

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	Dunkerrin PWS
Organisation	Irish Water
Scheme Code	2500PUB1007
County	Offaly
Site Visit Reference No.	SV20676

Report Detail	
Issue Date	23/10/2020
Prepared By	Michelle Roche

Site Visit Detail			
Date Of Inspection	05/10/2020	Announced	No
Time In	11:00	Time Out	13:00
EPA Inspector(s)	Michelle Roche		
Additional Visitors			
Company Personnel	Irish Water: Dara Chadwick Andrew Boylan John Gavin Offaly County Council: Mary Hussey Clodagh Graham Catherine Casey Pat Deveraux Joe Coleman David Doyle Mark Claffey Dermot Killeen		

> Summary of Key Findings

1. A Boil Water Notice was placed on the Dunkerrin public water supply from 22nd September to 6th October 2020 in response to a failure of the UV disinfection system on the Jones's Well source. The UV treatment is in place to provide a barrier against *Cryptosporidium* in the water supply.
2. There was a delay by Offaly County Council in escalating the failure of the UV treatment system to Irish Water, and in turn to the HSE and EPA. This prevented timely consultation with the HSE, and a delay in issuing the Boil Water Notice for the protection of public health.
3. The Lisduff Springs source has no *Cryptosporidium* barrier in place and the source is currently classified as a high risk source. Irish Water needs to identify how the protozoal compliance requirement is to be addressed at Lisduff Springs water treatment plant, to ensure there is an adequate barrier to *Cryptosporidium* in the water supply.

> Introduction

The Dunkerrin public water supply serves approximately 1,213 people in the village of Dunkerrin and the surrounding countryside. The supply is served by 2 spring fed wells at Dunkerrin Village and Jones's Well, and one spring collection chamber at Lisduff Springs. Water treatment consists of;

- UV and Chlorination at Dunkerrin Village,
- UV and Chlorination at Jones's Well, and
- Chlorination at Lisduff Springs.

The distribution network is fully connected and therefore can be served by a varying combination of all three sources.

The audit was carried out in response to a recent failure of the UV treatment at Jones's Well and subsequent Boil Water Notice placed on the Dunkerrin supply.

The audit consisted of a pre-site visit video conference meeting with all relevant parties on 02/10/20, and a site visit to all three sources with essential Irish Water and Offaly County Council staff on 05/10/20.

> Supply Zones Areas Inspected

All three water sources and associated treatment were inspected during the audit as was the reservoir at the Lisduff Springs source. Online monitoring data and water quality verification data was also assessed during the audit.



1. Incident Management

1.1

Was the incident suitably alerted to the plant operators, escalated and managed in order to maintain water quality and protect public health?

Answer

No

Comment

The UV unit on the Jones's Well source was intermittently shutting down between Saturday 12th September and Friday 23rd September 2020. Throughout this time the water from Jones's Well was disinfected by chlorination with sodium hypochlorite, however the failure of the UV meant there was intermittent *Cryptosporidium* treatment in place. As the three raw water sources combine within the Dunkerrin public water supply network, Irish Water placed a Boil Water Notice on the entire Dunkerrin water supply from 22nd September to 6th October 2020 to protect public health. While the UV unit was operating correctly from 23rd September, water quality verification sampling was undertaken up until 3rd October.

Detailed Account of the UV Failure at Jones's Well

The UV unit at Jones's Well shut-down at 2:44am on Saturday 12th September 2020 and an associated alarm was generated to the Caretakers mobile phone. The Caretaker attended the site at 8:30am and re-started the UV unit. After re-starting, the unit showed a dose rate of 41.4mj/cm2. This is above the minimum required dose rate of 21mj/cm2 to confirm the unit is operating within its validation set-points, and so it appears the unit was operating correctly when re-started and an adequate *Cryptosporidium* barrier was in place.

The UV unit alarmed and shut-down again on Sunday 13th September and Tuesday 15th September. Each time when the unit was re-started the UV dose was above 21mj/cm2. On Tuesday 15th the Caretaker escalated the ongoing issue to the Clerk of Works and the UV contractor was contacted. Replacement UV bulbs were ordered, however the UV unit was once again re-started on Tuesday 15th September.

On 16th, 17th and 18th September the UV unit was reading 0mj/cm2 each morning when the Caretaker arrived to site to conduct his daily checks, however no alarms or shut-downs occurred on these dates. A reading of 0mj/cm2 would indicate that the UV was not operating correctly and the *Cryptosporidium* barrier was not adequate. On 16th and 17th September the unit was re-started, however on morning of 18th the Caretaker contacted the Clerk of Works and it was agreed to shut-down the Jones's Well supply. The UV contractor again visited the site on morning of 18th September.

Replacement UV bulbs were installed on Wednesday 23rd September and a new firing card was fitted. It was also discovered that the relay switch, which controls the alarm call out and the automatic shut-down was not working, and this was replaced. The UV unit operated correctly from 23rd September and daily UV dose data was examined during the audit to verify this.

Audit Findings Regarding Incident Management

The audit found that the UV alarms and shut-downs were adequately responded to on Sunday 13th and Tuesday 15th September, when the relay switch was working and the UV dose was coming back to an acceptable level after re-starting the unit. Once the Caretaker discovered that the UV dose was reading 0mj/cm2 on the morning of Wednesday 16th, and he had neither received an alarm or the unit had not shut-down, the fault should have been immediately escalated to the Clerk of Works and on to Irish Water, the HSE and EPA. This would have allowed earlier action to shut-down the Jones's Well source and issue a Boil Water Notice for the protection of public health.

In response to the UV failure incident Irish Water have implemented a 6 month service programme for the UV unit at Jones's Well instead of the 12 month programme that had previously been in place. Irish Water are also investigating with the UV contractor whether a warning light can be installed on the UV control panel to alert the Caretaker if the relay switch fails again.



2. Source Protection

		Answer
2.1	Is the abstraction source(s) adequately protected against contamination?	Yes
Comment		
<p>The Dunkerrin Well and Jones's Well are spring-fed wells constructed of stacked concrete rings and both wells are housed in sealed chambers. The Lisduff Springs are a series of springs collected within one large sealed collection chamber.</p> <p>All three sources have continuous online turbidity monitors installed with a raw water turbidity alarm set-point of 1NTU.</p> <p>Landowners in the vicinity of each source have been written to reminding them of their responsibilities in protecting the drinking water sources from contamination.</p>		



3. Disinfection

3.1

Is the UV disinfection system operating within its validated range?

Answer

Yes

Comment

UV treatment is installed at Dunkerrin Well and Jones's Well and it's primary function is to provide a barrier against *Cryptosporidium* in the treated water. UV treatment has not been installed at Lisduff Springs and this is addressed in Section 5 of the audit report. While the UV units do provide disinfection, full disinfection is also provided by dosing sodium hypochlorite after the UV. The UV treatment is operated as follows;

Dunkerrin Well

Duty/Standby UV treatment is in place at Dunkerrin Well. The units have automatic switchover in the event of a unit failure and a timed switchover is in place under normal operating conditions.

The UV units are validated to a UV dose of 40mj/cm2 and will alarm at a dose of 45mj/cm2 and shut-down at a dose of 40mj/cm2. The UV dose at the time of the audit was 239mj/cm2.

Jones's Well

A duty only UV unit is in place at Jones's Well. The unit is validated to a UV dose of 21mj/cm2 and a flow of 30m3/hr. The UV unit will alarm and shut-down at a dose of 23mj/cm2. The UV dose at the time of the audit was 100mj/cm2 and the flow rate was 1.97m3/hr.

3.2

Is the chlorine dosed appropriately?

Answer

Yes

Comment

Sodium hypochlorite disinfection is installed at all three water sources in accordance with the minimum criteria set out in EPA Advice Note No. 3– *E.coli* in Drinking Water, i.e. duty/standby dosing pumps with automatic switchover and flow proportional dose. The validation details of disinfection treatment installed at each source is outlined below:

Dunkerrin Well

Following the last EPA audit of the Dunkerrin public water supply in July 2017 a contact tank was installed at the Dunkerrin Well site. Disinfection is verified via two chlorine residual monitors at the outlet of the contact tank. The low chlorine residual alarm set-point is 0.25mg/l and there is a shut-down in place at 0mg/l. The chlorine residual reading at the outlet of the contact tank was 0.4mg/l at the time of the audit.

Jones's Well

Disinfection contact time is achieved by a contact loop pipeline at Jones's Well water treatment plant and verified by a chlorine residual monitor at the end of the contact loop. The low chlorine residual alarm set-point is 0.25mg/l and there is a shut-down in place at 0mg/l. The chlorine residual reading at the end of the contact loop was 0.48mg/l at the time of the audit.

Lisduff Springs

Disinfection contact time is achieved in the reservoir at the Lisduff Springs water treatment plant and verified by a chlorine residual monitor at the outlet of the reservoir. The low chlorine residual alarm set-point is 0.25mg/l and there is a shut-down in place at 0mg/l. The chlorine residual reading at the outlet of the reservoir was 0.45mg/l at the time of the audit.

3.3

	Answer
Is there a chlorine residual ≥ 0.1 mg/l throughout the network?	Yes
Comment	
Chlorine residuals are measured approximately once a week in the distribution network and all results examined during the audit were above 0.1mg/l.	



4. Reservoirs and Distribution Networks

	Answer
4.1 Are reservoirs adequately inspected and maintained?	No
Comment	
<p>The Lisduff Springs reservoir was cleaned in 2012, however Irish Water could not confirm if the reservoir had been integrity tested at that time. A visual inspection of the reservoir found that the outer walls of the reservoir had crumbled in some areas and the metal structure beneath was exposed. There was no sign of water leakage through the outer walls, however an integrity test should be carried out to confirm if any structural defects are present.</p>	



5. Site Specific Issues

		Answer
5.1	Does the supply have adequate treatment for <i>Cryptosporidium</i> ?	No
Comment		
<p>Two of the Dunkerrin public water supply sources have adequate <i>Cryptosporidium</i> barriers in place, Dunkerrin Well and Jones's Well. The Lisduff Springs source does not have a <i>Cryptosporidium</i> barrier and Irish Water have not completed a detailed <i>Cryptosporidium</i> risk assessment for this source. The Lisduff Springs source is currently classified as a high risk source and no raw water monitoring has been carried out to verify or further refine this classification. The source has not been monitored in accordance with Irish Water's <i>Rationale for Determining the Frequency of Cryptosporidium Monitoring in Public Water Supplies</i>.</p>		

Recommendations

Subject	Dunkerrin Recommendations	Due Date	23/11/2020
Action Text	<p>Recommendation(s)</p> <ol style="list-style-type: none">1. Irish Water should ensure that all Offaly County Council water service operators are provided with refresher training in incident response to ensure incidents which could pose a risk to public health are escalated promptly, to enable consultation with the HSE and Irish Water to put in place protective measures if necessary.2. Irish Water should identify how the protozoal compliance requirement is to be addressed at Lisduff Springs water treatment plant, to ensure there is an adequate barrier to <i>Cryptosporidium</i> in the water supply.3. Irish Water should carry out an integrity assessment of the Lisduff Springs reservoir. <p>Follow-Up Actions required by Irish Water</p> <p>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.</p> <p>This report has been reviewed and approved by Aoife Loughnane, Drinking Water Team Leader.</p> <p>Irish Water should submit a report to the Agency on or before 23rd November 2020 detailing how it has dealt with the issues of concern identified during this audit.</p> <p>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.</p> <p>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.</p> <p>Please quote the Action Reference Number DW20170064 in any future correspondence in relation to this Report.</p>		