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	Ballyheigue
Organisation	Irish Water
Scheme Code	1300PUB1001
County	Kerry
Site Visit Reference No.	SV24204

Report Detail

Issue Date	11/02/2022
Prepared By	Regina Campbell

Site Visit Detail

Date Of Inspection	19/01/2022	**Announced**	Yes
Time In	11:30	**Time Out**	13:40
EPA Inspector(s) **Additional Visitors**	Regina Campbell		
Company Personnel	Irish Water: Kian Guihen, Derek O' Toole Kerry County Council (acting under service level agreement to Irish Water): Pat Kenny, Owen O'Sullivan, Seamus O'Mahony, Brian Lennon, Paul Neary.		

Summary of Key Findings

1. The newly installed UV disinfection system has been operating at the Ballyheigue Water Treatment Plant (WTP) since 16/11/21 and provides an adequate barrier to *Cryptosporidium.* However, one of the UV units installed (UV2) is not trending correctly and there are no trends for this UV unit available since 15/12/21 when a fault occurred due to an electrical power trip. Irish Water were unable to confirm when the fault would be rectified.

2. The alarms for the newly installed UV disinfection system are not operational yet and the UV disinfection system is not linked to SCADA. Shutdown of the plant linked to the UV system is operational but a PLC upgrade must take place to integrate the old and new PLC systems at the plant, to enable UV alarms and to link the new UV system to SCADA.

3. The supply will be considered for removal from the EPA Remedial Action List (RAL) following a) confirmation that unit UV2 is trending correctly and submission of satisfactory verification trend data and b) confirmation that the PLC upgrades have been completed, that all alarms and shutdowns are operational and that the upgraded treatment systems are linked to SCADA.

Introduction

The source of the Ballyheigue Public Water Supply (PWS) is a spring located approximately 150m from the water treatment plant (WTP). The supply serves a population of 2,453 and produces 4,027 m3/day.

The Ballyheigue PWS has been on the EPA's Remedial Action List (RAL) since January 2020 due to the absence of a treatment barrier to prevent C*ryptosporidium* from entering the supply. The purpose of the audit was to assess the treatment upgrade works and process controls that have been implemented under the RAL improvement programme and to verify if the Ballyheigue PWS can be removed from the RAL.

There have been 5no. *Cryptosporidium* detections reported to the EPA since March 2018 and a Boil Water Notice (BWN) was in place from 11th October to 19th November 2021 which was lifted following commencement of UV disinfection at the plant on 16/11/21.

Treatment at the plant consists of primary UV disinfection and secondary chlorination disinfection.

Supply Zones Areas Inspected

The audit consisted of a site visit to the spring source and water treatment plant. All aspects of the treatment processes were inspected.

1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	Yes

Comment

The source of the supply is a spring located approximately 150m from the WTP. New pumping arrangements were installed as part of the upgrade. Pumping operates in response to demand from the clear water tank with the rate varying between 25 m3/hr up to about 160 m3/hr.

The spring and pumphouse are securely fenced and the spring has a locked cover. Sheet piling was installed into the ground in the late 2000's to reduce surface water ingress and provide greater protection of the spring. Landuse in the immediate vicinity comprises of scrub and forestry with agriculture in the hinterland.

Kerry County Council could not confirm at the audit if relevant landowners had been written to under the European Union {Good Agricultural Practice for the Protection of Wates) Regulations 2014 (S.I. No. 31 of 2014).

Kerry County Council said that the quality of the water is very stable. There is a continuous nitrate monitor at the plant which was reading 36.9 mg/l at the audit. The pH was 6.87 at the audit

2. Disinfection

		Answer
2.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	No

Comment

Primary disinfection is provided UV with chlorination used for secondary disinfection in the network.

The UV units have been operational since 16/11/21. Two months satisfactory trend data was submitted for unit UV1. 1 month satisfactory trend data was submitted for unit UV2, however a second month was not available as UV2 has not trended correctly since 15/12/21 due a fault caused by an electrical power trip. At the audit it could not be confirmed when the issue with the trends would be fixed.

UV2 was confirmed to be operating at the audit but no more than a few hours previous trends could be viewed at the site. In addition the UV system is not yet connected to the county wide SCADA system and so trends cannot be viewed remotely.

		Answer
2.2	Are monitors and alarms operational via dial out and being responded to with a suitable cascade system in place?	No

Comment

The duty UV unit switches over if the UV dose < 45 mJ/cm2 and the plant shuts down if the UV dose < 40 mJ/m2. Shutdown of the plant occurs also if turbidity is > 1 NTU, UVT < 85% or flow > 220 m3/hr (all with time delay 180 seconds). Currently the plant caretaker will get a text alert to say the plant has shutdown but the nature of the shutdown is not communicated. Neither the UV alarms or shutdowns are linked to an alarm cascade system yet. This will be undertaken as part of the PLC upgrade.

A cascade system is in place for the old plant with chlorine and turbidity alarms operational. There are no shutdowns based on high or low chlorine in operation.

		Answer
2.3	Are duty and standby chlorine pumps/ UV units in operation?	Yes

Comment

Duty and standby UV units (atg UV Technology SX425-10) are in operation which automatically switchover every 24 hours or in the event of the duty UV unit dose falling below 45 mJ/cm2. The plant shuts down if the UV dose < 40 mJ/cm2.

		Answer
2.4	Is the UV system suitably validated?	Yes

Comment

Duty and standby UV units (atg UV Technology SX425-10) are validated to USEPA UVDGM standard. Each unit provides the required minimum dose of 40 mJ/cm2 at a maximum flow of 220 m3/hr and minimum UVT of 85%. The units are set up to target a dose of 50 mJ/cm2.

At the audit it was observed that no specification plates were attached to the UV unit.

UV2 was observed to be operating within its validated range on the day of the audit with the following operational parameters noted:

- Flow -135 m3/hr
- UVT - 97 %
- UV dose - 52 mJ/cm2
- Turbidity - 0.076 NTU

		Answer
2.5	Is the chlorine dosed appropriately?	Yes

Comment

10% sodium hypochlorite is dosed flow proportionally with residual trim to maintain secondary disinfection in the supply. There are duty and standby pumps with automatic changevoer in the the event of a failure. Pumps also change over every 6 hours.

Chlorine is monitored at the clear water tank with a target dose of 0.8 mg/l. A reading of 0.75 mg/l was observed on the day. Additional chlorine monitors are to be installed at the plant as part of the disinfection upgrade.

There is a low chlorine alarm (0.3 mg/l, 5 minutes time delay) and a high chlorine alarm (2.35 mg/l, 5 minutes delay) but there is no plant shutdown based on low or high chlorine.

Trends submitted showed adequate and stable levels of chlorination.

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

Comment

Records of network chlorine monitoring results from 18/11/21 to 06/01/22 were submitted and showed gaps of up to 15 days between monitoring at network extremities. The Ballyheigue network is large with no chlorine monitoring or boosting in the supply and it is important that monitoring takes place several times a week to verify that secondary disinfection is adequate.

Records that were submitted showed adequate residual chlorine levels of $\geq$ 0.1 mg/l in the network.

3. Management and Control

		Answer
3.1	Has the protozoal compliance log treatment requirement been identified for the water treatment plant?	No
	Comment	
	Irish Water said that the protozoal log treatment requirement has been provisionally identified as Log 3 but that the sanitary survey hasn't been completed yet.	

		Answer
3.2	Are instrument calibrations within date?	Yes
	Comment	
	All instrument calibrations checked were within date.	

4. Site Specific Issues

		Answer
4.1	Does the water treatment plant have an Operation & Maintenance (O&M) Manual?	No
	Comment	
	Plant staff have not received the Operation & Maintenance manual following the site upgrades and final training on the UV disinfection system has to be completed.	

Recommendations

Subject	Ballyheigue Audit Rcommendations	Due Date	11/03/2022
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 a) confirm that unit UV2 is trending continuously and that trends are available for review and b) submit 1 month operational trend data for UV2 since the issue was rectified. 2. Irish Water should a) integrate the old and new PLC systems at the plant, b) confirm that all alarms and shutdowns are operational and c) confirm that the plant is connected to SCADA. 3. Irish Water should install shutdown of the plant based on low and high residual chlorine in the final water. 4. Irish Water should ensure that there is a specification plate attached to each UV unit. 5. Irish Water should ensure that monitoring of residual chlorine is undertaken in the network, including the extremities, several times a week so that any disinfection issues in the network are picked up in a timely manner. 6. Irish Water should ensure that there is an Operation & Maintenance manual at the plant and that training is completed for all operational staff on the site upgrades. 7. Irish Water should liaise with Kerry County Council and confirm that relevant landowners have been written to in relation to setback distances in accordance with the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)* for the source of the supply. 8. Irish Water should confirm the protozoal log treatment requirement for the plant and provide details of how any log treatment deficit will be addressed. **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, Drinking Water Team Leader. Irish Water should submit a report to the Agency on or before 11/03/22 of Action 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 DW20180055 in any future correspondence in relation to this Report.		