Drinking Water Audit Report

County:	Wicklow	**Date of Audit:**	17th April 2015
Plant(s) visited:	Hollywood Water Treatment Plant	**Date of issue of Audit Report:**	1st May 2015
		File Reference:	DW2015/42
		Auditors:	Mr. Darragh Page Ms. Michelle Roche Mr. Kevin Kelleher
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *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 *Drinking Water Report*. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The definitive cause of the *E. coli* failure could not be identified but it was suspected that leakage from the hot water system at the sampling tap may have been a contributory factor. All subsequent sampling in the supply zone has been compliant.**
ii. **While the treatment plant was well run the management of the distribution network needs to be improved. A programme of regular monitoring of chlorine residual in the network should be prepared and implemented.**

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 the notification by Irish Water dated 2nd April 2015 of the failure to meet the *E. coli* parametric value (as specified in Table A of Part 1 of the Schedule of the Regulations) in the Hollywood/Donard PWS.

The Hollywood Water Treatment Plant supplies water from two boreholes to approx. 1,000 persons in the villages of Hollywood and Donard in Wicklow. Treatment consists of chlorination followed by aeration (for radon removal). A filter is in place at the plant but it was reported that this has never been used as it was not needed. The plant is operated by EPS as part of the South Leinster Design Build Operate contract.

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

Mr. Andrew Boylan, Regional Water Compliance Monitoring Liaison Specialist, Irish Water*
Mr. Tselophile Tlou, Water Engineer, Irish Water*
Mr. Ger Brady, DBO Engineer, Irish Water*
Mr. Noel Doody, Water Engineer, Wicklow County Council*
Mr. Tom Griffin, Senior Executive Chemist, Wicklow County Council*
Mr. Bernard Sexton, EPS
Mr. Eamon Walsh, EPS

Representing the Environmental Protection Agency:

Mr. Darragh Page, Inspector*
Ms. Michelle Roche, Inspector*
Mr. Kevin Kelleher, Scientific Officer*

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 source of the Hollywood PWS is two boreholes on high ground above the village of Hollywood. Both wells were 10 years old or less. Borehole construction logs were not available for either borehole on the day of the audit and Wicklow County Council or Irish Water were not able to provide any information on the construction of the borehole at the time of the audit. b. The borehole chambers were above ground and appeared to be secure and free from ingress of water. However, there were no borehole caps on either of the boreholes at the time of the audit to prevent insects or small animals entering. c. It appeared that both wells had a relatively high water level (<2 m below the top of the borehole) but it was not known where this water was being drawn from as the depth of the casing was not known. A small stream was flowing immediately adjacent to the main borehole (located a few hundred metres downgradient of the main water treatment plant). d. No microbiological monitoring of the raw water was available for either boreholes. e. Both boreholes were reported to have elevated levels of radon in the raw water though no raw water monitoring was available at the time of the audit. f. There was some low intensity agricultural activities immediately upgradient of the boreholes (sheep farming).
2.	**Chlorination and Disinfection** a. The raw water is disinfected with sodium hypochlorite using a duty/standby dosing arrangement. The pumps automatically change over every hour. b. The disinfectant used was 14/15% sodium hypochlorite supplied by Chemco. The label was not in compliance with the EU Biocides Products Regulation (528/2012) and associated Irish regulations (*European Union (Biocidal Products) Regulations, 2013)* as no PCS number or expiry date was visible on the drum in the dosing room. c. The chlorine monitor is alarmed and dials out using a cascade system in the event of low or high levels of chlorine in the final water. d. No monitoring for free residual chlorine in the network takes place other than when a check, audit or investigative sample is analysed.

	e. The chlorine residual from the chlorine monitor was observed and appeared to be very stable and in the range of 0.3 to 0.4 mg/l.
3.	**Aeration** a. The disinfected water is aerated post chlorination to remove radon. The supply was reported to have elevated levels of radon in the raw water but no monitoring was available to verify this. Monthly samples of the treated water are taken by EPS and sent via City Analysts to the EPA Office of Radiological Protection labs for analysis. These results were reviewed during the audit were all below 500 Bq/l and usually around 300 Bq/l. b. A sample of the raw water from both boreholes and the treated water post reservoir was taken by Kevin Kelleher, EPA and was analysed upon return to the EPA laboratories. c. Both boreholes used for the Hollywood PWS had elevated radon in water. The main borehole has an activity of 1121.9 ± 70 Bq/l with the other one being 835.2 ± 52 Bq/l. Both of these activities were above the recommended action level of 500 Bq/l but their remediation (aeration) is effective as the activity from the reservoir (post aeration) was measured at 336 ± 21 Bq/l. This activity concentration was comparable to the previous measurements made at this supply. d. The auditors questioned why the aeration took place after chlorination as this would mean that the chlorine just dosed would also be lost thereby increasing the chlorine dose required. No explanation for this arrangement was given.
4.	**Treated Water Storage** a. Disinfected water enters a contact tank and then into a treated water storage reservoir which has up to 3 days storage. b. A visual inspection of the reservoir and roof were carried out and no issues were observed.
5.	**Exceedances of the Parametric Values** c. A failure to meet the *E. coli* parametric value on 1st April 2015 was notified to the EPA on 2nd April 2015. Follow up samples at four locations in the supply zone were taken on 3rd April and again on 9th April. All results were compliant with the microbiological standards and contained adequate levels of free residual chlorine. d. The results of the investigation could not determine the exact cause of the failure but noted that when the original sample tap was in the fully closed position it was dripping. This may have been from the hot water system and was suspected as being a potential source of contamination. e. Further samples were taken on 16th April and the results were awaited at the time of the audit.

3. AUDITORS COMMENTS

The Hollywood water treatment plant appears to be well run and managed though the placement of the aeration chamber after the chlorination system appears to be a design flaw and necessitates a higher dose of sodium hypochlorite with much of the chlorine lost through the aeration process. However, management of the distribution network is lacking as there is no regular programme of monitoring for residual chlorine in the network and therefore no regular checks to determine whether the primary dose of chlorine at the plant is sufficient to maintain a residual throughout the network.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should carry out regular monitoring on all raw water sources and should include monitoring for *E .coli* bacteria, as an indicator of trends in assessing water quality and to determine the degree of treatment and controls required in the supply.

2. Irish Water should review the borehole logs for the two boreholes and determine whether there is a risk of surface water ingress into the boreholes from the adjacent land or, in the case of the primary borehole, the adjacent stream.

3. Irish Water should install borehole caps on both of the boreholes serving the Hollywood PWS.

Disinfection

4. Irish Water should prepare and implement a programme of regular monitoring of free residual chlorine in the network to verify that the primary chlorine dose is sufficient to maintain a residual at the extremities of the distribution network.

5. Irish Water should review the use of disinfectants at the Hollywood PWS and all other public water supplies to ensure that all disinfectants are authorised in accordance with the EU Biocides Products Regulation (528/2012) and associated Irish regulations (*European Union (Biocidal Products) Regulations, 2013*.

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. Yvonne Doris, 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:  **Date:** 1st May 2015

Darragh Page

Inspector