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	Fedamore PWS
Organisation	Irish Water
Scheme Code	1900PUB1048
County	Limerick
Site Visit Reference No.	SV18522

Report Detail

Issue Date	13/12/2019
Prepared By	Cliona Ni Eidhin

Site Visit Detail

Date Of Inspection	02/12/2019	**Announced**	No
Time In	11:00	**Time Out**	13:30
EPA Inspector(s) **Additional Visitors**	Cliona Ni Eidhin Regina Campbell Andrew Curtin (HSE)		
Company Personnel	Irish Water: Deirdre O'Loughlin, Oliver Harney, Kian Guihen. Limerick County Council: Diarmuid O'Dea.		

Summary of Key Findings

1. The Fedamore public water supply sources water from a borehole located within a limestone aquifer. This borehole had been susceptible to only occasional, short-lived turbidities of > 1 NTU until the recent onset of more sustained elevated turbidity. In view of this development and the possibility of its reoccurrence, either a permanent upgrade to the treatment processes or an upgrade to the borehole is required to ensure security of supply. The containerised filtration processes installed at the site recently should, once repaired, remain in operation until a permanent solution to the turbidity issue is in place.
2. Backwash water and 'run to waste' water was being discharged to adjacent lands as a temporary measure. An alternative, formalised solution for disposal of this water from the site is required and should be progressed.
3. The Fedamore drinking water treatment plant was not operational on the day of the audit pending the resolution of issues with one of the containerised filtration processes. Recent upgrades under Irish Water's disinfection programme were apparent; duty and standby UV was confirmed to be in place as primary disinfection.

Introduction

The source of the Fedamore Public Water Supply is a borehole (60 m deep) located within the treatment plant site close to the village of Fedamore, Co. Limerick. The plant produces 220 m3/day and serves a population of 492. Since the completion of disinfection programme upgrades to this site during 2019 treatment has consisted of bag filtration, ultra violet primary disinfection and chlorination with sodium hypochlorite providing secondary disinfection. With the onset of elevated turbidity in the raw water in late October 2019, Irish Water introduced additional containerised filtration processes (a Forsta 10 micron screening filter that can be backwashed and 1 micron Amazon cartridge filters) prior to bag filtration, UV and chlorination. Treated water is pumped to a reservoir located approximately 400m upgradient from the treatment plant from where it serves the network by gravity.

This audit was scheduled in response to the issuing of a boil water notice on the Fedamore supply on 21/11/2019. The notice was issued due to turbidity levels in excess of 1 NTU and was lifted the following day (on 22/11/2019) when turbidity levels returned to < 1NTU. Short-lived occurrences of elevated turbidity have occurred in the supply, historically. The elevated turbidity levels occurring in Fedamore in November 2019 were of a longer duration than is characteristic for the supply. Irish water had tankered water in to the scheme as a short term measure to maintain reservoir levels. This permitted the operation of the treatment plant on a 'run to waste' basis while allowing time for turbidity in the borehole to settle. When turbidity returned to < 1 NTU, the plant was returned to service and tankering ceased.

The treatment plant was not operational on the day of the audit as the plant had shut down automatically at 9am that morning due to elevated turbidity detected by the online turbidity monitor. Irish Water advised that a contractor was due to attend the site that afternoon to repair one of the filter units. The day after the audit, it was reported to the auditor that the contractor was unable to make it to site as scheduled and the plant was returned to service under a boil water notice. At the time of issue of this report, the boil water notice remained in effect.

Supply Zones Areas Inspected

Full inspections of the well head, treatment processes and reservoir were completed.

1. Source Protection

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

Comment

1. A zone of contribution (ZOC) has been delineated for this supply. It was confirmed that the landowner in the ZOC had been written to at the end of October 2019 in relation to his obligations under the Good Agricultural Practice for Protection of Waters Regulations. No observations of concern were noted by the auditor.
2. Raw water monitoring results from two samples taken during 2019 were reviewed. There was no evidence of chemical contamination. However, the results showed the occurrence of high turbidity which Irish Water reported to be occasional and short in duration up until the more sustained turbidity events of recent weeks. Since the onset of more prolonged turbidity issues, Irish Water advised that it has been concluded that the supply requires either an upgrade to the borehole or additional treatment beyond bag filtration, UV and chlorination. To this end, containerised filtration has been installed to cater to this requirement in the short to medium term.
3. The borehole was housed within a concrete chamber with a lockable access hatch. The well head itself was capped and well protected.

2. Filtration

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

Comment

1. Since the addition of containerised filtration to the Fedamore DWTP, the first process encountered by raw water is a Forsta 10 micron screening filter. It precedes cartridge filtration, bag filtration, UV and chlorination. The Forsta filters and Amazon cartridge filters are housed within the container; neither were operational on the day of the audit. Irish Water informed the auditor that the Forsta filter required a repair and that a contractor was due on site on the afternoon of the audit to complete this.
2. Duty and standby units are in place for both the Forsta filter and the Amazon cartridge filter. At high flow, the Forsta filters operate on a duty and assist basis.
3. The Forsta filter has a backwash facility which is initiated on the development of pre- and post- filter pressure differential. Backwash water from the Forsta filter has been discharged to adjacent lands since its commissioning. Irish Water advised that this was a temporary arrangement which would cease once a permanent solution for the discharge of this water to a nearby water course was in place.
4. The Amazon cartridge filters are not backwashed; the internal cartridge elements require replacement when clogged. A full set of spare cartridge elements is maintained onsite.

3. Disinfection

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

Comment

1. Primary disinfection is provided by UV treatment. Duty and standby UV units are in place with automatic switchover. The units operate on a variable flow basis, are validated to the USEPA protocol (calculated dose approach) and are alarmed at 89% (low) and 85% (low low) UVT.
2. Secondary disinfection is provided by the dosing of sodium hypochlorite. Duty and standby chlorine dosing pumps are in place with automatic switchover. Dosing is flow proportional, a chlorine monitor is in place and a residual of 0.5 mg/l is aimed for in water leaving the plant.
3. Primary and secondary disinfection alarms dial out to alert the caretaker when triggered. A cascade is in place for responding to alarms when issued.

4. Reservoirs and Distribution Networks

		Answer
4.1	Is treated water in tanks and reservoirs suitably protected against contamination?	Yes

Comment

1. The reservoir, which provides 24 hours of storage for the supply, was inspected. Two inspection hatches and two vents are in place. The reservoir is programmed for cleaning in 2020. No observations of concern were noted.

5. Management and Control

		Answer
5.1	Are instrument calibrations within date?	Yes
	Comment	
	1. A calibration due date sticker was not in place on the chlorine dosing pumps.	

6. Site Specific Issues

		Answer
6.1	Is there sufficient online monitoring to provide oversight of raw water quality and the performance of individual treatment processes?	No

Comment

1. There is no online monitoring of raw water quality for turbidity or other parameters. The only online monitoring for turbidity is on the final water.

		Answer
6.2	Are procedures in place for all of the caretaker's operational and maintenance activities?	Yes

Comment

1. Procedures are in place for plant operational and maintenance activities in the relevant locations around the treatment plant.

		Answer
6.3	Are adequate records of daily activities and observations maintained?	Yes

Comment

1. Records and observations made by the plant caretaker were viewed as part of the audit. It was noted that daily recordings of the following parameters were meticulously kept: flow, Cl2, free chlorine, pH, turbidity (monitor and hand-held reading), UVT, network chlorine.

		Answer
6.4	Was the management of waste streams from the drinking water treatment plant adequate?	No

Comment

1. Backwash water and ‘run to waste’ water was being discharged to adjacent lands as a temporary measure.

		Answer
6.5	Was the plant caretaker / operator trained on the operation of all processes?	Yes

Comment

1. The auditor highlighted the importance of training to the operation of the plant, particularly given the recent addition of new processes to the treatment regime. Irish Water advised that training was provided to the caretaker on the new UV unit and that follow-up sessions were available should they be required.

		Answer
6.6	Was the plant operating normally at the time of the audit?	No

Comment

1. The treatment plant was not operational at the time of the audit following automatic shut down due to elevated turbidity at 9am that morning. Irish Water informed the auditor that the shutdown event the previous Saturday was due to high chlorine which had occurred when the Forsta filter entered backwash mode.

Recommendations

Subject	Fedamore Audit Recommendations	Due Date	13/01/2020
Action Text	***Recommendations*** 1. Irish Water should provide an update on the proposed permanent upgrade to the borehole or to the treatment processes (or to both) at the Fedamore DWTP. 2. Irish Water should progress the repair to the Forsta filter and return all processes at the Fedamore DWTP to full operation as soon as possible. 3. Irish Water should ensure that calibration due dates are clearly displayed on the relevant plant and regularly checked by the caretaker. 4. Irish Water should install a raw water turbidity monitor. 5. Irish Water should install turbidity monitors either after both the Forsta and Amazon filters or on the outflow from the containerised unit, as a whole, to provide oversight as to the performance of filtration processes. 6. Irish Water should progress works to provide a permanent solution for disposal of backwash water and 'run to waste' water from the site. 7. Irish water should ensure that all plant procedures are collated into a plant manual and maintained in the plant office on site for reference. 8. Irish Water should ensure that the plant caretaker is trained in the operation, maintenance and trouble-shooting of all new plant installed at the Fedamore DWTP. 9. Irish Water should keep the EPA informed of progress in relation to the restarting of containerised filtration at the Fedamore DWTP. In particular, the EPA should be informed of periods when tankering is required, when the plant is restarted and returned to supply the network and of when the criteria for lifting the boil water notice have been met. **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 13/01/2020 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 Action Reference Number DW2019/208 in any future correspondence in relation to this Report.		