



# **The Quality of Drinking Water in Ireland A Report for the Year 2004**

**ENVIRONMENTAL PROTECTION AGENCY**  
**An Ghníomhaireacht um Chaomhnú Comhshaoil**  
PO Box 3000, Johnstown Castle Estate, Co Wexford, Ireland

Telephone: +353-53-60600; Fax: +353-53-60699  
E-mail: [info@epa.ie](mailto:info@epa.ie) Website: [www.epa.ie](http://www.epa.ie)

Lo Call: 1890 335599

**© Environmental Protection Agency 2005**

**All or part of this publication may be reproduced without further permission,  
provided the source is acknowledged.**

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. Neither the Environmental Protection Agency nor the author(s) accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication.

## **The Quality of Drinking Water in Ireland A Report for the Year 2004**

**Authors: Mr. Darragh Page, Mr. Frank Clinton and Dr. Matt Crowe**

**ISBN 1-84095-171-0**

**05/12/750**

**Price: €25**

<b><u>1</u></b>	<b><u>INTRODUCTION .....</u></b>	<b><u>3</u></b>
1.1	ROLES AND RESPONSIBILITIES .....	3
1.2	THE EUROPEAN COMMUNITIES (DRINKING WATER) REGULATIONS, 2000 .....	3
1.2.1	INTRODUCTION TO THE 2000 REGULATIONS .....	3
1.2.2	MONITORING REQUIREMENTS .....	4
1.2.3	CORRECTIVE ACTION.....	5
1.2.4	DEPARTURES .....	6
1.2.5	APPROVAL OF LABORATORIES .....	6
<b><u>2</u></b>	<b><u>DRINKING WATER MONITORING IN 2004 .....</u></b>	<b><u>7</u></b>
2.1	BACKGROUND .....	7
2.2	SANITARY AUTHORITY MONITORING OF DRINKING WATER.....	8
2.2.1	MICROBIOLOGICAL PARAMETER COMPLIANCE .....	11
2.2.2	CHEMICAL PARAMETER COMPLIANCE .....	14
2.2.3	INDICATOR PARAMETER COMPLIANCE .....	18
2.3	MAIN ISSUES RELATED TO DRINKING WATER IN IRELAND .....	24
2.3.1	MONITORING PROGRAMMES .....	24
2.3.2	THE QUALITY OF WATER IN PRIVATE GROUP WATER SCHEMES.....	24
2.3.3	<i>CRYPTOSPORIDIUM</i> .....	25
2.4	LOCAL AUTHORITY AUDITS.....	27
<b><u>3</u></b>	<b><u>DEPARTURES.....</u></b>	<b><u>33</u></b>
3.1	BACKGROUND .....	33
3.2	APPLICATION PROCEDURE.....	33
3.3	EPA ACTIVITIES IN 2004 .....	33
3.4	APPLICATIONS RECEIVED IN 2004 .....	33
<b><u>4</u></b>	<b><u>APPROVAL OF LABORATORIES PRODUCING DATA FOR INCLUSION IN THIS REPORT.....</u></b>	<b><u>34</u></b>
<b><u>5</u></b>	<b><u>CONCLUSIONS AND RECOMMENDATIONS .....</u></b>	<b><u>35</u></b>
5.1	THE QUALITY OF DRINKING WATER .....	35
5.1.1	PUBLIC WATER SUPPLIES.....	35
5.1.2	GROUP WATER SCHEMES.....	36
5.1.3	SMALL PRIVATE SUPPLIES .....	37
5.2	MONITORING .....	37
5.3	THE MANAGEMENT OF DRINKING WATER .....	38
5.4	REPORTING AND COMMUNICATION .....	39
5.5	ENFORCEMENT OF THE DRINKING WATER REGULATIONS .....	39
	<b><u>SUGGESTED FURTHER READING .....</u></b>	<b><u>40</u></b>

<b>APPENDIX 1 .....</b>	<b>41</b>
-------------------------	-----------

<b>APPENDIX 2 .....</b>	<b>46</b>
-------------------------	-----------

<b>APPENDIX 3 .....</b>	<b>83</b>
-------------------------	-----------

## Acknowledgements

The help of those sanitary authorities which contributed data to the Environmental Protection Agency for the purposes of this report is gratefully acknowledged. Thanks are also due to EPA staff members David Smith, Niamh O'Neill, Philip Browne and Deirdre Kirwan. Thanks are particularly due to Sheila Convery (intern) for her input to specific aspects of the report.

## EXECUTIVE SUMMARY

This is the fifteenth report by the Environmental Protection Agency (EPA) on the quality of drinking water in Ireland but the first report on the new Regulations, the European Communities (Drinking Water) Regulations, 2000 (SI No 439 of 2000) that came into force on 1<sup>st</sup> January 2004. These Regulations are substantially different from the previous Regulations and thus the format, content and focus of the report has been altered in accordance with the 2000 Regulations.

The results of monitoring of drinking water supplies in Ireland in 2004 involved the assessment and review of 189,743 individual tests carried out on 16,431 samples of drinking water in 904 public water supplies, 794 public group water schemes, 778 private group water schemes and 123 small private supplies. However, the number of samples and individual tests should be greater as many sanitary authorities did not fulfil the minimum monitoring requirements due to insufficient samples being analysed in some supplies, insufficient parameters being tested in some samples and the omission of some supplies from the monitoring programme entirely. No monitoring was carried out on 26% of public water group water supplies and on 10% of private group water schemes.

The report concludes that the quality of drinking water provided to 84% of the population by the sanitary authorities in public water supplies and public group water schemes (which get their water from public water supplies) was satisfactory while the quality of water provided to less than 7% of the population by private group water schemes was unsatisfactory. The overall rate of compliance with the 48 standards for drinking water in 2004 was 96.4%.

The primary reason for the unsatisfactory status of the private group water schemes was the relatively low percentage of samples complying with the *E. coli* parametric value (78.1%). In this regard the quality of the private group water schemes was lower than that of the small private supplies (90.3% compliance), the public group water schemes (96.2% compliance) and the public water supplies (98.9%). Four Counties had less than 60% compliance with the *E.coli* parametric value in private group water schemes.

The poor microbiological quality of the private group water schemes is the most challenging issue facing the authorities charged with responsibility for drinking water in Ireland. Though the majority of these schemes have plans in place to be upgraded as part of a Design Build Operate (DBO) bundle there are a significant number of poor quality schemes which are not participating in this process.

Monitoring of the chemical quality of drinking water reveals a high rate of compliance with the standards across all types of supplies (99.3%). However, compliance for fluoride, lead, bromate and trihalomethanes is in need of improvement. More stringent standards will apply in 2013 (for lead) and 2008 (for bromate and trihalomethanes).

Since 1<sup>st</sup> January 2004, Cryptosporidiosis has been made a notifiable disease. This means that where a case of the disease is detected it must be reported to the Health Protection Surveillance Unit (formerly the National Disease Surveillance Centre). The Unit reported that there were three outbreaks of cryptosporidiosis whose transmission route was suspected to be waterborne in 2004. Indications for 2005 are that the number of cases has risen substantially, though this may be due to improved reporting and surveillance.

Risk assessments were carried out on 331 individual public water supplies by sanitary authorities to determine the vulnerability of public water supplies to *Cryptosporidium*. 59% of the total population are served by a public water supply which has had a risk assessment carried out. Of the 363 risk assessments carried out (some supplies have more than one source) 21% were identified as being in the high-risk or very high-risk categories.

The Agency carried out a series of audits during the reporting period and found that management by sanitary authorities of the area of drinking water has improved compared to

previous years. More sanitary authorities have adopted a documented management systems approach and all sanitary authorities audited had developed a documented protocol for dealing with exceedances of the standards, in accordance with EPA recommendations. There was little evidence of the implementation of source protection measures at the majority of plants visited although the carrying out of *Cryptosporidium* Risk Assessments at many of the plants visited is a welcome step in the right direction.

Key recommendations of this report are.

1. Sanitary authorities should ensure that each exceedance of the parametric values is investigated. For non-trivial exceedances, a corrective action plan should be prepared within 60 days and the action to be taken should be complete within one year if the exceedance presents a risk to public health or within two years if the exceedance does not present a risk to public health.
2. Sanitary authorities must use the enforcement options available to them to pursue persons responsible for the management of group water schemes that supply water to members of the public to an unacceptable level.
3. Sanitary authorities should carry out risk assessments to determine the vulnerability of public water supplies to *Cryptosporidium* on the remaining public water supplies that serve 41% of the total population.
4. Sanitary authorities should examine the results of the risk assessments in detail and for those supplies that are high risk or very high risk, take remedial action to reduce the risk.
5. Consideration should be given to the introduction of legislation to provide for the overseeing and enforcing of sanitary authorities implementation of the drinking water Regulations. The legislation should include the provision of powers to an appropriate body to direct sanitary authorities to carry out specified actions where the need arises and to prosecute sanitary authorities if they fail to carry out directions or continually fail to provide drinking water that meets the requirements of the drinking water Regulations.
6. Sanitary authorities should carry out a lead survey to determine the extent of lead piping in the distribution network and in the population served.
7. Sanitary authorities should ensure that fluoridation is carried out in accordance with the requirements of the Fluoridation Act and that levels in the final waters do not exceed 1.0 mg/l.

# 1 INTRODUCTION

## 1.1 Roles and Responsibilities

The sanitary authorities in Ireland are responsible for the production, distribution and monitoring of public water supplies. A sanitary authority is defined as one of the 34 City and County Councils. As of 1<sup>st</sup> January 2004 sanitary functions which were formerly the responsibility of Town or Borough Councils now rest with the relevant County Council. The role of the Environmental Protection Agency is restricted to the activities defined under Section 58 of the EPA Act, 1992 (No. 7 of 1992) as well as some other functions assigned under the European Communities (Drinking Water) Regulations, 2000 (SI 439 of 2000).

In summary, the Environmental Protection Agency is responsible for:

- the collation and verification of monitoring results from all drinking water supplies covered by the European Communities (Drinking Water) Regulations, 2000 and the preparation of a national annual report on the overall quality of drinking water in Ireland;
- the provision of advice and assistance to local authorities both on a formal basis (e.g. the preparation of guidance documents) and on an ongoing basis;
- the authorisation of departures from the parametric values in respect of all drinking water supplies;
- checking the analytical quality control systems that are in place in laboratories carrying out analysis of drinking water;
- approval of microbiological methods of analysis other than those specified in Part 3 of the Schedule of the European Communities (Drinking Water) Regulations, 2000.

While the Environmental Protection Agency does not have the statutory power to take action against a sanitary authority that is not complying with the requirements of the relevant drinking water legislation, the Agency carried out audits of the sanitary authorities in relation to drinking water (see Chapter 7). These audits were used to verify the information that has been submitted to the Agency as part of the annual returns and also to provide advice and assistance to the sanitary authorities in the implementation of the Regulations.

The current report is the fifteenth report that the Environmental Protection Agency (and its predecessors) have produced in relation to the quality of drinking water in Ireland and it is the first such report under the 2000 Regulations.

## 1.2 The European Communities (Drinking Water) Regulations, 2000

### 1.2.1 Introduction to the 2000 Regulations

The European Directive on the quality of water intended for human consumption (98/83/EC) was transposed into Irish law on the 18<sup>th</sup> December 2000 and took effect on the 1<sup>st</sup> January 2004. The 2000 Regulations are substantially different from the previous Regulations (the European Communities (Quality of Water Intended for Human Consumption) Regulations, 1988). In summary, the 2000 Regulations:

- set standards in relation to the quality of water intended for drinking water, cooking, food preparation, other domestic purposes and food production (other than natural mineral waters, bottled water, certain medicinal products and exempted supplies);
- provide for temporary departures from the standard where there is no threat to human health; and



- require that information is made available to consumers in relation to various matters including water quality, exempted supplies, departures granted, precautionary measures and remedial action in case of non-compliant supplies.

In general, a wide-ranging overhaul of the original 1988 Regulations has been carried out. As well as introducing a series of new or revised standards, termed “parametric values”, and downgrading some existing standards to “*indicator*” status, the new Regulations introduce a revised regime for correcting breaches of standards.

## 1.2.2 Monitoring Requirements

The 2000 Regulations prescribe 48 parametric values which are classified as being either **microbiological**, **chemical** or **indicator** parameters. Furthermore, the Regulations outline two distinct monitoring categories, **check monitoring** and **audit monitoring**, the latter requiring fewer numbers of samples but being by far the more demanding in analytical terms.

The purpose of check monitoring is to provide information on the organoleptic and microbiological quality of the water supplied for human consumption as well as information on the effectiveness of drinking-water treatment (especially of disinfection) where it is used.

The purpose of audit monitoring is to provide the information necessary to determine whether or not all the standards specified in Part I of the Schedule to the Regulations are being complied with. All such parameters must be subject to audit monitoring unless it can be established by a sanitary authority, for a period of time to be determined by it, that a parameter is not likely to be present in a given supply in concentrations which could lead to the risk of a breach of the relevant parametric value.

**Table 1-1** provides the minimum sampling frequencies that apply.

**Table 1-1. Minimum Monitoring Frequencies**

<i>Volume of water distributed/produced each day within a supply zone (m<sup>3</sup>)</i>		<i>Estimated Population Served</i>	<i>Check monitoring Number of samples per year</i>	<i>Audit monitoring Number of samples per year</i>
>10	≤ 100	50-500	2	To be determined by the sanitary authority
>100	≤ 1,000	500-5,000	4	1
>1,000	≤10,000	>5,000-50,000	4  +3 for each 1,000 m <sup>3</sup> /d [5,000 pop] and part thereof of the total volume	1 + 1 for each 3,300 m <sup>3</sup> /d [16,500 pop] and part thereof of the total volume
>10,000	≤100,000	>50,000-500,000		3 +1 for each 10,000 m <sup>3</sup> /d [50,000 pop] and part thereof of the total volume
>100,000		>500,000		10 +1 for each 25,000 m <sup>3</sup> /d [125,000 pop] and part thereof of the total volume

### 1.2.3 Corrective Action

Article 9 of the 2000 Regulations outline the specific actions that must be taken in the event of a failure to meet the microbiological, chemical or indicator parametric values. In essence, the sanitary authority is required to investigate every breach of the parametric values to determine its cause and to instigate corrective action depending on the type of failure reported (i.e., whether it is a microbiological, chemical or indicator parameter), on whether there is a risk to public health and on the type of supply the failure is reported in (i.e., public water supply or a private water supply). Extensive guidance on this matter is provided in the EPA Publication "European Communities (Drinking Water) Regulations, 2000: A Handbook on Implementation for Sanitary Authorities" and it is not intended to repeat this guidance in its entirety. However the most salient points are emphasised here.

The primary requirement on the sanitary authority is to investigate each exceedance of the parametric value that is reported. Where the failure is with the microbiological or chemical parametric standard, the sanitary authority is required to prepare an action programme within 60 days of receipt of the initial result. The measures proposed in the action programme must be in place within one year in relation to failures that present a risk to public health and within two years for those exceedances that do not present a risk to public health.

Where a microbiological or chemical failure occurs in a private water supply, such as a group water scheme, the sanitary authority is required to serve a notice on the person responsible for the supply within 14 days of receipt of the results. The notice must require the persons responsible to prepare an action programme within 60 days of receipt of the notice. The action programme must ensure that the supply is brought back into compliance with the

Regulations within one year in relation to failures that present a risk to public health and within two years for those exceedances that do not present a risk to public health.

Where a failure to meet the indicator parametric values occurs the sanitary authority is first required to determine whether the non-compliance poses a risk to human health. If such a risk exists then the sanitary authority is required to follow the corrective action procedures outlined in the previous two paragraphs.

There is one exception to the above requirements: where the sanitary authority has applied for and received authorisation for a departure under Article 5 of the 2000 Regulations. This is dealt with in the section that follows.

### 1.2.4 Departures

Article 5 of the European Communities (Drinking Water) Regulations assigned the responsibility for the consideration of applications for departures from the parametric values specified in Table B in Part 1 of the Schedule of the Regulations to the Environmental Protection Agency. In the context of the Regulations, a departure is a temporary authorisation given to a sanitary authority (upon application) to exceed the limit for a specific chemical standard for a limited time period (not exceeding three years). Such a departure can only be granted by the Agency where “no such departure constitutes a potential danger to human health”. The Agency has the authority to refuse any such application where it is not satisfied that there is no potential danger to human health.

An application for a departure from the parametric values specified in Table B (Chemical Parameters) in Part 1 of the Schedule of the Regulations must contain all the information contained in the Agency application forms available either from the Agency website ([www.epa.ie/OfficeofEnvironmentalEnforcement/PublicAuthorityEnforcement/DrinkingWater](http://www.epa.ie/OfficeofEnvironmentalEnforcement/PublicAuthorityEnforcement/DrinkingWater)) or in Appendix 5 of the EPA Publication “European Communities (Drinking Water) Regulations, 2000 (SI No. 439 of 2000): A Handbook on Implementation for Sanitary Authorities”. In summary the application must contain:

- the details of the departure sought (name of water supply, parameter concerned, grounds for the departure, duration of the departure sought and details of any possible alternative sources);
- an assessment of the impact of the departure (including the identification of sensitive sub-populations and details of how the sanitary authority intends to deal with such groups);
- details of past monitoring for the parameter in question (three years monitoring results if available); and,
- a remedial action plan (including a timetable for the completion of necessary works in order to bring the supply into compliance) and details of how the authority intends to communicate the details of the departure to the affected populations.

A key feature of the application process is the assessment of the health implications of the departure. To satisfy this requirement the sanitary authority is required to consult the Health Services Executive and to submit with the application a letter stating that they are satisfied that there is no potential danger to human health as a result of the application sought. A summary of the activities of the EPA in regard to departures is given in Chapter 3.

### 1.2.5 Approval of Laboratories

Part 3 of the Schedule of the 2000 Regulations states that “each laboratory at which samples are analysed must have a system of analytical quality control that is subject from time to time to checking by a person who is not under the control of the laboratory and who is approved by the Agency for that purpose”. Consequently, the Agency is required to establish a system of ensuring that each of the laboratories have been approved and are regularly checked. A summary of EPA activities in regard to this matter is given in Chapter 4.

## 2 DRINKING WATER MONITORING IN 2004

### 2.1 Background

As discussed in Section 1.2 the European Communities (Drinking Water) Regulations, 2000 specify minimum monitoring frequencies that depend on the size of the supply in question. Though the 2000 Regulations specify two types of supplies ("public" and "private"), in practice there are four distinct categories of water supply in Ireland, of which the latter three would be classified as "private" in the context of the Regulations. These categories are listed below:

- Public Water Supplies (PWS). These are sanitary authority operated schemes (though these may be run by a private contractor on behalf of the sanitary authority). They supply water to the majority of households in Ireland.
- 'Public' Group Water Schemes (PuGWS). These are schemes where the water is provided by the sanitary authority but responsibility for distribution of the water rests with the group scheme. These schemes tend to be supplied off larger public water supplies.
- 'Private' Group Water Schemes (PrGWS). These are schemes where the owners of the scheme (usually representatives of the local community) source and distribute their own water. Combined; the 'public' and 'private' group water schemes supply water to around 10% of the population of Ireland.
- Small Private Supplies (SMP). This is a large group of different types of supplies comprising industrial water supplies (such as those used in the brewing industry) to boreholes serving single houses. The majority of these supplies are exempt from the requirements of the Regulations except where the water is supplied as part of a public or commercial activity.

The number of supplies monitored during 2004 and falling into each of these categories and the percentage of the total population served as given in Table 2-1.

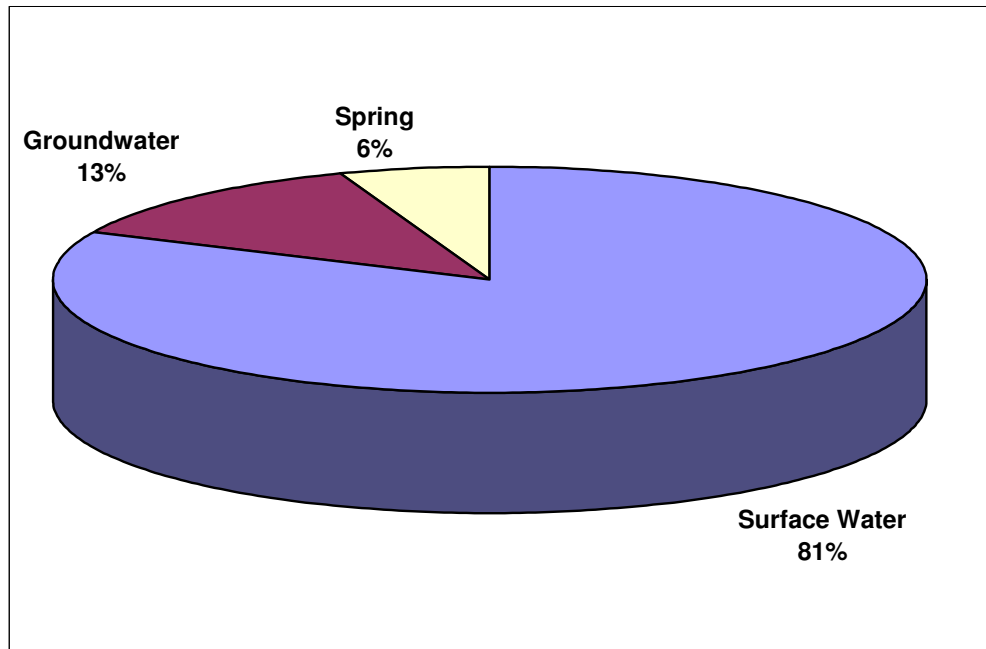
**Table 2-1. Supplies Monitored in 2004 and the Proportion of the Population Served.**

Type of Supply	No. of Supplies	Percentage of Total Population Served
<b>Public Water Supply (PWS)</b>	904	80%
<b>Public Group Water Scheme (PuGWS)</b>	794	4%
<b>Private Group Water Scheme (PrGWS)</b>	778	6%
<b>Small Private Supply (SMP)</b>	123	<1%
<b>Exempted Supplies<sup>1</sup></b>	Unknown	10% (approx)

In Ireland, the majority of drinking water originates from surface water (i.e., rivers and lakes) (Figure 2-1). This is particularly so for public water supplies whereas group water schemes and small private supplies tend to be slightly more reliant on groundwater or spring water.

---

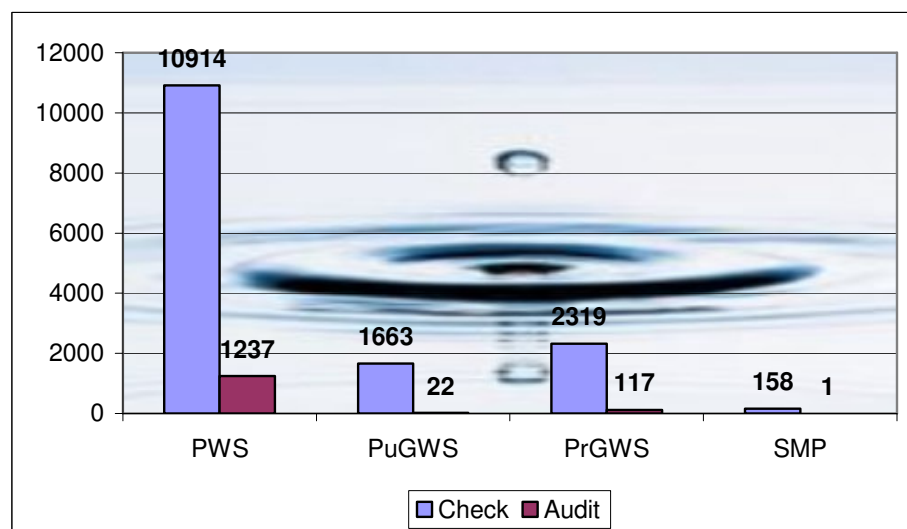
<sup>1</sup> Exempted supplies are supplies that are provided from either an individual supply providing less than 10m<sup>3</sup> a day on average or serving fewer than 50 persons and do not supply water as part of a public or commercial activity. Exempted supplies may also be a supply used exclusively for the purposes in respect of which the sanitary authority is satisfied that the quality of the water has no influence, either directly or indirectly, on the health of consumers concerned (e.g. industrial cooling water).



**Figure 2-1. Sources of Drinking Water in 2004.**

## ***2.2 Sanitary Authority Monitoring of Drinking Water***

As outlined in Section 1.2.2, sanitary authorities are required to monitor water supplies within their functional area a minimum number of times each year depending on the volume of water provided by the water supply. Sanitary authorities must take sufficient samples to ensure that the minimum number of check and audit samples are analysed for each supply each year. A summary of the number of check and audit samples analysed by each sanitary authority is given in Figure 2-2 with the total numbers for each supply type shown on Figure 2-2 while a complete breakdown of the total number of supplies monitored and samples analysed for all parameters is given in Table 2-3. A breakdown of the number of check and audit samples analysed in each individual supply and details of every individual analysis in each water supply zone is contained on the CD ROM that accompanies this report.



**Figure 2-2. Total Number of Check and Audit Samples for Each Type of Supply**

**Table 2-2. Number of Check and Audit Samples Analysed by Each Sanitary Authority**

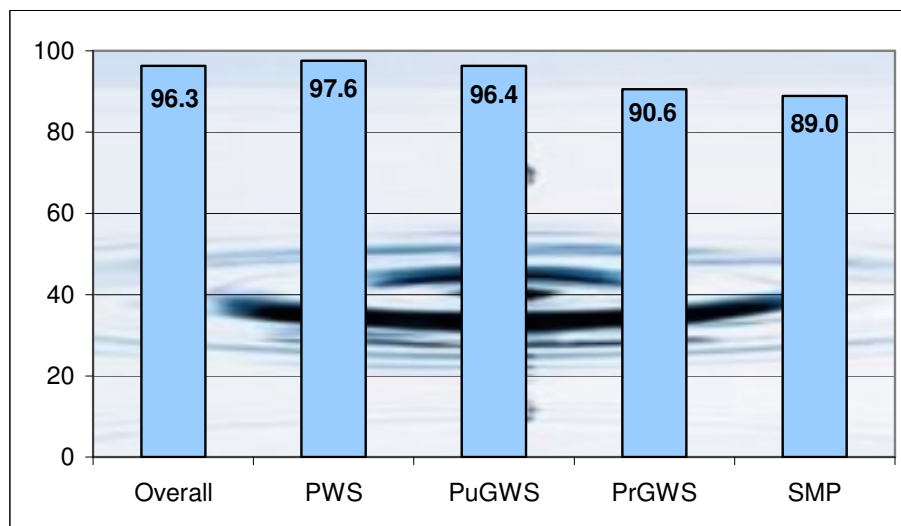
Sanitary Authority	PWS		PuGWS		PrGWS		SMP <sup>2</sup>	
	Check	Audit	Check	Audit	Check	Audit	Check	Audit
Carlow	65	25	19	0	35	2	0	0
Cavan	131	21	0	0	72	0	4	0
Clare	246	38	147	9	28	7	0	0
Cork City	148	10	0	0	0	0	0	0
Cork (North)	199	32	0	0	52	0	0	0
Cork (South)	360	48	0	0	23	0	0	0
Cork (West)	103	21	0	0	38	0	0	0
Donegal	464	126	0	0	86	12	0	0
Dublin City	877	41	0	0	0	0	0	0
Dun Laoghaire Rathdown	519	20	0	0	0	0	0	0
Fingal	628	16	0	0	0	0	0	0
Galway City	488	7	0	0	0	0	0	0
Galway County	611	56	284	0	470	0	0	0
Kerry	708	61	166	0	69	0	0	0
Kildare	177	12	0	0	26	2	42	1
Kilkenny	447	22	8	0	145	3	0	0
Laois	329	59	3	1	128	19	0	0
Leitrim	138	23	253	10	95	14	0	0
Limerick City	303	2	0	0	0	0	0	0
Limerick County	188	44	288	1	202	9	0	0
Longford	78	14	167	0	12	1	0	0
Louth	224	33	0	0	28	3	0	0
Mayo	729	40	107	0	233	0	0	0
Meath	179	38	14	1	6	2	0	0
Monaghan	102	20	0	0	128	17	0	0
North Tipperary	370	18	5	0	132	3	0	0
Offaly	153	36	0	0	58	18	0	0
Roscommon	120	45	108	0	122	0	0	0
Sligo	254	23	54	0	44	0	0	0
South Dublin	375	14	0	0	0	0	0	0
South Tipperary	352	57	0	0	7	0	0	0
Waterford City	96	15	0	0	0	0	0	0
Waterford County	348	106	37	0	15	0	0	0
Westmeath	79	15	0	0	8	3	0	0
Wexford	87	41	0	0	35	2	45	0
Wicklow	239	38	3	0	22	0	67	0
<b>Totals</b>	<b>10914</b>	<b>1237</b>	<b>1663</b>	<b>22</b>	<b>2319</b>	<b>117</b>	<b>158</b>	<b>1</b>

<sup>2</sup> SMP – Small Private Supply i.e., supply serving <50 persons but supplying water as part of a commercial or public activity

**Table 2-3. Total Number of Supplies Monitored and Samples Analysed for All Parameters.**

Parameter	No. of Supplies Monitored	No. of Supplies with Exceedances	% of Supplies Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
<b>Microbiological Parameters</b>						
<i>Escherichia coli</i> ( <i>E. coli</i> )	2304	443	<b>80.8%</b>	15132	735	<b>95.1%</b>
Enterococci	516	25	<b>95.2%</b>	1027	30	<b>97.1%</b>
<b>Chemical Parameters</b>						
Acrylamide	60	0	<b>100%</b>	183	0	<b>100%</b>
Antimony	616	4	<b>99.0%</b>	1006	4	<b>99.6%</b>
Arsenic	646	5	<b>99.2%</b>	1155	6	<b>99.5%</b>
Benzene	567	0	<b>100%</b>	890	0	<b>100%</b>
Benzo(a)pyrene	527	0	<b>100%</b>	805	0	<b>100%</b>
Boron	578	0	<b>100%</b>	904	0	<b>100%</b>
Bromate	535	17	<b>96.8%</b>	816	23	<b>97.2%</b>
Cadmium	650	0	<b>100%</b>	1177	0	<b>100%</b>
Chromium	656	0	<b>100%</b>	1167	0	<b>100%</b>
Copper	734	1	<b>99.9%</b>	1386	1	<b>99.9%</b>
Cyanide	522	0	<b>100%</b>	802	0	<b>100%</b>
1,2-dichloroethane	499	3	<b>99.3%</b>	785	3	<b>99.6%</b>
Epichlorohydrin	39	0	<b>100%</b>	61	0	<b>100%</b>
Fluoride	733	57	<b>92.2%</b>	3242	126	<b>96.1%</b>
Lead	718	14	<b>98.1%</b>	1389	23	<b>98.3%</b>
Mercury	517	0	<b>100%</b>	819	0	<b>100%</b>
Nickel	662	4	<b>99.4%</b>	1172	4	<b>99.7%</b>
Nitrate	1836	27	<b>98.5%</b>	6798	42	<b>99.4%</b>
Nitrite	1848	3	<b>99.8%</b>	8763	3	<b>99.9%</b>
Pesticides – Total	465	3	<b>99.1%</b>	707	3	<b>99.6%</b>
Polycyclic Aromatic hydrocarbons	529	2	<b>99.6%</b>	813	2	<b>99.8%</b>
Selenium	607	0	<b>100%</b>	997	0	<b>100%</b>
Tetrachloroethene/Trichloroethene	566	2	<b>99.6%</b>	1024	2	<b>99.8%</b>
Trihalomethanes – Total	698	34	<b>95.1%</b>	1509	50	<b>96.7%</b>
Vinyl chloride	81	0	<b>100%</b>	143	0	<b>100%</b>
<b>Indicator Parameters</b>						
Aluminium	1585	222	<b>86.0%</b>	9140	467	<b>94.9%</b>
Ammonium	2194	51	<b>97.7%</b>	11910	61	<b>99.5%</b>
Chloride	706	2	<b>99.7%</b>	1317	2	<b>99.9%</b>
<i>Clostridium perfringens</i>	1613	258	<b>84.0%</b>	7725	427	<b>94.5%</b>
Colour*	2221	432	<b>80.5%</b>	13303	848	<b>93.6%</b>
Conductivity	2233	1	<b>99.9%</b>	14252	3	<b>99.9%</b>
Hydrogen Ion Concentration	2248	408	<b>81.9%</b>	14053	762	<b>94.6%</b>
Iron	1981	254	<b>76.8%</b>	7986	485	<b>93.9%</b>
Manganese	1709	211	<b>87.7%</b>	5679	302	<b>94.7%</b>
Odour*	1767	56	<b>96.8%</b>	10249	209	<b>98.0%</b>
Oxidisability	3	0	<b>100%</b>	5	0	<b>100%</b>
Sulphate	643	0	<b>100%</b>	1093	0	<b>100%</b>
Sodium	664	3	<b>99.5%</b>	1114	4	<b>99.6%</b>
Taste*	812	14	<b>98.0%</b>	6307	67	<b>98.9%</b>
Colony count 22°C*	490	70	<b>85.7%</b>	1347	82	<b>97.2%</b>
Coliform bacteria	2305	950	<b>58.8%</b>	15134	2002	<b>86.8%</b>
Total organic carbon (TOC)	524	0	<b>100%</b>	851	0	<b>100%</b>
Turbidity*	2196	168	<b>92.3%</b>	13606	229	<b>98.3%</b>
<b>Radioactivity</b>						
Tritium	50	0	<b>100%</b>	77	0	<b>100%</b>
Total indicative dose	13	0	<b>100%</b>	22	0	<b>100%</b>

\*For several of the Indicator Parameters there are no specific standards in the Regulations. Therefore, for comparison purposes arbitrary levels have been assigned above which the sanitary authority may be concerned about the quality of the water and should investigate further.



**Figure 2-3. Overall Compliance in the Different Categories of Water Supplies**

As previously mentioned, new drinking water Regulations came into force on 1<sup>st</sup> January 2004 and hence this is the first report on compliance with these Regulations. As such it is not possible to directly compare overall compliance in 2004 with that in 2003 due to changes in parameters to be monitored and changing standards for some parameters. However, it is possible to compare compliance for certain parameters for which the standards have not changed. In this regard the most important indicators of drinking water quality in Ireland, microbiological parameters such as *Escherichia coli* (*E. coli*) and Coliform Bacteria can be compared to previous years monitoring.

The overall rate of compliance with the 48 standards for drinking water in 2004 was 96.4%. However, a more in-depth examination of this rate of compliance reveals that the quality in the public water supplies is generally higher than that of the group water schemes and the private supplies (Figure 2-3). The difference in quality in public water supplies and the other supplies is discussed in the next section.

As mentioned previously the parameters in the drinking water Regulations are divided into three categories, microbiological, chemical and indicator. Compliance with these categories of parameters is discussed in this section.

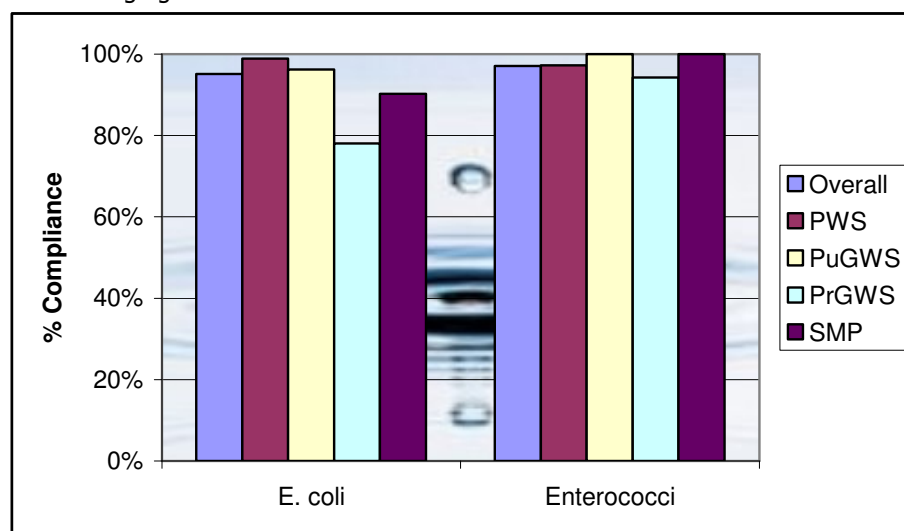
### 2.2.1 Microbiological Parameter Compliance

The most important indicators of drinking water quality in Ireland are the microbiological parameters and, in particular, *E. coli*. *E. coli* is present in very high numbers in human or animal faeces and is rarely found in the absence of faecal pollution. As such its presence in drinking water is a good indication that either the source of the water has become contaminated or that the treatment process at the water treatment plant is not operating adequately. *E. coli* is not in itself a harmful organism but merely indicates that other harmful organisms may be present. Similar to *E. coli*, enterococci are present in large numbers in sewage and water environments polluted by sewage or wastes from humans and animals. They are generally present in numbers lower than *E. coli* but they survive longer than *E. coli* and thus can indicate pollution that has occurred in the past.

An examination of the rates of compliance with the microbiological parametric values (Figure 2-4) clearly shows that the quality of water depends, at least to some extent, on what type of water supply it comes from. It is evident that compliance with the *E. coli* parametric value in public water supplies is satisfactory (98.9%) while the rate of compliance in the public group water schemes is similarly high (though slightly lower at 96.2%). However, the level of compliance with the *E. coli* parametric value in private group water schemes is unacceptably



low at 78.1% while that in the small private supplies was also unsatisfactory at 90.3%. Notwithstanding the low level of compliance in private group water schemes which has been identified in successive reports on drinking water quality, there has been some improvement in the level of compliance in 2004 compared to 2003 (when the rate of compliance was 74.9%). 2004 was the fourth successive year in which the rate of compliance with the *E. coli* standard has improved in group water schemes. Much further work is required to bring the standard of the private group water schemes up to that of the public water supplies, but the trend is encouraging.



**Figure 2-4. Compliance with the Microbiological Parameters in 2004.**

In 2004 a total of 735 samples in 443 supplies failed to meet the standards for *E. coli* at one time or more during the year. However, the majority of these exceedances were moderate (<20 cfu/100ml) and the majority were also one-off exceedances that were not detected in follow up samples. It is worthy of note that the majority of exceedances in public water supplies (those that serve 80% of the population) are found in the smaller public water supplies and that the rate of compliance in the large public water supplies (serving greater than 5,000 people) was 99.4% in 2004.

**Table 2-4. Summary of Supplies with *E. coli* Exceedances in 2004.**

	No. of Supplies Monitored	No. with Exceedances	No. with Serious Exceedances
Public Water Supplies	903	91 (10.1%)	16 (1.8%)
Public Group Water Schemes	585	56 (9.6%)	15 (2.6%)
Private Group Water Schemes	698	282 (40.4%)	111 (15.9%)
Small Private Supplies	118	14 (11.9%)	2 (1.7%)
<b>Total</b>	<b>2,304</b>	<b>443 (19.2%)</b>	<b>144 (6.3%)</b>

Overall, just under 20% of water supplies were contaminated with *E. coli* at least once during 2004. However, the majority of the supplies that were contaminated were private group water schemes.

There is a significant regional variation in the quality of drinking water with some sanitary authorities producing water that, in terms of *E. coli*, is excellent (100% compliance) or good (>99% compliance) while other sanitary authorities produce water that is less satisfactory. In a large number of sanitary authorities the quality of water supplied by the private group water schemes is unsatisfactory and in some cases poor. The highest and lowest performing sanitary authorities are shown on the tables below for the public water supplies and the

private group water schemes. It is quite apparent that, in general, the quality of drinking water supplied by public water supplies is superior to that provided by the private group water schemes.

**Table 2-5. Compliance with the *E. coli* Parametric Value in Public Water Supplies – Highest and Lowest Performing Sanitary Authorities.**

Sanitary Authority	% Compliance	Population Served	No. of Water Supply Zones
Carlow County Council	100%	33,259	13
Cavan County Council	100%	28,110	17
Cork City Council	100%	127,000	1
Dun Laoghaire Rathdown County Council	100%	175,617	6
Fingal County Council	100%	311,500	4
Galway City Council	100%	65,774	1
Kildare County Council	100%	148,040	16
Laois County Council	100%	56,228	19
Leitrim County Council	100%	15,927	11
Limerick City Council	100%	56,000	1
Waterford City Council	100%	50,000	1
South Dublin County Council	99.7%	240,180	4
Dublin City Council	99.7%	476,500	6
Limerick County Council	99.6%	66,212	46
Donegal County Council	99.5%	118,404	50
Mayo County Council	99.4%	42,416	27
Cork Co. Co. (South)	99.3%	118,440	66
Louth County Council	99.2%	81,065	18
Wexford County Council	99.1%	82,186	31
North Tipperary County Council	99.1%	43,769	22
Meath County Council	99.1%	99,350	21
Clare County Council	98.9%	79,513	26
Offaly County Council	98.9%	42,422	24
Longford County Council	98.9%	16,922	8
Galway County Council	98.6%	149,204	44
Kilkenny County Council	98.3%	44,687	15
Roscommon County Council	97.9%	36,228	18
Cork Co. Co. (North)	97.8%	56,150	62
South Tipperary County Council	97.8%	71,388	27
Wicklow County Council	97.3%	83,002	47
Kerry County Council	97.0%	110,195	86
Westmeath County Council	96.8%	67,050	8
Monaghan County Council	96.7%	40,771	13
Waterford County Council	96.2%	42,806	104
Sligo County Council	96.1%	29,770	12
Cork Co. Co. (West)	94.4%	31,015	30

**Table 2-6. Compliance with the *E. coli* Parametric Value in Private Group Water Schemes – Highest and Lowest Performing Sanitary Authorities.**

Sanitary Authority	% Compliance	Population Served	No. of Water Supply Zones
Longford County Council	100%	518	4
Meath County Council	100%	1,600	2
North Tipperary County Council	100%	6,521	37
Westmeath County Council	100%	1,050	3
Offaly County Council	98.7%	14,094	20
Kildare County Council	96.4%	2,110	5
Cork Co. Co. (North)	94.3%	1,405	13
Carlow County Council	94.1%	2,127	6
Monaghan County Council	93.1%	19,624	13
Laois County Council	92.5%	7,185	16
Wexford County Council	91.4%	4,330	12
Cork Co. Co. (South)	91.3%	510	6
Limerick County Council	91.0%	12,506	45
Louth County Council	87.1%	4,575	9
Clare County Council	82.9%	15,053	17
Roscommon County Council	77.0%	4,693	42
Cork Co. Co. (West)	76.3%	518	8
Wicklow County Council	76.2%	2,286	23
Mayo County Council	75.0%	38,235	108
Waterford County Council	73.3%	310	4
South Tipperary County Council	71.4%	560	4
Galway County Council	71.1%	91,492	194
Cavan County Council	70.3%	17,692	72
Kilkenny County Council	68.3%	4,043	35
Sligo County Council	52.3%	6,566	18
Kerry County Council	49.3%	1,471	13
Donegal County Council	49.1%	4,421	28
Leitrim County Council	44.1%	5,538	25

### 2.2.2 Chemical Parameter Compliance

The twenty six chemical parameters covered by the Regulations are listed in Appendix 3. The level of monitoring for several of these parameters in 2004 was insufficient. Many local authorities did not carry out any monitoring for some of the parameters included in this group. The primary reason for this was the difficulty in sourcing laboratories capable of carrying out the required analysis and indeed for some parameters there is no laboratory in Ireland capable of doing the analysis and thus requiring outsourcing to a laboratory in the UK. Notwithstanding this difficulty, sanitary authorities were aware of the requirements to monitor these parameters from the date of publication of the Regulations (in 2000) and should have put the necessary arrangements in place prior to the Regulations taking effect in 2004. This means that there are limitations in the interpretation of the data presented herein and it may not be possible to ascertain the full national picture for certain parameters.

Of the 26 chemical parameters included in this group of parameters full compliance was reported in 2004 for 12 of the 26 parameters while compliance in excess of 99% was reported for a further 10 parameters. The parameters for which monitoring indicated full compliance are reported on Table 2-3. Those parameters with compliance rates below 99% are discussed below (in alphabetical order).

### Bromate

Bromate is a chemical parameter that was not included in the 1988 Regulations but has been included in the 2000 Regulations as it is classified by the International Agency for Research on Cancer (IARC) in Group 2B (i.e., possibly carcinogenic to humans). Bromate is not normally found in water but may be formed during ozonation when the bromide ion is present in water. Under certain conditions, bromate may also be formed in concentrated hypochlorite solutions used to disinfect water (WHO, 2004).

A limited amount of monitoring for bromate was carried out in 2004 with 816 samples analysed in 535 water supplies. Six sanitary authorities did not carry out any monitoring for bromate in 2004. Overall compliance in the 28 sanitary authority areas that did carry out monitoring was 97.2% and elevated levels of bromate were found in 17 supplies (15 of which were public water supplies). However, it is most important to note that the bromate parametric value (25 µg/l) is an interim standard and the more stringent standard of 10µg/l will take effect on 25 December 2008. A comparison of compliance with this standard as well as a breakdown of compliance in the different supply types is shown on Table 2-7.

**Table 2-7. Compliance with the Bromate Parametric Value**

	25 µg/l PV		10 µg/l PV	
	% of Samples Complying	No. of Non Compliant Supplies	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>97.2%</b>	<b>17</b>	<b>92.5%</b>	<b>53</b>
Public Water Supplies	97.8%	15	92.6%	47
Public Group Water Schemes	100%	0	93.8%	1
Private Group Water Schemes	97.1%	2	91.3%	5
Small Private Supplies	100%	0	100%	0

Clearly there are significant challenges facing many sanitary authorities and water suppliers in the coming years with 7.5% of samples failing to meet the incoming parametric value. Investigations were underway at the time of reporting by a number of sanitary authorities and it is imperative that corrective action is taken to ensure that the supplies in question are returned to compliance.

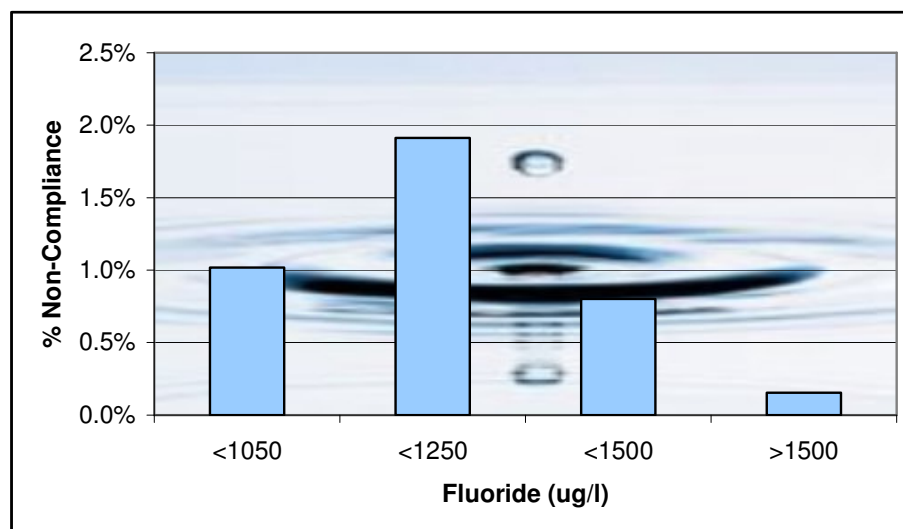
### Fluoride

Fluoride arises almost exclusively from fluoridation of public water supplies and from industrial discharges, although it occurs naturally in quite rare instances. Past health studies have shown that the addition of fluoride to water supplies at levels above 0.6mg/l F<sup>-</sup> leads to a reduction in tooth decay in growing children and that the optimum beneficial effects were thought to occur around 1.0 mg/l. However, in light of recent international and Irish research which shows an increasing occurrence of dental fluorosis, the Forum on Fluoridation (2002) recommended the lowering of the fluoride levels in drinking water to a range of 0.6 to 0.8 mg/l, with a target of 0.7 mg/l. At levels markedly over 1.5mg/l an inverse effect occurs and mottling of teeth (or severe damage at gross levels) will arise. For this reason there is a constraint on fluoride levels, the effects of which vary with temperature. In recent years the practice of adding fluoride to drinking has been addressed by the Forum on Fluoridation set up by the Minister for Health and Children in May 2000, which published its findings in September 2002. An expert group was set up by the Minister in April 2004 charged with the implementation of the recommendations of the forum.

The fluoride levels in fluoridated public water supplied in Ireland are legally restricted to the range 0.8-1.0 mg/l, though the recommendations of the Forum on Fluoridation regarding the lowering of this target level are to be introduced shortly. In making the 2000 Drinking Water Regulations the then Minister for the Environment fixed 1.0 mg/l F<sup>-</sup> [1,000 µg/l F<sup>-</sup>] as the

parametric value. This value is lower than the Parametric Value set in 1998 EC Drinking Water Directive, which set a value of 1.5 mg/l.

Naturally elevated levels of fluoride are quite rare in Ireland and thus any exceedances reported are due almost entirely to public water supplies being dosed with fluoride at levels in excess of the legally permitted dose. Overall compliance with the fluoride standard in 2004 was 96.1%, which was a slight improvement from 95.3% in 2003. An examination of the data for 2004 is presented below and indicates that the majority of the exceedances are moderate (Figure 2-5). A small number of exceedances were above the European Directive Parametric Value of 1,500 µg/l.



**Figure 2-5. Fluoride Exceedances in 2004.**

Over half (65 of 126) of the exceedances reported for fluoride in 2004 were in supplies in County Kerry, including all of the samples that reported values in excess of the European Directive Parametric Value of 1,500 µg/l. These exceedances were primarily in the Central Regional supply in Kerry and were due to the delivery of incorrect strength fluoride for addition to the water. This problem has since been rectified and a new fluorine monitor was installed to ensure that there was no repeat of the situation.

Equipment in some water treatment plants is in need of updating and in this regard the code of practice to be issued as part of the Irish Expert Body on Fluoride and Health should be followed to ensure that compliance with the fluoride parametric value improves. Notwithstanding this, publication of the Regulations amending the target dose to a range of 0.6 mg/l to 0.8 mg/l with a target of 0.7 mg/l should reduce the incidence of fluoride exceedances in the future.

### **Lead**

Lead is present in drinking water primarily from its dissolution from lead pipes or lead-containing solder and thus the concentration of lead in drinking water depends on a number of factors including pH, temperature, water hardness and standing time of the water. Consequently, the method of sampling for lead is critical and depending on the method used results can vary significantly. To date samples tested for lead tend to have been fully flushed prior to sampling. However, this does not meet the requirements of the current Regulations and it is recommended that the Random Daytime Sampling<sup>3</sup> method be used. In 2004 some,

<sup>3</sup> Random Daytime Sampling is defined as taking water directly from the tap normally used for consumption without any prior water abstraction, flushing or cleaning of the tap prior to sampling. The sample should be chosen randomly within the day but during normal office hours.

but not all, sanitary authorities had adopted this method, so it is likely that compliance with the lead parametric value may be lower than indicated by the results submitted in 2004.

According to the World Health Organisation (WHO, 2004) lead is a general toxicant that accumulates in bone. Infants, children up to 6 years of age and pregnant women are the most susceptible to its health effects. It is toxic to both the central and peripheral nervous systems.

The Regulations impose a parametric value of 25 µg/l Pb until the 25 December 2013 after which the parametric value of 10µg/l Pb becomes effective. The results for 2004 are examined in the context of compliance with the current standard of 25µg/l Pb as well as the future standard of 10µg/l Pb

**Table 2-8. Compliance with the Lead Parametric Value**

	25 µg/l PV		10 µg/l PV	
	% of Samples Complying	No. of Non Compliant Supplies	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>98.3%</b>	<b>14</b>	<b>96.0%</b>	<b>36</b>
Public Water Supplies	98.1%	14	95.4%	36
Public Group Water Schemes	100%	0	100%	0
Private Group Water Schemes	100%	0	100%	0
Small Private Supplies	100%	0	100%	0

Though full compliance was reported for group water schemes and private supplies, it must be noted that there was very little monitoring reported for lead in supplies other than public water supplies. Thus more sampling would be necessary before any firm conclusions about the level of compliance in non-public water supplies could be determined.

A total of 14 supplies reported lead exceedances during 2004 though as previously mentioned this number would probably be higher if a more suitable sampling method as recommended was universally adopted.

Sanitary authorities must consider this problem in more detail if compliance with the standard of 10 µg/l is to be achieved by 2013. In particular some sanitary authorities may need to consider phosphate dosing to reduce the plumbosolvency of the water. This practice is widespread in the UK and in Europe but is currently not practiced in Ireland. This measure will assist the sanitary authorities in achieving a higher level of compliance but the only means of assuring full compliance is to initiate a programme of the removal of all lead pipes from the distribution network. Owners of dwellings in which lead pipes may be located should be informed of the risks and given guidance on advice on their safe replacement.

### **Trihalomethanes – Total**

Trihalomethanes (THMs), as the name indicates, are derivatives of the simplest organic compound - methane, CH<sub>4</sub> - in which three of the hydrogen atoms are substituted by halogen atoms. The principal halogens are fluorine (F<sub>2</sub>), chlorine (Cl<sub>2</sub>), bromine (Br<sub>2</sub>) and iodine (I<sub>2</sub>), but while many combinations are theoretically possible, the term trihalomethanes is applied to four specific compounds containing only chlorine and/or bromine as the halogen elements. The four compounds are *chloroform* (CHCl<sub>3</sub>), *bromodichloromethane* (CHBrCl<sub>2</sub>), *dibromochloromethane* (CHBr<sub>2</sub>Cl) and *bromoform* (CHBr<sub>3</sub>).

Chlorine (or appropriate compounds of it) is undoubtedly the most important chemical used in water treatment in Ireland today as it has been in the past. Although it is a highly poisonous gas in its pure form and a powerful oxidising agent, chlorine in very dilute solution is a most effective agent for the disinfection of water. It is very efficient at destroying those bacteria which originate in human or animal waste and which cause undesirable and dangerous contamination of drinking water.

As a powerful oxidising agent, chlorine also breaks down the complex and inert organic molecules which are the colouring agents of the water, forming smaller, reactive entities. These entities react with chlorine (and with bromine derived from the oxidation by chlorine of bromide naturally present) to form the THM compounds, the most abundant of which is chloroform( $\text{CHCl}_3$ ). There is thus a fairly straightforward relationship between the degree of colour in the water prior to chlorination and the quantities of THMs present following chlorination. If colour is present at the point of chlorination, THMs are likely to be formed.

THM compounds are undesirable in drinking water for two reasons. Firstly the actual compounds themselves may pose a hazard to the health of the consumer if present in excessive amounts as chloroform is a suspected carcinogen. Secondly, the presence of the THM group may be an indicator of the possible presence of other organic by-products of chlorination in trace amounts. The WHO advises that *"In controlling trihalomethanes, a multistep treatment system should be used to reduce organic trihalomethane precursors, and primary consideration should be given to ensuring that disinfection is never compromised"*.

The level of monitoring for THMs in water supplies in Ireland was insufficient in some sanitary authorities in 2004 and no monitoring for THMs was carried out in three sanitary authority areas, Kilkenny, Laois and Wexford. Nonetheless, a total of 1,509 samples were analysed in 698 supplies with almost 90% of the samples from public water supplies.

The Regulations impose a parametric value of 150  $\mu\text{g/l}$  until the 25 December 2008; thereafter the parametric value of 100 $\mu\text{g/l}$  is effective. The results for 2004 are examined in the context of compliance with the current standard of 150 $\mu\text{g/l}$  as well as the future standard of 100 $\mu\text{g/l}$ .

**Table 2-9. Compliance with the Trihalomethanes (Total) Parametric Value**

	25 $\mu\text{g/l}$ PV		10 $\mu\text{g/l}$ PV	
	% of Samples Complying	No. of Non Compliant Supplies	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>96.7%</b>	<b>34</b>	<b>87.7%</b>	<b>103</b>
Public Water Supplies	96.4%	33	87.9%	80
Public Group Water Schemes	100%	0	77.8%	8
Private Group Water Schemes	99.2%	1	88.5%	15
Small Private Supplies	No results		No results	

Sanitary authorities will need to implement corrective action programmes for those supplies that are not complying with the parametric value at present and should examine all other supplies to ensure that they will be able to meet the parametric value of 100 $\mu\text{g/l}$  by 25 December 2008.

### 2.2.3 Indicator Parameter Compliance

The indicator group of parameters are a diverse group of parameters designed to provide information on the organoleptic and aesthetic quality of drinking water. As such several parameters do not have quantified standards but are dependent on consumers acceptability while others are based on practical consideration, e.g., the iron parametric value is set at a level that will ensure that water is acceptable to consumers rather than that which is a risk to health. In this regard, comparing the indicator parameter monitoring results to the parametric values should be given less importance than comparing the microbiological or chemical monitoring with their respective parametric values. In other words, a value reported above the indicator parametric value should not, *de facto*, be considered a cause for concern but more appropriately a guide for the sanitary authority to initiate an investigation into the cause of the elevated level of the parameter concerned. In many cases it is not the indicator parameter that is of concern rather what the presence that parameter may imply. For example, elevated aluminium levels indicate that the treatment plant is not operating



adequately and may indicate that the plant is operating above its design capacity. A discussion of the monitoring results for each of the parameters follows. In the following section parameters with specified parametric values are discussed individually while parameters with no quantitative parametric value are discussed collectively.

## Aluminium

Aluminium is present in drinking water as a result of its use as aluminium sulphate (a coagulant) in the water treatment process. Historically there has been some concern about possible links between aluminium in drinking water and Alzheimer's disease. However, the WHO states the following:

*"On the whole, the positive relationship between aluminium in drinking water and Alzheimer's disease which was demonstrated in several epidemiological studies, cannot be totally discounted. However, strong reservations about inferring a causal relationship are warranted in view of the failure of these studies to account for demonstrated confounding factors and for the total aluminium intake from all sources"*

Compliance with the aluminium parametric value has been problematic in a number of supplies in Ireland in the past. In recent years the trend appears to be towards improving compliance with overall compliance standing at 94.9% in 2004 (up from 92.8% in 2003). The compliance rates in the different types of water supplies are presented below.

**Table 2-10. Summary of Aluminium Compliance.**

	No .of Supplies Monitored	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>1585</b>	<b>94.9%</b>	<b>224</b>
Public Water Supplies	628	94.7%	108
Public Group Water Schemes	441	92.3%	87
Private Group Water Schemes	491	97.9%	28
Small Private Supplies	25	96.6%	1

There were a large number of supplies with exceedances of the aluminium parametric value during 2004. The rates of compliance vary significantly from county to county with five sanitary authorities achieving full compliance with the standard while 11 sanitary authorities reported compliance rates of less than 90%. Particularly poor rates of compliance were reported in Mayo (63%), South Tipperary (68%), Donegal (72%) and Leitrim (78%). There was a notable improvement in compliance with the aluminium parametric value in Wicklow where compliance improved from 76% in 2003 to 96% in 2004. This improvement was due to the considerable work that has been done to tackle the aluminium exceedances in the Arklow and Enniskerry supply which were fully compliant with the aluminium standard in 2004. These supplies had reported a large number of exceedances in the past. Corrective action in these cases included examining the management of the alum dosing including the location of the dose point, the time of mixing and pH optimisation.

## Ammonium

Ammonia in water supplies originates from agricultural and industrial processes as well as from disinfection with chloramines (a method of disinfection not in use in Ireland). Elevated levels of ammonium may arise from intensive agriculture in the catchment of the water source. Ammonium is therefore an indicator of possible bacterial, sewage and animal waste pollution. Ammonium in itself is not a health risk but the parametric value serves as a valuable indicator of source pollution. The parametric value of 0.3 mg/l in the Regulations is more stringent than that in the European Directive which sets out a parametric value of 0.5 mg/l. Analysis of the results in comparison with the EU parametric value indicates that just 29 samples were above 0.5 mg/l (99.8% compliance).



**Table 2-11. Summary of Ammonium Compliance**

	No .of Supplies Monitored	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>2194</b>	<b>99.5%</b>	<b>51</b>
Public Water Supplies	875	99.7%	18
Public Group Water Schemes	581	99.3%	11
Private Group Water Schemes	682	99.0%	19
Small Private Supplies	56	95.3%	3

**Chloride**

Chloride can originate from natural sources such as saltwater intrusion in coastal sources but can be present in sewage and industrial effluents and thus can be an indicator of pollution from these sources. The parametric value of 250 mg/l is based on taste rather than on health grounds as levels close to this value are detectable in drinking water and may be objectionable. There were just two exceedances of the chloride parametric value in 2004 (99.9% compliance) one of which was due to saltwater intrusion (Tory Island) while the other was in a private supply that serves a commercial activity.

***Clostridium perfringens***

*Clostridium perfringens* is a member of intestinal flora of humans and therefore serves as an indicator of faecal pollution. The spores of *Clostridium perfringens* are particularly resistant to unfavourable conditions in the environment and thus they survive for long periods. As such they can be useful indicators of water that is intermittently polluted.

**Table 2-12. Summary of *Clostridium perfringens* Monitoring.**

	No .of Supplies Monitored	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>1613</b>	<b>94.5%</b>	<b>258</b>
Public Water Supplies	600	96.6%	84
Public Group Water Schemes	488	96.4%	47
Private Group Water Schemes	512	87.1%	126
Small Private Supplies	13	95.0%	1

*Clostridium perfringens* was included in the Directive (and hence Regulations) as an organism to indicate the possibility of the presence of *Cryptosporidium*. The Regulations require that "in the event of non-compliance with this parametric value, the supply shall be investigated to ensure that there is no potential danger to human health arising from the presence of pathogenic micro-organisms e.g. *Cryptosporidium*". Furthermore, the Department of Environment, Heritage and Local Government circular L8 of 1998 states that where monitoring for *Clostridium perfringens* indicates levels above the parametric value of 0/100ml the sanitary authority should monitor the raw and treated water for *Cryptosporidium*. *Cryptosporidium* is discussed in detail in Section 2.3 of this report.

**Conductivity**

Monitoring for conductivity in 2004 indicated that elevated levels of conductivity were found in just one water supply of the 2,233 supplies monitored during the year. The supply in question was the Inishere public water supply. The high conductivity results are most likely attributable to the saltwater influence on the supply for the island.

**Hydrogen Ion Concentration (pH)**

pH is a measure of whether a liquid is acid or alkaline. The pH scale ranges from 0 (very acid) to 14 (very alkaline). The range of natural pH in freshwaters extends from around 4.5 for acid peaty upland waters to over 10 in waters where there is intense photosynthetic activity by algae. However, the most frequently encountered range is 6.5 to 8.0. The control of pH is a critical component of water treatment and distribution influencing the effectiveness

of coagulation, disinfection and the concentration of plumbing materials (such as lead, copper and nickel) in the final product.

The parametric value for pH was changed in the 2000 Regulations compared to the previous Regulations. The pH of drinking water at the tap should lie between 6.5 and 9.5 whereas under the 1988 Regulations the range was 6.0 to 9.0. The monitoring results clearly indicate that many sanitary authorities have failed to respond to this change in the legislation as a far higher proportion of samples failed to meet the parametric value in 2004 than in 2003. Overall compliance in 2004 was 94.9%. A total of 762 samples (of 14,053 samples analysed) were outside the range of 6.5 to 9.5 in 2004 of which 481 (over 60%) were in the range 6.0 to 6.5. It is clear that many sanitary authorities have failed to account for the changes in the parametric value in the Regulations.

## Iron

Iron is an abundant metal found in the Earth's crust. It is naturally present in water but can also be present in drinking water from the use of iron coagulants or the corrosion of steel and cast iron pipes during water distribution. Iron is an essential element in human nutrition. The WHO (WHO, 2004) states that values of up to 2 mg/l (10 times the parametric value) do not present a hazard to health. However, at levels less than 2 mg/l but above the parametric value, the colour of water may turn brown, become turbid or may deposit solids on clothes washed in the water or food cooked using water. Hence the reason for the parametric value is primarily aesthetic rather than health based.

Iron is commonly found naturally in many groundwaters in Ireland and hence many supplies may have levels of iron above the parametric value. Overall 93.9% of samples were below the parametric value of 200 µg/l. Compliance rates for iron in the different types of supplies are shown in Table 2-13.

**Table 2-13. Percentage of Samples below the Parametric Value for Iron in 2004.**

	No .of Supplies Monitored	% of Samples Complying	No. of Non Compliant Supplies
<b>Overall</b>	<b>1,981</b>	<b>93.9%</b>	<b>254</b>
Public Water Supplies	718	94.0%	95
Public Group Water Schemes	530	96.2%	47
Private Group Water Schemes	648	92.6%	98
Small Private Supplies	85	85.1%	14

## Manganese

Manganese is an element abundant in the Earth's crust and is commonly found in groundwater. In common with iron, the problems associated with levels of manganese above the parametric value are primarily aesthetic as manganese can cause staining problems. High levels of manganese also cause objectionable tastes in the water but there are no particular toxicological connotations. The WHO recommend a guideline value of 0.4 mg/l which is twice the parametric value in the Regulations.

As with iron a significant number of groundwater supplies in Ireland have levels of manganese in excess of the parametric value though the percentage of samples with levels of manganese below the parametric value (94.7%) is greater for manganese than for iron. Compliance rates for manganese in the different types of supplies are shown in Table 2-14.

**Table 2-14. Percentage of Samples below the Parametric Value for Manganese in 2004.**

	<b>No .of Supplies Monitored</b>	<b>% of Samples Complying</b>	<b>No. of Non Compliant Supplies</b>
<b>Overall</b>	<b>1,709</b>	<b>94.7%</b>	<b>211</b>
Public Water Supplies	609	96.5%	52
Public Group Water Schemes	455	96.2%	39
Private Group Water Schemes	603	91.9%	102
Small Private Supplies	42	64.0%	18

### **Oxidisability**

Oxidisability is a measure of the organic (and other oxidisable) matter present in a water. There were just three samples analysed for oxidisability in 2004, all of which complied. The reason for the low number of samples is the fact that the Regulations state that this parameter need not be measured if the sample has been analysed for Total Organic Carbon.

### **Sulphate**

Sulphate is naturally occurring and is present in numerous minerals. The WHO review (WHO, 2004) did not identify a level of sulphate in water that is likely to cause adverse health effects but studies did indicate a laxative effect at concentrations of 1,000 to 1,200 mg/l (i.e., several times higher than the parametric value). There was limited monitoring of sulphate in drinking water in 2004 with no monitoring for sulphate in two sanitary authorities (Mayo and Waterford) and limited monitoring in many other sanitary authorities. Notwithstanding this, compliance in the supplies that were monitored was excellent with no samples reported to be above the parametric value in 2004.

### **Sodium**

Sodium is an abundant natural constituent of rocks and soils and is always present in natural waters. Excessive intake can cause hypertension but the primary mode of intake is via food. The parametric value of 200 mg/l has been set due to the unacceptable taste of drinking water with concentrations of sodium above this level. The percentage of samples below the parametric value was high at 99.6% and levels of sodium in excess of the parametric value were reported in just one private group water scheme and two private supplies.

### **Coliform Bacteria**

The Coliform Bacteria (previously know as Total Coliforms) are a group of organisms that can survive and grow in water. They are a useful indicator of treatment efficiency and the cleanliness of the distribution mains. Coliform bacteria can occur in sewage and in natural waters. Coliform bacteria should not be present in a water that is disinfected and their presence indicates that either disinfection has not been complete or that there is ingress into the water mains in the distribution network. The coliform bacteria include *E. coli* as was discussed previously.

Compliance with the coliform bacteria parametric value has been problematic in the past in Ireland with a large number of supplies testing positive for the presence of coliform bacteria historically, particularly private group water schemes.

**Table 2-15. Percentage of Samples below the Parametric Value for Coliform Bacteria in 2004.**

	<b>No .of Supplies Monitored</b>	<b>% of Samples Complying</b>	<b>No. of Non Compliant Supplies</b>
<b>Overall</b>	<b>2,305</b>	<b>86.8%</b>	<b>950</b>
Public Water Supplies	903	93.2%	317
Public Group Water Schemes	585	88.0%	149
Private Group Water Schemes	699	58.7%	441
Small Private Supplies	118	64.5%	43

The low level of compliance with the parametric value for coliform bacteria is of concern particularly so in the private group water schemes of which only 58.7% of samples complied with the parametric value in 2004. These exceedances are caused mainly by poor management of the distribution mains. There should be a regular programme of flushing and cleaning to ensure that there is no contamination in the network.

**Colour, Odour, Taste, Colony Count at 22°C, Total Organic Carbon and Turbidity**

The above mentioned parameters are included in the Regulations but do not have specific parametric values assigned to them. The Regulations state that in respect of colour, odour, taste and turbidity the drinking water at the tap must be "acceptable to consumers and no abnormal change" while in respect of colony count at 22°C and total organic carbon there must be "no abnormal change". Thus the determination of whether a supply is complying in respect of these parameters is not easy to determine and will depend on what consumers are used to receiving. For example, consumers of a chlorinated supply will accept a drinking water that has a slight chlorine taste or odour but consumers whose supply has only recently commenced chlorination will be less tolerant of the same degree of odour or taste. For the purposes of this report the parametric value was only considered to be exceeded in respect of odour and taste where there was a definite odour or taste and values reported as having a slight odour or taste were considered acceptable to most consumers. In respect of colour and turbidity arbitrary values of 20 mg/l PtCo and 4 NTU's respectively were taken as values above which consumers may begin to question the acceptability of the water supplied (these were the Maximum Admissible Concentrations from the 1988 Regulations). Consequently the compliance figures reported in respect of these parameters should be considered a rough indication rather than an accurate figure. The percentages of samples reported with values above these arbitrary "acceptability" thresholds are shown in the table below.

**Table 2-16. Percentage of Samples below the Parametric Value for Colour, Odour, Taste, Colony count at 22°, Total Organic Carbon and Turbidity in 2004.**

<b>Parameter</b>	<b>Overall</b>	<b>PWS</b>	<b>PuGWS</b>	<b>PrGWS</b>	<b>SMP</b>
Colour	<b>93.6%</b>	96.1%	93.8%	83.3%	96.8%
Odour	<b>98.0%</b>	97.7%	99.2%	100%	98.9%
Taste	<b>98.9%</b>	98.8%	100%	100%	100%
Colony count at 22°C	<b>97.2%</b>	94.5%	88.5%	86.2%	87.5%
Total Organic Carbon	<b>100%</b>	100%	100%	100%	100%
Turbidity	<b>98.3%</b>	98.9%	98.8%	95.6%	93.3%

## 2.3 Main Issues Related to Drinking Water in Ireland

### 2.3.1 Monitoring Programmes

A review of the monitoring carried out in 2004 indicates that the majority of sanitary authorities failed to carry out the minimum monitoring required to satisfy the requirements of the Regulations. Examples of these failures to do adequate monitoring include:

- No monitoring carried out on some public and group supplies;
- Failure to include private supplies that supply water as part of a commercial or public activity in the monitoring programme;
- Insufficient check samples being analysed;
- Insufficient audit samples being analysed;
- All parameters not being monitored as part of the audit sample.

An estimate of the total number of water supplies in the country was made by examining the supplies identified in the Drinking Water National Monitoring Programme (DWNMP) and including supplies identified by sanitary authorities subsequent to the publication of this programme (via the returns submitted to the Agency). A summary of the number of supplies in Ireland and the number actually monitored is presented in Table 2-17.

**Table 2-17. Summary of the Supplies Monitored in 2004.**

Parameter	Estimated No. of Supplies	No. of Supplies Monitored	% of Supplies Not Monitored
Public Water Supplies	904	903	0.1%
Public Group Water Schemes	794	585	26.3%
Private Group Water Schemes	778	698	10.4%
Small Private Supplies	unknown	118	

In essence all public water supplies are being monitored at least once during the year (though not all are being monitored at the required frequency) while there are a significant number of public and private group water schemes that were not monitored at all during 2004 despite the Regulations requiring at least two samples from every supply that serves greater than 50 persons. Of equally significant concern is the fact that only four sanitary authorities have monitored any private supply that supplies water as part of a public or commercial activity. The remaining 30 sanitary authorities have not identified or monitored any private supplies although these supplies are covered by the Regulations and require monitoring in accordance with the Regulations.

In relation to the sampling frequencies a large number of supplies were not monitored at the required frequency. This was reportedly due to the fact that several sanitary authorities did not commence monitoring in accordance with the requirements of the 2000 Regulations until late in the year and thus did not have sufficient time to collect and analyse the appropriate number of samples. This applies equally to the public water supplies and group water schemes.

### 2.3.2 The Quality of Water in Private Group Water Schemes

The quality of group water schemes has historically been inferior to that of the public water supplies. This fact has been reported on since the first drinking water annual report was published in 1991. Up to 2002 the group water schemes (public and private) had always been reported together. However, it was always understood that the private group water schemes were the main cause of concern in the group water scheme sector. In the 2003 report, the Agency clearly separated the private group water schemes from the public group water schemes and reported on them separately. This clearly indicated that the quality of drinking water (in terms of compliance with the *E. coli* standard) in public group water

schemes was similar to that of the public water supplies themselves while the quality of water supplied by private group water schemes was of an inferior status. The results for 2004 clearly show the same situation. However, there has been an improvement in compliance with the *E. coli* standard in the private group water schemes from 74.9% in 2003 to 78.1% in 2004. This improvement is to be welcomed but the rate of improvement must increase dramatically for the quality of drinking water in the group water scheme sector to be considered satisfactory.

The National Federation of Group Water Schemes is the representative organisation for group water schemes in Ireland. The primary short to medium term objective of this organisation is to ensure that its members achieve the quality standards necessary to ensure compliance with the Regulations. The activities of this organisation are summarised in its annual report (NFGWS, 2005).

In the most recent report (for 2004) the NFGWS states that in 2004 construction had commenced on upgraded treatment facilities for group schemes that supply water to one-fifth of all rural households served by a privately sourced group water scheme. Furthermore, they report that construction should begin in 2005 on treatment facilities that supply water to the equivalent of 29,000 rural households. Thus, it is likely that the poor water quality currently reported in private group water schemes will improve in the coming year but the problem will not be entirely addressed in the short term.

Furthermore, while the majority of privately sourced group water schemes are part of the NFGWS and are in the process of upgrading their treatment facilities to meet the requirements of the Regulations a significant minority of privately sourced group water schemes remain outside the NFGWS network (approx 5,000 households). Particular attention must be paid by the relevant sanitary authority to these schemes as the majority of the schemes within the NFGWS are part of Design Build Operate (DBO) bundles while those outside it are "going it alone" and may in many cases not be planning any upgrading works. The sanitary authorities must use their powers under Article 14 of the Regulations to ensure that these schemes are fully compliant with the quality requirements of the Regulations. In particular where a group water scheme is unwilling to address a quality problem the sanitary authority must consider using all the enforcement options available to it, including, where necessary, prosecution. It is unacceptable for persons responsible for the management of group water schemes to supply water to members of the public that is contaminated with human or animal waste.

### **2.3.3 *Cryptosporidium***

*Cryptosporidium* is a microscopic protozoan parasite present in faecal material that has pathogenic effects in both children and adults when it enters the gastrointestinal tract and causes an infection called cryptosporidiosis. Cryptosporidiosis can cause fever, stomach upsets, weight loss and diarrhoea and can be fatal in the young and old and those with weak immune systems. *Cryptosporidium* is protected by an outer shell (cyst) permitting it to survive for long periods outside the body. The cyst is very resistant to destruction by chlorine and other disinfectants, although it is destroyed by boiling water. The first recorded outbreak of *Cryptosporidium* associated with a public water supply occurred in April 2002, in Co. Westmeath. Since 1<sup>st</sup> January 2004, Cryptosporidiosis has been made a notifiable disease. This means that where a case of the disease is detected it must be reported to the Health Protection Surveillance Unit (formerly the National Disease Surveillance Centre). The HPSU reported that there were three outbreaks of cryptosporidiosis whose transmission route was suspected to be waterborne in 2004. Indications for 2005 are that the number of cases has risen substantially, though this may be due to improved reporting and surveillance.

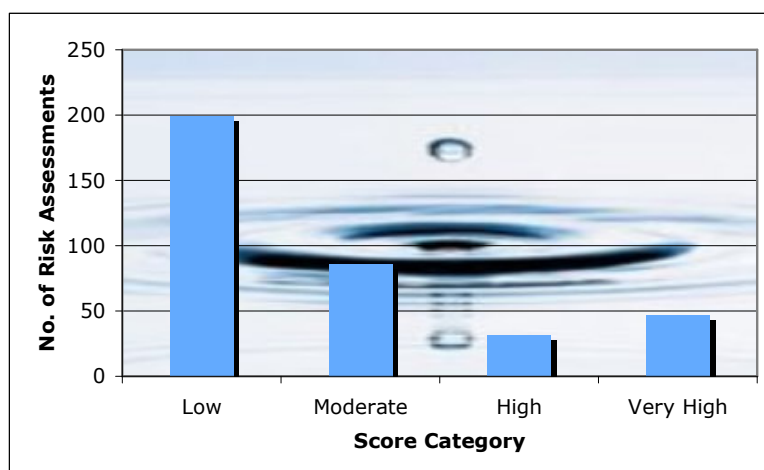
A key recommendation of the European Communities (Drinking Water) Regulations, 2000 (S.I. 439 of 2000) A Handbook on Implementation for Sanitary Authorities (EPA, 2004), and the successive EPA Drinking Water reports is that risk assessment should be carried out by

each sanitary authority, to determine the vulnerability of public water supplies to *Cryptosporidium*, commencing with the larger water treatment plants.

In 2005, a review was carried out by the EPA on the *Cryptosporidium* risk assessments that have been completed by sanitary authorities in Ireland (Convery, in prep.). Each sanitary authority was contacted and asked to provide information pertaining to the recommendation regarding implementation of risk assessments for *Cryptosporidium*. Details of corrective actions planned and implemented and results of follow-up monitoring for *Cryptosporidium* were also requested.

Responses were received from 29 of the 34 sanitary authorities contacted, a response rate of 85%. Risk assessments were carried out on 331 individual public water supplies. 59% of the total population (CSO, 2002) are served by a public water supply which has had a risk assessment carried out.

A total of 363 risk assessments were carried out (some supplies have more than one source). Of these, 55% were in the low risk category, 24% in the moderate risk category, 8% in the high-risk category and 13% in the very high-risk category. Few sanitary authorities have completed the risk assessments for all of the supplies in their functional area. The risk assessment identifies source protection and treatment issues that are high risk and in need of addressing. Sanitary authorities should examine the results of the risk assessments in detail and for those supplies that are high risk or very high risk the sanitary authority should take remedial action to reduce the risk.



**Figure 2-6. Risk Category Scores for Risk Assessments Carried Out**

In recognition of the risk of contamination of water supplies by *Cryptosporidium* many sanitary authorities have carried out monitoring of the public water supplies for *Cryptosporidium*. Sanitary authorities submitted a total of 139 monitoring results for *Cryptosporidium* in drinking water in 2004. Results were reported for 52 drinking water supplies, 43 of which were public water supplies, 6 of which were public group water schemes and the remaining 3 were private group water schemes. 135 of the results were reported as 0 while 3 results were reported above the UK threshold for investigation of 0.1 oocyst<sup>4</sup>/10L. Two of these results were above 1 oocyst/10L (the statutory limit in the UK). These results were reported in the South Leitrim Regional supply (Leitrim) and the Gortnapisha supply (South Tipperary). Both these results were investigated immediately. In the case of the Leitrim supply, *Cryptosporidium* was discovered to be present in the raw water but not in the treated water and therefore the treatment processes appear to be working adequately while in the case of the South Tipperary supply the catchment is being closely observed and monitored to ensure the risk is minimised.

<sup>4</sup> An oocyst is the thick walled resistant outer shell that encases the parasite when it is excreted by humans or animals



## 2.4 Local Authority Audits

In 2001, the EPA first undertook the auditing of a limited number of sanitary authorities, focusing in particular on the management of reported exceedances of the drinking water standards. These audits were extended to other sanitary authorities in the following years. The Agency intends to continue the process of auditing sanitary authorities in future years and to include the findings in the annual drinking water report. This section of the report provides the background and the results of the recent series of EPA audits.

Following the publishing of the Protection of the Environment Act in 2003 the EPA now has significant new powers open to it regarding the performance of statutory environmental protection functions by local authorities. These powers were used by the Agency in the course of the audit programme in 2004.

The EPA carried out a total of 10 audits during the period September 2004 to August 2005 to determine the conformity of the sanitary authorities with the Regulations and to assess the performance of the sanitary authorities with regard to their statutory duties pertaining to drinking water. The audit criteria included:

- The European Communities (Drinking Water) Regulations 2000 (S.I. No 439 of 2000);
- The European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989;
- The recommendations specified in the Handbook on Implementation for Sanitary Authorities in relation to the European Communities (Drinking Water) Regulations 2000;
- The recommendations specified in the Handbook on Implementation for Sanitary Authorities in relation to the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989;
- The recommendations specified in The Quality of Drinking Water in Ireland reports;
- The recommendations specified in the EPA Publications 'Water Treatment Manuals – Filtration', 'Water Treatment Manuals – Disinfection' and 'Water Treatment Manuals – Coagulation, Flocculation and Clarification';
- The observations and recommendations raised in previous audits carried out by the Agency.

The following table lists the progress made by the EPA auditing of sanitary authorities and details the sanitary authorities who were audited during 2004 and 2005:



**Table 2-18. Sanitary Authorities Audited During the Period 2001 - 2005**

Sanitary Authority	2001	2002	2003	2004	2005 <sup>5</sup>
Carlow County Council		√		√	
Cavan County Council			√		√
Clare County Council	√		√		√
Cork City Council				√	
Cork County Council	√			√	
Donegal County Council		√		√	
Dublin City Council	√*				
Dun Laoghaire Rathdown County Council	√*	√		√	
Fingal County Council	√*		√		
Galway City Council			√	√	
Galway County Council		√		√	
Kerry County Council				√	
Kildare County Council			√		√
Kilkenny County Council	√		√	√	
Laois County Council	√			√	
Leitrim County Council		√		√	
Limerick City Council		√			√
Limerick County Council		√		√	
Longford County Council			√	√	
Louth County Council		√	√		√
Mayo County Council		√			√
Meath County Council			√	√	
Monaghan County Council		√		√	
North Tipperary County Council			√		
Offaly County Council			√	√	
Roscommon County Council			√	√	
Sligo County Council	√			√	
South Dublin County Council	√*			√	
South Tipperary County Council		√			√
Waterford City Council	√		√		√
Waterford County Council	√		√	√	
Westmeath County Council	√			√	
Wexford County Council	√			√	
Wicklow County Council	√		√		√
<b>Total</b>	<b>11</b>	<b>11</b>	<b>15</b>	<b>22</b>	<b>9</b>
Note; √* All four Dublin local authorities were assessed as part of one audit with a single report being issued to Fingal County Council.					

As can be seen from Table 2-18, all local authorities have now been audited at least once, with many having been audited twice or three times.

The audit procedure consists of an opening meeting with senior management of the sanitary authority, a review of relevant documentation and a site inspection of a selected plant. At the opening meeting the scope and objectives of the audit are reviewed and outlined. The site inspection is used to review the general operation of a selected plant. A closing meeting is held in which the main findings of the Agency auditors are presented and discussed with senior management of the sanitary authority. Subsequent to the audit, a report is issued to each authority. This audit report sets out the *observations* noted during the audit and *recommended actions* to be taken by the authority concerned. These actions form part of the criteria to be used in future audits.

There were four main aspects covered in the audits carried out by the Agency during the period September 2004 to August 2005. These were:

- the overall management and control system for the production, distribution and monitoring of drinking water in the sanitary authority area;
- the sampling and monitoring arrangements;

<sup>5</sup> Audits listed below were carried out to the end of August 2005

- the procedures for dealing with exceedances of the drinking water standards; and,
- the management of an individually selected water treatment plant which is inspected on the day of the audit.

### **Overall Documented Management and Control System**

The audits carried out in 2004 and 2005 indicate that there has been improvement in the development of documented management and control systems in sanitary authorities compared to the previous period. Of the 10 sanitary authorities audited during the period September 2004 to August 2005, 5 had detailed documented management and control systems in place. This represents an improvement from the previous period when only 4 out of 21 sanitary authorities had such a system in place.

A welcome observation noted is the improvement and development of such systems at the plant level. Several sanitary authorities have tailored systems to suit the needs of the specific treatment plant.

### **Sampling and Monitoring Programmes**

All sanitary authorities visited had developed a documented sampling and monitoring programme at the time of the audit although all sanitary authorities require further work on their sampling manuals to ensure that they are meeting the recommendations of the EPA Handbook. Notwithstanding this all sanitary authorities had identified and quantified the sampling requirements for public water supplies and group water schemes within their functional areas. There were a number of common shortcomings noted in the sampling manuals prepared by the different sanitary authorities.

The majority (7 of the 10 sanitary authorities audited) failed to identify the small supplies (serving less than 50 people or providing less than 10 m<sup>3</sup> per day) that supply water as part of a public or commercial activity. Consequently these supplies were not included in the documented monitoring programme in 7 of the 10 sanitary authorities audited.

No sanitary authority audited had developed a protocol for determining compliance with the parametric values for acrylamide, epichlorohydrin and vinyl chloride. Sanitary authorities are not required to analyse drinking water for these parameters but are required to determine compliance with these parameters by product specification in accordance with the guidance given in Section 4.8 of the EPA "Handbook on Implementation for Sanitary Authorities".

The final common failure of sanitary authorities monitoring programmes was that the majority of them had not amended their sampling protocol to account for the change in the manner in which drinking water should be sampled for copper, lead and nickel. Sanitary authorities should be sampling for these metals in accordance with the recommendations of Section 4.2 of the EPA "Handbook on Implementation for Sanitary Authorities".

### **Protocols for dealing with Exceedances of the Parametric Values**

There was a further improvement in the number of sanitary authorities that have developed documented procedures for dealing with exceedances of the parametric values. In the previous report 4 of the 21 sanitary authorities did not have such protocols in place while all of the 10 sanitary authorities audited for the current report had a documented procedure in place. However, the documented protocol for Louth was in need of updating to reflect the requirements of the 2000 Regulations.

### **Management of Water Treatment Plants**

In general the management of water treatment plants has improved and the majority of the plants visited had documented management systems in place. There was evidence of corrective action plans being implemented at some of the plants visited and in particular the Laragh/Annamoe supply (Wicklow) which had historical problems in complying with the aluminium and fluoride standards. There was evidence of considerable civil works being undertaken at this plant to identify and rectify the cause of the exceedances. However, there

were a number of recurring problems identified at the plants visited which are in need of corrective action. These include:

- inadequate source protection;
- inadequate secondary containment in chemical storage areas;
- inadequate alarms on treatment process to identify system failures or errors; and,
- inappropriate means of dealing with wastes generated at treatment plants.

There was little evidence of the implementation of source protection measures at the majority of plants visited although the carrying out of *Cryptosporidium* Risk Assessments at many of the plants visited is a welcome step in the right direction. Only one local authority had carried out a general risk assessment to determine vulnerability to pollution (Kildare County Council). In one case, there was evidence that cattle had access to the source of drinking water approximately 20m upstream of the intake at the plant (Greenmount, Louth County Council). In the majority of other plants the focus was on treatment of the water once it enters the plant rather than inspection of the catchment or source of water to prevent pollution.

Chemical storage at a number of plants was inadequate and in some cases presented an unacceptable risk to the water supply and to the environment. In only one of the treatment plants visited (Bailieboro, Cavan) was the means of storing chemicals to the satisfaction of the Agency. Examples of bad practice observed included the storage of fluoride, sodium hypochlorite and aluminium sulphate in unbunded areas. In two cases (Athy and Greenmount) the chemicals were being stored in areas liable to flooding. Other examples include fill points that were located outside bunded areas (Galtee Regional) and inappropriate means of filling storage tanks (Kiltarnan – the person filling the fluoride storage tank was not able to see the tank being filled thus posing a risk of overfilling).

None of the plants inspected were attended to 24 hours a day due to the size of the plants in question. In the majority of these plants there was no alarm on the treated water to indicate situations where the water is not being treated properly. For example, in some plants there was no alarm for residual chlorine. Thus a sudden drop in the chlorine residual (due to a rise in chlorine demand or failing pumps) will not be detected until the plant is attended the next morning. As such there is the potential for several hours of undisinfected water to enter the distribution system before it is detected.

The final area of concern identified at the inspection of the treatment plants was the manner in which some treatment plants are dealing with waste generated at the plants. At one of the inspections carried out (Milltown/Malbay) sludge was observed discharging from the treatment plant into a receiving water while correspondence following the audit indicated that sludge was discharging from a further two treatment plants in the County to receiving waters. These are summarised below (Table 2-20). Furthermore, as a result of information published in the EPA Biological Reports a further three discharges were identified that warranted enforcement actions by the Agency.

The Agency served 10 notices under Section 63 of the Environmental Protection Agency Act, 1992 (as amended by the Protection of the Environment Act, 2003) on sanitary authorities in 2004, 8 of which were still pending a final resolution at the time of the publication of this report last year. An update of actions taken/to be taken is presented in Table 2-19.

**Table 2-19. Current Situation Regarding Statutory Notices Served on Sanitary Authorities in 2004.**

<b>Sanitary Authority</b>	<b>Name of Treatment Plant</b>	<b>Reason for Statutory Notice</b>	<b>Action Taken/To Be Taken by Sanitary Authority</b>
Cork City Council	Lee Road Waterworks	Direct discharge of aluminium sludge to the River Lee	Lee Road waterworks to be refurbished with a completion date (including sludge management facilities) by fourth quarter of 2007.
Cork County Council	Inniscarra	Direct discharge of filter backwash water to the River Lee at Inniscarra	Design team in Cork County Council are currently progressing the upgrading of sludge treatment facilities in Inniscarra
Donegal County Council	Pollan Dam	Unauthorised landspreading of waste sludge from treatment plant	Spreading of sludge ceased immediately following audit and is now disposed of in a licensed landfill
Kerry County Council	Dromin	Unauthorised storage of sludge at the treatment plant	Council investigating options at present. Sludge disposal will depend on results of further study.
Kilkenny County Council	Troyswood	Direct discharge of sludge to the River Nore	Council failed to meet deadline of 17 <sup>th</sup> December 2004 for the cessation of the discharge. The Council was served with a Proposed Direction in August 2005 directing them to cease discharge.
Limerick County Council	Newcastlewest	Discharge of aluminium sludge to the River Deel	The discharge has ceased and sludge is currently settled at the plant and transported off-site for further dewatering and disposal to landfill
Meath County Council	Trim, Navan, Liscarton and Kilcarran	Unauthorised landspreading of waste sludge from treatment plants	This practice is still continuing. The Council report that the practice will cease in December 2005 with the dewatering and landfilling of sludge from these plants
Westmeath County Council	Athlone	Direct discharge of sludge to the River Shannon	The sludge treatment facilities are to be installed as part of the overall upgrade of the plant. At the time of preparation of the report the contract documents were with the Department of Environment, Heritage and Local Government.

**Table 2-20. Statutory Notices Issued to Sanitary Authorities in 2005.**

<b>Sanitary Authority</b>	<b>Name of Treatment Plant</b>	<b>Reason for Statutory Notice</b>	<b>Action Taken/To Be Taken by Sanitary Authority</b>
<b>Notices Issued as a Result of Audit</b>			
Clare County Council	Milltown/Malbay	Direct discharge of aluminium sludge to river	On-site sludge thickening facilities to be provided and sludge to be transported to appropriate treatment facility
Louth County Council	Cavan Hill	Overflow of sludge drying beds resulting in discharge of sludge to the River Boyne	Discharge ceased following issue of notice. Sludge now collected in holding tank and disposed of to landfill
Wicklow County Council	Arklow	Direct discharge of aluminium sludge to Ballyduffbeg River	Discharge now ceased. Sludge now collected in settlement tanks, to be dewatered.
<b>Notices Issued as a Result of EPA Biological Reports</b>			
Cork County Council	Clonakilty	Direct discharge of aluminium sludge to Ardigeen River	Sludge treatment system had been installed between the date of the survey and the issue of notice. Thus discharge no longer occurring.
Cork County Council	Bandon	Overflow of sludge drying beds resulting in discharge of sludge to the River Bandon	Following the issue of the notice the sludge settling tanks were cleared. A new pump was installed and sludge was allowed to settle and thus only allow supernatant to discharge to the river. Sludge now drawn off and discharged to Bandon WWTP.
Donegal County Council	Crolly (Rosses Regional)	Direct discharge of sludge to the Keel Lough Stream causing serious pollution	This site is seriously polluted. The Council are intensively monitoring the site and the plant is to be upgraded by 2009 including the installation of sludge treatment facilities.

## **3 DEPARTURES**

### **3.1 Background**

Article 5 of the European Communities (Drinking Water) Regulations assigns the responsibility to the Environmental Protection Agency for the consideration of applications for departures from the parametric values specified in Table B in Part 1 of the Schedule of the Regulations. In the context of the Regulations, a departure is a temporary authorisation given to a sanitary authority (upon application) to exceed the parametric value for a specific chemical standard for a limited time period (not exceeding three years). Such a departure can only be granted by the Agency where "no such departure constitutes a potential danger to human health". The Agency has the authority to refuse any such application where it is not satisfied that there is no potential danger to human health.

### **3.2 Application Procedure**

An application for a departure from the parametric values specified in Table B (Chemical Parameters) in Part 1 of the Schedule of the Regulations must contain all the information contained in the Agency application forms available either from the Agency website ([www.epa.ie/OfficeofEnvironmentalEnforcement/PublicAuthorityEnforcement/DrinkingWater](http://www.epa.ie/OfficeofEnvironmentalEnforcement/PublicAuthorityEnforcement/DrinkingWater)) or in Appendix 5 of the EPA Publication "European Communities (Drinking Water) Regulations, 2000: A Handbook on Implementation for Sanitary Authorities".

### **3.3 EPA Activities in 2004**

The Agency carried out a detailed review of the requirements of Article 5 of the Regulations. As part of this review the Agency met with the Principal Environmental Health Officers of the Health Boards to discuss the requirements of the Regulations in relation to the health assessments of breaches of the parametric values. Following from this the Agency developed detailed internal procedures for dealing with applications as they arise.

In December 2003, the Agency wrote to all sanitary authorities informing them of the implications of the Regulations regarding departures. The Agency carried out an assessment of past monitoring results (from the year 2002) and highlighted those supplies potentially requiring a departure based on historical exceedances. In August 2004, the Agency carried out a similar exercise on the 2003 monitoring results and notified every sanitary authority of supplies that potentially required departures. The Agency intends to monitor the situation to ensure that relevant applications for departures are sought where needed.

### **3.4 Applications Received in 2004**

The Agency dealt with one application for a departure from the parametric value for nitrate in 2004. Louth County Council sought a temporary derogation to exceed the parametric value for nitrate in the Sheepgrange group water scheme for a period of three years. The decision of the Agency was to refuse authorisation for the departure on the grounds that the North Eastern Health Board was not satisfied that there was no potential danger to public health.

Refusal of the departure sought means that the requirements of Article 9 take effect. In the case of the Sheepgrange group water scheme application this means that Louth County Council were required to serve a notice on the person responsible for the scheme requiring them to prepare an action programme within 60 days of the receipt of the notice. The notice should require corrective action to be taken that would bring the scheme into compliance within one year of the finalisation of the action programme.

## **4 APPROVAL OF LABORATORIES PRODUCING DATA FOR INCLUSION IN THIS REPORT**

Part 3 of the Schedule of the 2000 Regulations states that "Each laboratory at which samples are analysed must have a system of analytical quality control that is subject from time to time to checking by a person who is not under the control of the laboratory and who is approved by the Agency for that purpose". Consequently, the Agency is required to establish a system of ensuring that each of the laboratories have been approved and is regularly checked.

In June 2004 the Agency wrote to all sanitary authorities requesting them to submit details of the laboratories they are currently using (or that they intend to use) for the purposes of carrying out compliance monitoring under the 2000 Regulations. A reminder was issued to sanitary authorities that had not replied in August 2004. The purpose of the questionnaire that was issued with the correspondence was to identify the laboratories each sanitary authority was using and to establish whether the laboratory was accredited or not. Responses were received from all the sanitary authorities indicating that 36 laboratories were being used by the sanitary authorities in Ireland. The Agency considers that laboratories that are accredited to ISO 17025 satisfy the requirements of Part 3 of the Schedule of the Regulations.

In July 2005 all sanitary authorities were reminded of their responsibilities to ensure that laboratories they use for drinking water analysis have in place a system of analytical quality control that is subject to checking by a person from the Agency or approved by the Agency to do so. They were requested to notify the Agency of any additional laboratories that were being used that were not in use at the time of the previous correspondence (many sanitary authorities had not sourced laboratories to do some of their analysis). The 34 sanitary authorities notified the Agency that they are collectively using 42 laboratories (not including laboratories that have been subcontracted to do analysis of particular parameters). The Agency is in the process of developing a plan of inspection of these laboratories to ensure they are producing data in a quality controlled manner. It is anticipated that the details will be finalised shortly and the work will be carried out by the Agency or by a person appointed by the Agency to do so.

## 5 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 The Quality of Drinking Water

#### 5.1.1 Public Water Supplies

##### Conclusions

1. The quality of drinking water supplied by the majority of public water supplies was satisfactory while that in the larger public water supplies serving cities and large towns was good.
2. While the microbiological quality of public water supplies was satisfactory overall, *E. coli* was detected in approximately 10% of public water supplies at least once during 2004, although the majority of these exceedances were moderate and once-off occurrences.
3. Compliance with the chemical standards was satisfactory. However, there were non-compliances with the fluoride, lead, bromate and trihalomethanes parametric values that must be addressed.
4. Compliance with the indicator parametric values was less than that of the microbiological or chemical parameters but was nonetheless satisfactory. While compliance with these indicator parametric values is not as significant from a health perspective as an exceedance of the microbiological or chemical parametric value from the consumers point of view these exceedances will often be the most obvious. As such, exceedances of the colour, turbidity, taste and odour parametric values have the potential to damage consumer confidence in the quality of drinking water supplied.

##### Recommendations

- Sanitary authorities should ensure that each exceedance of the parametric values is investigated. For non-trivial exceedances, a corrective action plan should be prepared within 60 days and the action to be taken should be complete within one year if the exceedance presents a risk to public health or within two years if the exceedance does not present a risk to public health.
- The presence of *E. coli* in a public water supply is unacceptable and sanitary authorities must ensure that all such exceedances are investigated immediately and rectified as soon as possible.
- Sanitary authorities should carry out risk assessments to determine the vulnerability of public water supplies to *Cryptosporidium* on the remaining public water supplies that serve 41% of the total population.
- Sanitary authorities should examine the results of the risk assessments in detail and for those supplies that are high risk or very high risk, take remedial action to reduce the risk.
- Sanitary authorities should ensure that fluoridation is carried out in accordance with the requirements of the Fluoridation Act and that levels in the final waters do not exceed 1.0 mg/l.
- Sanitary authorities should carry out a lead survey to determine the extent of lead piping in the distribution network and in the population served. Dosing with phosphate should be considered where the sanitary authority is unable to ensure compliance with the lead standard in the short/medium term.
- Sanitary authorities must prepare action programmes to deal with the exceedances of the bromate and trihalomethane parametric values. The standard for these parameters are currently being breached in a significant number of samples. The



standards for these parameters will become more stringent on 25 December 2008 and sanitary authorities must prepare action programmes to ensure that they can comply with these standards prior to their entry into force.

- Sanitary authorities should respond positively to all complaints received by members of the public in relation to the organoleptic quality of drinking water and should strive to reduce these exceedances as much as possible.

### **5.1.2 Group Water Schemes**

#### **Conclusions**

1. The quality of drinking water supplied to public group water schemes was satisfactory while the quality of drinking water supplied by private group water schemes was unsatisfactory.
2. The microbiological quality of the drinking water provided by the public group water schemes was slightly lower than that supplied by the parent public water supplies. This is likely to be due to the less intense management of the distribution network in the public group water schemes (e.g., less flushing of mains).
3. The microbiological quality of the private group water schemes was unsatisfactory though there was an improvement compared to the previous year.
4. The chemical quality of the public and private group water schemes was generally good. However, there were a number of private group water schemes in which elevated levels of nitrate were reported.
5. Compliance with the indicator parametric values in the public group water schemes was similar to that of the public water supplies.
6. Compliance with the indicator parametric values in the private group water schemes was unsatisfactory. In particular, over 40% of samples failed to meet the coliform bacteria parametric value.

#### **Recommendations**

- Sanitary authorities should ensure each group water scheme (public or private), where microbiological quality problems were identified, has an action programme prepared to address the quality deficiency. Sanitary authorities should particularly focus on the private group water schemes that are not being upgraded as part of a planned Design Build Operate (DBO) bundle. Where a group water scheme has not prepared a corrective action programme in accordance with the requirements of Article 9 of the Regulations and where there is little evidence of action taken to improve the quality of the water supply, the sanitary authority should use all the enforcement powers available to it to rectify the problems including, where necessary, prosecution.
- Operators of public group water schemes should ensure that the distribution networks are regularly cleaned and maintained to ensure that the quality of the water supplied by the sanitary authority does not deteriorate in the group water schemes distribution network.
- Operators of private group water schemes that are in breach of the nitrate standard should investigate the cause of this exceedance and should take the necessary steps to reduce the levels of nitrate in the water supply so as to comply with the parametric value. The first step to be taken should be the protection of the source of the supply.

### 5.1.3 Small Private Supplies

#### Conclusions

1. All small private supplies (serving <50 persons or <10m<sup>3</sup>/day) must comply with the requirements of the Regulations where such supplies provide water as part of a public or commercial activity.
2. The quality of drinking water supplied by a sizeable proportion of the small private supplies monitored was unsatisfactory, though an overall assessment of the quality of water in these supplies cannot be made due to the insufficient monitoring carried out by the sanitary authorities.

#### Recommendations

- Owners of small private supplies that supply water as part of a public or commercial activity must be identified by the sanitary authority and the owners made aware of the obligation to meet the quality requirements of the Regulations.

## 5.2 Monitoring

#### Conclusions

1. There was no monitoring carried out at 26% of public group water schemes and 10% of private group water schemes during 2004.
2. 30 sanitary authorities have not identified nor carried out any monitoring of small private supplies that supply water as part of a public or commercial activity as required by the Regulations.
3. There were insufficient numbers of check and audit samples analysed at a large number of public water supplies and group water schemes.
4. Most sanitary authorities did not analyse for the full suite of parameters as required when carrying out an audit sample.

#### Recommendations

Sanitary authorities should develop/review their documented monitoring programme to ensure that:

- All public water supplies and group water schemes covered by the Regulations have been identified and have individual monitoring programmes established for each supply.
- A survey should be carried out (in consultation with the local Health Services Executive) to identify all private supplies that supply water as part of a public or commercial activity. Such supplies should be included in the monitoring programme and the monitoring frequencies for such supplies specified.
- Where audit sampling is to be carried out the sanitary authority should ensure that all parameters in the audit group of parameters are analysed unless the sanitary authority can satisfy the requirements of Section 2 of Table A of Part 2 of the Schedule of the Regulations with regard to the removal of certain parameters from the monitoring programme.

## 5.3 The Management of Drinking Water

### Conclusions

1. All sanitary authorities had developed a documented protocol for dealing with exceedances of the standards and there was evidence of the implementation and use of these protocols in most sanitary authorities. However, some protocols needed to be updated and revised to ensure they meet the full requirements of the Regulations.
2. There was an improvement in the management systems in the drinking water treatment plants visited as part of the audits during 2004/5. There was an increase in the number of plants adopting a documented management systems approach to the treatment of drinking water.
3. Chemical storage at a number of plants was insufficient and presented a risk to the environment. Specifically, the majority of plants visited were storing chemicals in unsuitable conditions and chemicals were not being stored in bunded areas.
4. The management of wastes generated at treatment plants was inappropriate at a small number of plants. In some cases sludge was discharged to the nearby receiving waters while at two plants waste from the plant was being burnt on site (Mooncoin, Co. Kilkenny and Doolough New, Co. Clare). In other cases water sludge was being mixed with sewage sludge and spread on land.
5. While disinfection by chlorination was practiced at all of the treatment plants visited, not all of the plants visited had a residual chlorine monitor on the final water leaving the plant. Furthermore, in some of the plants that did have a residual chlorine monitor not all of them were alarmed or generated a call out in the event of a problem.

### Recommendations

- All sanitary authorities should develop a documented protocol for dealing with exceedances of the microbiological, chemical and indicator parametric values. Sanitary authorities should develop this protocol in conjunction with the local health authorities and should ensure that it is regularly reviewed to ensure it meets the requirements of the Regulations and that it accurately reflects the up to date situation.
- All sanitary authorities should develop a documented management system to assist in the management of drinking water in the sanitary authority area. Such a system should address the issues raised in Chapter 9 of the EPA Manual "Coagulation, Flocculation and Clarification".
- Group water schemes should obtain certification under the Hazard Analysis Critical Control Points (HACCP) system adopted by the National Federation of Group Water Schemes. Where the quality model adopted by the NFGWS is not in place, those responsible for group water scheme should prepare a protocol in order to reduce the risk of an unsafe drinking water supply.
- All sanitary authorities should review chemical storage arrangements at treatment plants. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein.
- All sanitary authorities should review current methods of handling and disposal of water treatment sludge to ensure that the practice is not in contravention of the Waste Management Act, 1996. The discharge of water treatment sludge to receiving water, where practiced, should cease immediately. The mixing of water treatment sludges for subsequent spreading on land is not permitted under the Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998 and therefore

such practices should cease immediately.

- All treatment plants should have a continuous chlorine residual monitor on the final water and such monitors should be alarmed to ensure that either a sudden increase in chlorine demand or a failure of the chlorine dosing system is immediately detected. The aim of such alarms is to ensure that corrective action is initiated as quickly as possible to prevent undisinfected water entering the distribution mains.

## **5.4 Reporting and Communication**

### **Conclusions**

1. A significant proportion of sanitary authorities (27 of the 36) did not submit the drinking water monitoring results for 2004 by the deadline of 28<sup>th</sup> February 2005. A number of sanitary authorities submitted the data over three months late (Kilkenny, Mayo and Monaghan County Councils). This late submission of results delays the preparation and publication of the Agency annual report.
2. The Agency receives numerous requests for drinking water monitoring results from members of the public concerned about the quality of their supply.

### **Recommendations**

- In accordance with Section 58 of the EPA Act, 1992 sanitary authorities must submit the results of monitoring carried out in accordance with the relevant drinking water legislation to the Agency on the template specified and by the deadline of 28<sup>th</sup> February each year.
- Drinking water results should be made more accessible to the public by the sanitary authority. In this regard the Agency recommends that sanitary authorities post up-to-date results of their monitoring on their websites on a regular basis.

## **5.5 Enforcement of the Drinking Water Regulations**

### **Conclusions**

1. Sanitary authorities are charged with the responsibility for ensuring that the persons responsible for the operation of group water schemes ensure that their schemes meet the requirements of the Regulations. In this regard the sanitary authority can issue a notice requiring a corrective action programme to be prepared and can prosecute a group water scheme where it fails to prepare a corrective action programme or fails to take the necessary measures to rectify the non-compliance. Similar arrangements are not in place for ensuring that water supplied by sanitary authorities meets the requirements of the Regulations.

### **Recommendations**

- Consideration should be given to the introduction of legislation to provide for the overseeing and enforcing of sanitary authorities implementation of the drinking water Regulations. The legislation should include the provision of powers to an appropriate body to direct sanitary authorities to carry out specified actions where the need arises and to prosecute sanitary authorities if they fail to carry out directions or continually fail to provide drinking water that meets the requirements of the drinking water Regulations.

## SUGGESTED FURTHER READING

Convery, S. (in prep). *"Vulnerability of Public Drinking Water Supplies to Cryptosporidium: An analysis of progress and implementation of risk assessments by Sanitary Authorities in the Republic of Ireland."* M. Sc. Thesis, Dublin Institute of Technology

Council Directive 98/83/EC of 3 November 1998 on the Quality of Water Intended for Human Consumption.

Department of the Environmental and Local Government. (1998). Protection of Water Supplies: Guidelines for Local Authorities on minimising the risk of *Cryptosporidium* in water supplies. Circular L7/98.

Environmental Protection Agency (2004). *European Communities (Drinking Water) Regulations 2000 (S.I. No. 439 of 2000): A Handbook on Implementation for Sanitary Authorities*. EPA, Ireland.

Environmental Protection Agency (2001). *Parameters of Water Quality: Interpretations and Standards*. EPA, Ireland.

Environmental Protection Agency Act, 1992 (No. 7 of 1992)

European Communities (Drinking Water) Regulations, 2000 (SI No. 439 of 2000)

Health (Fluoridation of Water Supplies) Act, 1960 (No. 46 of 1960)

National Federation of Group Water Schemes Co-Op Society Ltd. (2005). *Annual Report 2004*.

World Health Organisation (2004). *Guidelines for Drinking Water Quality*. (3<sup>rd</sup> Ed).

**APPENDIX 1**  
**SUMMARY OF COMPLIANCE WITH THE PARAMETRIC VALUES**  
**FOR THE DIFFERENT TYPES OF WATER SUPPLIES**

**Table A1.1. Total Number of Supplies Monitored and Samples Analysed for All Parameters in Public Water Supplies**

Parameter	No. of Supplies Monitored	No. of Supplies with Exceedances	% of Supplies Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
<b>Microbiological Parameters</b>						
<i>Escherichia coli</i> ( <i>E. coli</i> )	903	91	<b>89.9%</b>	10865	124	<b>98.9%</b>
Enterococci	429	21	<b>97.4%</b>	907	25	<b>97.2%</b>
<b>Chemical Parameters</b>						
Acrylamide	60	0	<b>100%</b>	183	0	<b>100%</b>
Antimony	516	3	<b>99.4%</b>	894	4	<b>99.6%</b>
Arsenic	543	4	<b>99.3%</b>	1033	5	<b>99.5%</b>
Benzene	487	4	<b>99.2%</b>	804	0	<b>100%</b>
Benzo(a)pyrene	453	0	<b>100%</b>	725	0	<b>100%</b>
Boron	484	0	<b>100%</b>	799	0	<b>100%</b>
Bromate	457	15	<b>96.7%</b>	730	16	<b>97.8%</b>
Cadmium	548	0	<b>100%</b>	1055	0	<b>100%</b>
Chromium	541	0	<b>100%</b>	1032	0	<b>100%</b>
Copper	571	1	<b>99.8%</b>	1189	1	<b>99.9%</b>
Cyanide	439	0	<b>100%</b>	714	0	<b>100%</b>
1,2-dichloroethane	414	3	<b>99.5%</b>	693	3	<b>99.6%</b>
Epichlorohydrin	37	0	<b>100%</b>	61	0	<b>100%</b>
Fluoride	623	54	<b>91.3%</b>	3111	123	<b>96.0%</b>
Lead	576	14	<b>97.6%</b>	1201	23	<b>98.1%</b>
Mercury	440	0	<b>100%</b>	736	0	<b>100%</b>
Nickel	558	4	<b>99.3%</b>	1057	4	<b>99.6%</b>
Nitrate	762	7	<b>99.1%</b>	3580	9	<b>99.7%</b>
Nitrite	714	2	<b>99.7%</b>	5410	2	<b>100%</b>
Pesticides – Total	394	3	<b>99.2%</b>	630	3	<b>99.5%</b>
Polycyclic Aromatic hydrocarbons	452	2	<b>99.6%</b>	730	2	<b>99.7%</b>
Selenium	521	0	<b>100%</b>	899	0	<b>100%</b>
Tetrachloroethene/Trichloroethene	469	2	<b>99.6%</b>	913	2	<b>99.8%</b>
Trihalomethanes – Total	547	80	<b>85.4%</b>	1342	49	<b>96.3%</b>
Vinyl chloride	78	0	<b>100%</b>	141	0	<b>100%</b>
<b>Indicator Parameters</b>						
Aluminium	628	108	<b>82.3%</b>	6132	328	<b>94.6%</b>
Ammonium	875	18	<b>97.9%</b>	8033	25	<b>99.7%</b>
Chloride	570	0	<b>100%</b>	1142	0	<b>100%</b>
<i>Clostridium perfringens</i>	600	84	<b>86.0%</b>	4562	155	<b>96.6%</b>
Colour*	856	150	<b>82.5%</b>	9251	360	<b>96.1%</b>
Conductivity	877	1	<b>99.9%</b>	10145	3	<b>100%</b>
Hydrogen Ion Concentration	892	218	<b>75.6%</b>	9990	423	<b>95.8%</b>
Iron	718	95	<b>86.8%</b>	4341	262	<b>94.0%</b>
Manganese	609	52	<b>91.5%</b>	2434	86	<b>96.5%</b>
Odour*	843	53	<b>93.7%</b>	9073	205	<b>97.7%</b>
Oxidisability	3	0	<b>100%</b>	5	0	<b>100%</b>
Sulphate	536	0	<b>100%</b>	972	0	<b>100%</b>
Sodium	544	0	<b>100%</b>	979	0	<b>100%</b>
Taste*	470	14	<b>97.0%</b>	5726	67	<b>98.8%</b>
Colony count 22°C*	410	57	<b>86.1%</b>	1247	69	<b>94.5%</b>
Coliform bacteria	903	317	<b>64.9%</b>	10861	742	<b>93.2%</b>
Total organic carbon (TOC)	433	0	<b>100%</b>	748	0	<b>100%</b>
Turbidity*	849	69	<b>91.9%</b>	9707	108	<b>98.9%</b>
<b>Radioactivity</b>						
Tritium	34	0	<b>100%</b>	60	0	<b>100%</b>
Total indicative dose	13	0	<b>100%</b>	22	0	<b>100%</b>

**Table A1.2. Total Number of Supplies Monitored and Samples Analysed for All Parameters in Public Group Water Schemes.**

Parameter	No. of Supplies Monitored	No. of Supplies with Exceedances	% of Supplies Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
<b>Microbiological Parameters</b>						
<i>Escherichia coli</i> ( <i>E. coli</i> )	585	56	<b>90.4%</b>	1692	65	<b>96.2%</b>
Enterococci	26	0	<b>100%</b>	30	0	<b>100%</b>
<b>Chemical Parameters</b>						
Acrylamide	0	0		0	0	
Antimony	19	0	<b>100%</b>	19	0	<b>100%</b>
Arsenic	22	0	<b>100%</b>	29	0	<b>100%</b>
Benzene	15	0	<b>100%</b>	15	0	<b>100%</b>
Benzo(a)pyrene	14	0	<b>100%</b>	14	0	<b>100%</b>
Boron	19	0	<b>100%</b>	19	0	<b>100%</b>
Bromate	16	0	<b>100%</b>	16	1	<b>93.8%</b>
Cadmium	23	0	<b>100%</b>	30	0	<b>100%</b>
Chromium	23	0	<b>100%</b>	29	0	<b>100%</b>
Copper	27	0	<b>100%</b>	33	0	<b>100%</b>
Cyanide	18	0	<b>100%</b>	18	0	<b>100%</b>
1,2-dichloroethane	17	0	<b>100%</b>	17	0	<b>100%</b>
Epichlorohydrin	0	0		0	0	
Fluoride	32	2	<b>93.8%</b>	38	2	<b>94.7%</b>
Lead	27	0	<b>100%</b>	34	0	<b>100%</b>
Mercury	15	0	<b>100%</b>	15	0	<b>100%</b>
Nickel	20	0	<b>100%</b>	22	0	<b>100%</b>
Nitrate	457	1	<b>99.8%</b>	1390	1	<b>99.9%</b>
Nitrite	481	1	<b>99.8%</b>	1444	1	<b>99.9%</b>
Pesticides – Total	13	0	<b>100%</b>	13	0	<b>100%</b>
Polycyclic Aromatic hydrocarbons	14	0	<b>100%</b>	14	0	<b>100%</b>
Selenium	15	0	<b>100%</b>	15	0	<b>100%</b>
Tetrachloroethene/Trichloroethene	26	0	<b>100%</b>	33	0	<b>100%</b>
Trihalomethanes – Total	28	0	<b>75.0%</b>	36	0	<b>100%</b>
Vinyl chloride	0	0		0	0	
<b>Indicator Parameters</b>						
Aluminium	441	87	<b>80.3%</b>	1350	104	<b>92.3%</b>
Ammonium	581	11	<b>98.1%</b>	1653	11	<b>99.3%</b>
Chloride	24	0	<b>100%</b>	24	0	<b>100%</b>
<i>Clostridium perfringens</i>	488	47	<b>90.4%</b>	1459	53	<b>96.4%</b>
Colour*	581	79	<b>86.4%</b>	1670	104	<b>93.8%</b>
Conductivity	581	0	<b>100%</b>	1678	0	<b>100%</b>
Hydrogen Ion Concentration	581	67	<b>88.5%</b>	1672	96	<b>94.3%</b>
Iron	530	47	<b>91.1%</b>	1522	58	<b>96.2%</b>
Manganese	455	39	<b>91.4%</b>	1384	52	<b>96.2%</b>
Odour*	255	3	<b>98.8%</b>	362	3	<b>99.2%</b>
Oxidisability	0	0		0	0	
Sulphate	19	0	<b>100%</b>	19	0	<b>100%</b>
Sodium	21	0	<b>100%</b>	21	0	<b>100%</b>
Taste*	152	0	<b>100%</b>	231	0	<b>100%</b>
Colony count 22°C*	19	3	<b>84.2%</b>	26	3	<b>88.5%</b>
Coliform bacteria	585	149	<b>74.5%</b>	1694	204	<b>88.0%</b>
Total organic carbon (TOC)	296	0	<b>100%</b>	18	0	<b>100%</b>
Turbidity*	575	17	<b>97.0%</b>	1621	19	<b>98.8%</b>
<b>Radioactivity</b>						
Tritium	0	0		0	0	
Total indicative dose	0	0		0	0	



**Table A1.3. Total Number of Supplies Monitored and Samples Analysed for All Parameters in Private Group Water Schemes.**

Parameter	No. of Supplies Monitored	No. of Supplies with Exceedances	% of Supplies Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
<b>Microbiological Parameters</b>						
<i>Escherichia coli</i> ( <i>E. coli</i> )	698	282	<b>59.6%</b>	2420	531	<b>78.1%</b>
Enterococci	79	5	<b>93.7%</b>	88	5	<b>94.3%</b>
<b>Chemical Parameters</b>						
Acrylamide	0	0		0	0	
Antimony	80	0	<b>100%</b>	92	0	<b>100%</b>
Arsenic	77	0	<b>100%</b>	89	0	<b>100%</b>
Benzene	65	0	<b>100%</b>	71	0	<b>100%</b>
Benzo(a)pyrene	60	0	<b>100%</b>	66	0	<b>100%</b>
Boron	74	0	<b>100%</b>	85	0	<b>100%</b>
Bromate	62	2	<b>96.8%</b>	69	2	<b>97.1%</b>
Cadmium	78	0	<b>100%</b>	91	0	<b>100%</b>
Chromium	88	0	<b>100%</b>	102	0	<b>100%</b>
Copper	83	0	<b>100%</b>	129	0	<b>100%</b>
Cyanide	64	0	<b>100%</b>	69	0	<b>100%</b>
1,2-dichloroethane	68	0	<b>100%</b>	75	0	<b>100%</b>
Epichlorohydrin	0	0		0	0	
Fluoride	77	1	<b>98.7%</b>	92	1	<b>98.9%</b>
Lead	90	0	<b>100%</b>	122	0	<b>100%</b>
Mercury	61	0	<b>100%</b>	67	0	<b>100%</b>
Nickel	83	0	<b>100%</b>	92	0	<b>100%</b>
Nitrate	575	18	<b>96.9%</b>	1777	31	<b>98.3%</b>
Nitrite	595	0	<b>100%</b>	1842	0	<b>100%</b>
Pesticides – Total	57	0	<b>100%</b>	64	0	<b>100%</b>
Polycyclic Aromatic hydrocarbons	60	0	<b>100%</b>	66	0	<b>100%</b>
Selenium	71	0	<b>100%</b>	83	0	<b>100%</b>
Tetrachloroethene/Trichloroethene	71	0	<b>100%</b>	78	0	<b>100%</b>
Trihalomethanes – Total	123	1	<b>99.2%</b>	131	1	<b>99.2%</b>
Vinyl chloride	2	0	<b>100%</b>	2	0	<b>100%</b>
<b>Indicator Parameters</b>						
Aluminium	491	28	<b>94.3%</b>	1629	34	<b>97.9%</b>
Ammonium	682	19	<b>97.2%</b>	2160	22	<b>99.0%</b>
Chloride	87	1	<b>98.9%</b>	119	1	<b>99.2%</b>
<i>Clostridium perfringens</i>	512	126	<b>75.4%</b>	1684	218	<b>87.1%</b>
Colour*	698	200	<b>71.3%</b>	2287	381	<b>83.3%</b>
Conductivity	690	0	<b>100%</b>	2335	0	<b>100%</b>
Hydrogen Ion Concentration	691	96	<b>86.1%</b>	2298	216	<b>90.6%</b>
Iron	648	98	<b>84.9%</b>	2029	151	<b>92.6%</b>
Manganese	603	102	<b>83.1%</b>	1811	146	<b>91.9%</b>
Odour*	296	0	<b>100%</b>	720	0	<b>100%</b>
Oxidisability	0	0		0	0	
Sulphate	87	1	<b>98.9%</b>	101	0	<b>100%</b>
Sodium	83	1	<b>98.8%</b>	96	1	<b>99.0%</b>
Taste*	131	0	<b>100%</b>	288	0	<b>100%</b>
Colony count 22°C*	46	8	<b>82.6%</b>	58	8	<b>86.2%</b>
Coliform bacteria	699	441	<b>36.9%</b>	2424	1001	<b>58.7%</b>
Total organic carbon (TOC)	73	0	<b>100%</b>	85	0	<b>100%</b>
Turbidity*	691	215	<b>68.9%</b>	2188	96	<b>95.6%</b>
<b>Radioactivity</b>						
Tritium	16	0	<b>100%</b>	17	0	<b>100%</b>
Total indicative dose	0	0		0	0	

**Table A1.4. Total Number of Supplies Monitored and Samples Analysed for All Parameters in Small Private Supplies.**

Parameter	No. of Supplies Monitored	No. of Supplies with Exceedances	% of Supplies Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
<b>Microbiological Parameters</b>						
<i>Escherichia coli</i> ( <i>E. coli</i> )	118	14	<b>88.1%</b>	155	15	<b>90.3%</b>
Enterococci	2	0	<b>100%</b>	2	0	<b>100%</b>
<b>Chemical Parameters</b>						
Acrylamide	0	0		0	0	
Antimony	1	0	<b>100%</b>	1	0	<b>100%</b>
Arsenic	4	1	<b>75.0%</b>	4	1	<b>75.0%</b>
Benzene	0	0		0	0	
Benzo(a)pyrene	0	0		0	0	
Boron	1	0	<b>100%</b>	1	0	<b>100%</b>
Bromate	1	0	<b>100%</b>	1	0	<b>100%</b>
Cadmium	1	0	<b>100%</b>	1	0	<b>100%</b>
Chromium	4	0	<b>100%</b>	4	0	<b>100%</b>
Copper	28	0	<b>100%</b>	35	0	<b>100%</b>
Cyanide	1	0	<b>100%</b>	1	0	<b>100%</b>
1,2-dichloroethane	0	0		0	0	
Epichlorohydrin	0	0		0	0	
Fluoride	1	0	<b>100%</b>	1	0	<b>100%</b>
Lead	25	0	<b>100%</b>	32	0	<b>100%</b>
Mercury	1	0	<b>100%</b>	1	0	<b>100%</b>
Nickel	1	0	<b>100%</b>	1	0	<b>100%</b>
Nitrate	42	1	<b>97.6%</b>	51	1	<b>98.0%</b>
Nitrite	58	0	<b>100%</b>	67	0	<b>100%</b>
Pesticides – Total	0	0		0	0	
Polycyclic Aromatic hydrocarbons	3	0	<b>100%</b>	3	0	<b>100%</b>
Selenium	0	0		0	0	
Tetrachloroethene/Trichloroethene	0	0		0	0	
Trihalomethanes – Total	0	0		0	0	
Vinyl chloride	0	0		0	0	
<b>Indicator Parameters</b>						
Aluminium	25	1	<b>96.0%</b>	29	1	<b>96.6%</b>
Ammonium	56	3	<b>94.6%</b>	64	3	<b>95.3%</b>
Chloride	25	1	<b>96.0%</b>	32	1	<b>96.9%</b>
<i>Clostridium perfringens</i>	13	1	<b>92.3%</b>	20	1	<b>95.0%</b>
Colour*	86	3	<b>96.5%</b>	95	3	<b>96.8%</b>
Conductivity	85	0	<b>100%</b>	94	0	<b>100%</b>
Hydrogen Ion Concentration	84	27	<b>67.9%</b>	93	27	<b>71.0%</b>
Iron	85	14	<b>83.5%</b>	94	14	<b>85.1%</b>
Manganese	42	18	<b>57.1%</b>	50	18	<b>64.0%</b>
Odour*	94	1	<b>98.9%</b>	94	1	<b>98.9%</b>
Oxidisability	0	0		0	0	
Sulphate	1	0	<b>100%</b>	1	0	<b>100%</b>
Sodium	16	2	<b>87.5%</b>	18	3	<b>83.3%</b>
Taste*	59	0	<b>100%</b>	62	0	<b>100.0%</b>
Colony count 22°C*	15	2	<b>86.7%</b>	16	2	<b>87.5%</b>
Coliform bacteria	118	43	<b>63.6%</b>	155	55	<b>64.5%</b>
Total organic carbon (TOC)	0	0		0	0	
Turbidity*	81	6	<b>92.6%</b>	90	6	<b>93.3%</b>
<b>Radioactivity</b>						
Tritium	0	0		0	0	
Total indicative dose	0	0		0	0	

**APPENDIX 2**  
**SUMMARY REPORTS FOR ALL SANITARY AUTHORITIES**

## Carlow County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	13	33,259
PuGWS	6	696
PrGWS	6	2,127
SMP	None Identified	

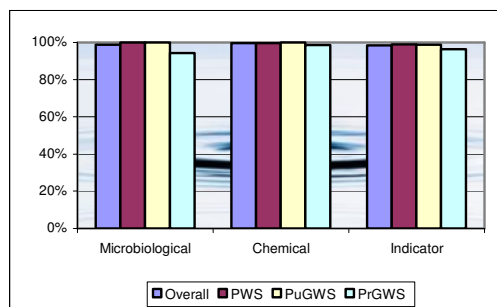
### Assessment of 2004 Monitoring

Carlow County Council carried out analysis on 119 check and 27 audit samples during 2004. There was a shortfall in the total number of samples analysed as there was insufficient check and audit samples analysed in some supplies during the year. Furthermore, of those audit samples analysed there was no analysis for mercury or pesticides and insufficient sampling for acrylamide, benzo(a)pyrene, bromate, cyanide, epichlorohydrin, pesticides, trihalomethanes and PAHs. There was no monitoring carried out in small private supplies that supply water as part of public or commercial activities in Carlow during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Carlow County Council, 98.7%, was above the national average during 2004. Compliance in the public water supplies was higher than that of the public group water schemes which in turn was higher than that of the private group water schemes.

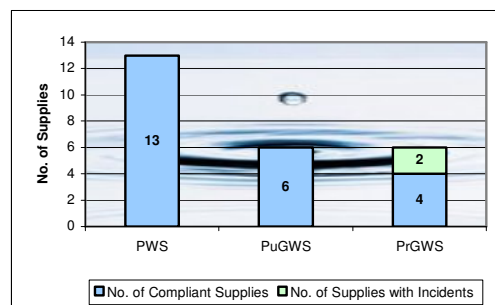
Full compliance was achieved with the microbiological parameters in both the public water supplies and public group water schemes in Carlow in 2004. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	99.4%	99.0%	96.4%	N/A
Micro	100%	100%	94.4%	N/A
Chemical	99.7%	100%	98.6%	N/A
Indicator	99.1%	98.7%	96.4%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were no incidents of *E. coli* contamination in any of the public water supplies or public group water schemes in Carlow during 2004. *E. coli* was detected in 2 of the 6 private group water schemes monitored. Both were minor incidents with just one *E. coli* detected in one sample in both schemes during 2004. All other samples in these schemes were free of *E. coli* during the year.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards for all parameters except fluoride and nitrate (one exceedance each). Both chemical exceedances were marginally above the parametric values.

Similarly compliance with the indicator parametric values was above the national average and the only cause for concern the low rate of compliance with the coliform bacteria parametric value in private group water schemes (75%).

## Cavan County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	17	28,110
PuGWS	0	0
PrGWS	72	17,692
SMP	4	No information

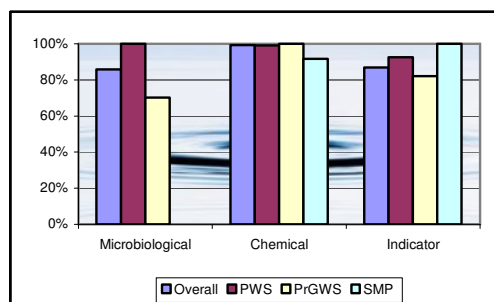
### Assessment of 2004 Monitoring

Cavan County Council carried out analysis on 306 check and 21 audit samples during 2004. Cavan County Council monitored above the minimum number of samples required in public water supplies but there was a shortfall in the total number of samples analysed in private group water schemes as there were no audit samples analysed in any of the private group water schemes during the year. Compliance was not reported for the acrylamide, epichlorohydrin or vinyl chloride parameters while no monitoring was reported for odour and taste.

### Overall Compliance in 2004

The overall rate of compliance in Cavan County Council, 89.3%, was below the national average during 2004. The low overall rate of compliance was due primarily to the poor adherence to the parametric values for the indicator parameters such as colour (52%), manganese (82%) and coliform bacteria (72%).

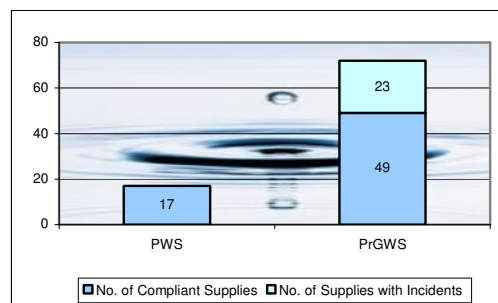
Notwithstanding the low levels of compliance with the indicator parameters, microbiological compliance in public water supplies was excellent and the absence of *E. coli* in all public water supplies is welcome. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	95.0%	N/A	83.7%	93.3%
Micro	100%	N/A	70.3%	N/A
Chemical	99.1%	N/A	100%	91.7%
Indicator	92.7%	N/A	82.2%	100%

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were no incidents of *E. coli* contamination in any of the public water supplies in Cavan during 2004. *E. coli* was detected in 23 of the 72 private group water schemes monitored. The *E. coli* exceedances in six of these private group water schemes were serious (i.e. >20 cfu/100ml). Overall, 13 of the 23 supplies with *E. coli* in the water supply reported its presence on more than one occasion in 2004.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in private group water schemes and for all parameters except bromate, lead (one exceedance each) and fluoride (three exceedances) in public water supplies. Elevated levels of arsenic were found at one of the small private supplies (a timber treatment facility).

Although compliance with the microbiological and chemical parameters was satisfactory in public water supplies compliance with the indicator parametric values was unsatisfactory for several parameters including colour (60%), manganese (76%) and aluminium (89%). The latter was due to exceedances reported in the Cavan Town supply (11 of 28 samples analysed) though the majority of these exceedances were only marginally above the parametric value.

In common with the public water supplies compliance with the indicator parametric values in private group water schemes was unsatisfactory. This was due to the relatively low percentage of samples below the parametric values for colour (45%) and coliform bacteria (47%).

## Clare County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	26	79,513
PuGWS	106	21,547
PrGWS	17	15,053
SMP	None Identified	

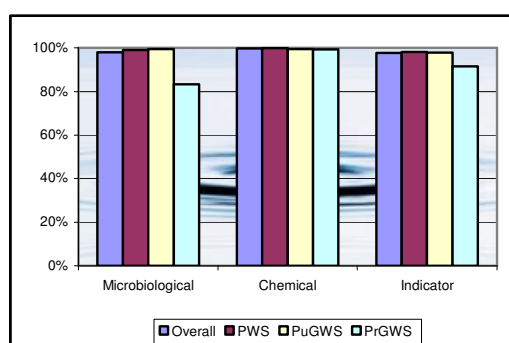
### Assessment of 2004 Monitoring

Clare County Council carried out analysis on 421 check and 54 audit samples during 2004. There were insufficient numbers of check samples taken in a small number of public water supplies and there was also a shortfall in the total number of check and audit samples analysed in public and private group water schemes. Compliance was not reported for the acrylamide, epichlorohydrin or vinyl chloride parameters. A small number of the public group water schemes (6) and one private group water scheme covered by the Regulations were not monitored. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Clare during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Clare County Council, 98.0%, was above the national average during 2004. Compliance with the parametric values for the majority of parameters was satisfactory and in many cases was good, particularly in the public water supplies and the public group water schemes. With the exception of a small number of private group water schemes the quality of the group water schemes (both public and private) was satisfactory.

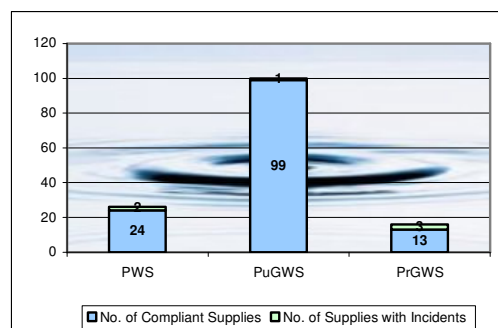
Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.6%	98.1%	93.1%	N/A
Micro	99.1%	99.4%	83.3%	N/A
Chemical	99.8%	99.5%	99.3%	N/A
Indicator	98.2%	97.8%	91.6%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were two incidents of *E. coli* contamination in public water supplies in Clare during 2004 in the Turlough and West Clare New RWS both of which were moderate (<20 cfu/100ml) and one-off incidents (i.e. *E. coli* was not detected in follow up samples). *E. coli* was detected in 1 of the 100 public group water schemes and 3 of the 16 private group water schemes monitored. The *E. coli* exceedances in one of the group water schemes (Fanore) was ongoing and serious (i.e. >20 cfu/100ml) while the remainder were all one-off incidents. In general, the microbiological quality of drinking water in the majority of group water schemes was satisfactory.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in private group water schemes and for all parameters except fluoride and trihalomethanes (two exceedances each).

Although compliance with the microbiological and chemical parameters was satisfactory in public water supplies compliance with the indicator parametric values was less satisfactory for several parameters including aluminium (90%) and iron (90%). The former was due to exceedances reported in a number of different supplies and the overall rate of compliance for aluminium has not improved compared to 2003. The majority of the iron exceedances were due to the West Clare New supply (7 of 44 samples analysed).

Compliance with the chemical parametric values in the public group water schemes was good with just one exceedance reported in 2004 (fluoride). Compliance with the indicator parametric values was similar to the public group water schemes (as they are sourced from public water supplies).

Compliance with the chemical parametric values in private group water schemes was good with just one exceedance reported in 2004 (total trihalomethanes). However, compliance with the indicator parametric values was lower than that of the public water supplies and public group water schemes. The main reason for this lower level of compliance was the low rate of compliance with the coliform bacteria parametric value (54%).

## Cork City Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	1	127,000
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

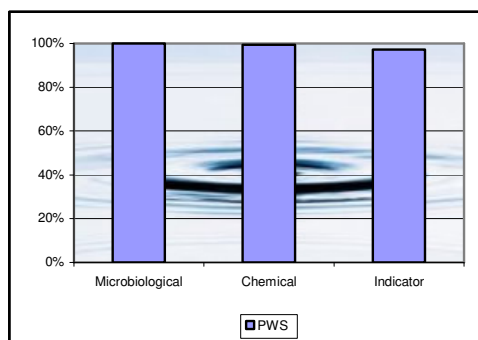
### Assessment of 2004 Monitoring

Cork City Council carried out analysis on 148 check and 10 audit samples during 2004. There were insufficient numbers of check samples taken in the Cork City supply due to an error in the calculation of the sampling frequency at the start of the year. This error has since been corrected. Compliance was not reported for the acrylamide, epichlorohydrin or vinyl chloride parameters.

### Overall Compliance in 2004

The overall rate of compliance in Cork City Council, 97.8%, was above the national average during 2004. Compliance with the parametric values for the majority of parameters was satisfactory and in many cases was excellent.

Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.8%	N/A	N/A	N/A
Micro	100%	N/A	N/A	N/A
Chemical	99.3%	N/A	N/A	N/A
Indicator	97.2%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* and enterococci parametric values in 2004 in Cork City was excellent with no samples testing positive for either organism at any time during the year.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the parametric

values for all parameters except fluoride for which there were a small number (3 of 60 samples analysed) of exceedances marginally above the parametric value.

Though compliance with the indicator parametric values was slightly above the national average there were a significant number of results reported in excess of the aluminium parametric value (17 of 169 samples analysed) and manganese (5 of 10 samples analysed). The former is a function of the treatment processes at the Cork City water treatment plant while the latter is a naturally occurring parameter in the source waters.

## Cork (North) County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	62	56,150
PuGWS	0	0
PrGWS	13	1,405
SMP	None Identified	

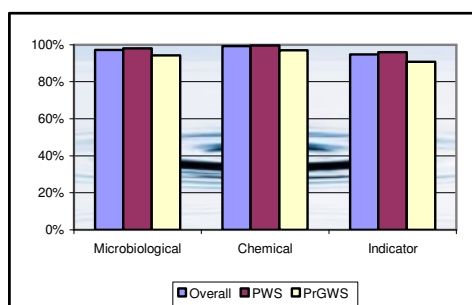
### Assessment of 2004 Monitoring

Cork (North) County Council carried out analysis on 251 check and 32 audit samples during 2004. There were insufficient numbers of check and audit samples taken in a large number of public water supplies although the full monitoring requirements were met in the private group water schemes. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in North Cork during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Cork (North) County Council, 96.0%, was slightly below the national average during 2004. Though there was limited monitoring submitted for several supplies compliance with the parametric values for the majority of parameters was satisfactory. However, there were some notable exceptions and compliance with some of the parametric values was problematic in North Cork. Overall the quality of the public water supplies was higher than that of the private group water schemes.

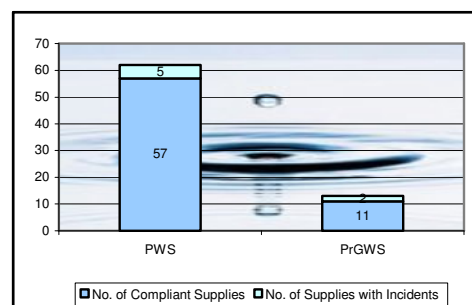
Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless slightly higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.0%	N/A	92.1%	N/A
Micro	98.0%	N/A	94.3%	N/A
Chemical	99.7%	N/A	97.1%	N/A
Indicator	95.9%	N/A	90.7%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were five incidents of *E. coli* contamination in public water supplies in North Cork during 2004 in the Bartlemy, Glenduff, Killavullen, Labbamollagga PP and Strawhall (public) supplies all of which were moderate (<20 cfu/100ml) and one-off incidents (i.e. *E. coli* was not detected in follow up samples). *E. coli* was detected in 2 of the 13 private group water schemes. Though the exceedances were moderate *E. coli* in one of the schemes was detected twice during the year (Caherdrinny).

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in for all parameters except nitrate and tetrachloroethene/trichloroethene. While the latter exceedance was a one-off anomalous result the former is of concern as elevated levels of nitrate were detected in one public water supply (Glanworth) and three private group water schemes (Curraghalla, Taurbeigh and Downing). However, the situation in Glanworth is much improved compared to previous years. Just 1 of the 8 samples analysed failed to comply with the parametric value and that was in the early part of 2004. Subsequent to this the Glanworth source was blended with another source and the levels of nitrate brought into compliance with the standard for nitrate. The level of nitrate in the three group schemes is of concern with levels in the Downing scheme approaching twice the standard.

Although compliance with the microbiological and chemical parameters in public water supplies was satisfactory (with the exception the above) compliance with the indicator parametric values was less satisfactory for several parameters including aluminium (84%), pH (85%) and coliform bacteria (90%). All the aluminium exceedances were reported in the Allow Regional (5 of 9 samples analysed) and Mallow (3 of 12 samples analysed) supplies. The poor rate of compliance with the pH parametric value was a result of the failure to correct pH levels in accordance with the new range in the 2000 Regulations.

The low rate of compliance with the indicator parametric values in group water schemes was due to the high percentage of samples testing positive for the presence of coliform bacteria (60% of samples contained coliform bacteria). In total 11 of the 13 group water schemes contained coliform bacteria during 2004.



## Cork (South) County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	66	118,440
PuGWS	0	0
PrGWS	6	510
SMP	None Identified	

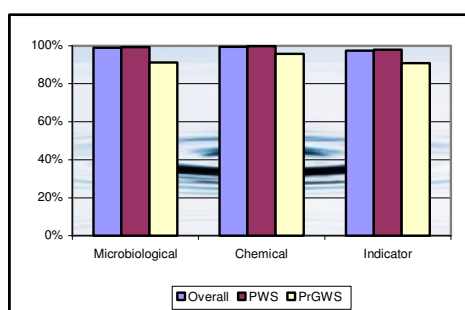
### Assessment of 2004 Monitoring

Cork (South) County Council carried out analysis on 383 check and 48 audit samples during 2004. There were insufficient numbers of check and audit samples taken in a significant number of public water supplies although the full monitoring requirements were met in the private group water schemes. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in South Cork during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Cork (South) County Council, 98.0%, was above the national average during 2004. Though there was less monitoring than required for several supplies compliance with the parametric values for the majority of parameters was satisfactory, though compliance for some parameters was problematic. Overall the quality of the public water supplies was satisfactory and higher than that of the private group water schemes which was unsatisfactory.

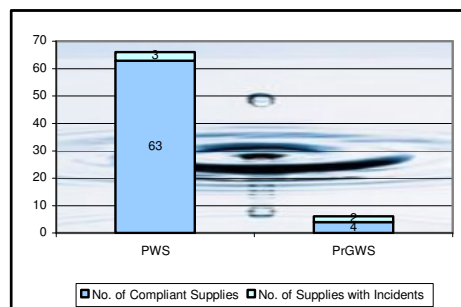
Though the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was marginally higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.5%	N/A	91.6%	N/A
Micro	99.3%	N/A	91.3%	N/A
Chemical	99.8%	N/A	95.7%	N/A
Indicator	98.0%	N/A	90.8%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were three incidents of *E. coli* contamination in public water supplies in South Cork during 2004 in the Bilberry, Clash/Leamleara and Inniscarra supplies of which the former was serious (>20 cfu/100ml) though all were one-off incidents (i.e. *E. coli* was not detected in follow up samples). *E. coli* was detected in 2 of the 6 private group water schemes. One of these exceedances was moderate while the other (Burgess/Ballykilty) was serious though one-off.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in South Cork for all parameters except nitrate. Elevated levels of nitrate were found in 2 public water supplies (Roberts Cove and Ballymacoda) and in 1 private group water scheme (Walterstown).

The overall percentage of samples below the parametric values for the indicator parameters in public water supplies was above the national average in South Cork. However, as in previous years there continues to be a relatively high number of exceedances of the aluminium parametric value in Youghal (7 of 11 samples analysed) though there was a welcome drop in the number of aluminium exceedances in the Macroom Urban supply (from 6 exceedances in 2003 down to 1 exceedance in 2004). In relation to the Youghal supply, the Council has instigated a corrective action programme involving the installation of additional treatment capacity at the plant aimed at resolving the problem.

While compliance with the majority of indicator parametric values was good in the private group water schemes compliance with the pH (65%) and coliform bacteria (44%) parametric values was most unsatisfactory and in need of investigation and correction by the sanitary authority. It is of concern that coliform bacteria were detected in 5 of the 6 private group water schemes in 2004.

## Cork (West) County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	30	31,015
PuGWS	0	0
PrGWS	8	518
SMP	None Identified	

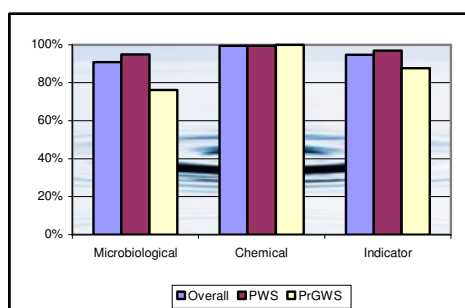
### Assessment of 2004 Monitoring

Cork (West) County Council carried out analysis on 141 check and 21 audit samples during 2004. There were insufficient numbers of check samples taken in a significant number of public water supplies although the full monitoring requirements were met in the private group water schemes. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in West Cork during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Cork (West) County Council, 95.5%, was below the national average during 2004. The below average rate of compliance was due to the below average compliance with the microbiological parametric values. Overall the quality of the public water supplies was satisfactory though there was a relatively large number of public water supplies where that were not satisfactory due to contamination with *E. coli*.

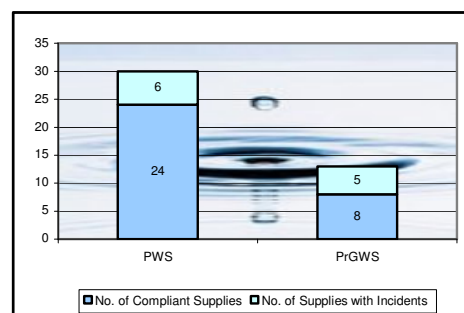
The level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters and was also less than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.4%	N/A	88.4%	N/A
Micro	94.9%	N/A	76.3%	N/A
Chemical	99.5%	N/A	100%	N/A
Indicator	96.9%	N/A	87.7%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were six incidents of *E. coli* contamination in public water supplies in West Cork during 2004 in the Bantry New, Bantry Old, Cahermore, Kealkill, Snaive and Tareilton supplies of which only the exceedances in Snaive were serious (>20 cfu/100ml). *E. coli* was detected in 5 of the 8 private group water schemes the majority of which were serious. The relatively high number of public water supplies and group water schemes that were contaminated with *E. coli* during 2004 was of concern.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in for all parameters in the group schemes. Compliance with the chemical standards was also satisfactory in the public water supplies with only two exceedances reported in 2004 (fluoride and nitrate). The former was marginally above the standard while the nitrate exceedance was of concern and occurred in the Castletownkinnagh supply which has a history of difficulty in complying with the nitrate standard. The Council reported seeking an alternative source for the supply at Castletownkinnagh and should advance plans without delay to bring the supply into compliance with the Regulations.

There was a below average number of samples for indicator parameters reported below the parametric values in public water supplies in West Cork. The primary cause of this was the relatively low percentage of samples in compliance with the parametric values for *Clostridium perfringens* and Coliform Bacteria. This considered in conjunction with the below average compliance with the *E. coli* parametric value indicates that there are significant microbiological problems in some of the public water supplies in West Cork that must be addressed.

Similarly, there was a very low rate of compliance with the Coliform Bacteria parametric value in the private group water schemes, all of which reported coliform bacteria contamination at least once during 2004. Though the private group water schemes serve a relatively small number of people in West Cork, the Council must take action to ensure that these supplies are brought into compliance with the Regulations.

## Donegal County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	50	118,404
PuGWS	4	2,144
PrGWS	28	4,421
SMP	2	Not specified

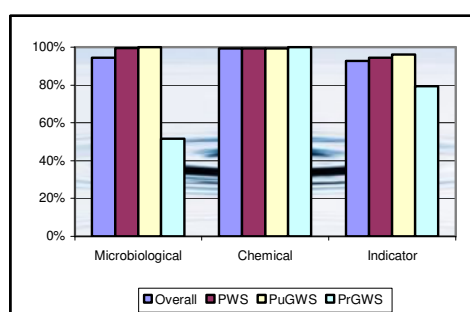
### Assessment of 2004 Monitoring

Donegal County Council carried out analysis on 550 check and 138 audit samples during 2004. Though there was more check samples taken than required in many public water supplies there were also several supplies in which insufficient numbers of check samples were taken. Furthermore, there were 2 public water supplies, 4 private group water schemes at least 2 small private supplies that were not monitored during 2004 at all. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Donegal during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Donegal County Council, 95.1%, was below the national average during 2004. The below average rate of compliance was due to the below average compliance with the microbiological parametric values. Overall the microbiological and chemical quality of the public water supplies was satisfactory though there was a relatively large number samples reporting results in excessive of the indicator parametric values. The overall quality in the private group water schemes was poor and of concern.

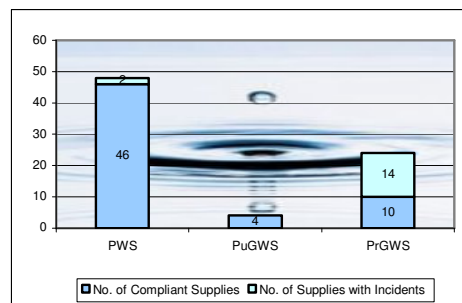
The level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters and was also less than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.3%	97.4%	82.4%	N/A
Micro	99.6%	100%	51.6%	N/A
Chemical	99.4%	99.3%	100%	N/A
Indicator	94.4%	96.2%	79.5%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were two incidents of *E. coli* contamination in public water supplies in Donegal during 2004 in the Ballintra and Cashelard supplies both of which were moderate (<20 cfu/100ml). *E. coli* was detected in over half (14 of the 24) of the private group water schemes the many of which were serious. Indeed, Donegal County Council has placed a permanent boil notice on almost all of the private group water schemes in the county. This situation is unacceptable and action must be taken by the sanitary authority to ensure that these group schemes take the appropriate measures to ensure that they are capable of supplying potable water on a consistent basis.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was good (>99%). However, there were some notable problems in some supplies in Donegal that were identified as a result of monitoring carried out during the year. An issue of concern was the formation of disinfection by-products. Seven public water supplies reported exceedances of the bromate parametric value while 6 reported exceedances of the trihalomethanes parametric value. Donegal County Council reported that they were investigating the cause of these exceedances.

The number of exceedances reported for some of the indicator parametric values was of concern. In particular, there were a large number of aluminium exceedances (38 of 137 samples analysed). Though this was an improvement compared to 2003, the number of exceedances was still unacceptably high and all samples failed to meet the parametric value in the Carndonagh, Carrigart/Downings, Falcarragh Mixed, Frosses Inver, Gortahork/Falcarragh and Lettermacaward supplies while almost all samples exceeded in Ballyshannon (7 of 8 samples exceeded).

Compliance with the chemical standards in the private group water schemes was good and there were no chemical exceedances reported during 2004. However, compliance with the indicator parametric values was particularly in relation to *Clostridium perfringens* (67%), colour (42%) and was extremely poor for coliform bacteria (26%). The microbiological problems that affect the majority Donegal group water schemes must be addressed by the Council.

## Dublin City Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	6	476,500
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

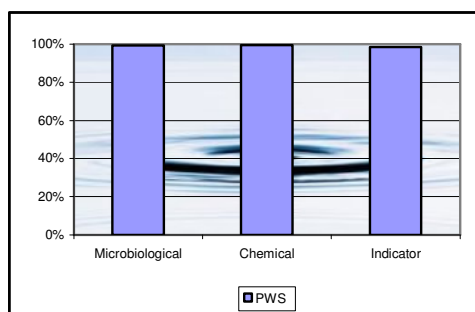
### Assessment of 2004 Monitoring

Dublin City Council carried out analysis on 877 check and 41 audit samples during 2004, a number greatly in excess of the minimum requirements of the Regulations.

### Overall Compliance in 2004

The overall rate of compliance in Dublin City Council, 98.7%, was above the national average during 2004. The quality of drinking water supplied in the City Council area of Dublin was satisfactory.

Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless satisfactory and higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.7%	N/A	N/A	N/A
Micro	99.3%	N/A	N/A	N/A
Chemical	99.6%	N/A	N/A	N/A
Indicator	98.5%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* and enterococci parametric values in 2004 in Dublin City was satisfactory though there was two incidents of *E. coli* being detected in the water supply. However, in both cases follow up samples were clear.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the parametric values for all parameters except nickel and lead. Both these metals are associated with the pipework used and can be widespread where the use of such metals is common.

Though compliance with the indicator parametric values was slightly above the national average there were a significant number of results reported in excess of the coliform bacteria parametric value (90.6% compliance). Though this value is lower than it should be, the absence of *E. coli* in the majority of samples tested (99.7%) indicates that the problem is likely due to slight problems in the distribution network rather than contamination at the source or insufficient treatment at the plant.

## Dun Laoghaire Rathdown County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	6	175,617
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

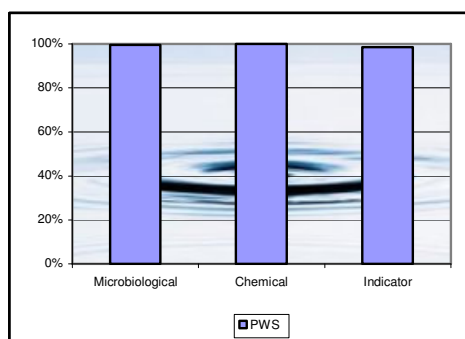
### Assessment of 2004 Monitoring

Dun Laoghaire Rathdown County Council carried out analysis on 519 check and 20 audit samples during 2004, a number greatly in excess of the minimum requirements of the Regulations.

### Overall Compliance in 2004

The overall rate of compliance in Dun Laoghaire Rathdown Council, 98.9%, was above the national average during 2004. The quality of drinking water supplied in the Dun Laoghaire Rathdown area of Dublin was satisfactory.

Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless satisfactory and higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.9%	N/A	N/A	N/A
Micro	99.6%	N/A	N/A	N/A
Chemical	100%	N/A	N/A	N/A
Indicator	98.7%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* parametric values in 2004 in Dun Laoghaire Rathdown was excellent and none of the 533 samples analysed in the area contained *E. coli*.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was also excellent and all samples tested were below the parametric values for all parameters tested during 2004.

Compliance with the indicator parametric values was not as high as the microbiological or chemical parameters but was nonetheless satisfactory. Though there were occasional samples that were above the parametric values for several of the indicator parametric values the only parameter that exceeded of note was the coliform bacteria parameter. However, as with Dublin City Council the absence of *E. coli* in all samples indicates that the problem is likely due to slight problems in the distribution network rather than contamination at the source or insufficient treatment at the plant.

## Fingal County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	4	311,500
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

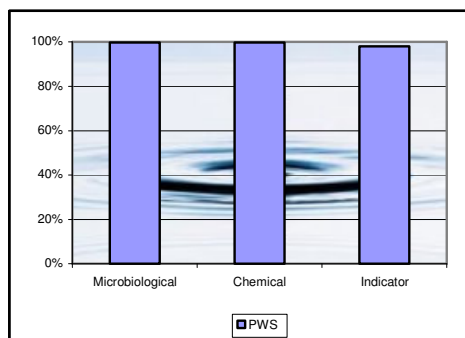
### Assessment of 2004 Monitoring

Fingal County Council carried out analysis on 628 check and 16 audit samples during 2004, thus exceeding the minimum sampling requirements of the Regulations.

### Overall Compliance in 2004

The overall rate of compliance in Fingal, 98.4%, was above the national average during 2004. The quality of drinking water supplied in the Fingal area of Dublin was satisfactory.

Compliance with the microbiological and chemical standards was good and although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless satisfactory and higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.4%	N/A	N/A	N/A
Micro	99.7%	N/A	N/A	N/A
Chemical	99.7%	N/A	N/A	N/A
Indicator	98.0%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* parametric values in 2004 in Fingal was excellent and none of the 625 samples analysed in the area contained *E. coli*.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good and all samples tested were below the parametric values for all parameters tested during 2004. The only chemical exceedances reported were two lead samples slightly in excess of the parametric value.

Compliance with the indicator parametric values was not as high as the microbiological or chemical parameters but was nonetheless satisfactory. Compliance with the coliform bacteria standard was higher than the other Dublin areas (94.7%) but there were a greater number of odour and taste exceedances in Fingal than the rest of Dublin (both 94.2% compliance). This was primarily due to detectable levels of chlorine in the water. The levels detected were not of health concern.

## Galway City Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	1	65,774
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

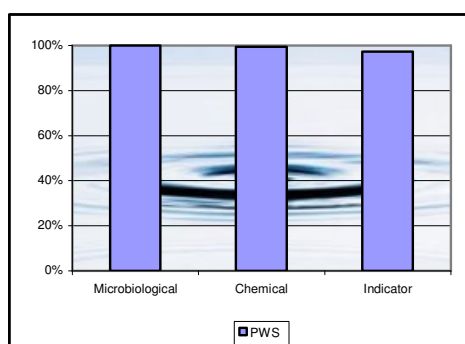
### Assessment of 2004 Monitoring

Galway City Council carried out analysis on 488 check and 9 audit samples during 2004, thus exceeding the minimum requirements of the Regulations.

### Overall Compliance in 2004

The overall rate of compliance in Galway City, 98.1%, was above the national average during 2004. The quality of drinking water supplied in Galway City was satisfactory.

Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless satisfactory and higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.1%	N/A	N/A	N/A
Micro	100%	N/A	N/A	N/A
Chemical	99.4%	N/A	N/A	N/A
Indicator	97.3%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* parametric values in 2004 in Galway City was excellent and none of the 342 samples analysed in the city contained *E. coli*.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was also satisfactory with full compliance achieved with all parameters with the exception of lead. The relatively large number of lead exceedances (7 of 28 samples analysed) was due to the targeting of the sampling locations in areas that were likely to be problematic (due to the presence of lead pipework).

Compliance with the indicator parametric values was not as high as the microbiological or chemical parameters but was nonetheless satisfactory. The parameters for which results were most frequently reported above the parametric value were odour (86.2% compliant) and *Clostridium perfringens* (87.8% compliant). The former were all related to chlorine odours and were not of health significance while the latter were all moderate and were from water emanating from the old waterworks which is due to be upgraded in the coming years as part of the Water Services Investment Programme.



## Galway County Council

### Summary of Water Supplies

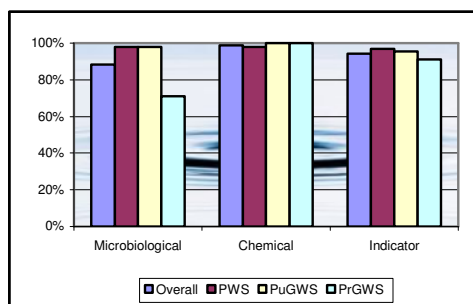
Type of Supply	No. of Supply Zones	Population Served <sup>6</sup>
PWS	44	149,204
PuGWS	168	49,124
PrGWS	194	91,492
SMP	None Identified	

### Assessment of 2004 Monitoring

Galway County Council carried out analysis on 1,374 check and 56 audit samples during 2004. In general, Galway County Council have carried out additional sampling above the minimum requirements of the Regulations in the larger public water supplies but have not taken enough samples from the smaller public supplies and group water schemes. Indeed, no audit samples had been taken in any of the group water schemes (public or private) during 2004. Furthermore, no monitoring at all was done in 2 public water supplies, 66 public group water schemes and 38 private group water schemes covered by the Regulations. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Galway County during 2004. This shortfall must be rectified in future monitoring programmes.

### Overall Compliance in 2004

The overall rate of compliance in Galway County Council, 94.8%, was below the national average during 2004. The below average rate of compliance was due to the below average compliance with the microbiological parametric values in the public water supplies and the private group water schemes. Galway County has a large number of group water schemes covered by the Regulations but the overall quality of these schemes was below average and is unsatisfactory. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.

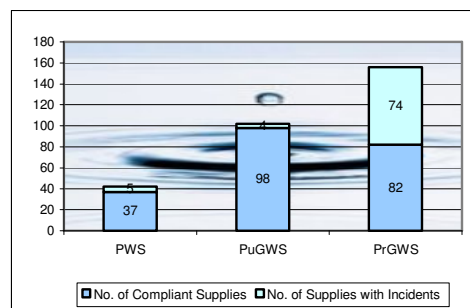


	PWS	PuGWS	PrGWS	SMP
Overall	94.8%	96.4%	91.0%	N/A
Micro	98.0%	97.9%	71.1%	N/A
Chemical	98.0%	100%	100%	N/A
Indicator	96.9%	95.5%	91.2%	N/A

### Compliance with the *E. coli* Standard

<sup>6</sup> The population figures reported by Galway County Council were an estimation based on the volume supplied and are thus an overestimation of the population actually served

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were six incidents of *E. coli* contamination in 5 public water supplies in Galway County during 2004 in the Carroroe (2 incidents), Cleggan/Claggahaduff, Inishere, Killimor and Rosmuc supplies the latter two of which were serious (>20 cfu/100ml). *E. coli* was detected in almost half (74 of the 156) of the private group water schemes the many of which were serious and repeated. This situation is unacceptable and action must be taken by the sanitary authority to ensure that these group schemes take the appropriate measures to ensure that they are capable of supplying potable water on a consistent basis.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was satisfactory. However, there were some notable problems in some supplies in Galway County that were identified as a result of monitoring carried out during the year. The issue of concern was the formation of disinfection by-products. Of particular concern was the very high levels of trihalomethanes reported in some public water supplies in Galway. Eighteen of the 42 supplies monitored reported elevated levels of trihalomethanes. Every sample analysed in the Portumna supply exceeded the parametric value (10 samples) with one value reported almost 5 times the standard. It is imperative that Galway County Council addresses this issue and reduce the levels to bring them into compliance with the Regulations.

Compliance with the indicator parametric values in Galway County was close to the national average and the exceedances that were present were not confined to a particular parameter but exceedances of several parameters (at low frequencies) were reported.

No samples analysed for the chemical parameters exceeded the parametric values in either the public or private group water schemes. While compliance with the indicator parametric values in the public group water schemes was broadly similar to that of the public water supplies, the number of samples exceeding the parametric values in private group water schemes was relatively high. The primary cause of the exceedances was the large number of samples failing to meet the coliform bacteria parametric value (58% of samples complied with the parametric value).



## Kerry County Council

### Summary of Water Supplies

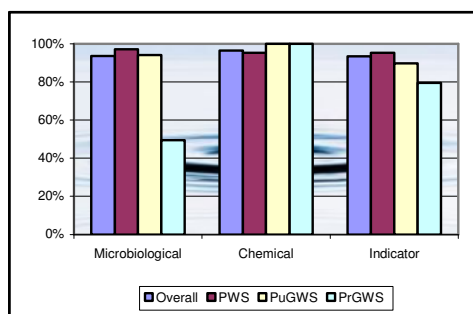
Type of Supply	No. of Supply Zones	Population Served
PWS	86	110,195
PuGWS	37	13,126
PrGWS	13	1,471
SMP	None Identified	

### Assessment of 2004 Monitoring

Kerry County Council carried out analysis on 943 check and 61 audit samples during 2004. In general, Kerry County Council have carried out appropriate check sampling in the majority of public water supplies but have not taken enough samples from a small number of public water supplies. Furthermore, the level of audit samples was below the minimum required and there were no audit samples analysed in any of the group water schemes (public or private) during 2004. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Kerry during 2004.

### Overall Compliance in 2004

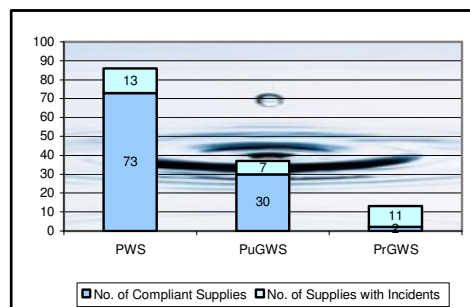
The overall rate of compliance in Kerry County Council, 93.4%, was below the national average during 2004. The below average rate of compliance was due to the below average compliance with the microbiological parametric values in the public water supplies and the private group water schemes. The quality of drinking water provided by private group water schemes in Kerry County was below average and was unsatisfactory. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	95.5%	91.7%	80.1%	N/A
Micro	97.1%	94.0%	49.3%	N/A
Chemical	95.3%	100%	100%	N/A
Indicator	95.3%	89.8%	79.5%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 17 incidents of *E. coli* contamination in 13 public water supplies in Kerry County during 2004 in the Báile Breach, Barraduff, Breanlee (3 incidents), Camp, Caragh Lake, Dromin-Ballyduff, Emlaghpeasta, Graigue/Clogher, Kenmare, Lauragh, Mid Kerry-Gearha, Mountain Stage (3 incidents) and Tieraclea/Tarbert. The large number of public water supplies in which *E. coli* was detected in 2004 is of concern and the cause of such a high incidence of *E. coli* should be investigated and corrected as a matter of urgency. The number of private group water schemes in which *E. coli* was unacceptable as 11 of the 13 private group water schemes tested failed to meet the standards at least once during 2004. Action must be taken by the sanitary authority to ensure that these group schemes take the appropriate measures to ensure that they are capable of supplying potable water on a consistent basis.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was, with the exception of fluoride, satisfactory. There were also two samples with elevated levels of pesticides. The high number of fluoride exceedances (65 of 392 samples analysed) was reportedly due to the delivery and use of a batch of fluoride which was not the strength labelled thus leading to overdosing of the fluoride. The majority of the exceedances reported were in the Central Regional supply. This problem has since been rectified and procedures have been put in place to prevent a reoccurrence of this incident.

Compliance with the indicator parametric values in Kerry County was also below the national average. This was due to low levels of compliance with the coliform bacteria (85%), pH (89%) and aluminium (92%) parametric values. The coliform bacteria exceedances are likely to be caused by the same problem that is causing the *E. coli* exceedances while the pH is likely to be due to a failure to take into account the change in the Regulations. The aluminium exceedances were for the most part moderate and originate from the Dromin plant.

Chemical monitoring in the group water schemes was confined to nitrate and nitrite all of which samples complied. The main feature of the indicator parameters was the extremely poor level of compliance with the coliform bacteria parametric value (14%) in the private group water schemes. The Council must address the bacteriological quality deficiencies in the private group water schemes as a matter of urgency.

## Kildare County Council

### Summary of Water Supplies

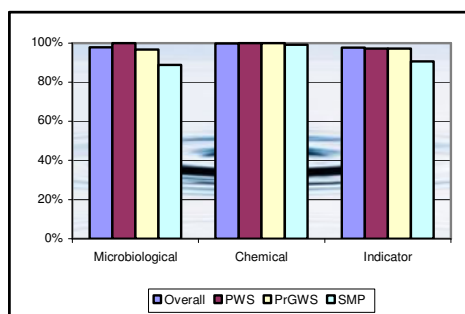
Type of Supply	No. of Supply Zones	Population Served
PWS	16	148,040
PuGWS	0	0
PrGWS	5	2,110
SMP	28	>1400 <sup>7</sup>

### Assessment of 2004 Monitoring

Kildare County Council carried out analysis on 245 check and 15 audit samples during 2004. Kildare County Council also carried out extensive monitoring of small supplies that provide water as part of a public or commercial activity during 2004 including extensive follow up where exceedances were detected.

### Overall Compliance in 2004

The overall rate of compliance in Kildare County Council, 98.2%, was above the national average during 2004. This above average level of compliance was due to the high quality of drinking water supplied in the public water supplies and the majority of private group water schemes. The quality of the private supplies was somewhat lower but the quality issues identified in the 2004 monitoring have been addressed by the private suppliers under the direction of Kildare County Council. Indeed, the Council are to be commended for the pro-active approach taken to dealing with the quality problems identified in the small private supplies. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.

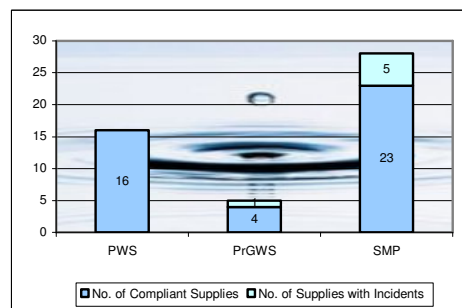


	PWS	PuGWS	PrGWS	SMP
Overall	99.3%	N/A	97.9%	92.4%
Micro	100%	N/A	96.7%	88.9%
Chemical	100%	N/A	100%	99.2%
Indicator	99.0%	N/A	97.3%	90.7%

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. *E. coli* was not detected in any of the 16 public water supplies in Kildare during 2004 and was detected in just one group water scheme (a

single organism was detected in one sample that was not detected in follow up sampling).



Kildare County Council identified all known private water supplies that provide water as part of a public or commercial activity and monitored them in 2004. The monitoring indicated that 5 of the supplies were contaminated. Kildare took action to assist the suppliers to identify the cause of the problems and to ensure that the water treated to meet the requirements of the drinking water Regulations.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was excellent and there were no chemical exceedances in any public water supplies or group water scheme in Kildare during 2004. However, elevated levels of nitrate were detected in one of the private water supplies. The elevated levels of nitrate detected in some small supplies in successive past reports were not reported in 2004. This was due to the replacement of some of the supplies by Kildare County Council and actions taken to reduce nitrate levels in other cases.

Compliance with the indicator parametric values in Kildare was also above the national average. Overall the quality of drinking water in Kildare was satisfactory and the public water supplies consistently provided drinking water that was of a good quality.

<sup>7</sup> It was not possible to accurately estimate the population served by the commercial supplies in Kildare

## Kilkenny County Council

### Summary of Water Supplies

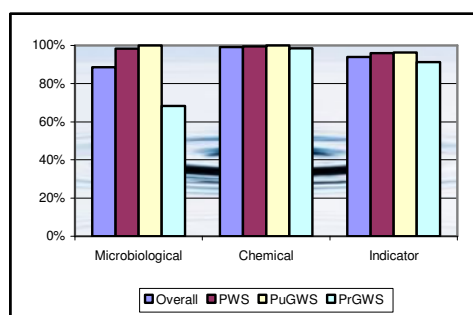
Type of Supply	No. of Supply Zones	Population Served
PWS	15	44,687
PuGWS	59	5,939
PrGWS	35	4,043
SMP	None Identified	

### Assessment of 2004 Monitoring

Kilkenny County Council carried out analysis on 600 check and 25 audit samples during 2004. In general, Kilkenny County Council have carried out appropriate sampling in the majority of public water supplies (and have exceeded the minimum requirements in most cases). However, Kilkenny County Council did not carry out monitoring in 57 public group water schemes and 3 private group water schemes that were covered by the Regulations in 2004. Furthermore, no monitoring results were reported for cyanide, benzo(a)pyrene, bromate, pesticides, PAH's, trihalomethanes and taste nor was compliance reported for acrylamide, epichlorohydrin and vinyl chloride. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Kilkenny during 2004. These discrepancies must be corrected in future monitoring programmes.

### Overall Compliance in 2004

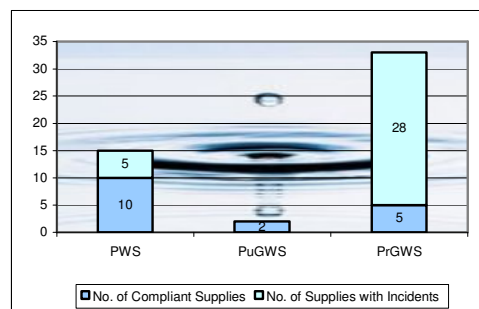
The overall rate of compliance in Kilkenny County Council, 94.6%, was below the national average during 2004. The quality of drinking water in public water supplies was, in general, satisfactory while the quality of drinking water provided by private group water schemes was below average and was unsatisfactory. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.9%	97.1%	92.4%	N/A
Micro	98.3%	100%	68.3%	N/A
Chemical	99.5%	100%	98.4%	N/A
Indicator	95.9%	96.3%	91.4%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 5 incidents of *E. coli* contamination in public water supplies in Kilkenny County during 2004 in the Bennetsbridge, Gowran-Goresbridge-Paulstown, Kilkenny City (Troyswood), Mooncoin and Thomastown. All these incidents were moderate (<20 cfu/100ml) and were once off incidents. The number of private group water schemes in which *E. coli* was unacceptable as 28 of the 33 private group water schemes tested failed to meet the standards at least once during 2004. This situation is unacceptable and action must be taken by the sanitary authority to ensure that these group schemes take the appropriate measures to ensure that they are capable of supplying potable water on a consistent basis.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was, with the exception of a small number of moderate fluoride exceedances, satisfactory. The sole issue of concern in relation to the chemical parameters was the presence of elevated levels of nitrate in 4 private group water schemes. Exceedances of the nitrate parametric value have been a feature of a small number of private group water schemes in Kilkenny historically and the issue must be addressed by the sanitary authority and the group schemes concerned.

Compliance with the indicator parametric values in Kilkenny County was marginally above the national average. While there has been an improvement in compliance with the aluminium parametric value in Kilkenny City (Troyswood) (just 1 of the 31 samples analysed exceeded) there has been a decline in the level of aluminium compliance in the Mooncoin supply (11 of 21 samples analysed exceeded) reversing the trend reported in 2003. Compliance with the indicator parametric value in the public group water schemes was similar to that of the public water supplies.

The overriding feature of the monitoring of the indicator parameters in the private group water schemes was the relatively low percentage of samples complying with the coliform bacteria parametric value (52%). In total 30 of the 33 private group water schemes monitored exceeded the parametric value for coliform bacteria at least once during 2004. The Council must address the quality bacteriological quality deficiencies in the private group water schemes as a matter of urgency.

## Laois County Council

### Summary of Water Supplies

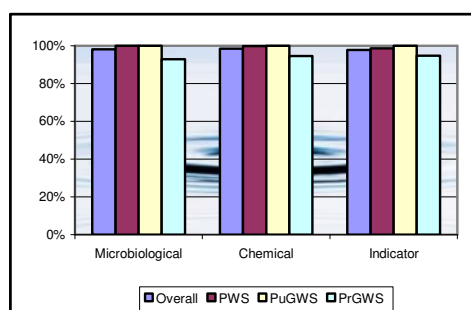
Type of Supply	No. of Supply Zones	Population Served
PWS	19	56,228
PuGWS	22	3,384
PrGWS	16	7,185
SMP	None Identified	

### Assessment of 2004 Monitoring

Laois County Council carried out analysis on 460 check and 79 audit samples during 2004. Laois County Council have analysed in excess of the minimum sampling requirements of the Regulations in the public water supplies and in the group water schemes that were monitored. However, Laois County Council did not carry out monitoring in 21 public group water schemes and 2 private group water schemes that were covered by the Regulations in 2004. Furthermore, no monitoring results were reported for benzo(a)pyrene, bromate, cyanide, pesticides, PAH's, trihalomethanes and taste nor was compliance reported for acrylamide, epichlorohydrin and vinyl chloride. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Laois during 2004. These discrepancies must be corrected in future monitoring programmes.

### Overall Compliance in 2004

The overall rate of compliance in Laois County Council, 97.9%, was above the national average during 2004. The quality of drinking water in public water supplies was, in general, good while the quality of drinking water provided by private group water schemes was unsatisfactory though above the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.

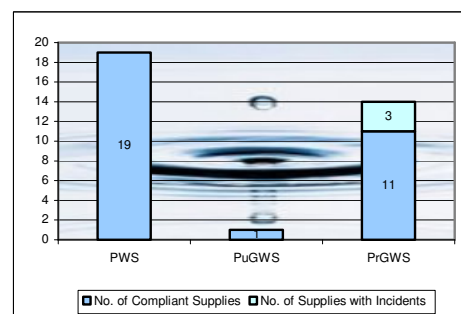


	PWS	PuGWS	PrGWS	SMP
Overall	99.1%	100%	94.5%	N/A
Micro	100%	100%	92.8%	N/A
Chemical	99.8%	100%	94.6%	N/A
Indicator	98.8%	100%	94.7%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. The microbiological quality of public water supplies in Laois was excellent during

2004 and there were no incidents of *E. coli* contamination in public water supplies in Laois.



The microbiological quality of the majority of the private group water schemes was satisfactory during 2004 however *E. coli* was present in 3 private group water schemes. While it was present just once during 2004 in 2 of the schemes, in the remaining scheme (Ballacolla) it was present on several occasions.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was satisfactory. However, an exceedance of the nitrate parametric value was reported in the Durrow supply. Though only one sample (of 13 analysed) failed to meet the nitrate the rest of the samples were close to, but just below the parametric value. Compliance with the indicator parametric values was satisfactory and was above the national average.

There were a large number of private group water schemes in Laois that did not comply with the nitrate parametric value. The monitoring results submitted indicate that four private group water schemes (Attanagh, Ballacolla, Cullohill and Killeaney) consistently reported results that exceeded the standard for nitrate. The elevated levels of nitrate in these supplies (two of which were also contaminated with *E. coli*) must be addressed as a matter of urgency by the sanitary authority and the water suppliers in question.

The results for the majority of indicator parameters was satisfactory during 2004 though the percentage of samples complying with the coliform bacteria parametric value was unsatisfactory (72%). Coliform bacteria were present in half (7 of 14) of the supplies monitored by Laois County Council during the year.

## Leitrim County Council

### Summary of Water Supplies

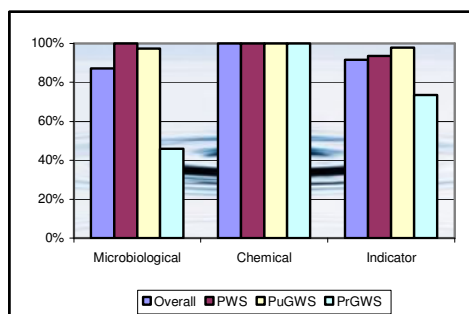
Type of Supply	No. of Supply Zones	Population Served
PWS	11	15,927
PuGWS	73	8,922
PrGWS	25	5,538
SMP	None Identified	

### Assessment of 2004 Monitoring

Leitrim County Council carried out analysis on 487 check and 47 audit samples during 2004. Leitrim County Council have analysed sufficient numbers of samples to meet the requirements of the Regulations in the public water supplies and in the group water schemes that were monitored. However, Leitrim County Council did not carry out monitoring in 4 public group water schemes and private group water scheme that was covered by the Regulations in 2004. Furthermore, no monitoring results were reported for benzene, PAH and selenium nor was compliance reported for acrylamide, epichlorohydrin and vinyl chloride. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Leitrim during 2004. These discrepancies must be corrected in future monitoring programmes.

### Overall Compliance in 2004

The overall rate of compliance in Leitrim County Council, 93.0%, was below the national average during 2004. The quality of drinking water in public water supplies was, in general, good (with no microbiological or chemical exceedances reported) while the quality of drinking water provided by private group water schemes was well below the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.

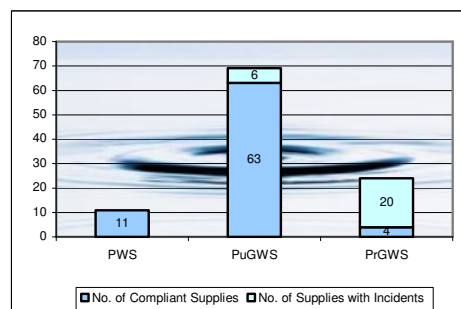


	PWS	PuGWS	PrGWS	SMP
Overall	96.0%	98.2%	76.7%	N/A
Micro	100%	97.4%	45.9%	N/A
Chemical	100%	100%	100%	N/A
Indicator	93.7%	97.9%	73.6%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. The microbiological quality of

public water supplies in Leitrim was excellent during 2004 and there were no incidents of *E. coli* contamination in public water supplies in Leitrim.



The microbiological quality of the majority of the private group water schemes was very poor during 2004 and there were just 4 private group water scheme in which *E. coli* was not detected. Leitrim reported the lowest rate of compliance nationally with the *E. coli* parametric value in private group water schemes. This situation is unacceptable and must be addressed as a matter of urgency by the sanitary authority and the water suppliers in question.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical parametric values in all types of water supplies was excellent and there were no exceedances reported in any supply in Leitrim during 2004.

However, the level of compliance with the indicator parametric values was less satisfactory. The control of aluminium levels in public water supplies continues to be problematic (78% compliance) and exceedances were reported in four separate public water supplies. Significant structural changes occurred in Leitrim with regard to the supply of water in 2004 continuing into 2005. Several supplies were replaced and larger ones reorganised and thus it is likely that these problems will be eradicated in the future.

Very poor compliance was reported against a number of the indicator parametric values in 2004 including *Clostridium perfringens* (47%), colour (46%), pH (58%) and coliform bacteria (29%). Overall, the quality of private group water schemes in Leitrim is poor with the majority of schemes providing water that does not meet the requirements of the Regulations.

## Limerick City Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	1	56,000
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

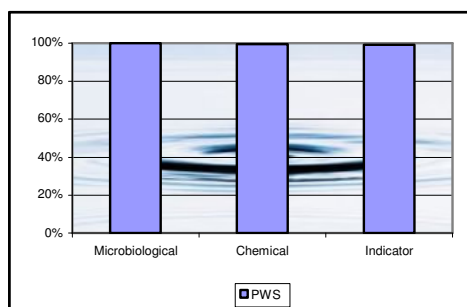
### Assessment of 2004 Monitoring

Limerick City Council carried out analysis on 303 check and 2 audit samples during 2004, thus exceeding the minimum requirements of the Regulations in relation to check sampling but failing to meet the minimum requirements in relation to audit sampling. Furthermore, although 303 check samples were reported, microbiological results were reported for only 93 of the check samples. The monitoring programme must be reviewed for the future to ensure that the minimum sampling requirements are met.

### Overall Compliance in 2004

The overall rate of compliance in Limerick City, 99.3%, was above the national average during 2004. Notwithstanding the lack of monitoring for the chemical parameters, the quality of drinking water supplied in Limerick City was satisfactory.

Although the level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters it was nonetheless satisfactory and higher than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	99.3%	N/A	N/A	N/A
Micro	100%	N/A	N/A	N/A
Chemical	99.6%	N/A	N/A	N/A
Indicator	99.2%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* parametric values in 2004 in Limerick City was excellent and none of the 93 samples analysed in the city contained *E. coli*.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was also satisfactory with full compliance achieved with all

parameters with the exception of fluoride (98.7% compliance), though as previously mentioned there was a lack of chemical monitoring for the majority of parameters.

Compliance with the indicator parametric values was not as high as the microbiological or chemical parameters but was nonetheless good. Full compliance was reported for all indicator parameters except aluminium (95.1%) and coliform bacteria (97.9%).



## Limerick County Council

### Summary of Water Supplies

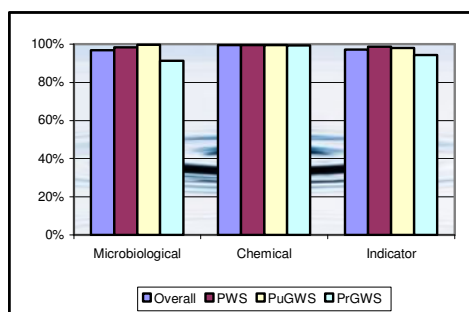
Type of Supply	No. of Supply Zones	Population Served
PWS	46	66,212
PuGWS	68	9,953
PrGWS	45	12,506
SMP	None Identified	

### Assessment of 2004 Monitoring

Limerick County Council carried out analysis on 678 check and 54 audit samples during 2004. Limerick County Council did not analyse sufficient numbers of check and audit samples to meet the requirements of the Regulations in some public water supplies and in the a small number of public and private group water schemes. No monitoring was also reported for one public water supply, as well as 2 public group water schemes. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Limerick during 2004.

### Overall Compliance in 2004

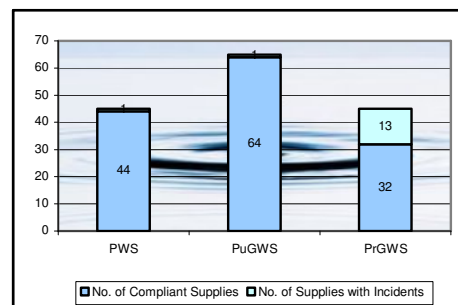
The overall rate of compliance in Limerick County Council, 97.6%, was above the national average during 2004. The quality of drinking water in public water supplies and public group water schemes was, in general, satisfactory while the quality of drinking water provided by private group water schemes was unsatisfactory, though compliance was above the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	99.0%	98.3%	95.0%	N/A
Micro	98.2%	99.7%	91.4%	N/A
Chemical	99.6%	99.6%	99.3%	N/A
Indicator	98.8%	97.9%	94.3%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. The microbiological quality of public water supplies in Limerick County was satisfactory during 2004 with the exception of one public water supply in which *E. coli* was detected (Rathkeale). However, only one *E. coli* was detected in this sample and was not detected in follow up sampling.



The microbiological quality of the majority of the private group water schemes was unsatisfactory during 2004 with *E. coli* present in 13 of the 35 private group water schemes monitored. Further improvements in the group water schemes are necessary with contamination in some of the schemes ongoing and serious.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical parametric values in all types of water supplies was good though there were occasional fluoride exceedances in some of the public water supplies these exceedances were just marginally above the parametric value. Of greater concern was the nitrate exceedances reported in 4 private group water schemes (Sluggary, Ballysteen, Cappagh No.1 and Kilcornan). The nitrate levels in the latter are of concern and a value of over 100 mg/l was reported in the scheme during 2004 (this supply also was contaminated with *E. coli*).

The level of compliance with the indicator parametric values in public water supplies and public group water schemes satisfactory. There were a small number of aluminium exceedances reported in a few supplies (94% compliance) but the majority of these exceedances were marginally above the parametric value.

The number of samples failing to comply with the indicator parametric values in private group water schemes was greater than that of the public water supplies and was primarily due to the low level of compliance with the coliform bacteria parametric value (64%).

## Longford County Council

### Summary of Water Supplies

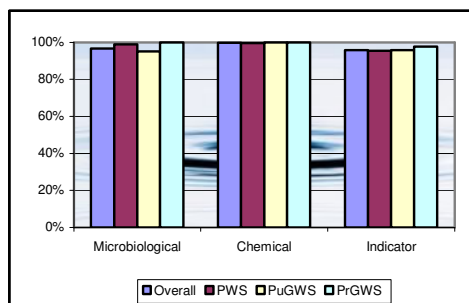
Type of Supply	No. of Supply Zones	Population Served
PWS	8	16,922
PuGWS	56	6,710
PrGWS	4	518
SMP	None Identified	

### Assessment of 2004 Monitoring

Longford County Council carried out analysis on 257 check and 15 audit samples during 2004 thus exceeding the minimum monitoring requirements under the Regulations. However, Longford County Council did not report compliance with the acrylamide, epichlorohydrin and vinyl chloride parametric values in accordance with the requirements of the Regulations. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Longford during 2004.

### Overall Compliance in 2004

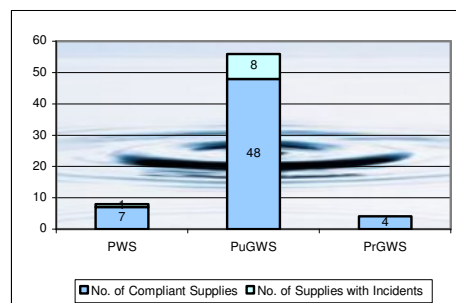
The overall rate of compliance in Limerick County Council, 96.5%, was marginally above the national average during 2004. The quality of drinking water in public water supplies and public group water schemes was, in general, satisfactory while the quality of drinking water provided by private group water schemes was good. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.7%	96.3%	98.3%	N/A
Micro	99.0%	95.2%	100%	N/A
Chemical	99.7%	100%	100%	N/A
Indicator	95.5%	95.7%	97.7%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. The microbiological quality of public water supplies in Longford County was satisfactory during 2004 with the exception of one public water supply in which *E. coli* was detected (Gowna). However, only one *E. coli* was detected in this sample and was not detected in follow up sampling.



Of concern, and warranting further investigation is the fact that 8 of the 56 public group water schemes were contaminated with *E. coli* during 2004. These schemes all receive their water from public water supplies and therefore should be of a similar quality. The cause of this contamination should be investigated and corrective action taken as soon as possible. The microbiological quality of the 4 private group water schemes was excellent during 2004 all 4 fully complying with the *E. coli* parametric value at all times during 2004.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical parametric values in all types of water supplies was good with all public and private group water schemes complying with the chemical parametric values at all times. There was just one fluoride exceedance in one public water supply (Granard) while the rest of the public water supplies fully complied with the chemical parametric values.

The level of compliance with the indicator parametric values was lower in public water supplies and public group water schemes than in the private group water schemes. The primary reason for this was a relatively low level of compliance with the aluminium parametric value (82%). As in previous years a relatively large number of aluminium exceedances continue to be reported in the Longford Central supply (8 of 29 samples analysed). Compliance with the indicator parametric values in the private group water schemes was satisfactory during 2004.



## Louth County Council

### Summary of Water Supplies

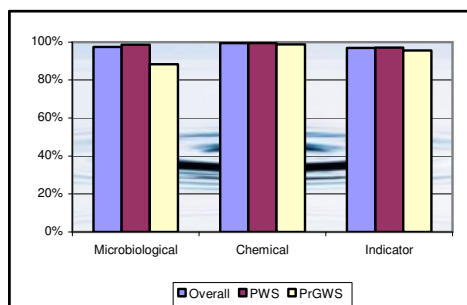
Type of Supply	No. of Supply Zones	Population Served
PWS	18	81,065
PuGWS	0	0
PrGWS	9	4,575
SMP	None Identified	

### Assessment of 2004 Monitoring

Louth County Council carried out analysis on 252 check and 36 audit samples during 2004. There was an insufficient number of check samples analysed in a small number of the public water supplies though sufficient audit samples were analysed. Louth County Council have indicated that they intend to address this shortfall in 2005. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Louth during 2004.

### Overall Compliance in 2004

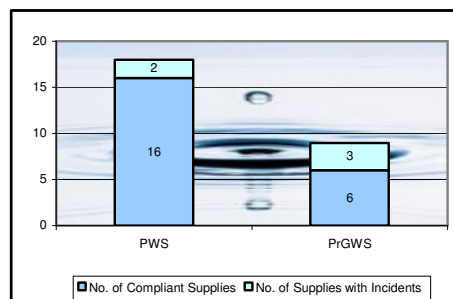
The overall rate of compliance in Louth County Council, 97.6%, was above the national average during 2004. The quality of drinking water in public water supplies was, in general, satisfactory while the quality of drinking water provided by private group water schemes was unsatisfactory. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.8%	N/A	95.5%	N/A
Micro	98.6%	N/A	88.2%	N/A
Chemical	99.6%	N/A	98.7%	N/A
Indicator	97.2%	N/A	95.5%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. The microbiological quality of public water supplies in Louth County was satisfactory during 2004 though there were two incidents of *E. coli* contamination of public water supplies in Louth. *E. coli* was detected in the Clogherhead/Termonfeckin and Sheelagh supplies though both exceedances were moderate (<20 cfu/100ml).



One third (3 of 9) of the private group water schemes monitored were contaminated with *E. coli* at least once during 2004 and thus these schemes were of unsatisfactory microbiological quality.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical parametric values public water supplies was generally satisfactory with just two exceedances reported in the county. A single fluoride exceedance was reported in the Castletown Mount supply while a single lead exceedance was reported in the Dundalk supply. The latter should be investigated further as the presence of lead pipes in the distribution network or in domestic premises is likely to lead to breaches of the standard for lead. The chemical quality of the majority of the private group water schemes was good with just one exceedance reported in one group water scheme. The Sheepgrange scheme reported elevated levels of nitrate that were the subject of a departure application (see Chapter 4). The Council is actively seeking a resolution to this problem and reported bringing an alternative source into the supply in 2005.

A number of exceedances of the aluminium parametric value were reported in the Staleen (9 of 54 samples analysed) and the Ardee (8 of 15 samples analysed). The problems in the former supply were restricted to the early part of 2004 and have since been corrected while the exceedances in the latter were distributed evenly throughout the year and in need of correction as these exceedances have been reported in previous years.

The less than satisfactory rate of compliance with the indicator parametric values in the private group water schemes was due to a poor rate of compliance with the coliform bacteria parametric value (61%) and coliform bacteria were detected in 7 of the 9 schemes monitored.

## Mayo County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	27	42,416
PuGWS	100	17,407
PrGWS	108	38,235
SMP	None Identified	

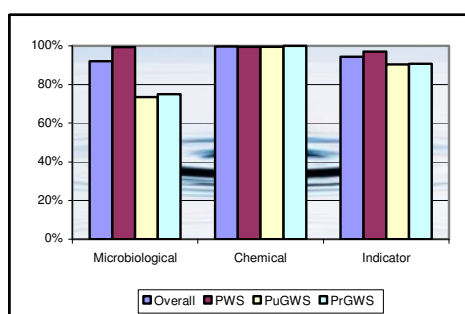
### Assessment of 2004 Monitoring

Mayo County Council carried out analysis on 550 check and 138 audit samples during 2004. The Agency had particular difficulties in obtaining the complete set of monitoring results from Mayo County Council in the format requested and by the deadline specified (the results were submitted three months late). Furthermore, Mayo County Council did not submit any monitoring results for 19 of the 48 parameters that are required to be monitored by the Regulations. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Mayo during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Mayo County Council, 95.2%, was below the national average during 2004. The below average rate of compliance was due to the poor quality of the public and private group water schemes. The quality (as reported) of the public group water schemes was significantly inferior to that of the public water supplies and was similar to that of the private group water schemes.

The level of compliance with the indicator parametric values was less than that of the microbiological and chemical parameters and less than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



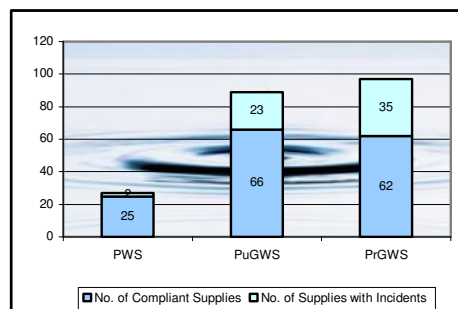
	PWS	PuGWS	PrGWS	SMP
Overall	98.0%	90.4%	90.9%	N/A
Micro	99.4%	73.5%	75.0%	N/A
Chemical	99.6%	99.5%	100%	N/A
Indicator	97.1%	90.4%	90.7%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.

There were three incidents of *E. coli* contamination in public water supplies in Mayo during 2004 in the

Lough Mask Ballyhaunis (2 incidents) and Swinford supplies. The second incident in the Lough Mask Ballyhaunis supply was serious (>20 cfu/100ml).



The large number of public group water schemes contaminated with *E. coli* during 2004 was of great concern and difficult to justify. These schemes obtain their water from the public water supplies in Mayo and therefore should be of the same quality. However, the percentage of samples contaminated with *E. coli* (73%) is of great concern. Mayo County Council should investigate the cause of the deterioration in the quality of water once it leaves the public mains and is transferred to the public group water schemes. The group scheme operators should review their supplies to ensure that contamination is not entering their distribution networks once the water has been delivered into their systems.

The quality of drinking water in the private group water schemes was poor during 2004 with one quarter of samples contaminated during the year. This situation is unacceptable and action must be taken by the sanitary authority to ensure that these group schemes take the appropriate measures to ensure that they are capable of supplying potable water on a consistent basis.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in public water supplies was good >99% compliance achieved. There were a small number of fluoride exceedances in Achill and Shrule. The exceedance in the former was relatively high though still below the EU parametric value of 1.5 mg/l. Monitoring for the chemical parameters in the group water schemes was restricted to nitrate and nitrite and compliance with both of these parameters was satisfactory.

As in previous years the main issue in relation to compliance with the indicator parametric values in public water supplies was the relatively low percentage of samples that complied with the aluminium parametric value (63%). There were two plants where the levels of aluminium in drinking water were particularly high, Louisburgh (8 of 9 samples analysed exceeded) and Mulranny (3 of 3 samples analysed exceeded).

The number of exceedances reported for some of the indicator parametric values was of concern. In particular, there were a large number of coliform bacteria exceedances (77 of 196 samples analysed). The microbiological problems that affect the majority Mayo private group water schemes (52 of 97) must be addressed by the Council.

## Meath County Council

### Summary of Water Supplies

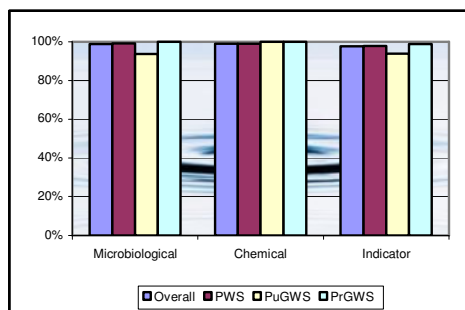
Type of Supply	No. of Supply Zones	Population Served
PWS	21	99,350
PuGWS	9	1,468
PrGWS	2	1,600
SMP	None Identified	

### Assessment of 2004 Monitoring

Meath County Council carried out analysis on 199 check and 41 audit samples during 2004. There were insufficient numbers of samples analysed in some of the public water supplies and group water schemes in Meath during 2004. Furthermore, Meath County Council did not submit any monitoring results for 19 of the 48 parameters that are required to be monitored by the Regulations. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Meath during 2004.

### Overall Compliance in 2004

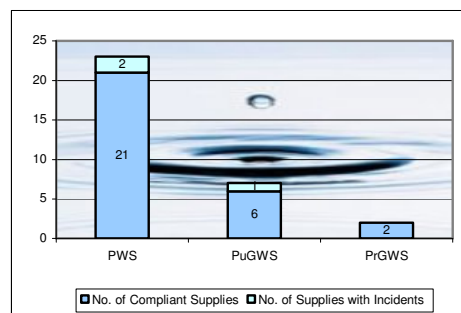
Of the parameters that were monitored the overall rate of compliance in Meath County Council, 98.1%, was above the national average during 2004. The above average rate of compliance was due to the above average compliance in all types of supplies monitored. The quality of drinking water provided by public water supplies and the public and private group water schemes in Meath was satisfactory. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.2%	95.0%	99.2%	N/A
Micro	99.2%	93.8%	100%	N/A
Chemical	99.1%	100%	100%	N/A
Indicator	97.9%	94.0%	98.9%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 2 incidents of *E. coli* contamination in 2 public water supplies in Meath during 2004 in the Ballivor and Navan-Mid Meath supplies, both of which were moderate (<20cfu/100ml) and were not detected in follow up sampling. The microbiological quality of the private group water schemes was excellent and all samples analysed in the two private group water schemes were free of *E. coli* at all times.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards in all supplies was satisfactory with the public and private group water schemes full compliant with the parametric values for the parameters analysed. The sole exceedances reported in the public water supplies related to fluoride and the three exceedances reported (of 149 samples analysed) were only marginally above the parametric value. However, as previously stated analysis was not carried out for a large number of the chemical parameters and the results must be considered in this context.

Compliance with the indicator parametric values in Meath was also above the national average. The number of manganese exceedances (12 of 71 samples analysed) depressed the overall rate of compliance though the presence of manganese at levels above parametric value was likely due to natural background levels in the source water.

## Monaghan County Council

### Summary of Water Supplies

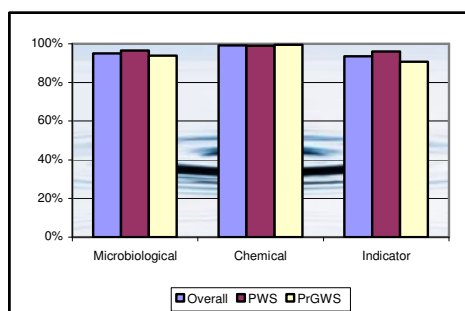
Type of Supply	No. of Supply Zones	Population Served
PWS	13	40,771
PuGWS	0	0
PrGWS	13	19,624
SMP	None Identified	

### Assessment of 2004 Monitoring

Monaghan County Council carried out analysis on 230 check and 37 audit samples during 2004. There were insufficient numbers of check samples analysed in two of the public water supplies in Monaghan during 2004. Furthermore, compliance was not reported against the parametric values for acrylamide, epichlorohydrin and vinyl chloride. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Monaghan during 2004.

### Overall Compliance in 2004

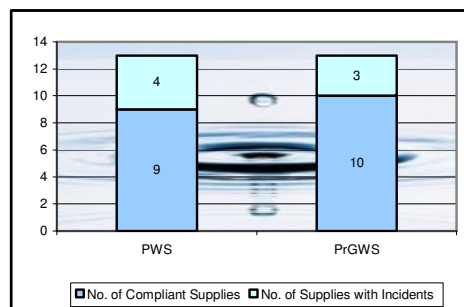
The overall rate of compliance in Monaghan County Council, 95.0%, was below the national average during 2004. The quality of drinking water in the majority of public water supplies and group water schemes was satisfactory, however there were a few supplies that were not of satisfactory quality primarily for microbiological reasons. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.7%	N/A	93.0%	N/A
Micro	96.5%	N/A	93.8%	N/A
Chemical	98.9%	N/A	99.5%	N/A
Indicator	95.9%	N/A	90.6%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 4 incidents of *E. coli* contamination in 4 public water supplies in Monaghan during 2004 in the Carrickmacross, Clontibret, Glaslough and Smithborough supplies, the first two of which were serious (>20cfu/100ml). The presence of *E. coli* in a relatively high proportion of public water supplies is of concern.

The microbiological quality of the majority of private group water schemes was satisfactory but contamination with *E. coli* was present in 3 group water schemes with the contamination in the Killaney scheme a concern due to the ongoing nature of the exceedances.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards (99.2%) in Monaghan was satisfactory though there were occasional exceedances of bromate in two public water supplies and 2 group water schemes that were of concern. Furthermore, one sample analysed in the Clontibret supply exceeded the arsenic and antimony parametric values. As this was the only sample analysed for these parameters in the Clontibret supply further investigations are necessary to determine whether this was a once-of anomalous occurrence or a feature of the water supply.

Compliance with the indicator parametric values in public water supplies in Monaghan was slightly below the national average. The number of manganese exceedances (5 of 24 samples analysed) was a contributing factor to the lower rate but the majority of these exceedances were marginally above the parametric value and not of health concern. The main reason for the below average compliance with the indicator parametric values in the private group water schemes was the relatively low percentage of coliform bacteria samples complying with the parametric value (70%).

## North Tipperary County Council

### Summary of Water Supplies

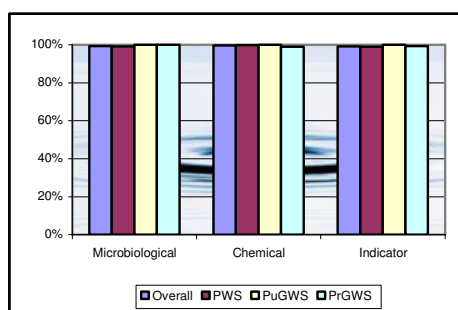
Type of Supply	No. of Supply Zones	Population Served
PWS	22	43,769
PuGWS	1	154
PrGWS	37	6,521
SMP	None Identified	

### Assessment of 2004 Monitoring

North Tipperary County Council carried out analysis on 507 check and 21 audit samples during 2004. The minimum monitoring requirements were exceeded in many of the supplies in North Tipperary in 2004. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in North Tipperary during 2004.

### Overall Compliance in 2004

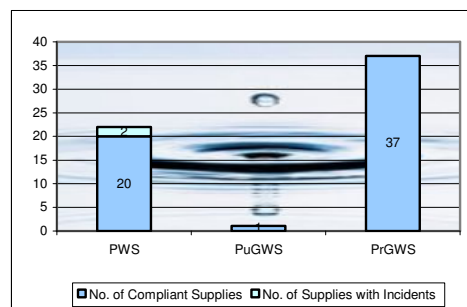
The overall rate of compliance in North Tipperary County Council, 99.3%, was above the national average during 2004. The quality of drinking water in the majority of water supplies (both public and group) was good. The high quality in the group water schemes is commendable. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	99.2%	100%	99.4%	N/A
Micro	99.2%	100%	100%	N/A
Chemical	99.8%	100%	99.0%	N/A
Indicator	99.1%	100%	99.4%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 3 incidents of *E. coli* contamination in 2 public water supplies in North Tipperary during 2004 in the Terryglass (2 incidents) and Thurles supplies. The microbiological quality of the one public group water scheme monitored and all of private group water schemes was excellent and it was notable that none of the group water schemes in North Tipperary tested positive for the presence of *E. coli* during 2004.

### Compliance with the Chemical and Indicator Parametric Values

The overall rate of compliance with the chemical standards (99.7%) in North Tipperary was also good. The only exceedances of note were an exceedance of the lead parametric value in the Nenagh supply and one nitrate exceedance in the Patrickswell private group water scheme.

Compliance with the indicator parametric values in both public water supplies and group water schemes was good in North Tipperary and well above the national average.

Notwithstanding the exceedances highlighted the overall the quality of drinking water in North Tipperary in public water supplies, public group water schemes and private group water schemes was good.

## Offaly County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	24	42,422
PuGWS	7	1,043
PrGWS	20	14,094
SMP	None Identified	

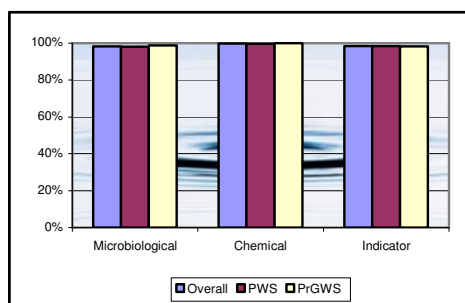
### Assessment of 2004 Monitoring

Offaly County Council carried out analysis on 211 check and 54 audit samples during 2004. There were insufficient numbers of check samples taken in a small number of public water supplies although the audit monitoring frequencies were exceeded in several supplies. No monitoring results were submitted for the 7 public group water schemes in Offaly that are covered by the Regulations. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Offaly during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Offaly County Council, 98.9%, was above the national average during 2004 and thus the overall quality of drinking water in Offaly in both public water supplies and group water schemes was satisfactory.

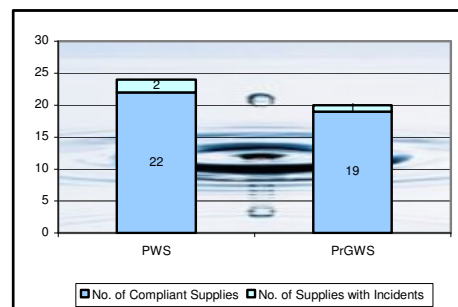
The level of compliance with the indicator parametric values was slightly less than that of the microbiological and chemical parameters and though was also above than the national average. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.8%	N/A	99.0%	N/A
Micro	98.2%	N/A	98.9%	N/A
Chemical	99.7%	N/A	100%	N/A
Indicator	98.5%	N/A	98.4%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were two incidents of *E. coli* contamination in public water supplies in Offaly during 2004 in the Dungar and Edenderry supplies both of which were moderate (<20 cfu/100ml). Follow up investigations by Offaly County Council indicated that the problem was once off and no *E. coli* was detected in follow up samples. The microbiological quality of the group water schemes was good and *E. coli* was detected in just 1 of the 20 private group water schemes monitored. The scheme was provided with an alternative source of water and new chlorination unit to eradicate the microbiological problems.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards in for all parameters in the group schemes while the only chemical exceedance reported was a small number of marginal exceedances of the fluoride parametric value in the Clara/Ferbane supply which were due to dosing errors which are being closely monitored to prevent a re-occurrence.

Compliance with the indicator parametric values was also above average though there were some exceedances of the aluminium parametric value (12 of 24 samples analysed). This problem has been caused by the plant operating over capacity. A new source has been identified and is due to come into operation in late 2005. This should reduce pressure on the existing source and lead to a reduction in the number of aluminium exceedances in the future. Compliance with the indicator parametric values in the private group water schemes was satisfactory.



## Roscommon County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	18	36,228
PuGWS	40	6,443
PrGWS	42	4,693
SMP	None Identified	

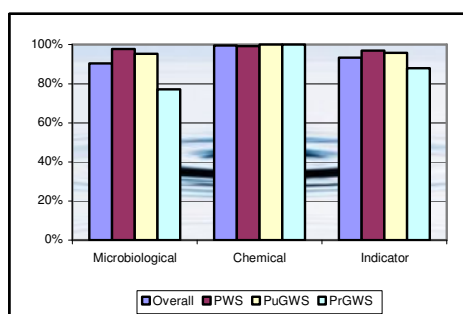
### Assessment of 2004 Monitoring

Roscommon County Council carried out analysis on 350 check and 45 audit samples during 2004. There were insufficient numbers of check samples taken in some public water supplies while no audit samples were taken in any of the group water schemes. However, Roscommon County Council did carry out substantial additional operational monitoring of microbiological parameters in all public water supplies. No monitoring was carried out on 4 public and 2 private group water schemes that were covered by the Regulations in 2004. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Roscommon during 2004. The monitoring programme should be reviewed to ensure the correct numbers of full check samples are analysed in all supplies in future.

### Overall Compliance in 2004

The overall rate of compliance in Roscommon County Council, 94.5%, was below the national average during 2004. While the overall quality of drinking water supplied by public water supplies and public group water schemes was satisfactory the quality from private group water schemes was unsatisfactory.

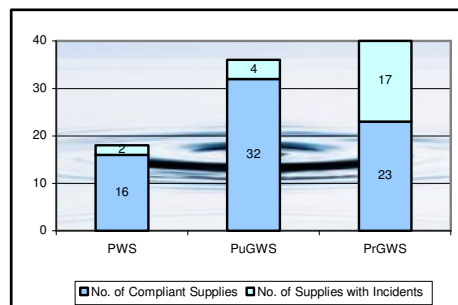
The level of compliance with the microbiological parametric values was below average and was low for the private group water schemes. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.8%	96.4%	88.9%	N/A
Micro	97.9%	95.4%	77.1%	N/A
Chemical	99.3%	100%	100%	N/A
Indicator	97.0%	95.9%	88.0%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 3 incidents of *E. coli* contamination in 2 public water supplies in Roscommon during 2004 in the Castlerea Regional and Keadue (2 incidents) supplies. Follow up investigations by Roscommon County Council for all of these incidents indicated that the problem was once off and no *E. coli* was detected in follow up samples. The microbiological quality of the public group water schemes was satisfactory and similar to that of the public water supplies. The private group water schemes were poor in quality for the most part with 17 of the 40 schemes monitored contaminated during 2004 and in need of action to resolve the quality problems.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was good with full compliance achieved with the standards for all parameters in the group schemes. However, there were some problems in complying with the chemical parametric values in 2004 for certain supplies. Of most concern was the exceedances in the Arigna supply which had elevated levels of bromate and trihalomethanes. The results reported for these disinfection by-products were several times the parametric values. The council has reported an investigation into the problems and at the time of submission of the results reported the installation of a new filtration plant at Arigna to address the issue.

Compliance with the indicator parametric values was below average. *Clostridium perfringens* was present in a relatively large number of samples in all types of supplies (84% compliance) and is of concern while many of the private group water schemes had difficulty in complying with the coliform bacteria parametric value (65% compliance).

## Sligo County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	12	29,770
PuGWS	22	4,174
PrGWS	18	6,566
SMP	None Identified	

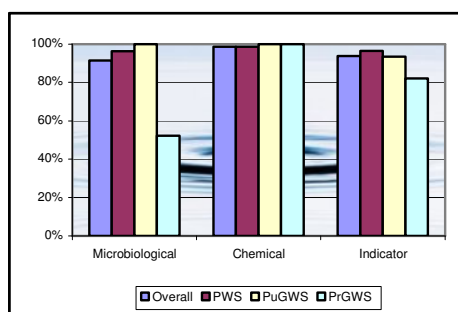
### Assessment of 2004 Monitoring

Sligo County Council carried out analysis on 352 check and 23 audit samples during 2004. The number of check samples taken in public water supplies exceeded the minimum requirements while the number of check samples in the group water schemes audit samples were taken in any of the group water schemes. No monitoring was carried out on 5 public and 2 private group water schemes that were covered by the Regulations in 2004. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Sligo during 2004. The monitoring programme should be reviewed to ensure that all supplies are monitored at the required frequency.

### Overall Compliance in 2004

The overall rate of compliance in Sligo County Council, 94.6%, was below the national average during 2004. While the overall quality of drinking water supplied by public water supplies and public group water schemes was satisfactory the quality from private group water schemes was unsatisfactory.

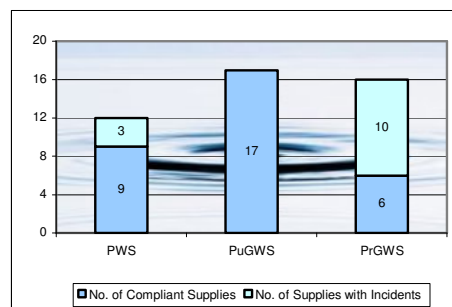
The level of compliance with the microbiological parametric values was below average and was poor for the private group water schemes. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	97.1%	94.6%	81.1%	N/A
Micro	96.4%	100%	52.3%	N/A
Chemical	98.6%	100%	100%	N/A
Indicator	96.6%	93.4%	82.1%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 5 incidents of *E. coli* contamination in 3 public water supplies in Sligo during 2004 in the Lough Easkey, Lough Talt Regional (3 incidents) and Riverstown supplies. Though all exceedances of the *E. coli* parametric value were moderate (<20cfu/100ml), it is nonetheless of concern that *E. coli* was detected on three separate occasions in the Lough Talt Regional supply. The microbiological quality of the public group water schemes was satisfactory and there were no *E. coli* exceedances during the year. The private group water schemes were poor in quality for the most part with 10 of the 16 schemes monitored contaminated during 2004. The presence of *E. coli* in such a high proportion of supplies is of concern.

### Compliance with the Chemical and Indicator Parametric Values

Full compliance achieved with the standards in for all parameters in the public water supplies with the exception of trihalomethanes. However, the low level of compliance with the trihalomethanes parametric values is of concern. The majority of these exceedances were reported in the Kilsellagh/Kinsellagh supply in Sligo Town. These exceedance must be addressed and the supply returned to compliance with this standard. Monitoring of the chemical parameters in the public and private group water schemes was restricted to nitrate and nitrite and no exceedances of either were reported in 2004.

Compliance with the indicator parametric values was slightly below average particularly in the private group water schemes. A number of aluminium exceedances were reported in the Lough Easkey supply in 2004 (6 of 19 samples analysed) and should be investigated and corrective action taken as some of the results were several times the parametric value. Similarly there were a number of aluminium exceedances in the public group water schemes most likely associated with the parent supply.

Compliance with the indicator parametric values in the private group water schemes was below average and in particular compliance with the coliform bacteria parametric value was very poor (18%). There were also a relatively large proportion of samples that did not comply with the parametric value for *Clostridium perfringens* (30%). Overall the bacteriological quality of private group water schemes in Sligo was poor.



## South Dublin County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	4	240,180
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

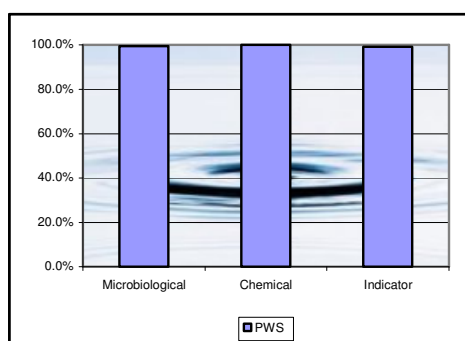
### Assessment of 2004 Monitoring

South Dublin County Council carried out analysis on 375 check and 14 audit samples during 2004, a number greatly in excess of the minimum requirements of the Regulations.

### Overall Compliance in 2004

The overall rate of compliance in South Dublin County Council, 99.3%, was above the national average during 2004. The quality of drinking water supplied in the South Dublin County Council area of city was good.

Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	99.3%	N/A	N/A	N/A
Micro	99.5%	N/A	N/A	N/A
Chemical	100%	N/A	N/A	N/A
Indicator	99.2%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* and enterococci parametric values in 2004 in South Dublin was satisfactory with just one sample detecting a single *E. coli* during 2004. However, follow up samples were free of *E. coli*.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the chemical standards was excellent and there were no exceedances of the chemical parametric values.

Compliance with the indicator parametric values was also good in South Dublin in 2004 (99.2%) with the only exceedances reported against the odour parametric value (1 sample of 388 analysed) and coliform bacteria (25 of 389). However, given the good level of compliance with the *E. coli* standard,

bacteriological quality was considered good during the year. Overall, the quality of drinking water in South Dublin in 2004 was good.

## South Tipperary County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	27	71,388
PuGWS	0	0
PrGWS	4	560
SMP	None Identified	

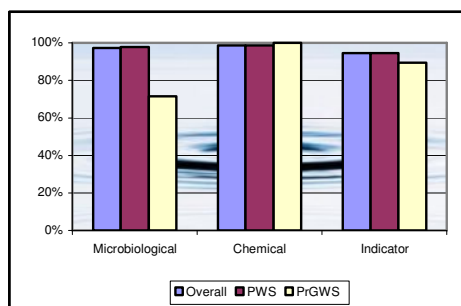
### Assessment of 2004 Monitoring

South Tipperary County Council carried out analysis on 359 check and 57 audit samples during 2004. No monitoring results were submitted for one private group water scheme. Furthermore, no monitoring results were reported for enterococci, benzo(a)pyrene, bromate, cyanide, mercury, pesticides and tetrachloroethene/trichloroethelene. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in South Tipperary during 2004.

### Overall Compliance in 2004

The overall rate of compliance in South Tipperary County Council, 95.6%, was slightly below the national average during 2004. The reason for the lower overall quality is the lower than average microbiological quality of drinking water.

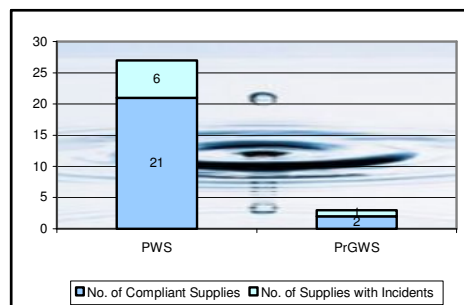
The level of compliance with the microbiological parametric values was below average and was poor for the private group water schemes. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	95.7%	N/A	88.2%	N/A
Micro	97.8%	N/A	71.4%	N/A
Chemical	98.6%	N/A	100%	N/A
Indicator	94.6%	N/A	89.5%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 7 incidents of *E. coli* contamination in 6 public water supplies in South Tipperary during 2004 in the Clodgeen, Glenary (2 incidents), Killurney, Mullenbawn and Tulllohea supplies. All of the incidents reported were moderate with the exception of the Killurney incident in which high levels of *E. coli* were detected. The microbiological quality of 2 the private group water schemes was satisfactory though a single *E. coli* was detected in one sample in the other scheme monitored.

### Compliance with the Chemical and Indicator Parametric Values

Full compliance was achieved with the standards in for all parameters in the public water supplies with the exception of fluoride and lead. Though there was a relatively high number of fluoride exceedance all the exceedances reported were marginal and were less than the EU standard. Nonetheless corrective action should be taken to eliminate these non-compliances. Monitoring of the chemical parameters in the public and private group water schemes was restricted to nitrate of which there were no exceedances.

Compliance with the indicator parametric values was below average particularly in the public water supplies. The major cause of the below average level of compliance was the low rate of compliance with the aluminium parametric value (67% compliance). A number of aluminium exceedances were reported in the Ardfinnan Regional (10 of 20 samples analysed), Dundrum Regional (5 of 16 samples analysed), Galtee Regional (22 of 38 samples analysed) and Killurney (5 of 16 samples analysed) supplies in 2004.

Compliance with the indicator parametric values in the private group water schemes was below average and in particular compliance with the coliform bacteria parametric value was very poor (4 of 7 samples analysed exceeded).

## Waterford City Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	1	50,000
PuGWS	0	0
PrGWS	0	0
SMP	None Identified	

were not repeated during the year. Overall, the quality of drinking water in Waterford in 2004 was satisfactory.

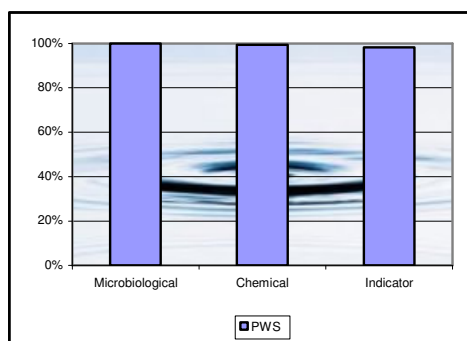
### Assessment of 2004 Monitoring

Waterford City Council carried out analysis on 96 check and 15 audit samples during 2004, a number in excess of the minimum requirements of the Regulations. However, no monitoring results were submitted for benzo(a)pyrene, bromate, boron, cyanide, pesticides and PAH.

### Overall Compliance in 2004

The overall rate of compliance in Waterford City Council, 98.8%, was above the national average during 2004. The quality of drinking water supplied in the Waterford City was satisfactory, although microbiologically the quality was excellent.

Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.9%	N/A	N/A	N/A
Micro	100%	N/A	N/A	N/A
Chemical	99.4%	N/A	N/A	N/A
Indicator	98.3%	N/A	N/A	N/A

### Compliance with the *E. coli* Standard

Compliance with the *E. coli* and enterococci parametric values in 2004 in Waterford City was excellent and none of the 108 samples analysed for *E. coli* tested positive during the year.

### Compliance with the Chemical and Indicator Parametric Values

Compliance with the indicator parametric values was good in Waterford City in 2004 (99.4%) with just one fluoride and one lead exceedance. Though compliance with the indicator parametric values was lower than that of the microbiological or chemical parametric values it was nonetheless above the national average. The majority of the indicator parameter exceedances were one-off results that

## Waterford County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	104	42,806
PuGWS	12	753
PrGWS	4	310
SMP	None Identified	

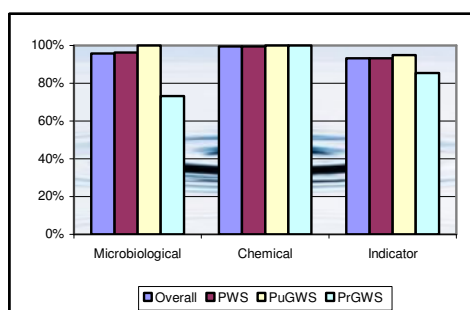
### Assessment of 2004 Monitoring

Waterford County Council carried out analysis on 400 check and 106 audit samples during 2004. No monitoring results were submitted for two public group water schemes while there was a shortfall in the number of check samples analysed in some supplies. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Waterford County during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Waterford County Council, 95.1%, was below the national average during 2004. The reason for the lower overall quality is the lower than average microbiological quality of drinking water.

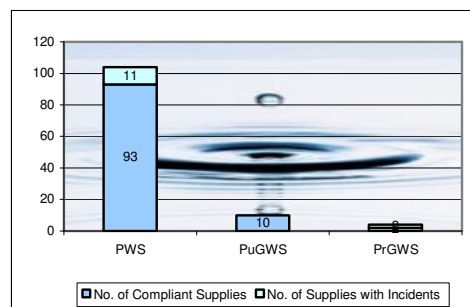
The level of compliance with the microbiological parametric values was below average and was poor for the private group water schemes. Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	95.3%	96.1%	86.7%	N/A
Micro	96.2%	100%	73.3%	N/A
Chemical	99.5%	100%	100%	N/A
Indicator	93.2%	94.9%	85.3%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 11 incidents of *E. coli* contamination in 11 public water supplies in Waterford County during 2004 in the Ardmore-Grange-Bybrussa, Ballinacourty/Deelish, Dunhill, Dunmore East Regional, East Waterford Regional, Graiguerush, Joanstown, Kilcooney, Kilgaine, Shanacoole and Stradbally supplies. All of the incidents reported were moderate with the exception of the Ballinacourty/Deelish and East Waterford Regional incidents in which high levels of *E. coli* were detected. The microbiological quality of public group water schemes was good with *E. coli* not detected in any of the supplies. Two of the four private group water schemes were contaminated on an ongoing basis in 2004.

### Compliance with the Chemical and Indicator Parametric Values

Though compliance with the chemical parametric values in public water supplies was generally satisfactory there were exceedances of the arsenic and nitrate standards that were of concern. Elevated levels of arsenic were detected in two public water supplies (Ballyogarty and Kill-Bonmahon) while there were elevated levels of nitrate in two supplies also (Ballyogarty and Adramone). The quality of the former supply is of concern and should be investigated as soon as possible with corrective action taken to rectify the non-compliances. Monitoring of the chemical parameters in both public and private group water schemes was restricted to nitrate and nitrite and no exceedances of either parameter were reported in 2004.

Compliance with the indicator parametric values was below average particularly in the public water supplies. The main feature of the monitoring results for indicator parameters was the low level of compliance with the pH parametric value. A total of 40% of the samples analysed in public water supplies were outside the permitted range while 66% of the samples analysed for pH in private group water schemes were outside the permitted range. Waterford County Council must take steps to correct the pH of these supplies to bring them into compliance with the Regulations.

## Westmeath County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	8	67,050
PuGWS	0	0
PrGWS	3	1,050
SMP	None Identified	

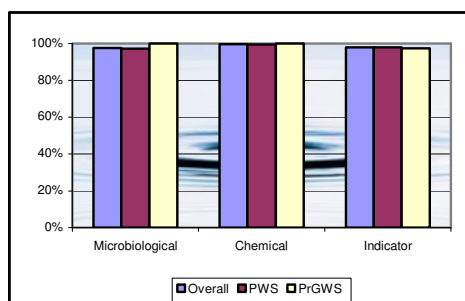
### Assessment of 2004 Monitoring

Westmeath County Council carried out analysis on 87 check and 18 audit samples during 2004. There was no monitoring carried out in private supplies that supply water as part of public or commercial activities in Westmeath during 2004.

### Overall Compliance in 2004

The overall rate of compliance in Westmeath County Council, 98.3%, was above the national average during 2004. Water supplies in Westmeath displayed above average compliance with the chemical and indicator parametric values but slightly below average compliance with the microbiological parametric values public water supplies.

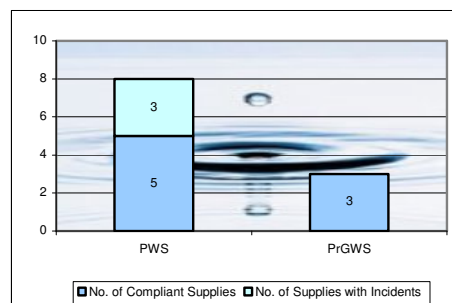
Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	98.3%	N/A	98.2%	N/A
Micro	97.3%	N/A	100%	N/A
Chemical	99.5%	N/A	100%	N/A
Indicator	97.8%	N/A	97.4%	N/A

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 3 incidents of *E. coli* contamination in 3 public water supplies in Westmeath during 2004 in the Athlone, Castlepollard Low and Castlepollard High supplies. While the Athlone and Castlepollard High exceedances were due to the detection of a single *E. coli* in one sample each, the exceedance in the Castlepollard Low supply was detected in follow up samples (at higher levels) and the was contaminated with *E. coli* for two weeks before a compliant sample was obtained.

The microbiological quality of the 3 private group water schemes was good and all three were compliant with the *E. coli* parametric value throughout the year.

### Compliance with the Chemical and Indicator Parametric Values

There were just two exceedances of the parametric values for the chemical parameters in public water supplies in 2004. Both exceedances were with the fluoride standard and were in different supplies. However, both exceedances were less than the EU parametric value of 1.5 mg/l and were not repeated in either supply in 2004. The 3 private group water schemes were fully compliant with the chemical parametric values in 2004.

Compliance with the indicator parametric values in both public water supplies and private group water schemes was above the national average during 2004. The sole issue of note with respect to both types of supplies was the relatively low percentage of samples that complied with the parametric value for coliform bacteria (90% and 81% respectively).

## Wexford County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	31	82,186
PuGWS	1	200
PrGWS	12	4,330
SMP	45	Not Specified

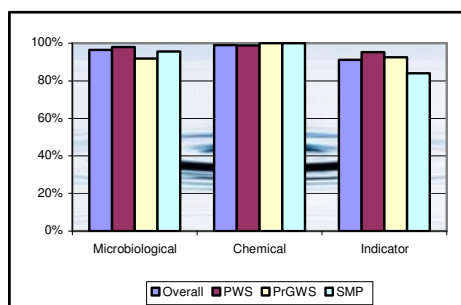
### Assessment of 2004 Monitoring

Wexford County Council carried out analysis on 87 check and 18 audit samples during 2004. Wexford County Council is one of the few sanitary authorities that have identified and monitored the small private water supplies that supply water as part of a commercial activity and are to be commended for including them in the monitoring programme. There was an insufficient number of check samples analysed in a number of public water supplies in 2004 while no sample was analysed in the single public group water scheme in Wexford. Furthermore, analysis was not carried out for 1,2 dichloroethene, mercury, pesticides and trihalomethanes while insufficient analysis was done for a number of other parameters.

### Overall Compliance in 2004

The overall rate of compliance in Wexford County Council, 93.1%, was below the national average during 2004 and was primarily due to the relatively low level of compliance with the indicator parametric values.

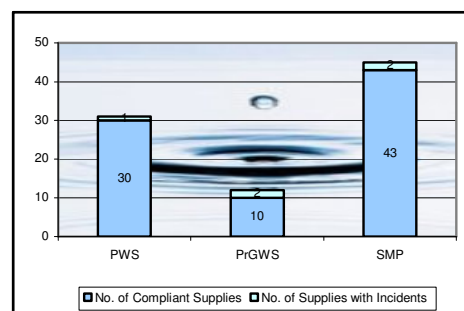
Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.3%	N/A	86.0%	86.3%
Micro	98.0%	N/A	91.9%	95.6%
Chemical	98.8%	N/A	100%	100%
Indicator	95.3%	N/A	82.6%	84.0%

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There was 1 incident of *E. coli* contamination in a public water supply in Wexford during 2004 in the Gorey Regional supply. This exceedance was due to the detection of a single *E. coli* in one sample.

The microbiological quality of the majority of the private group water schemes was satisfactory though the two schemes in which *E. coli* was detected were not of a satisfactory quality.

The monitoring results from the small private supplies (based on one sample per supply) indicated that the majority of these supplies are of a sufficient microbiological quality though 2 of the 45 supplies monitored failed to meet the standards required.

### Compliance with the Chemical and Indicator Parametric Values

In general compliance with the chemical parametric values was good with no exceedances reported in either the private group water schemes or the small private supplies. There were a small number of exceedances of the chemical parametric value in the public water supplies. Elevated levels of arsenic were reported in the Oulart supply (the single sample analysed failed to meet the standard) while there were also some moderate fluoride exceedances (3 of 30 samples analysed) and one anomalous very high lead exceedance in the South Regional supply.

Compliance with the indicator parametric values was below average for all three types of supplies. This was due to relatively low compliance with the pH standard (71%) in public water supplies while coliform bacteria was the main problem in the private group water schemes (69% compliance). There were numerous parameters that contributed to the low level of compliance with the indicator parametric values in the small private supplies including pH (49% compliance), manganese (33% compliance) and coliform bacteria (71% compliance).

## Wicklow County Council

### Summary of Water Supplies

Type of Supply	No. of Supply Zones	Population Served
PWS	47	83,002
PuGWS	3	Not specified
PrGWS	23	2,286
SMP	44	Not specified

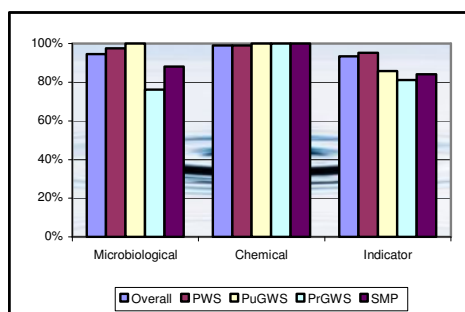
### Assessment of 2004 Monitoring

Wicklow County Council carried out analysis on 331 check and 38 audit samples during 2004. Wicklow County Council is one of the few sanitary authorities that have identified and monitored the small private water supplies that supply water as part of a commercial activity and are to be commended for including them in the monitoring programme.

### Overall Compliance in 2004

The overall rate of compliance in Wicklow County Council, 94.9%, was below the national average during 2004 and was primarily due to the relatively low level of compliance with the indicator parametric values.

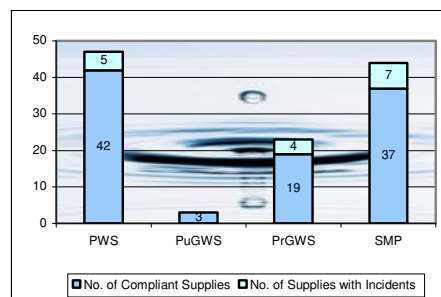
Compliance with the microbiological, chemical and indicator parametric values for the different types of water supplies is shown below.



	PWS	PuGWS	PrGWS	SMP
Overall	96.4%	88.9%	82.7%	86.4%
Micro	97.5%	100%	76.2%	88.1%
Chemical	99.0%	100%	100%	100%
Indicator	95.2%	85.7%	81.2%	84.1%

### Compliance with the *E. coli* Standard

A summary of the number of incidents of *E. coli* contamination reported during 2004 is provided on the figure below. A brief summary of the *E. coli* incidents in the public water supplies is also provided.



There were 6 incidents of *E. coli* contamination in 5 public water supplies in Wicklow during 2004 in the Donard, Glenealy, Knockanna, Knockanarrigan/Davidstown (2 incidents) and Templecarrig. However, all exceedances reported were moderate (<20 cfu/100ml). The 3 public group water schemes were fully compliant with the microbiological parametric values.

The microbiological quality of the majority of the private group water schemes was satisfactory though the four schemes in which *E. coli* was detected were not of a satisfactory quality. In particular the Manor Kilbride group water scheme reported very high levels of contamination with *E. coli* during 2004.

The monitoring results from the small private supplies (based on one sample per supply) indicates that while the majority of these supplies are of a sufficient microbiological quality a significant number of these supplies (7 of 44) failed to meet the standards required.

### Compliance with the Chemical and Indicator Parametric Values

In general compliance with the chemical parametric values was good with no exceedances reported in the public or private group water schemes or the small private supplies. There were a small number of exceedances of the chemical parametric value in the public water supplies. There were a small number of antimony exceedances reported and one pesticide exceedance reported during 2004 however upon investigation these results were not repeated and were considered anomalous.

Compliance with the indicator parametric values was below average for all four types of supplies. In spite of the below average level of compliance there has been considerable improvement in the number of samples complying with the aluminium parametric value (from 76% in 2003 to 96% in 2004). This is due to the considerable work that has been (and is continuing) on the supplies that in the past have had difficulty in complying with the aluminium standard. In this regard, the Enniskerry supply was fully compliant in 2004 (having had no aluminium samples complying as recently as 2002). Improvements have also been reported in the Arklow and Wicklow Regional supplies while work undertaken in 2004/2005 in Laragh/Annemoe should see the results improve in the future.

The lower than average rates of compliance in the private group water schemes and the small private supplies was due in part to difficulties in meeting the coliform bacteria parametric value (38% and 58% compliance respectively).

## **APPENDIX 3**

### **LIST OF MICROBIOLOGICAL, CHEMICAL AND INDICATOR PARAMETERS MONITORED AND ASSOCIATED PARAMETRIC VALUES**



## MICROBIOLOGICAL, CHEMICAL AND INDICATOR PARAMETRIC VALUES

	Parameter	Parametric value	Unit	Comments
<b>Microbiological Parameters</b>				
1	<i>Escherichia coli</i> ( <i>E. coli</i> )	0	No./100ml	
2	Enterococci	0	No./100ml	
<b>Chemical Parameters</b>				
3	Acrylamide	0.10	µg/l	Note 1
4	Antimony	5.0	µg/l	
5	Arsenic	10	µg/l	
6	Benzene	1.0	µg/l	
7	Benzo(a)pyrene	0.010	µg/l	
8	Boron	1.0	mg/l	
9	Bromate	10	µg/l	Note 2
10	Cadmium	5.0	µg/l	
11	Chromium	50	µg/l	
12	Copper	2.0	mg/l	Note 3
13	Cyanide	50	µg/l	
14	1,2-dichloroethane	3.0	µg/l	
15	Epichlorohydrin	0.10	µg/l	Note 1
16	Fluoride	1.0	mg/l	Note 11
17	Lead	10	µg/l	Notes 3 and 4
18	Mercury	1.0	µg/l	
19	Nickel	20	µg/l	Note 3
20	Nitrate	50	mg/l	Note 5
21	Nitrite	0.50	mg/l	Note 5
22	Pesticides	0.10	µg/l	Notes 6 and 7
23	Pesticides – Total	0.50	µg/l	Note 6 and 8
24	Polycyclic aromatic hydrocarbons	0.10*	µg/l	Note 9
25	Selenium	10	µg/l	
26	Tetrachloroethene and Trichloroethene	10*	µg/l	
27	Trihalomethanes – Total	100*	µg/l	Note 10
28	Vinyl chloride	0.50	µg/l	Note 1
<b>Indicator Parameters</b>				
29	Aluminium	200	µg/l	
30	Ammonium	0.30	mg/l	
31	Chloride	250	mg/l	Note 12
32	<i>Clostridium perfringens</i> (including spores)	0	No/100 ml	Note 13
33	Colour	Acceptable to consumers and no abnormal change		
34	Conductivity	2500	µS cm <sup>-1</sup> at 20 °C	Note 12
35	Hydrogen ion concentration	≥ 6.5 and ≤9.5	pH units	Note 12
36	Iron	200	µg/l	
37	Manganese	50	µg/l	
38	Odour	Acceptable to consumers and no abnormal change		
39	Oxidisability	5.0	mg/l O <sub>2</sub>	Note 14
40	Sulphate	250	mg/l	Note 12
41	Sodium	200	mg/l	
42	Taste	Acceptable to consumers and no abnormal change		
43	Colony count 22°C	No abnormal change		
44	Coliform bacteria	0	No./100 ml	
45	Total organic carbon (TOC)	No abnormal change		Note 15
46	Turbidity	Acceptable to consumers and no abnormal change		Note 16
<b>Radioactivity</b>				
47	Tritium	100	Bq/l	Notes 17 and 19
48	Total indicative dose	0.10	mSv/year	Notes 18 and 19

\* sum of concentrations of specified compounds

## Notes

- Note 1:** The parametric value refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.
- Note 2:** For the water referred to in sub-articles 6 (a), (b) and (c) the parametric value to be met by 1 January, 2004 is 25 µg/l. A value of 10 µg/l must be met by 25 December, 2008.
- Note 3:** The value applies to a sample of water intended for human consumption obtained by an adequate sampling method\* at the tap and taken so as to be representative of a weekly average value ingested by consumers and that takes account of the occurrence of peak levels that may cause adverse effects on human health.
- \*The Copper, Lead and Nickel parameters shall be monitored in such a manner as the Minister shall determine from time to time.
- Note 4:** For water referred to in sub-articles 6 (a), (b) and (c), the parametric value to be met by 1, January 2004 is 25 µg/l. A value of 10 µg/l must be met by 25 December, 2013.
- All appropriate measures shall be taken to reduce the concentration of lead in water intended for human consumption as much as possible during the period needed to achieve compliance with the parametric value.
- When implementing the measures priority shall be progressively given to achieve compliance with that value where lead concentrations in water intended for human consumption are highest.
- Note 5:** Compliance must be ensured with the conditions that  $[\text{nitrate}]/50 + [\text{nitrite}]/3 < 1$ , the square brackets signifying the concentrations in mg/l for nitrate (NO<sub>3</sub>) and nitrite (NO<sub>2</sub>) and the value of 0.10mg/l for nitrites ex water treatment works.
- Note 6:** Only those pesticides which are likely to be present in a given supply require to be monitored.
- “Pesticides” means:
- organic insecticides,
  - organic herbicides,
  - organic fungicides,
  - organic nematocides,
  - organic acaricides,
  - organic algicides,
  - organic rodenticides,
  - organic slimicides,
  - related products (inter alia, growth regulators)
- and their relevant metabolites, degradation and reaction products.
- Note 7:** The parametric value applies to each individual pesticide. In the case of aldrin, dieldrin, heptachlor and heptachlor epoxide the parametric value is 0.030 µg/l.
- Note 8:** “Pesticides – Total” means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure;
- Note 9:** The specified compounds are:
- benzo(b)fluoranthene

- benzo(k)fluoranthene
- benzo(ghi)perylene
- indeno(1,2,3-cd)pyrene.

**Note 10:** The specified compounds are: chloroform, bromoform, dibromochloromethane and bromodichloromethane.

For the water referred to in sub-articles 6 (a), (b) and (c), the parametric value to be met by 1 January, 2004 is 150 µg/l. A value of 100 µg/l must be met by 25 December, 2008.

All appropriate measures must be taken to reduce the concentration of THMs in water intended for human consumption as much as possible during the period needed to achieve compliance with the parametric value.

When implementing the measures to achieve this value, priority must progressively be given to those areas where THM concentrations in water intended for human consumption are highest.

**Note 11:** The parametric value is 1.0mg/l for fluoridated supplies. In the case of supplies with naturally occurring fluoride the parametric value is 1.5mg/l.

**Note 12:** The water should not be aggressive

**Note 13:** This parameter need not be measured unless the water originates from or is influenced by surface water. In the event of non-compliance with this parametric value, the supply shall be investigated to ensure that there is no potential danger to human health arising from the presence of pathogenic micro-organisms, e.g. *cryptosporidium*.

**Note 14:** This parameter need not be measured if the parameter TOC is analysed.

**Note 15:** This parameter need not be measured for supplies of less than 10 000m<sup>3</sup> a day.

**Note 16:** In the case of surface water treatment, a parametric value not exceeding 1.0 NTU (nephelometric turbidity units) in the water ex treatment works must be strived for.

**Note 17:** Monitoring frequencies to be set at a later date in Part 2 of the Schedule.

**Note 18:** Excluding tritium, potassium –40, radon and radon decay products; monitoring frequencies, monitoring methods and the most relevant locations for monitoring points to be set at a later date in Part 2 of the Schedule.

**Note 19:** **A.** The proposals required by Note 6 on monitoring frequencies, and Note 7 on monitoring frequencies, monitoring methods and the most relevant locations for monitoring points in Part 2 of the Schedule shall be adopted in accordance with the Committee procedure laid down in Article 12 of Council Directive 98/83/EEC.

**B.** Drinking water need not be monitored for tritium or radioactivity to establish total indicative dose where, on the basis of other monitoring carried out, the levels of tritium of the calculated total indicative dose are well below the parametric value.