



Drinking Water Audit Report

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| County: | Kerry County | Date of Audit: | 06/10/2014 |
| Plant(s) visited: | Shrone 1300PUB1121 | Date of issue of Audit Report: | 10/10/2014 |
| | | File Reference: | DW2007/477 |
| | | Auditors: | Mr Niall Dunne |
| 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 EPA Report on <i>The Provision and Quality of Drinking Water in Ireland</i>. • The recommendations in any previous audit reports. | | |

MAIN FINDINGS

- i. This supply is on the RAL for insufficient treatment for THMs, even though the plant has been upgraded, there are still regular THM exceedances being experienced in this supply. Irish Water must develop proposals, with timeframes, to resolve THM exceedances on this supply.
- ii. The turbidity monitor after the slow sand filters does not have a dial out alarm in place. Irish Water must ensure that a dial out alarm is placed on the turbidity monitor and that alarm levels allow sufficient time for staff to respond appropriately.
- iii. The cleaning and maintenance of the filters is based on headloss. Irish Water should ensure that turbidity is taken into account when scheduling the cleaning and when bringing of the filters back into service.

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. This audit was carried out in response to on-going THM exceedances at this plant and to the latest THM notification of 124 µg/l dated 02/09/2014 in the Shrone PWSS 078A. Where the text refers to the Water Service Authority this refers to Irish Water in accordance with Section 7 of the Water Services (No. 2) Act 2013.

This supply is fed from a mountainous stream, a tributary of Shrone Lake. The daily flow through the plant is estimated at 350 m³/day, and the population served is approximately 200. Treatment consists of slow sand filtration with chlorine disinfection. This new treatment plant was commissioned in 2012.

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

The opening meeting commenced at 10.00 am at the Shrone 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: (* indicates that person was also present for the closing meeting)

Conor Foley: IW; Above Ground Lead*;

Kevin Murphy: IW; Water Engineer*;

John Ahern: KCC; Acting Senior Executive Engineer*;

Seamus O Mahony: KCC; Executive Engineer*;

Kathleen Casey: KCC; Technician*;

Denis Cremin: KCC; Caretaker*;

Representing the Environmental Protection Agency:

Niall Dunne: EPA; 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.

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| 1. | <p>Source Protection</p> <ul style="list-style-type: none"> a. Land use around the source consists of private farmland and commonage. Farming is low intensity. Sheep were observed to be grazing within the vicinity of the source. b. The river bank adjacent to the source was fenced off. c. There are duty and standby abstraction points. The standby abstraction point is used when water levels in the raw water storage tank are low. d. KCC stated that the Crypto risk score for this supply was calculated as low risk. e. KCC stated that the water quality can be variable, historical raw water data shows that the colour can be high, and on one occasion in 2012 it reached 119 Hazen. Based on results since 2010 the mean raw water colour result is calculated as 51.7 Hazen; the mean turbidity as 2.17 NTU and the mean TOC as 4.97mg/l; there have only been four raw water TOC samples taken since 2010. f. No raw water monitoring results were observed to have been taken in 2013. g. From the data supplied 260 no/100ml <i>E.coli</i> was detected in the raw water on the 11/07/2012. h. KCC stated that there is no turbidity monitor on the raw water. |
| 2. | <p>Filtration</p> <ul style="list-style-type: none"> a. Filtration at this plant consists of four slow sand filters, with two filters in operation at any one time. At the time of the audit filters No 3 and No 4 were operational. According to KCC each filter is cleaned every 2-3 months, cleaning is scheduled based on head loss of the filter and not on turbidity. b. Water from the filters which are not in use is run to waste. The standby filters are brought straight back into service when required. c. KCC stated that the design and the actual flow through each filter is 18 m³/hr and 7- 8 m³/hr respectively. The surface area of each filter is 81 m². d. KCC confirmed that the depth of the sand was 1m; and that the effective size of the sand was 0.36 mm. e. There is one turbidity monitor after the filters, (see photograph 1). This monitor automatically alternates reading between each filter every five minutes, and according to KCC it takes approximately one minute after alternating for the monitor to adjust fully to the correct reading. It is indicated on SCADA which filter is being monitored at any one time. |

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| | <ul style="list-style-type: none"> f. The reading on the turbidity monitor at the time of the audit was 0.153 NTU. KCC stated that there was no alarm on this monitor. This monitor was last calibrated on the 24/07/2014. g. Two months turbidity results in graph form from the filters were observed; the results showed the turbidity levels from filters No. 2 and No. 3, the results were at a consistently low level, at approximately 0.3 NTU. h. There was a filter log book on site which clearly documented the maintenance of the filters. Daily turbidity monitoring results after each filter were also documented. |
| 3. | <p>Chlorination and Disinfection</p> <ul style="list-style-type: none"> a. There are three chlorine dosing pumps a duty, a standby and a trim pump. The chlorine set point is 1.2 mg/l and the low and high level dial out alarms are set to 0.5 and 1.8 mg/l respectively. b. KCC stated that the chlorine contact time on this supply is calculated at 45 mg.min/l. c. Chlorine is dosed into a contact tank. The chlorine sampling point is located after the contact tank, but it could not be viewed as it was buried in an adjacent field. d. The observed chlorine reading on the monitor was 1.18 mg/l. The chlorine monitor was calibrated on the 30/07/2014. A chlorine reading taken with a hand held monitor on the day returned a result of 1.35 mg/l, the hand held monitor was calibrated on the 16/06/2014. e. Chlorine results are taken daily within the network by a different caretaker. A record of the network chlorine readings was on site. On observation the chlorine levels at Dooncorrig, a point at the extremity of the network, on the 25/07/2014 returned a chlorine result of 0.03 mg/l. |
| 4. | <p>Monitoring and Sampling Programme for treated water</p> <ul style="list-style-type: none"> a. KCC have initiated a TOC/SUVA/THM sampling program for the treated water for this supply. The highest results were; 6.5 mg/l TOC detected on the 09/06/2014; 3.5 L/mg-m SUVA detected on the 09/06/2014 and 104 µg/l THM detected on the 13/06/2014. b. There is an alarmed turbidity monitor on the final combined water. The dial out alarm level is set at 0.8 NTU. The final turbidity reading at the time of the audit was 0.24 NTU. |
| 5. | <p>Exceedances of the Parametric Values</p> <ul style="list-style-type: none"> a. This slow sand filtration plant was commissioned in 2012, however, there has been THM exceedances in this supply since, with the most recent result of 124 µg/l on the 02/09/2014. |
| 6. | <p>Management and Control</p> <ul style="list-style-type: none"> a. The caretaker is also in-charge of wastewater treatment plants. There is no written procedure in place for staff working between waste and drinking water treatment plants. b. The caretaker is trained to FETAC level 5. c. All monitoring equipment is calibrated once a year by an external contractor and by KCC staff every two months. d. A signed off maintenance schedule was displayed on the notice board in the plant, (see photograph 2). e. The plant is a very clean and tidy and well run; with a very high standard of documentation and record keeping is in place. f. Sealed and lockable covers were observed on all hatches (see photograph 3). |

3. AUDITORS COMMENTS

This plant was upgraded and commissioned in 2012, but it still remains on the RAL for the "Elevated levels of THMs above the standard in the Drinking Water Regulations". Since the plant has been commissioned, there have been THM exceedances, the most recent 124 µg/l on the 02/09/2014. Currently Irish Water does not have plans in place to rectify the THM issue. Irish Water must put plans, with timeframes, in place to resolve the on-going THM exceedances in this supply.

The cleaning schedule and when the filters are brought back into services does not take into account turbidity. Irish Water should ensure that both headloss and turbidity are taken into account when scheduling the maintenance, the cleaning and when the filters are brought back into service.

There is no alarm on the turbidity monitor after the filters. Irish Water must ensure that all turbidity monitors have dial out alarms in place. Alarms levels should be set so as to give the caretaker/staff adequate time to respond to appropriately.

The standard of record keeping at this plant is very high and the use of a displayed signed off maintenance schedules is one that should be replicated in other water treatment plants. The caretaker and Kerry County Council should be commended in this regard.

4. RECOMMENDATIONS

1. The Water Services Authority should put plans, with time frames, in place to resolve the THM exceedances on this supply and in this regard should submit a report into the outcomes of the investigations and monitoring of THM formation in this supply. The Water Services Authority should also take note of the EPA Advice Note Number 4; Disinfection on By-Products in Drinking Water THM; located at the following address.
http://www.epa.ie/pubs/advice/drinkingwater/DrinkingWaterGuide4_v8.pdf
2. The Water Services Authority should install a dial out alarm on the turbidity monitor after the filters. The alarm levels should be set to alert staff to any deviation from the acceptable operating range of the filters.
3. The Water Service Authority should review the procedure in determining when the filters are to be cleaned and brought back into service. The scheduling procedure should be based on both head loss and turbidity. Turbidity should to be kept as low as possible and not greater than 0.5 NTU.
4. The Water Services Authority should ensure that chlorine levels at the extremities of the distribution system are maintained at a minimum of 0.1 mg/l.
5. The Water Services Authority should ensure that the chlorine sampling point can be easily accessed for maintenance and inspection purposes.
6. The Water Services Authority should ensure that procedures are in place for caretakers who have responsibility for both water and waste water treatment plant so as to eliminate the potential of cross contamination between waste water and drinking water.
7. The Water Services Authority should consider installing a raw water turbidity monitor to alert plant operators of any changes in raw water quality.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit the Water Services Authority representatives were advised of the audit findings and that action must be taken as a priority by the Water Services Authority to address the issues raised. This report has been reviewed and approved by Mr. Darragh Page, Drinking Water Team Leader.

The Water Services Authority 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 DW2007/477 in any future correspondence in relation to this Report.

Report prepared by:



Date:

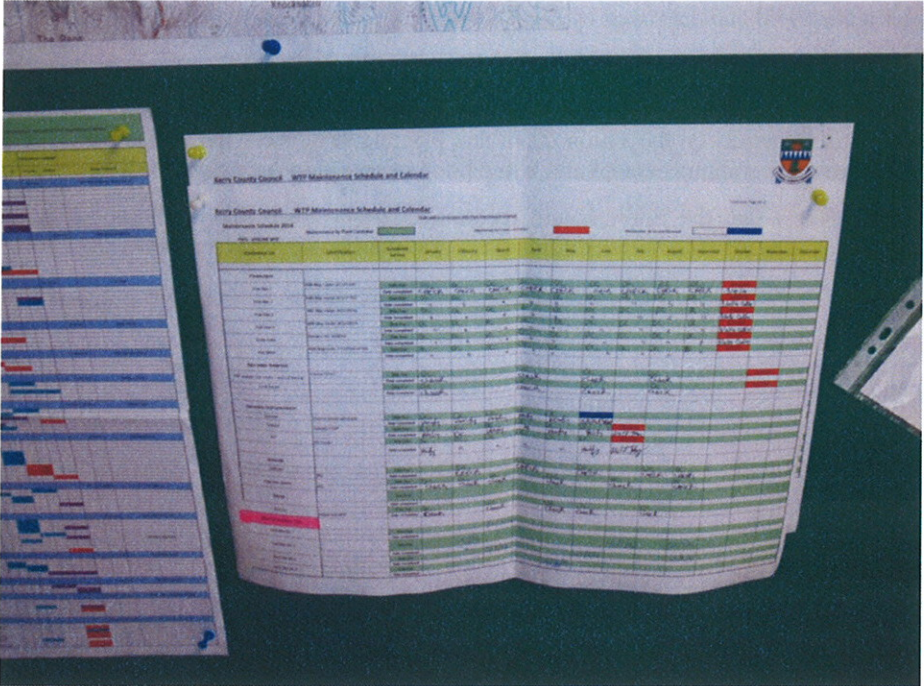
10/10/2014

Inspector

Photograph 1: Turbidity monitor; there is one turbidity monitor which alternates between the two active filters every five minutes.



Photograph 2: A maintenance schedule that is signed off was displayed on the notice board.



Photograph 3: Sealed and lockable covers were on all hatches.

