Drinking Water Audit Report

County:	Dun Laoghaire Rathdown	**Date of Audit:**	20th September 2017
Plant visited:	Disinfection system at Foxrock Pumping Station (DLR Zone 6) Scheme Code 1000PUB1006	**Date of issue of Audit Report:**	26th September 2017
		File Reference:	DW2017/111 DLR Zone 6 – Inadequate Disinfection
		Auditors:	Aoife Loughnane
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)* • *EPA Drinking Water Advice Note No. 3: E.coli in Drinking Water*.		

MAIN FINDINGS

i. **The upgrade works to the disinfection system at Foxrock Pumping Station comply with the requirements of the EPA Direction issued to Irish Water on 11th August 2017 under Regulation 13(3) of the *European Union (Drinking Water) Regulations 2014*.**

ii. **The incident response procedure needs to be further developed to set out who to contact and the actions to be taken in response to disinfection incidents and alarms.**

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 to assess compliance with the EPA Direction issued to Irish Water on 11th August 2017 to upgrade the disinfection system at Foxrock Pumping Station, which serves the DLR Zone 6 public water supply, by 31st August 2017.

Foxrock Pumping Station receives treated water from Vartry water treatment plant. This water is abstracted from the Vartry Reservoir and is treated by slow sand filtration, disinfection, fluoridation and pH conditioning before it travels through the Callow Hill tunnel. At Foxrock Pumping Station, the chlorine levels are boosted and the treated water is then distributed to the Merville, Leopardstown and Foxrock areas of Dun Laoghaire Rathdown.

There are complex management arrangements of the disinfection plant at Foxrock Pumping Station because it is owned by Irish Water and operated by Dun Laoghaire Rathdown County Council at a compound located on the site of the Stillorgan reservoir which is operated and controlled by Dublin City Council. Access to the site is controlled by Dublin City Council. Furthermore, the upgraded disinfection plant has not yet been officially handed over from the contractor, Veolia, to Irish Water.

The opening meeting commenced at 10:00 am at Foxrock Pumping Station. 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:

Tomás Cawley - Water Compliance Monitoring Liason Analyst

Trevor Hennessy - Regional Engineer

John McCormack - Capital Programmes, Irish Water

Representing Dun Laoghaire Rathdown County Council

Gerry Concannon - Senior Executive Engineer

Hugo Van Wyk - Senior Executive Engineer

Representing Dublin City Council:

Eoin Walsh - Engineer

Representing the Health Service Executive:

Dr. Helena Murray - Specialist in Public Health Medicine

Representing the Environmental Protection Agency:

Aoife Loughnane - 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. Disinfection Incident

a. An incident occurred at Foxrock Pumping Station on 28th July 2017 when the chlorine dosing pumps failed to operate from approximately 11:00 am to 3:30 pm. As a result, the water supply was not being adequately disinfected during that time period.

b. There was no chlorine alarm at Foxrock Pumping Station to alert an appropriate person to the incident.

c. Sometime after 12:00 pm on 28th July, Dublin City Council (DCC) staff based at the site noticed that the chlorine dosing pumps were off and there were a series of errors on the control panel. They notified Dun Laoghaire Rathdown County Council (DLRCC) staff who attended the site and succeeded in restarting the dosing pumps in manual operation mode by late Friday afternoon, dosing at 1 litre per hour. The disinfection system remained operating in fixed dose configuration for the weekend, and returned to full normal operation when a contractor attended the site on Monday morning 31st July.

d. A log of chlorine residuals taken as part of the daily inspection of the booster station showed the following residuals leaving the plant:
   - 0.58 mg/l on Friday 28th July;
   - 0.86 mg/l on Saturday 29th July;
   - 0.50 mg/l on Sunday 30th July; and
   - 0.58 mg/l on Monday 31st July.

e. No manual chlorine testing was carried out in the network during the period when the chlorine pumps failed or when they were operating in fixed mode over the weekend.

f. The follow up investigations revealed that the disinfection system did not meet EPA requirements because the chlorine monitor was not alarmed with a dial out facility to alert relevant personnel, and the monitor was not connected to a recording device.

g. On 11th August 2017, the EPA issued a Direction to Irish Water under Regulation 13(3) requiring the upgrade of the disinfection system at Foxrock Pumping Station to meet the chlorination criteria set out in *EPA Drinking Water Advice Note No. 3: E.coli in Drinking Water* by 31st August 2017.

2.	**Upgrade of Disinfection System** a. The chlorine type is 10% sodium hypochlorite, stored in 2 bunded bulk storage tanks. During the audit there was no PCS number displayed on the labels on the chlorine tanks, as required under the Biocides Regulations. b. There are duty and standby chlorine dosing pumps with automatic changeover between pumps every 24 hours and in the event of a pump malfunction. c. The chlorine dose is flow proportional with trim linked to the residual chlorine monitor. The target chlorine dose leaving the plant is 0.6 mg/l. During the audit the monitor was reading 0.63 mg/l. d. As required by the EPA Direction, the chlorine monitor is now alarmed with a dial out facility to alert personnel to malfunctions. The system has been configured to alert for the following events: - Chlorine alarms: low level 0.30 mg/l, low low level 0.1 mg/l, high level 0.8 mg/l; - Mains power failure; - Chlorine dosing pump failure; - Low level in both chlorine storage tanks: 10%. e. The chlorine monitor is linked to a recording device with levels recorded every minute. The monitor has been connected to the Dublin Regional Telemetry system since last week. f. In the event of a failure of the disinfection system, there is no shutdown of the forward feed pumps to prevent inadequately disinfected water entering supply.
3.	**Management and Control** a. A draft procedure "*Irish Water Procedure for Responding to Out of Hours Incidents at Foxrock Secondary Disinfection Plant*" has been prepared and submitted to the EPA. The procedure does not contain key information such as: - Names and phone numbers of persons responsible for receiving and responding to alarms during routine hours and out of hours; - Details of the alarm response cascade system; - Actions to be taken in the event of an alarm; - A standard checklist of items to be checked in the event of a call-out; - Contact details for relevant personnel in DLRCC, Irish Water, HSE and EPA and details on the circumstances requiring their notification. b. A copy of this incident response procedure was not available at the plant during the audit and neither DLRCC or DCC representatives were aware of the draft procedure. c. The chlorine dosing pumps and monitor have not yet been serviced or calibrated since they were installed in late 2016. d. A record keeping system is not yet in place for equipment checks and maintenance, including regular inspection of the chlorine injection points located in the underground chamber.
4.	**Monitoring and Sampling Programme for treated water** a. Network chlorine levels are tested as part of the regulatory compliance monitoring samples, with little or no further operational monitoring of residual chlorine levels in the distribution network. b. DLRCC confirmed there can be difficulties maintaining 0.1 mg/l residual chlorine at the extremity of the distribution network in the Leopardstown area. They outlined a proposal to install an online chlorine monitor linked to telemetry in this location to assist in ensuring adequate disinfection of the water supply. A timeframe is not yet available for this work.

3. AUDITORS COMMENTS

The upgrade works to the disinfection system at Foxrock Pumping Station meet the requirements of the EPA Direction issued on 11th August 2017 under Regulation 13(3) of the *European Union (Drinking Water) Regulations 2014*. A chlorine alarm and dial out facility is now in place to ensure an immediate response can be made in the event of inadequate levels of chlorine in the final water. The chlorine monitor has also been linked to a recording device and connected to telemetry.

The incident response procedure needs to be further developed to set out who to contact and the actions to be taken in response to disinfection incidents and alarms.

4. RECOMMENDATIONS

1. Irish Water should ensure that a documented incident response procedure is in place, to include:

   (i) Names and phone numbers of persons responsible for receiving and responding to alarms during routine hours and out of hours;
   (ii) Details of the alarm response cascade system;
   (iii) Actions to be taken in the event of an alarm;
   (iv) A standard checklist of items to be checked in the event of a call-out;
   (v) Contact details for relevant personnel in DLRCC, Irish Water, HSE and EPA, and details on circumstances requiring their notification.

   A copy of the procedure should be kept close to the chlorine dosing system so that it is readily available in the event of an alarm.

2. Irish Water should assess the feasibility of installing an automatic shut-down of the forward feed pumps in the event of a failure of the disinfection system at Foxrock Pumping Station, to prevent inadequately disinfected water entering the distribution network.

3. Irish Water should ensure that all monitors and equipment are regularly calibrated and maintained in accordance with the manufacturer's instructions. Service/calibration labels should be clearly displayed on equipment.

4. Irish Water should ensure that all disinfectants used in drinking water treatment are authorised and appropriately labelled in accordance with the EU Biocides Products Regulation (518/2012) and associated Irish regulations (*European Union (Biocidal Products) Regulations, 2013*).

5. Irish Water should ensure that residual chlorine readings at the end of the distribution network are maintained at a minimum level of 0.1 mg/l. Irish Water should implement a monitoring programme in the distribution network to demonstrate adequate levels of residual chlorine at all times.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit the representatives were advised of the audit findings and that action must be taken as a priority to address the issues raised. This report has been reviewed and approved by Darragh Page, Programme Manager, Office of Environmental Enforcement.

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: Aoife Loughnane **Date:** 26th September 2017

Aoife Loughnane

Inspector