Public Drinking Water Monitoring Programme Audit Report

County:	Fingal	**Date of Audit:**	22nd August 2018
Location visited:	Dublin City Council Central Laboratory	**Date of issue of Audit Report:**	29th November 2018
		Auditors:	Ms. Derval Devaney (EPA) Dr. John Gray (Consultant)
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended*. • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7).*		

MAIN FINDINGS

- The monitoring programme is generally satisfactory although some weaknesses were highlighted in relation to the pre-determined selection of consumers' properties for sampling and the distribution of those samples within a Public Water Supply zone to ensure that the compliance samples are representative of water in the entire water supply zone.
- The process used by Fingal County County for the labelling of samples on-site could be susceptible to loss of integrity.
- There was no documented procedure for reacting to exceedances of the parametric values outlined in the *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended*.

INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), 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 carrying out effective monitoring of drinking water supplies to ensure the provision of clean and wholesome drinking water.

An audit of Irish Water's 2017 monitoring programmes implemented in County Fingal was carried out at Dublin City Council Central Laboratory (DCCCL) on 22nd August 2018. There are two public water supplies in the Fingal area named Fingal Zone 1 (Leixlip Water Treatment Plant) and Fingal Zone 3 (a blend of water from Bog of the Ring Water Treatment Plant and Leixlip Water Treatment Plant). Prior to the audit, the EPA assessed the 2017 monitoring returns to identify any areas of discrepancy between samples taken and analysed and reported to EPA for these public water supplies. and what was observed during the audit and required to be reported. Using a questionnaire as a guide[1], Irish Water, Fingal County Council and Dublin City Council Central Laboratory staff were interviewed to ascertain the principles and methodology for establishing monitoring programmes, sample point selection, sample classification, integrity of data reporting and notification procedures.

The audit observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

[1] The questionnaire was based on those used by the Drinking Water Inspectorate, London, and modified by Dr John Gray for the purpose of this audit.

Representing Irish Water: (*indicates that person was also present for the closing meeting)

Mr. Andrew Boylan – Irish Water, Drinking Water Compliance Specialist*
Mr. Brian Walsh – Irish Water, Drinking Water Compliance Analyst*
Mr. Francis Glancy – Irish Water, Drinking Water Compliance Analyst*
Mr. Brian Boylan – Irish Water, Reporting Specialist*
Mr. Stephen Cummins – Executive Engineer, Fingal County Council*
Mr. James Dowling – Executive Engineer, Fingal County Council*
Ms. Aileen O'Connell – Dublin City Council, Central Laboratory*
Ms. Sheila Hourigan – Dublin City Council, Central Laboratory*
Ms. Imelda Averill – Dublin City Council, Central Laboratory*

Representing the Environmental Protection Agency:

Ms. Derval Devaney – Inspector, EPA*
Dr. John Gray – Consultant*

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.	**Compliance Monitoring Programme** a. The 2017 compliance monitoring programme was prepared by Irish Water in advance of sampling and included a list of all public water supplies in the county, population data for each supply, the required number and frequency of all check and audit samples and approximate sample locations. Supplies have been classified according to volume of water supplied and population by the Environmental Regulation Team of Irish Water in agreement with Asset Intelligence of Irish Water. b. A review of the temporal and spatial distribution of sampling, to ensure sampling represents the supply as accurately as possible, is carried out by Irish Water. The two WSZs in the Fingal Co. Co. area, Fingal Zone 1 and Fingal Zone 3, were mapped once sampling was complete for the year. The maps illustrated the location of the water treatment plants, reservoirs and the 2017 regulatory (check and audit) monitoring locations. The maps showed areas where no regulatory monitoring was carried out and Irish Water stated this may be due to the land being used for agricultural purposes. c. The number of samples required in each WSZ was based on the volume of water supplied to the WSZ if the ratio of population to volume was >2.2, otherwise sample numbers were based on population. The coefficient is based on an understanding by Fingal Co. Co. of occupation rates. Population data is reviewed annually and Fingal Co. Co. advises Irish Water of any changes it becomes aware of. Census data produced at four yearly intervals is also considered. d. Samples were collected within a monthly period although precise dates were not pre-determined. Samplers are directed on a weekly basis to sample from a specific area by listing road or street names to be sampled from. Therefore, specific addresses are not listed in the compliance monitoring programme. Instead DCCCL identified a specific area based on consideration of the location of previous samples, which were recorded in field sheets to include name, address and telephone number of residences sampled previously. A random number generator is used to aid the selection of locations for check samples. Audit samples are focussed on major areas of population. Suitable alternative sample locations were not pre-determined in the 2017 monitoring programme and only properties where there is an indication that someone is in on the day are approached. e. All samples are taken from taps in consumers' properties or taps in public or commercial buildings. Potential issues were identified by DCCCL regarding the concerns expressed by

	some consumers regarding the large number of sample bottles required on some occasions which entails collecting a large volume of water from their tap which can be a time-consuming process and may have cost implications regarding water usage. f. A number of WSZ are sampled at a reduced frequency for nitrite. No WSZ are sampled at increased frequency for regulatory samples. g. Compliance samples are taken from consumers taps in the network as required and not from water treatment plants or service reservoirs. Samplers also carry out analysis using calibrated portable instrumentation to cross-check against data from grab samples taken in the network and on-line monitoring data taken at the water treatment plants or reservoirs for significant parameters including UVT, turbidity, aluminium, iron and residual chlorine. h. Examination of 2017 monitoring data submitted to the EPA showed an apparent shortfall in regulatory monitoring for public water supplies in Fingal. Four samples for colour appeared not to be taken as part of some check and audit compliance sampling. Data held by Irish Water confirmed there was no shortfall and the discrepancy was attributed to the nomenclature used for recording the term "colour" when submitted the data to the EPA via EDEN. The EPA and Irish Water are working to address this discrepancy.
2.	**Operational Monitoring Programme** a. The 2017 operational monitoring programme was prepared by Irish Water and includes sampling from raw water sources (feeder streams and rivers), water treatment plants, service reservoirs, the distribution system and consumers' taps. The parameters examined are dependent on a number of factors including the site, time of year and historical data. b. DCCCL produce and circulate to relevant parties a monthly summary of operational monitoring carried out at the raw water intake, water in the process of being treated and final water outlet and at reservoirs. Monitoring includes *Cryptosporidium* and *Giardia* at the raw and final water, aluminium residuals in the final water and a suite of other parameters including microbiological and chlorine residuals taken at the plant and reservoirs c. No provision has been made to determine acrylamide, epichlorhydrin and vinyl chloride levels in drinking water and reliance is placed on well-defined product specification and accurate control of delivery of polymer at the treatment plant.
3.	**Monitoring Programmes for Specific Parameters** a. Specific monitoring programmes were in place in 2017 for lead, trihalomethanes and pesticides and were in accordance with Irish Water's national programmes. Radiological parameters were sampled in accordance with the EPA's annual monitoring programme. b. There is a procedure for the cleaning, testing and storage of tankers which are held in readiness for deployment when required in response to incidents. Appropriate taps are fitted and "Advice to boil water" notices are fixed to the tankers which are uniquely identified and certified when ready for use.
4.	**Sampling Procedures** a. Fingal Co. Co. employs its own samplers who are managed by DCCCL and Fingal Co. Co. The sampling procedure is a controlled document which was issued in December 2015 by DCCCL. Daily worksheets are issued to samplers by DCCCL and identify regulatory and non-regulatory samples to be taken. b. Samples are transported in clean, identifiable cool boxes the temperature of which is recorded before, during and after the sampling round. c. Results from field tests are recorded by the sampler on daily worksheets. d. Bottles for compliance samples are labelled at the time of sampling using a marker pen which could lead to loss of sample integrity. Adhesive labels for all sample bottles are printed at the laboratory when the samples are logged in to the Laboratory Information Management Systems (LIMS) identifying the analytical requirements. A list is prepared of all samples requiring the same analyses. e. Sample numbers are generated sequentially and duplication of numbers is not possible. f. Irish Water stated that standard operating procedures are to be incorporated into an electronic

	system by the end of 2018. Also, Labworks7 is to go live in October 2018.
5.	**Data Handling** a. Field data is entered onto the laboratory system by the sampler when logging in the samples. Printed labels with adhesive backing are produced which are attached to the individual sample containers. The information on these labels allows for batching of analyses. b. Analytical data from the laboratory is entered onto the LIMS by the analysts and subsequently authorised by the Senior Scientific Officer. The Technical Manager ensures that appropriate analytical quality control (AQC) is associated with each analysis. c. Any changes made to data on LIMS are automatically recorded and an audit trail of entries can be produced. Once data has been validated on LIMS, no changes can be made. d. If the data recorded is subsequently shown to be incorrect, the Technical Manager would investigate and, if appropriate, issue a revised laboratory report which would again require authorisation by the Senior Scientific Officer.
6.	**Exceedances of Parametric Values** a. The LIMS system automatically emails selected staff in DCCCL of a failed result. This result is confirmed by the technical manager and an email is sent to Fingal Co. Co. engineers who forward the information to Irish Water. b. Irish Water via their Service Level Agreement with the Local Authorities have a template protocol outlining the actions to be taken where a sample result shows an exceedance of the microbiological or chemical parametric values outlined in the *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended.* There is no procedure outlining actions to be taken by all parties (including the lab and the HSE) when a failure is detected. c. Amongst the sampling results reviewed prior and during the audit, a notification by DCCCL to Fingal Co. Co. of a sample containing 1 *Clostridium*/100ml (an indicator parameter) on 27/09/17 in Zone 1 Leixlip Public Water Supply was questioned. This exceedance was included in the 2017 Drinking Water Returns but not reported via ODWNS when the failure occurred. Irish Water explained that this was not reported via ODWNS as the failed sample had adequate chlorine residuals and other microbiological parameters were compliant and the neighbouring property also sampled was compliant. Also, a repeat sample taken at the failed premises on 02/10/17 was compliant. The likely cause of the exceedance was thought to be associated with tap contamination. d. DCCCL produce and circulate to interested parties a monthly summary of drinking water quality in the distribution system which identifies the number of check and audit samples and any exceedances of the parametric values.
7.	**Review of Sampling Data** a. Samples were primarily collected on Mondays, Tuesdays and Wednesdays with a few on Thursdays. b. Sample collection was well distributed throughout the year. c. The first samples in 2017 were taken on 5 January and the last on 19 December.

3. AUDITORS' COMMENTS

The monitoring programmes drawn up by Irish Water and implemented by the Dublin City Council Central Laboratory and Fingal Co. Co. in 2017 were generally found to be satisfactory in assessing the quality of water in public water supplies.

Weaknesses were highlighted in relation to the predetermined selection of consumers' properties and alternative properties in the event that the sampling locations are not available and the distribution of sampling across the entire WSZ. It was also noted that a documented procedure for responding to exceedances of the parametric values outlined

in the *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended* was lacking. A review of all 2017 data submitted to the EPA by Irish Water determined that all sample results were accurately reported to the EPA. The auditors note and welcome the production and circulation by DCCCL of monthly summaries of water quality data.

4. RECOMMENDATIONS

Compliance Monitoring Programme

1. Irish Water should ensure its compliance monitoring programme, prepared before the start of each sampling year, includes a list of predetermined sampling dates and sampling locations and is provided to samplers.

2. Irish Water should provide predetermined alternative sample locations to samplers in the event that a sample location is unsuitable or inaccessible.

3. Irish Water should ensure that sampling is representing the entire water supply zone as accurately as possible and that the spread of sample days and locations within a monitoring programme should be as wide as possible.

4. Irish Water should ensure all public water supplies are monitored for compliance at their required frequencies. To obtain approval by the EPA for a reduction in the monitoring frequency of a parameter (e.g. nitrite), the *European Union (Drinking Water) (Amendment) Regulations 2017 (S.I. 464 of 2017)* and specifically Part C of these regulations require Irish Water to complete a risk assessment in its determination of a derogation from the required sampling frequencies and parameters set out in the Drinking Water Regulations.

5. Irish Water should continue to work with the EPA to ensure that the nomenclature used for reported data for colour is that required by EPA.

Sampling procedures

6. Irish Water should review the procedure used by Fingal County Council for the labelling of samples on-site which could be susceptible to loss of integrity.

Exceedances of Parametric Values

7. Irish Water should develop a written procedure for dealing with sample results that exceed the parametric values outlined in the *European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended* and issue to relevant personnel. The procedure should include the reporting of the failures by the laboratory and actions to be taken to investigate the exceedance and the reporting of the exceedance to the HSE, the EPA and any other relevant party.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

This report has been reviewed and approved by and Emer Cooney, Inspector, EPA.

Irish Water is recommended to put such measures in place as are necessary to implement the recommendations listed in this report. The actions by Irish Water to address the recommendations taken will be verified by the Agency during any future audits.

The EPA also advises that the findings and recommendations from this audit report should, where relevant, be applied to the monitoring programmes of all public water supplies operated and managed by Irish Water.

Report prepared by: Dearbhail Deaney **Date:** 29th November 2018

EPA Inspector

John Gray, Consultant