



Drinking Water Audit Report

County:	Clare	Date of Audit:	23/03/2017
Plant visited:	Kilkeedy PWS (0300PUB1039)	Date of issue of Audit Report:	07/04/2017
		File Reference:	DW2013/47
		Auditors:	Mr Niall Dunne Ms Criona Doyle
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • <i>The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i> • The recommendations specified in the <i>EPA Drinking Water Report</i>. • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **Significant upgrade works to the disinfection system have been completed at the Kilkeedy Public Water Supply, including duty and standby equipment for both UV and chlorine dosing. Facilities are now in place for automatic shutdown of the plant to prevent the risk of inadequately disinfected water entering into supply.**
- ii. **Irish Water is required to submit two months of verification monitoring data to confirm that all equipment and controls are operating correctly to facilitate the removal of Kilkeedy public water supply from the Remedial Action List.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. Kilkeedy Public Water Supply was added to the EPA's Remedial Action List (RAL) in Quarter 2 of 2016 due to inadequate treatment for *Cryptosporidium*. The EPA issued a Direction on 19/07/13 requiring the installation of equipment to ensure automatic switch over between the duty and standby chlorine dosing pumps. This Direction was closed on 22/12/16 following the completion of these works. This audit was carried out to determine if the upgrade works have been satisfactorily completed to allow the supply to be removed from the RAL.

The Kilkeedy Public Water Supply (PWS) is located approximately 11km north east of Corofin, Co. Clare. Raw water for the supply is sourced from a single borehole. Treatment includes UV disinfection and chlorination. The supply provides an average volume of 32m³/d serving a population of approximately 78 (26 houses). Recent upgrade works have been undertaken as part of the Irish Water Disinfection Programme.

The opening meeting commenced at 10.30 am at the Kilkeedy Water Treatment Plant. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews

with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water (IW):

Deirdre O’Loughlin; IW Compliance Specialist.

Representing Clare County Council;

John Strand; Engineer

Maura Mc Nulty; Executive Scientist.

Maeve Lait; Senior Executive Technician.

Roisin Breheny; Executive Technician

Martin Carkill; Caretaker.

Representing the EPA:

Niall Dunne; Inspector.

Criona Doyle; Inspector.

2. AUDIT OBSERVATIONS

The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.

1.	<p>Source Protection</p> <ul style="list-style-type: none"> a. The source for the Kilkeedy PWS is a borehole located within agricultural land used for low intensity dry stock grazing. b. Clare County Council wrote to 10 no. adjacent landowners during 2016 to inform them of their obligations under the European Union (Good Agricultural Practice For Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014). c. It is proposed to revise the <i>Cryptosporidium</i> Risk Assessment in light of the recent upgrade works. Irish Water indicated that they would forward a copy of the revised risk assessment. d. Some improvements have been made to the wellhead protection since the last audit on the 10/12/2013. A permanent concrete post and rail fence with access gate has been installed on the perimeter of the borehole to prevent direct livestock access to the wellhead. Expandable foam has been installed within the below ground chamber to seal up gaps around ducting on the edge of the chamber. Efforts have been made to extend the conductor casing above the base of the chamber floor (Photo No. 1) with the fixing of a section of PVC casing on top of the steel conductor casing. However a fully sealed borehole cover has not been installed. The wellhead is still below ground level and does not meet the requirements of EPA Drinking Water Advice Note No. 14: Borehole Construction and Wellhead Protection. e. Clare County Council indicated that raw water quality monitoring during 2016 was limited to monitoring for <i>Cryptosporidium</i> in February, April and September.
2.	<p>Disinfection</p> <ul style="list-style-type: none"> a. Disinfection at the plant consists of UV disinfection and chlorination. b. Duty and standby UV units are installed, with automatic switchover to the standby unit in the event of failure of the duty unit. In the event the UV unit drops outside its validated operating range (74.1% UVT and UVI 19.0 W/m² for a flow rate up to 3.15m³/hr) the plant automatically shuts down and a text alert is sent to the caretaker. A time delay is in place on start up to ensure the UV lamps have heated up sufficiently. On the date of the audit UV Unit No. 1 was in operation at 108.3

	<p>W/m².</p> <p>c. A cascade alarm system is being set up as part of the commissioning stage and is due to come online in the coming weeks when the SCADA portal is fully operational. A pre alarm limit for UVI is reported to be in place. The warning alarm level could not be confirmed at the time of the audit.</p> <p>d. Water softening filters are present prior to the UV units to prevent scaling of the lamps.</p> <p>e. There are currently 2 no. continuous UVT monitors in place at the plant both linked to recording devices. A temporary UVT monitor was installed by Glan Agua at the site to gather 12 months monitoring data in October 2016 in advance of the disinfection programme upgrades. The temporary unit was reading 96.76% at the time of the audit. A second permanent monitor was installed as part of the upgrade works and is linked to the HMI and was reading 96.6% UVT at the time of the audit.</p> <p>f. Chlorination is undertaken using 5% sodium hypochlorite with softner. A continuous residual chlorine monitor is installed on the final water and is linked to a recording device. Dosing is flow proportional with a target residual chlorine set point of 0.8 mg/l at the treatment plant. Duty and standby chlorine dosing pumps are in place with automatic switchover in the event of failure of one of the pumps.</p> <p>g. No storage of treated water is provided and pumping takes place directly to the distribution mains. Due to issues with the HMI residual chlorine trends could not be observed on site on the date of the audit.</p> <p>h. The low level chlorine alarm is set at 0.15 mg/l and the high level chlorine alarm is 3 mg/l. In the event of the chlorine alarm being triggered a text alert is sent to the caretaker. A cascade alarm system is due to be installed as part of commissioning of the HMI.</p> <p>i. Monitoring of chlorine residual in the network is undertaken by the caretaker 3 times per week. The residual chlorine levels in the network for March 2017 ranged from 0.21 to 0.25 mg/l.</p>
3.	<p>Chemical Storage and Bunds</p> <p>a. The chlorine day tank was banded.</p> <p>b. The sodium hypochlorite was in date and drums are stored on a banded tray adjacent to the day tank.</p>
4.	<p>Management and Control</p> <p>a. The caretaker visits the treatment plant three times per week.</p> <p>b. Service labels were present and in date on all disinfection equipment.</p> <p>c. On the date of the audit it was not possible to view trends on the newly installed HMI as training had yet to be provided to the local authority on the newly installed system. The HMI is reported to be correctly logging on site with data available to download on site.</p>

3. AUDITORS COMMENTS

The audit has confirmed that the upgrade works have significantly improved the safety and security of Kilkeedy public water supply. A robust disinfection system has been installed including duty and standby equipment for both the UV and chlorination elements. Facilities are now in place for automatic shutdown of the UV units to prevent the risk of inadequately disinfected water entering into the distribution system. An alarm system is in place to notify the caretaker in the event of issues with the UV or chlorine dosing systems. The monitoring equipment allows for continuous monitoring and recording of UVT, UVI, flow, turbidity and residual chlorine levels to verify that the water is adequately disinfected and safe for human consumption.

To facilitate removal of this supply from the Remedial Action List, Irish Water should submit two months operational performance data to verify that the plant is operating satisfactorily. Confirmation of the alarm settings and cascade system for alarm notifications is also required. Training is to be provided to local authority staff following the completion of the commissioning of the HMI.

In accordance with EPA advice monitoring for *Cryptosporidium* is not required where a validated UV system is operating within its validated range.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should submit a copy of the revised *Cryptosporidium* Risk Assessment to the Agency.
2. The borehole chamber should be constructed in accordance with EPA Advice Note No. 14: Borehole Construction and Wellhead Protection. Irish Water should ensure that the wellhead is raised above ground level and that it is securely capped to address the risk of ingress into the borehole shaft and that the chamber is sealed with a lockable manhole cover.

Disinfection

3. Irish Water should provide confirmation of the disinfection system alarm settings including the warning levels and plant shut-down levels.
4. Irish Water should submit two months plant operational performance data in graph form (to include UVT/UVI, flow, turbidity and residual chlorine) to support the removal of Kilkeedy public water supply from the RAL.

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 Ms. Aoife Loughnane, Drinking Water Team Leader.

Irish Water should submit a report to the Agency within one month of the date of this audit report 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 timeframe 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 File Reference Number in any future correspondence in relation to this Report.

Report prepared by:

Críona Doyle

Date:

07/04/17

Photograph No. 1: Inadequate Wellhead Protection

