



# Drinking Water Monitoring Programme Audit Report

<b>County:</b>	Cavan	<b>Date of Audit:</b>	16 <sup>th</sup> November 2016
<b>Location visited:</b>	Cavan County Council Offices	<b>Date of issue of Audit Report:</b>	6 <sup>th</sup> January 2017
		<b>Auditors:</b>	Ms. Derval Devaney (EPA) Dr. John Gray (Consultant)
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>.</li> <li>• The <i>EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i>.</li> </ul>		

## MAIN FINDINGS

- Irish Water should undertake a review of the temporal and spatial distribution of sampling for compliance monitoring. A formal and structured method of assessment should be developed and implemented to ensure that sampling represents the water supply zone as accurately as possible. The distribution of sample days, times and locations within a monitoring programme should be as wide as possible.
- Irish Water should update its procedure relating to sampling and provide training to relevant staff on its use.
- Irish Water should provide a written procedure for dealing with sample results that exceed the parametric values outlined in the *Drinking Water Regulations (S.I. no 122 of 2014)*.
- Irish Water should ensure analysis for compliance sampling is undertaken in accordance with ISO 17025 for all parameters and the that samples are analysed by, or under the supervision of, a person who is competent to perform that task as outlined in Section 5 of the EPA's Public Water Supply's Handbook.

## 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 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 the Irish Water 2015 monitoring programmes implemented in County Cavan was carried out at the Cavan County Council Offices on 16<sup>th</sup> November 2016. Prior to the audit the EPA assessed monitoring returns, to identify any areas of discrepancy between samples taken and analysed and reported to EPA. Using a questionnaire as a guide<sup>1</sup>, Irish Water and Cavan County Council 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.

<sup>1</sup> The questionnaire was based on those used by the Drinking Water Inspectorate, London, and modified for the purpose.

Most of the public water supplies in Co. Cavan are derived from shallow surface water sources. There are 16 public water supplies (PWS) in Co. Cavan of which 10 have water treatment plants managed by Irish Water (IW), the remaining 6 (Blacklion, Dowtra, Shercock, Ballyhaise, Gowna and Arvagh PWS) are treatment works operated by Group Water Schemes (GWS) which provide water to the PWS. One GWS, Erne Valley GWS, provides water to two public water supplies, Gowna PWS and Arvagh PWS.

The audit 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)

Ms. Helen Conefrey, – Irish Water Compliance Specialist (Wastewater) \*

Mr Colm O Callaghan – Acting Senior Executive Engineer, Cavan County Council\*

Representing the Environmental Protection Agency:

Ms. Derval Devaney – Inspector, EPA\*

Dr. John Gray – Consultant, John Gray Consultancy\*

## 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 2015 compliance monitoring programme was prepared by Cavan County Council with oversight by Irish Water. Water supply zones were delineated and mapped but sampling locations were not recorded on a map.
- b. The sampling programme is not a controlled document and is held by the Acting Senior Engineer and the single sampler.
- c. The compliance monitoring programme for 2015 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 the week in which a sample should be taken.
- d. Sample collection dates, locations and suitable alternative sample locations were not pre-determined in the 2015 monitoring programme.
- e. No water supply zone (WSZ) was sampled on a reduced number or frequency of samples.
- f. The number of samples required in each WSZ was calculated based on the WSZ population, using an occupational value of 3.2 persons per property, a value that was derived by the CSO data.
- g. Selection of premises and alternative premises for compliance sampling is not formalised and is based on Cavan Co. Co.'s sampler's local knowledge and awareness of the supply networks.
- h. Samples are generally taken from the consumer's tap or at taps at taps in public or commercial buildings. It was stated that on some occasions samples may be taken from outside taps. It was stated that due to the note that in some areas the threat of physical violence or security domestic sampling is often precluded from sampling.
- i. It was stated that there was an SOP for sampling but that it was not presented on the day of the audit nor was it clear if it was fit for purpose and required to be updated.
- j. During 2015 the analysis of audit samples was carried out by the EPA (Monaghan Lab.) and check samples were analysed by Cavan County Council's lab. During 2016, all compliance samples were analysed by ELS laboratories. The laboratory is accredited to the International Standard ISO 17025 "General requirements for the competence of testing and calibration laboratories". An audit of the external laboratories was not undertaken by Irish Water or Cavan Co. Co. although the laboratory's accreditation has been checked by Cavan Co. Co. through ELS's website.

	<ul style="list-style-type: none"> <li>k. A critical review of the temporal and spatial distribution of sampling, to ensure sampling represents the supply as accurately as possible, has not been carried out for County Cavan. Reliance is placed on the predetermined sampling plan and sampler's choice of sampling location.</li> <li>l. At the end of 2015 a review of all compliance sampling was carried out by Cavan Co Co to determine any compliance monitoring shortfalls. Irish Water now conduct this review on an on-going basis throughout the year to ensure monitoring is carried out for the appropriate frequency determined for the PWSs at the start of the year.</li> <li>m. Some public supplies on Cavan Co. Co. compliance monitoring programme had scheme codes, populations, volumes that differed to that submitted to the EPA on the 2015 Drinking Water Returns (e.g. Balliborough PWS had a population of 9,000 listed on the 2015 monitoring programme and a population of 2,000 was listed in the 2015 Drinking Water Returns).</li> <li>n. Upon review of the 2015 compliance sampling data returns submitted to EPA it is evident that most samples taken at PWSs are taken on Monday, with fewer samples taken on Tuesday, Wednesday or Thursday with none on Friday and the weekend.</li> <li>o. Consideration of the data for total coliforms shows that the first sample date for Cavan Co. Co. was 7 January 2015 and the last 21 December 2015. If these circumstances are repeated year on year then it is apparent that no compliance samples are taken for 17 days for Cavan Co. Co.</li> </ul>
<b>2.</b>	<p><b>Operational Monitoring Programme</b></p> <ul style="list-style-type: none"> <li>a. No operational monitoring programme for 2015 was prepared for public supplies. However it was stated that operational samples were taken at the water treatment plants and chlorine residuals and turbidity in the distribution network by the plant caretaker. Turbidity and nitrite are also determined at water treatment plants and recorded locally. Investigative operational samples were also taken as required, in liaison with the HSE in response to particular events.</li> <li>b. There was no routine operational monitoring of service reservoirs or towers.</li> </ul>
<b>3.</b>	<p><b>Monitoring Programmes for Specific Parameters</b></p> <ul style="list-style-type: none"> <li>a. The 2015 compliance monitoring programme did not include any radiological sampling; however this was in agreement with the recommendation from the EPA's Office of Radiological Protection where supplies serving populations above 10,000 persons are required to carry out radiological sampling every four years. The auditors advised that new guidance would be published by the EPA before year end.</li> <li>b. Cavan County Council does not have a specific sampling programme for tankers. Tankers are deployed in response to incidents and all have "Boil Water Advice" notices permanently fixed as well as additional notices on the tanker taps.</li> <li>c. A specific monitoring programme for 21 baseline pesticides was included in this year's (2016) investigative monitoring and one treatment works (a GWS operated by a contractor which serves a PWS) was subject to monitoring for MCPA.</li> </ul>
<b>4.</b>	<p><b>Sampling Procedures</b></p> <ul style="list-style-type: none"> <li>a. Cavan County Council believed a sampling methodology exists in the form of Standard Operating Procedure and that it was issued by Cavan County Council to the single sampler and the "deputy" sampler; however this document was not provided or examined during the audit.</li> <li>b. A weekly sample list is provided to the sampler and is updated as required by the Acting Senior Engineer. The type of sample required is colour coded based on whether an audit or check compliance sample is required.</li> <li>c. Alternative addresses are selected by the sampler in the event that sampling from the originally selected property is not feasible, particularly in more rural areas; however this alternative sample location is not set out on the worksheet. There is no formal procedure in place to select an alternative address although it was stated that the sampler is aware of the need to take a representative sample from a given area.</li> <li>d. It was stated that for 2016 sample bottle labels with adhesive backing is sent by ELS to Cavan County Council for compliance samples and these labels are fixed securely to the container and appropriate information recorded. The location is not pre-printed on the label and the sampler documents this information when the sample is taken.</li> </ul>

	<ul style="list-style-type: none"> <li>e. Sample ID numbers are generated in the laboratory by ELS. Samples are accompanied by a chain-of-custody form.</li> <li>f. Free and total chlorine concentrations were required to be taken with each sample collected for bacteriological analysis.</li> <li>g. In the event that the sampler is unavailable, a substitute sampler (the assistant chemist) would take samples although training is not always given. Cavan Co. Co. uses a sampling procedure established by HSE although it does not check or audit the procedure in practice or that the sampler is adhering to this procedure during the course of routine sampling.</li> </ul>
<b>5.</b>	<p><b>Data Handling</b></p> <ul style="list-style-type: none"> <li>a. Monitoring data for 2015 is recorded on the Cavan County Council LIMS system, with ELS maintaining its own records.</li> <li>b. Entries in LIMS are checked by a designated person in Cavan County Council (Quality Control) against that reported by ELS labs and require checking of at least ten per cent of entries before authorisation of data is granted.</li> <li>c. Cavan County Council is required to upload the results by the 10th working day of the following month and these are cross-checked by IW. Cavan County Council also upload all monitoring results to its Sharepoint System so that the Water Services have access to this information.</li> <li>d. Any changes made to data on the LIMS were automatically recorded and an audit trail of entries can be produced at any time. No information was available regarding data handling procedures within the HSE or ELS.</li> <li>e. Sample results were uploaded to the EPA via EDEN during 2016 and notifications as they occurred via ODWNS.</li> <li>f. It was noted that for a small number of exceedances, there was a conflict in dates for failures notified by Cavan Co Co/Irish Water to the EPA to that submitted to the EPA as part of the 2015 annual returns e.g. ammonium failure notified on 20/03/16 as occurring on 20/03/16 and failure was documented as occurring on the 18/03/15 in the 2015 returns. It was explained that it is thought that this arose due to the ODWNS notification system automatically selecting the date of notification as the date of the sample. The auditors stated that this issue would be raised with the EPA's IT Dept.</li> </ul>
<b>6.</b>	<p><b>Exceedances of Parametric Values</b></p> <ul style="list-style-type: none"> <li>a. There is a documented joint protocol issued by Cavan County Council, to be followed by HSE and Cavan County Council, "for dealing with unsatisfactory drinking water results". The protocol is dated 2006 and is not a controlled document.</li> <li>b. The protocol specifies that whichever organisation (HSE or Cavan County Council) has taken the sample in which the exceedance occurs will notify the other. Remedial actions as appropriate to the severity of the incident will be initiated and communications maintained until the situation has been resolved.</li> <li>c. There is no SOP for notification of exceedances.</li> <li>d. Exceedances of indicator parameters are considered on a case by case basis. Circumstances which constitute trivial exceedances are not defined.</li> <li>e. There is no procedure to guide the identification of reasons for exceedances and any remedial actions required.</li> <li>f. Although no written procedure was observed to be in place, it was stated that ELS notify all parametric exceedances to Cavan County Council via email.</li> </ul>

### 3. AUDITORS COMMENTS

Arrangements by Cavan County Council with the oversight of Irish Water in assessing the quality of public water supplies for 2015 was generally found to be satisfactory. Weaknesses were highlighted in relation to the lack of pre-determined sampling locations and dates and suitable alternative sample locations to ensure samples are evenly spread and representative of the supply zone. It was also noted that up to date documented procedures for implementing the monitoring programme and reacting to exceedances of the parametric values outlined in the Drinking Water Regulations (S.I. no 122 of 2014) were lacking or not up-to-date.

In order to satisfy Part 3 of the schedule to the *European Union (Drinking Water) Regulations 2014*, as of the end of 2015, the EPA recommends that all compliance samples are analysed by laboratories that are accredited to ISO 17025 for all parameters. While the laboratory used for compliance monitoring purposes is accredited, it was not clear if it was accredited for all parameters.

### 4. RECOMMENDATIONS

#### Compliance Monitoring Programme

1. Irish Water should ensure that:
  - (a) the spread of sample days, times and locations within a monitoring programme are as wide as possible to ensure that compliance samples are representative of water quality consumed throughout the year as required by the Drinking Water Regulations;
  - (b) a formal protocol is established for the selection of random addresses for consumer's premises and for the selection of alternative addresses if required;
  - (c) sample locations are mapped using GIS co-ordinates obtained in sampling to assist in reviewing the temporal and spatial distribution of sampling for compliance monitoring. A formal and structured method of assessment should be developed and implemented to ensure that sampling is representing the water supply zone as accurately as possible.
2. Irish Water should ensure that the compliance sampling programme:
  - (a) is a controlled document;
  - (b) has a predetermined narrow window of sampling dates for samplers that includes taking samples throughout the entire week;
  - (c) includes specific sampling locations;
  - (d) has predetermined alternative sample locations in the event that a sample location is unsuitable or inaccessible;
  - (e) is accurate (i.e. has correct scheme codes, population and volumes) for all public water schemes.

#### Operational Monitoring Programme

3. Irish Water should ensure that a formal and routine operational monitoring programme is in place which includes monitoring of service reservoirs and towers.

#### Monitoring Programmes for Specific Parameters

4. Irish Water should ensure that Section 4, Paragraph 5 of the EPA's Handbook is adhered to in relation to sampling required on water in tankers. A certain amount of sampling is required on the water used to fill a tanker, if the water is stored more than 48 hours in the tanker.

#### Sampling Procedures

5. Irish Water should:
  - (a) review the procedure for compliance sampling to ensure it is appropriate and up-to-date;

- (b) provide training to the sampler and substitute sampler(s) on the sampling procedure in the event that the regular sampler is unavailable, to ensure compliance sampling is undertaken adequately (e.g. not at an outside tap);
- (c) audit the external laboratory to ensure analysis is undertaken in accordance with its ISO 17025 for all parameters and the that samples are analysed by, or under the supervision of, a person who is competent to perform that task as outlined in Section 5 of the EPA's Public Water Supply's Handbook.

### **Exceedances of Parametric Values**

- 6. Irish Water should develop a written procedure for dealing with sample results that exceed the parametric values outlined in the Drinking Water Regulations (SI no 122 of 2014). The procedure should include (a) actions to be taken to investigate the exceedance and determine its cause, (b) reporting the exceedance to the HSE, the EPA and any other relevant party and (c) remedial action required. The circumstances that constitute trivial and the more serious exceedances should be clearly defined.

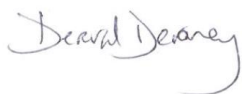
### **FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER**

This report has been reviewed and approved by Mr Darragh Page, Senior Manager, Drinking Water Team.

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 other Public Water Supplies operated and managed by Irish Water.

**Report prepared by:**



**Date:**

6<sup>th</sup> January 2016

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Derval Devaney

Inspector