Ballinacurra and Shanagarry areas were also moved to alternative supplies. Cork County Council notified the HSE and Irish Water notified the EPA that the plant was operating under the previously agreed protocol.

The plant remained in production until 17:00 hours on Sunday 31/01/21 when the 1.8 NTU pre UV turbidity trigger level was exceeded and the plant automatically shut down. The rising main was scoured to waste to assist recovery as the raw water turbidity was observed to be decreasing and the UVT was increasing.

At 19:30 hours the Kilva WTP was restarted and run to waste but the filters remained in a continuous cycle of backwashing. At 22:45 hours the pre UV turbidity set point was adjusted to allow water into supply to obtain a real time turbidity reading at the pre UV turbidity analyser. By this time the reservoir was at a critically low level. At approximately midnight, following consultation with the HSE, the decision was taken to bypass the filters and bring the plant back into operation under a Boil Water Notice to maintain a supply of water to consumers.

The failure of the generation of the alarm notification to the Caretaker on 30/01/21 resulted in the loss of reservoir storage which contributed to the need for the imposition of the BWN on the 31/01/21. Once the site operators became aware of the issues on site the incident was suitability escalated and managed to protect public health. However as discussed below in Section 4.1 the treatment provided at the WTP is insufficient to deal with the variations in raw water quality.

On the day of the audit (11/02/21) the boil water notice remained in place.

2. Filtration

		Answer
2.1	Does monitoring indicate that the filters are operating effectively?	No

Comment

Subsequent to the issuing of the BWN an issue arose with the filtration stage on Sunday 07/02/21. A piston on Filter No. 2 misaligned which prevented backwashing of the filter. The filters were bypassed and a contractor was called to site. Works were undertaken on 07/02/21 and 08/02/21. The filters were brought back online at 17:30 hours on 08/02/21.

On 09/02/21 electrical issues caused tripping of the backwash pumps on Filter no. 2. On the day of the audit it was confirmed that investigations were underway to determine if further servicing or repairs are required on the filters prior to or subsequent to the lifting of the boil water notice.

Subsequent to the audit an update was received from Irish Water on 17/02/21 outlining that the investigations indicated wear and tear on Filter No. 2. and that a decision had been made to investigate Filter No. 1 to establish whether the same level of wear and tear has occurred and to identify the specific works required for each filter before consideration is given to lifting of the BWN.

3. Management and Control

		Answer
3.1	Is the water treatment plant resilient enough to cope with significant variations in raw water quality or demand?	No

Comment

The treatment process in place at the Kilva WTP cannot deal with the variations in raw water quality that are experienced in response to heavy rainfall.

The plant is not resilient as demonstrated by 6 no. boil water notices which have been placed on the supply in response to elevated turbidity since 2016: 01/01/2016 to 08/01/2016; 13/02/2016 to 17/02/2016; 27/02/2016 to 21/10/2016; 27/11/2091 to 20/12/2019; 16/02/2020 to 05/03/2020 and the current BWN which is in place since 31/01/21.

		Answer
3.2	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	Yes

Comment

Irish Water confirmed that the protozoal compliance log treatment for the Whitegate PWS has been assessed under the new *Irish Water Source Cryptosporidium Risk Assessment Methodology*. A 3 log treatment requirement has been determined for the source and based on the 3 log credit provided by the validated UV system Irish Water have determined there is no log deficit at the WTP.

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

Comment

On the 30/01/21 a text alert alarm was not generated in response to the pre UV turbidity high high alarm. The plant automatically shut down in response to the alarm and consumers were protected from receiving inadequately treated water however plant operators were not aware there was an issue at the plant as no text alert was sent out. The issue was not identified until 8 hours later when the Caretaker arrived on site. This delay resulted in the loss of reservoir storage which contributed to the need to impose a boil water notice on 31/01/21.

An investigation carried out by Cork County Council into the alarm failure incident indicated that while the plant shut down when the pre-UV turbidity high high trigger level was reached, a text alarm notifying the Caretaker of a plant shutdown could only occur when both a high post filter turbidity reading of 1NTU and a pre-UV turbidity high reading of 0.9NTU were triggered simultaneously.

This issue has now been rectified and an additional text alert will now also issue following an automatic shutdown on the pre-UV turbidity high high reading.

		Answer
3.4	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	Yes

Comment
Cork County Council confirmed that the alarm set points and shut down levels remained unchanged from the previous audit on 12/03/20. The plant shut downs correctly operated during the incident on 30/01/21 and 31/01/21.

4. Site Specific Issues

		Answer
4.1	Do the audit findings support progress made with the Regulation 16(1) Direction ?	No

Comment

A Direction was issued to Irish Water on 23/12/19 under Regulation 16 (1) of the European Union (Drinking Water) Regulations 2014, as amended. The Direction required Irish Water to install and commission a suitable coagulation dosing system before the filtration stage at the Kilva Water Treatment Plant by 28/02/20 to deal with periods of elevated raw water turbidity. The Direction has not been complied with and further enforcement action may be considered by the EPA.

At the previous audit on 12/03/20 duty and standby dosing pumps had been installed and jar testing had been completed at laboratory scale to identify a suitable blend of coagulants.

Irish Water undertook further testing of the coagulant dosing system in Whitegate during a suitable weather event on 18th and 19th of August 2020. The results of the field testing were inconclusive. Problems were encountered with blinding of the filters which resulted in the requirement for continuous filter backwashing. Irish Water have confirmed it is no longer proposed to proceed with the coagulation dosing stage.

Irish Water outlined that interim measures are being examined including options for the installation of additional booster pumps and pressure relief valves to allow further rezoning of portions of the network to adjacent supplies. This would increase the storage available at the Kilva WTP which would allow the plant to shutdown for longer periods when the raw water turbidity is elevated without impacting on consumers. Irish Water outlined that an update on the proposed interim works will be available at the end of Quarter 1 2021.

Irish Water also indicated that a more permanent long term solution is also being investigated. This includes the assessment of alternative sources and new treatment processes. Irish Water indicated an update on the longer term solution will be available by end of Q2 2021 as part of the National Water Resources Plan for the region.

The EPA intend to add the Whitegate PWS to the EPA's Remedial Action List at the end of Quarter 1 2021 under the category of poor turbidity removal.

Recommendations

Subject	Whitegate - Audit February 2021	**Due Date**	02/04/2021
Action Text	**Recommendation(s)** 1. Irish Water should submit a further report on the works undertaken during 2020 in response to the Regulation 16 Direction issued on 23/12/2019. 2. Irish Water should undertake further action to improve the resilience of the Whitegate PWS to ensure the plant can deal with elevated turbidity levels caused by rainfall events and to reduce the risk of further BWNs. 3. Irish Water should submit details of the proposed interim works and associated timeframes for completion of the interim remedial works. 4. Irish Water should submit details of the proposed long term works and associated timeframes for completion of the long term remedial works. 5. Irish Water should submit a copy of the Irish Water protozoal log treatment requirement assessment for the Whitegate WTP. 6. Irish Water should submit an update on the outcome of the investigations into Filter No. 1 with Filter No. 2 together with details of any remedial works undertaken or proposed. 7. Irish Water should continue to notify turbidity exceedances via EIMs / CRM. 8. Irish Water should keep the EPA informed of any changes relating to the HSE advice and rescinding of the BWN. **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 02/04/21 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. 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 the Compliance Plan DW20190214 in any future correspondence in relation to this Report.		