



Drinking Water Audit Report

| | | | |
|--------------------------|--|---------------------------------------|-------------------------------------|
| County: | Co. Kerry | Date of Audit: | 09/05/2018 |
| Plant(s) visited: | Kenmare Public Water Supply (1300PUB1058) | Date of issue of Audit Report: | 06/06/2018 |
| | | File Reference: | DW2009/31 |
| | | Auditors: | Cliona Ní Eidhin Regina Campbell |
| Audit Criteria: | <ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014) as amended.</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. *The newly constructed Kenmare Drinking Water Treatment plant was found to be fully commissioned and operating well on the day of the audit with no apparent operational issues.*
- ii. *The purpose of the audit was to assess the suitability of the Kenmare Public Water Supply for removal from the EPA's Remedial Action List (RAL) by verifying the validation of the UV unit in particular. The audit findings, along with monitoring results submitted to the EPA, will be considered when revising the next RAL at the next review at the end of Q2 2018.*
- iii. *Comprehensive training and handover to be provided by the Design Build Operate (DBO) contractor over the coming 6 months will be of critical importance to the continued security of the Kenmare supply in the provision of drinking water in compliance with the quality standards to consumers.*

1. INTRODUCTION

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 drinking water in the Kenmare Public Water Supply.

The Kenmare Public Water Supply sources raw water from the Carrig East Stream which originates from Eirk Lough. This source has been in use for the Kenmare supply since the 1970s. The supply serves a population of 2,858 (based on volume) within the town of Kenmare and its environs, including areas west of Kenmare to Templenoe. Demand increases during the tourist season and bank holiday

weekends. The newly constructed drinking water treatment plant located over 2.5 km north of Kenmare town has coagulation, flocculation, dissolved air flotation clarification, multimedia rapid gravity sand filtration, UV, chlorination and fluoridation in place and produces approximately 1,300 m³/day. At the time of the audit, the plant was being operated by Glan Agua under a Design Build Operate contract, the operation phase of which is 12 months in duration.

Photographs taken by the EPA representatives during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 10.30am at the Kenmare Drinking 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.

| |
|---|
| <p>Representing Irish Water: Deirdre O’Loughlin – DW Compliance Specialist Tommy Roche – DW Compliance Analyst Salvador McNamara – Water Engineer, Asset Operations Ian O’Mahony – Operations Lead Niall O’Brien – Operations Manager, Glan Agua (DBO Contractor) Gabriel Larkin - Operations Manager, Glan Agua (DBO Contractor) Eoin O’Connell – Operator Glan Agua (DBO Contractor) Richard Murphy – Engineer - JB Barry Consulting Engineers</p> |
| <p>Representing Kerry County Council: Eamonn Lawlor – Executive Engineer Seamus O’Mahony – Executive Engineer Kathleen Casey – Senior Executive Technician Brian Lennon – A/Senior Executive Engineer</p> |
| <p>Representing the Environmental Protection Agency: Regina Campbell, Inspector Cliona Ní Eidhin, Inspector</p> |

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.

| | |
|------------------|--|
| <p>1.</p> | <p>Source Protection</p> <ol style="list-style-type: none"> a. A <i>Cryptosporidium</i> risk assessment for the supply was available in draft form only on the day of the audit. This was not reviewed during the audit. b. A new band screen is in place at the intake from the Carrig East stream and was examined during the audit. c. Continuous online monitoring of the raw water is in place for pH, ammonia, turbidity, temperature, colour, potassium, UVT. Alarms are in place for the following parameters: pH, ammonia, turbidity, colour and UVT. A triggered alarm will automatically shut-down the intake. d. Landowners in the vicinity of the intake have not been written to in recent years in relation to their obligations under the Good Agricultural Practice Regulations. |
|------------------|--|

| | |
|----|---|
| 2. | <p>Coagulation, Flocculation and Clarification</p> <ol style="list-style-type: none"> a. Polyaluminium chloride (PAC) is used as the coagulant and no coagulant aid is used. Coagulant dose is based on UVT. b. The dissolved air flotation (DAF) clarification unit was examined by the auditors and found to be producing clarified water with a turbidity of 0.243 NTU, on inspection of the monitor readouts, verifying that it was operating well. c. The plant operator confirmed the cleaning down schedule for the DAF unit and that a visual check of clarified water is undertaken throughout the day but that there is no procedure or record for this as yet. |
| 3. | <p>Filtration</p> <ol style="list-style-type: none"> a. Three dual media rapid gravity sand filters of stainless steel construction are in operation at the plant. It was not possible to view the media surface due to the height of the filter walls, relative to the walkway, and the lighting in the area. b. A backwash cycle of one filter was observed by the auditors. No observations of concern were made during the backwash but some loss of sand to the filter channel was noted. c. It was noted that there is no sand level marker within the filter units. d. A turbidity monitor was confirmed to be in place on each filter with readings as follows verifying good filter performance: Filter 1: 0.014 NTU Filter 2: 0.074 NTU (after backwash) Filter 3: 0.039 NTU e. The plant operator informed the auditors that coagulation, flocculation, DAF clarification and filtration processes combined provide a 3-log physical removal credit at the Kenmare drinking water treatment plant. |
| 4. | <p>Disinfection</p> <p><u>Primary disinfection</u></p> <ol style="list-style-type: none"> a. Filtered water is disinfected in a Wedeco Spektron 250e UV reactor. The operator explained that the unit specification was determined with a view to providing a further 1 log reduction of treated water, and thus achieving a total of 4 log reduction over the entire treatment process at this plant. b. UVT is measured prior to the unit with shutdown at 75%. A UVI monitor measures intensity at the point of disinfection and was reading 111.1 W/m² at the time of inspection. c. Automatic shutdown is based on dose. The target dose is 16.8mJ/cm² and automatic shutdown is triggered by a low level of 14mJ/cm². d. The plant operator explained that the UVI sensor is verified monthly in-house and an “Operating Plant Procedure” for undertaking this verification was affixed to the adjacent wall. e. The UV validation certificate was reviewed by the auditors and it verified that the unit had operated within its validated range since commissioning. <p><u>Secondary Disinfection</u></p> <ol style="list-style-type: none"> f. Sodium hypochlorite is used as the secondary disinfectant. Duty and standby dosing pumps with automatic switchover were confirmed to be in place. Dosing is based on chlorine residual aiming for 1.1 mg/l in treated water. Shutdown takes place at the low level alarm set point of 0.6mg/l. g. The sodium hypochlorite dosing lines were close to floor level and unprotected from potential damage by tripping. (See Photograph 1) h. Chlorine residual is checked in the network every 2-3 weeks. While results reviewed during the audit were satisfactory, the auditors noted that the frequency of verification checks was low. |
| 5. | <p>Treated Water Storage, Reservoirs and Distribution Network</p> <ol style="list-style-type: none"> a. Two treated water reservoirs are located onsite at the drinking water treatment plant site and |

| | |
|------------------|--|
| | <p>were inspected during the audit. Whilst vents had galvanised mesh in place, the pore size was coarse enough to allow insects to enter.</p> <p>b. A further reservoir is located at Lissaniska in the distribution network; this was also visited during the audit. The structure is above ground and showed evidence of seepage of treated water outward through small cracks. The auditors were informed that the reservoir had been entered into Irish Water’s Reservoir Cleaning and Inspection Programme but that no timeframe for completion of work was available yet. The upgrading requirements for this piece of infrastructure will be identified by this inspection.</p> |
| <p>6.</p> | <p>Management and Control</p> <p>a. The auditors noted that much information pertaining to the operation of the treatment plant was displayed clearly at locations throughout the plant.</p> <p>b. Overall the plant was very clean and tidy.</p> |

3. AUDITORS COMMENTS

This recently commissioned treatment plant has all the necessary infrastructure in place to produce drinking water to a high standard and in compliance with the parametric values of the Drinking Water Regulations. Online raw water monitoring for a range of parameters, with alarms and shut-down, confer a high degree of source security to protect the plant from exceptional or extreme events impacting on the source. Further monitoring of key parameters at various stages of the treatment process allow for informed management of all processes in real time.

The plant was well operated and has an exceptional capacity for oversight, monitoring and control afforded to the operator through monitoring instrumentation and modern control interfaces. Useful information is displayed in an organised and durable format throughout the plant at the locations to which it relates. The plant is designed such that all routine maintenance and calibration is undertaken onsite by the operator which provides for a high degree of autonomy in running it, eliminating potential delays with external contractors.

Training of the plant operator in the running of this new drinking water treatment plant will be of critical importance particularly in the handover phase from the DBO contractor.

4. RECOMMENDATIONS

General

1. Irish water should update the particulars for the Kenmare Public Water Supply on the EPA’s EDEN portal.

Source Protection

2. Irish Water should ensure that the *Cryptosporidium* risk assessment for the Kenmare supply is finalised, submitted to the EPA and reflected on the EPA’s EDEN portal.
3. Irish Water should ensure that landowners in vicinity of the intake are written to remind them of their obligations under the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014)*.

Filtration

4. Irish Water should investigate the cause of the observed loss of small quantities of filter media from the filters into the filter channel and take appropriate action to prevent this loss of media.
5. Irish Water should ensure that the minimum depth of filter media (excluding the gravel layer)

is no less than 800 mm and provide a means (such as a sand level marker) or procedure for readily verifying media depth at regular frequencies.

Disinfection

6. Irish Water should ensure that the chlorine residual is routinely and frequently checked in the network to verify that free residual chlorine levels at the end of the distribution network are maintained at 0.1mg/l at all times.
7. Irish Water should ensure that the chlorine dosing lines and injection points are protected from potential accidental damage.

Treated Water Storage

8. Irish Water should provide a timeframe for the inspection and cleaning, if required, of the Lissaniska Reservoir under Irish Water's Reservoir Cleaning and Inspection Programme. Any upgrading works identified as required should be scheduled for completion as soon as possible in view of the failing condition of the structure.
9. Irish Water should ensure that all vents on reservoirs are secured against ingress of animals and insects or deliberate introduction of any contaminant or acts of vandalism.

Management and Control

10. Irish Water should compile a plant manual containing technical specifications for all plant, structures, materials and consumables relevant to the Kenmare drinking water treatment plant. This should be maintained onsite for reference by future plant operators.
11. Standard operating procedures for routine and periodic check and maintenance activities to be undertaken by the plant operator should be developed and a means for recording the completion of daily/weekly/monthly (etc) checks should be developed.

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 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 DW2009/31 in any future correspondence in relation to this Report.

Report prepared by:

CNE

Date:

06/06/2018

Inspector

Photograph 1: Sodium hypochlorite dosing line - vulnerable to accidental damage.

