Drinking Water Audit Report

Local Authority:	Fingal County Council	**Date of Audit:**	15 November 2012
Plant(s) visited:	Leixlip Water Treatment Plant	**Date of issue of Audit Report:**	10 December 2012
		File Reference:	DW2012/149
		Auditors:	Mr. Darragh Page Mr. David Flynn
Audit Criteria:	• The *European Communities (Drinking Water) (No. 2) Regulations, 2007.* • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* • The recommendations specified in the EPA Report on *The Provision and Quality of Drinking Water in Ireland.* • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The Leixlip water treatment plant is well run and well operated.**

ii. **Fingal County Council has been unable to determine the cause of the *E. coli* failures in the Leixlip PWS. A detailed examination of the performance of the plant prior to one of these failures (20 October) indicated that the plant was challenged with a deterioration in raw water quality which may have caused the lower levels of chlorine in the final water at the time of the failure. This may have been a contributory factor to the *E. coli* failure. The WSA should examine the raw water monitoring and the alarm levels to determined if these are adequate to address any challenges deterioration in the raw water present to the operation of the plant**

iii. **Record keeping should be improved such that the results of manual tests (e.g. for chlorine) are recorded and available alongside the results from the monitor at the time to ensure that the monitor is recording accurately.**

iv. **Procedures should be updated to reflect practice (flaming taps/ disinfection of taps).**

1. INTRODUCTION

Under the *European Communities (Drinking Water) (No. 2) Regulations 2007* the Environmental Protection Agency is the supervisory authority in relation to the local authorities and their role in the provision of public water supplies. This audit was carried out in response to the notification by Fingal County Council dated 27 September 2012 of the failure to meet the *E. coli* parametric value (as specified in Table A of Part 1 of the Schedule of the Regulations) at the Leixlip Water Treatment Plant.

The Leixlip Water Treatment Plant (WTP) is operated by Fingal County Council but located in Co. Kildare. The treatment plant produces approx. 160,000 m^3/d drinking water from the River Liffey and is currently undergoing an expansion to increase capacity. Treatment at the plant consists of coagulation, rapid gravity filtration, chlorination and fluoridation. The fluoridation and sludge treatment facilities were not examined as part of this audit.

The opening meeting commenced at 10.00 am at the Leixlip WTP. 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 Local Authority: (* indicates that person was also present for the closing meeting)

Mr. John Keane, Plant Manager*
Ms. Nicola Humphreys, Executive Engineer*
Mr. Des Bartley, Senior Executive Chemist
Mr, Andrew Boylan, Executive Chemist
Ms. Natalie Bruton, Technician
Mr. Pat Nolan, Plant Supervisor

Representing the Environmental Protection Agency:

Mr. Darragh Page, Inspector*
Mr. David Flynn, Programme Manager*

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.	**Source Protection** a. The WSA stated that some upgrade works were being undertaken at the abstraction point to facilitate the expansion of the plant. They stated that these works have not resulted in any alteration to the intake at this time and that all drainage from the works has been directed downstream of the abstraction point. b. The Osberstown WWTP is located approx. 10 kilometres upstream of the intake. The WSA stated that there is good communication between staff at the plant and Fingal County Council and that the Council is notified of any incidents or issues with the potential to cause incidents. When such notifications are received the staff observe the raw water quality to determine if there is any impact on water quality and can shut off the intake if necessary. The WSA were notified of an incident in advance of the 20 October.
2.	**Coagulation, Flocculation and Clarification** a. The clarifiers were observed and appear to be operating well. There was no evidence of floc carryover or any other significant issues with the clarifiers. b. A small number of the clarification channels require adjustment and levelling (water was not entering them) and the WSA stated that this work will be undertaken when the tanks are drained down next (this is carried out annually).
3.	**Filtration** a. The clarified water then passes through to 16 no. rapid gravity filters. b. Filter No.3 was backwashed at the request of the auditors. The air, air/water and water cycles appear to be operating well and were even across the filter.

	c. The turbidity levels on filter no. 3 were later observed on the SCADA and the levels were consistently around 0.1 NTU. The filter is brought back into service slowly over 10-15 mins and although there was a slight spike in turbidity the levels were still low (0.15 NTU). d. The WSA stated that the media in the filter has not been replaced since 1998 and did appear to have gravel on the surface at the time of the audit. The WSA stated that they intended to replace the media but as significant works were planned on the filter in 2013 it was decided to await the completion of these works. The auditors agreed that this was adequate given the good performance of the filters. e. The WSA stated that an assessment of the filters was carried out recently by Frank Harvey, Consultant.
4.	**Chlorination and Disinfection** a. Disinfection is achieved using chlorine gas. There are duty and standby chlorine gas cylinders with three cylinders in each set. The WSA stated that the units switch over when the pressure drops to 0.75 bar and that this occurs approx. every 13 days. b. The chlorinators were replaced in 2012. c. Chlorinated water then travels through the 2 no. clear water tank which takes approx. 2.5 hours. d. A chlorine monitor takes a sample in the first clear water tank approx. 30 mins travel time after chlorination. This was installed to give an early warning on the levels of chlorine in the water to allow adjustments be made to the dose and to give a quicker response time than using the chlorine monitor at the end of the second clear water tank. The target chlorine level at this stage is between 0.5 and 0.6 mg/l. e. The chlorine levels on the SCADA were examined. The trends are further discussed in section 6.
5.	**Monitoring and Sampling Programme for treated water** a. An extensive monitoring and sampling programme of the treated water exists including sampling of raw water, in-process water and final water. b. Documented procedures were available for each of the methods of analysis and for the sampling methods. c. The sample tap where three of the *E. coli* failures occurred was examined. The WSA stated that following earlier exceedances they replaced the sample taps. d. The WSA stated that the taps are disinfected using disinfectant wipes and run to waste for 3 mins prior to sampling. The procedure states that the taps are flamed but the WSA stated that this is not normally done in practice as it would require shutting the valve which the WSA stated may influence the results. e. As part of the daily samples manual chlorine tests are carried out and recorded by the Central Laboratory. The WSA stated that the results are checked with that on the online monitor but they are not recorded or trended together to determine if there is a correlation between the two.
6.	**Exceedances of the Parametric Values** a. *E. coli* monitoring is carried out daily on the final water. There have been four samples testing positive for a single *E. coli* in the Leixlip PWS since September, three of which were from samples at Leixlip WTP (30 September, 22 October and 1 November) with the remaining sample taken from the Ballycoolin Reservoir Inlet (24 September). b. The results from the chlorine monitor were examined in detail for the three days prior to the exceedance. There appeared to be a drop in the levels of chlorine in the Leixlip final water from a normal average of around 0.4 mg/l to between 0.25 and 0.3 mg/l. The levels did not drop below the alarm level of 0.25 mg/l (i.e. the alarm setting) at any stage. c. The results from the ammonia monitor on the raw water were also examined and indicated that there was a rise from none detected to a peak of 0.18 mg/l on 17/18 October lasting approx. 12 hours. d. The WSA stated that they also received an incident notification from Osberstown WWTP on 18 October stating that sludge tanks had overfilled.

3. AUDITORS COMMENTS

The cause of the *E. coli* failures is not clear as there did not appear to be any significant issues in the treatment stages of the Leixlip water treatment plant at the time of the audit. However, it is possible that the incident at the Obserstown WWTP may have contributed to the rise in the levels of ammonia in the raw water on 17/18 October which in turn may have caused an increase in chlorine demand resulting in the lower levels of chlorine in the final water over the period 17 – 20 October. Although there was adequate chlorine in the raw water at this time it may have been a contributory factor in the failure.

4. RECOMMENDATIONS

Coagulation, Flocculation and Clarification

1. The Water Services Authority should ensure that settled water outlet channels are level, free from blockage and flow into these channels is even.

Disinfection

2. The Water Services Authority should record the results of the manual chlorine tests alongside the result from the chlorine monitor and should regularly assess these results to ensure that there is no discrepancy between the two.

3. The Water Services Authority should review the alarm setting on the chlorine monitor to ensure that it is adequate to ensure that adequate chlorine levels are in supply at all times.

FOLLOW-UP ACTIONS REQUIRED BY THE LOCAL AUTHORITY

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. David Flynn, Programme Manager.

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 Fingal County Council.

Please quote the File Reference Number in any future correspondence in relation to this Report.

Report prepared by: Darragh Page
Inspector

Date: 10/12/12