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	Killavullen
Organisation	Irish Water
Scheme Code	0500PUB1310
County	Cork
Site Visit Reference No.	SV25567

Report Detail

Issue Date	24/05/2022
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	12/05/2022	**Announced**	Yes
Time In	10:00	**Time Out**	11:35
EPA Inspector(s) **Additional Visitors**	Regina Campbell		
Company Personnel	Irish Water: Tommy Roche, Robert Kennedy, Pat Britton Cork County Council (acting under service level agreement to Irish Water): Frances Whoriskey, Jason O Donoghue, Donal Healy		

Summary of Key Findings

1. There have been 2 no. boil water notices placed on the Killavullen PWS (Public Water Supply) since the beginning of 2022 due to turbidity issues in the supply. The first BWN lasted from 28/02/22 to 24/03/22 with the second BWN in place from 02/05/22. Investigations into the cause of the elevated turbidity spikes are ongoing with geological conditions and responses to pumping rates under review. The audit found that the incident was escalated satisfactorily to the relevant authorities.

2. Irish Water should complete their investigations into the causes of the high turbidity in the supply and undertake remedial actions to address the issues identified and ensure ongoing security of the supply.

3. Irish Water should submit an action programme to address the protozoal log treatment deficit at the plant.

Introduction

The Killavullen Public Water Supply (PWS) serves a population of 834 and produces 450 m3/day (EDEN figures). There are two sources, the main borehole 1 at the water treatment plant house in the village and a second borehole located at the reservoir. EDEN only lists the main borehole at the treatment plant as a source and does not list the borehole located at the reservoir.

The audit was undertaken to assess Irish Water's performance in producing clean and wholesome water following the imposition of a Boil Water Notice (BWN) on the supply from 28/02/22 to 24/03/22 and a second BWN placed on the supply on 02/05/22 which was still in place on the day of the audit.

Supply Zones Areas Inspected

The boreholes and chlorination disinfection systems at the water treatment plant site and reservoir site were 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?	Yes

Comment

There have been two boil water notices (BWN) placed on the Killavullen supply since the beginning of 2022. The first BWN lasted from 28/02/22 to 24/03/22 and the second BWN was put in place on 02/05/22 and was still in place on the day of the audit. The boil water notices were placed due to the turbidity rising rapidly above 1 NTU at the treatment plant borehole on both occasions which meant disinfection would be compromised. This borehole isupplies the bulk of the supply.

Irish Water said that the exact geological reasons for the turbidity spikes are not known and are not linked directly to heavy rainfall. Irish Water and Cork County Council said that the pumping rate needs to be as steady as possible, with some spiking also caused by turning on and off the pumps. At the moment, there is no information on how water levels are rising and falling. The current borehole configuration will not allow a water level sensor to be installed.

There is a supplementary borehole located at the reservoir which has been switched off since the beginning of March in order to allow the main borehole to run constantly and avoid the start/stop pumping arrangement.

There is a turbidity monitor with alarm and shutdown at the main borehole and at the reservoir outlet but there is no turbidity monitor on the supplementary borehole at the reservoir. Cork County Council said it hopes to bring the supplementary borehole back into the supply once steady pumping rates are reached at the treatment plant borehole.

Since the BWN was placed on the 02/05/22, there was another turbidity spike on 07/05/22 to 9.5 NTU. At the audit the turbidity reading for the raw water at the borehole was 0.3 NTU and the pumping rate was 19 m3/hr.

Irish Water are investigating a number of possible corrective actions to address the turbidity issues including looking at alterations to the borehole pump operating regime, installation of a UVT monitor, completion of reservoir cleaning by 31/05/22, installation of run to waste, additional treatment steps, network alterations to reduce demand on supply and possible rationalisation of the supply in the longer-term.

The audit found that both turbidity incidents were escalated promptly to the relevant authorities.

2. Source Protection

		Answer
2.1	Is the abstraction source(s) adequately protected against contamination?	No

Comment

Both boreholes are housed in concrete chambers with lockable lids. No standing water was observed in the chambers. The boreholes are capped. However it could not be confirmed if all borehole linings and seals are maintained in accordance with *EPA Advice Note No. 14: Borehole Construction and Wellhead Protection*. Construction logs are not available for either borehole. Cork County Council said that Borehole 1 is 24 m deep with the pump at 19 m depth.

The water treatment plant borehole is located in a housing estate with agricultural land also adjacent to it. The reservoir borehole is surrounded by agricultural land.

Raw water results for the water treatment plant borehole were examined. It was found that since 16/11/22 that faecal coliforms have been found on 6 no. occasions in the raw water which indicates that there is a source and a pathway for contamination into the borehole.

There is no turbidity monitor on the reservoir borehole.

Irish Water said that landowners have been written to on 10/05/22 in relation to the requirements of the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014).

3. Disinfection

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

Comment

Chlorination dosing (with 10% sodium hypochlorite) takes place at both the water treatment plant borehole and reservoir borehole (when in operation). Dosing is flow proportional and duty/standby dosing pumps with automatic switchover are in place at both locations.

There is a low chlorine alarm and shutdown at 0.4 mg/l and high chlorine alarm and shutdown of 1.98 mg/l on the final water at the outlet from the reservoir. The low chlorine alarm setpoint is too low and does not allow a timely response for any failure of the chlorine dosing system. The time delays for both high and low chlorine shutdown are 20 minutes which is considered to be too high. Trended data is recorded and accessible remotely.

		Answer
3.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	Yes

Comment

The caretaker and relief caretaker receive alarms via dial out.

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

Comment

Trends submitted show stable levels of chlorine between 0.8 and 1.0 mg/l in the final water leaving the reservoir. The chlorine level in the final water at the audit was 0.84 mg/l.

		Answer
3.4	Is the residual chlorine monitored at a suitable sample location after contact time has been completed?	Yes

Comment

The residual chlorine monitor is located at the outlet of the reservoir which is after chlorine contact time has been achieved. An effective chlorine contact time of 58.98 mg.min/ is achieved which is adequate.

		Answer
3.5	Are manual chlorine tests carried out and recorded on final treated water to compare with the continuous monitor results?	No

Comment

Daily manual tests of final water chlorine residual are not currently being carried out. These should be undertaken with results recorded in the site log book/diary and compared with the reading from the continuous monitor.

Daily monitoring of residual chlorine in the network is undertaken with records reviewed showing levels > 0.1 mg/l.

4. Management and Control

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

Comment

The protozoal log credits required for the plant has been identified as 2.75. There is no protozoal barrier at the treatment plant.

		Answer
4.2	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 an alarm and shutdown of 1 NTU at the treatment plant borehole and an alarm and shutdown of 0.8 NTU at the outlet of the reservoir. The time delay on the shutdown setpoint at both the borehole and the reservoir is 20 minutes which is considered to be too long to prevent inadequately treated water entering the network.

There is no turbidity monitor or alarm on the reservoir borehole.

5. Drinking Water Quality

		Answer
5.1	Is Cryptosporidium monitoring being carried out in accordance with Irish Water's 'Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies'?	Yes

Comment

At present *Cryptosporidium* monitoring is being carried out four times per year. In light of the detections of microbiological contamination in the raw water it is considered that the frequency of monitoring should be increased.

Recommendations

Subject	Killavullen Audit Recommendations	Due Date	24/06/2022
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 submit an action programme for the supply to ensure that future occurrences of elevated turbidity in the raw water do not impact on the security of the supply. 2. Irish Water should a) submit an action programme to address the log treatment deficit at the plant and b) increase the current frequency of *Cryptosporidium* monitoring in the supply. 3. Irish Water should notify the EPA when the BWN is lifted. 4. Irish Water should a) review the time delay on the turbidity shutdown at the borehole and reservoir and b) install an online turbidity monitor with alarm at the reservoir borehole. 5. Irish Water should raise the low chlorine alarm setpoint iand review the time delay on the high and low chlorine shutdown to ensure that any failure of the chlorine dosing system is picked up in a timely manner. 6. Irish Water should ensure that all borehole linings and seals are maintained in accordance with EPA Advice Note No. 14: Borehole Construction and Wellhead Protection. 7. Irish Water should ensure that daily manual tests of final water chlorine residual are undertaken with results recorded in the site log book/diary and compared with the reading from the continuous monitor. 8. Irish Water should update EDEN with details of the 2nd borehole for the supply. **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 Dr. Michelle Minihan, Senior Inspector, Drinking Water Team. Irish Water should submit a report to the Agency on or before 24/06/22 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 Reference Number DW20220022 in any future correspondence in relation to this Report.		