

Drinking Water Quality in Scotland 2004

Annual Report by the
Drinking Water Quality Regulator



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Published on behalf of the Drinking Water Quality Regulator for Scotland, July, 2005

ISBN: 0-7559-4509-3


Produced for the Drinking Water Quality Regulator by Astron B39731 07/05

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53 South Bridge
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Foreword

I have pleasure in presenting the fifteenth annual report on Drinking Water Quality in Scotland; the third since the creation of Scottish Water and my appointment as Drinking Water Quality Regulator. The water industry in Scotland has been through a number of changes over the past fifteen years, but the formation of Scottish Water marked an important step in securing a consistent, high quality public drinking water supply for the whole of Scotland.

Three years after the birth of Scottish Water, much work has been undertaken to merge the systems and practices of the three legacy Authorities into one coherent structure. This work should provide the foundations for an organisation in which securing the quality of drinking water is one of its most fundamental objectives. I have been encouraged by many of the initiatives I have seen this year, and look forward to seeing them bear fruit in years to come.

This was the first whole year for which the Water Supply (Water Quality) (Scotland) Regulations 2001 were in force. The 2001 Regulations, which implement the 1998 EC Drinking Water Directive, impose tighter standards for several parameters. This has made a direct comparison between 2004 and previous years difficult. In many cases this year's results will be taken as the baseline against which water quality will be judged in future years. Where comparisons have been possible, such as with microbiological parameters, the general improving trend seen in previous years has continued.

The current investment programme continues apace and assets are being upgraded across Scotland to meet modern standards and

improve compliance with the Regulations. As I write, work continues to finalise Scottish Water's capital investment programme for the period April 2006 to March 2014. Work to improve the quality of drinking water in Scotland will continue throughout that period and it is hoped this will be reflected in greater compliance with drinking water quality standards and delivery of the Ministerial objectives announced in February 2005.

Last year I highlighted problems with Scottish Water's regulatory sampling programme which resulted in a significant shortfall of samples and concerns over aspects of the analytical process. As a result of these concerns, I commenced enforcement action against Scottish Water in June 2004. Scottish Water responded swiftly and made major changes to the organisation of its laboratory facilities and the systems for the collection and transportation of samples. I am satisfied that these changes are delivering significant improvements to the monitoring of drinking water quality in Scotland and have already seen evidence that the benefits arising from these changes are beginning to be realised.

The summer months of 2004 were notable for the severe weather which occurred, particularly in August, when exceptionally heavy rainfall and strong winds caused difficulties at many of Scottish Water's sites. Microbiological and colour parameters were particularly affected, and in some cases raw water quality has yet to return to normal. These events highlighted the need for Scottish Water to ensure that new assets delivered by the investment programme are able to withstand extremes of climate. The capability of existing assets also needs to be reviewed as part of this process.

Many of the drinking water incidents which occurred in 2004 were related to the extreme weather. However, some were not, and it was particularly disappointing to receive notification of another major discoloured water incident in the North Ayrshire area, this time affecting around 60,000 people. This followed a similar event in the same area in April 2002 when approximately 37,000 consumers received discoloured supplies. Following investigation it was apparent that Scottish Water had clearly not undertaken sufficient improvement work in the area since that event and its procedures for operating this sensitive distribution system were obviously still deficient. In response to the incident, Scottish Water has proposed a series of detailed actions to minimise the risk of such an event occurring in the future. I shall be monitoring these actions closely to ensure that they are fully discharged.

In the Foreword to my 2003 report I highlighted my concern that reductions were being made in manpower without the necessary safeguards in place to ensure public health was not jeopardised. I still have some concerns in this area but I look to Scottish Water to ensure that their efficiency programme is delivered in a way that is consistent with safeguarding public health. Inadequate or nonexistent monitoring and telemetry systems appeared as factors in many of the events and water quality incidents reported by Scottish Water in 2004. This reinforces the need for a robust telemetry system with reliable alarms and the need to have the right people in the right places to ensure that they are acted upon promptly. In addition to my own concerns, comments by external stakeholders such as Consultants in Public Health Medicine and the Local Authorities suggest that, in some cases, further work by Scottish Water is required to improve external communications, particularly during incidents.

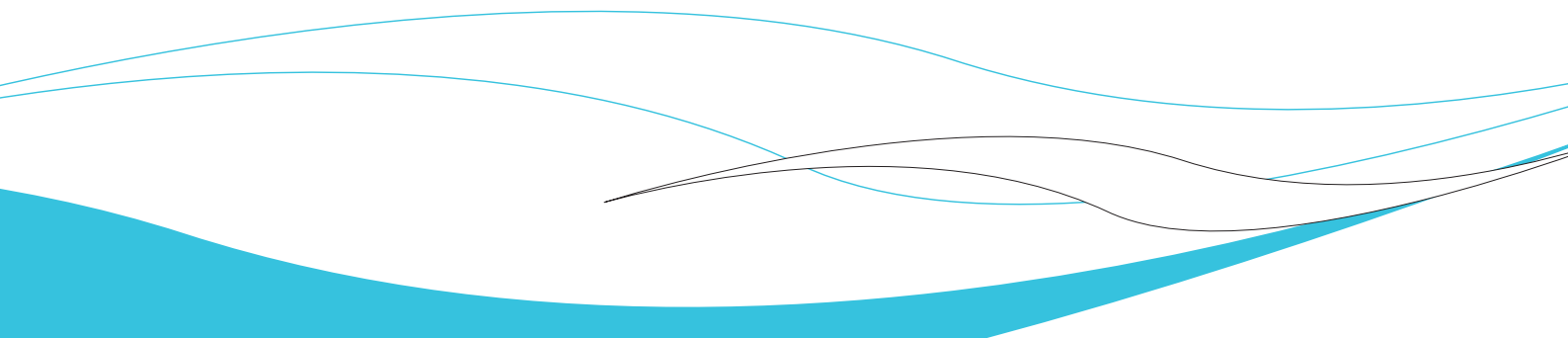
Although this report focuses primarily on public water supplies, it also summarises data on private water supplies. I remain concerned about the public health risks presented by some private water supplies in Scotland and welcome the proposals contained in the Scottish Executive's draft private water supply regulations, which were recently consulted on by the Executive. These proposals should trigger improvements in the quality of many of these supplies.

In discharging my role as Drinking Water Quality Regulator for Scotland I am mindful of the need for a consistent approach to the regulation of drinking water quality across the UK. To address this, I meet regularly with the other UK drinking water regulators to discuss our work and review how we undertake the assessment and reporting of drinking water quality. This process is of great value, and in 2005 the UK regulators published a Memorandum of Understanding, which sets out how we will work together. This document is published on each regulator's website.

In addition to the annual programme of technical audits and inspections, in the coming year I intend to focus on some particular topics, to ensure that the quality of drinking water in Scotland continues to improve. These areas are:

- The adequacy of the provision of telemetry at water treatment works and storage reservoirs, together with Scottish Water's response to telemetry alarms;
- Scottish Water's compliance with the *Cryptosporidium* (Scottish Water) Directions 2003;
- The scope and quality of Scottish Water's data returns, to ensure that the systems used for storing and interpreting drinking water quality data across Scotland are accurate and up to date.

Tim Hooton
Drinking Water Quality Regulator for Scotland
July 2005



1. Executive Summary

The drinking water quality results reported by Scottish Water for 2004 show that 334,046 tests were carried out on over 152,000 samples taken from water treatment works, service reservoirs and consumer taps. Of these examples, 99.57% complied with the standards. Of the 90,406 samples taken from consumer taps, 99.42% met the required standard. This compares favourably with results in 2003, however a direct comparison is not possible due to the introduction of the Water Supply (Water Quality) (Scotland) Regulations 2001 which came into force at the end of 2003.

The implementation of the new Regulations has not affected the validity of comparison of the key microbiological parameters. The results show that there was some improvement of the microbiological standards in 2004 compared with 2003. The 123 failures of the coliform standard at customers' taps in 2004 is less than the 135 in 2003. The number of faecal coliform failures also fell from 24 in 2003 to 18 in 2004. Results going back to the year 1991 are also shown in Figures S1 and S2 to allow historical comparisons to be drawn and trends to be identified.

Figure S1 Number of Microbiological Tests on Tap Samples Containing Coliforms

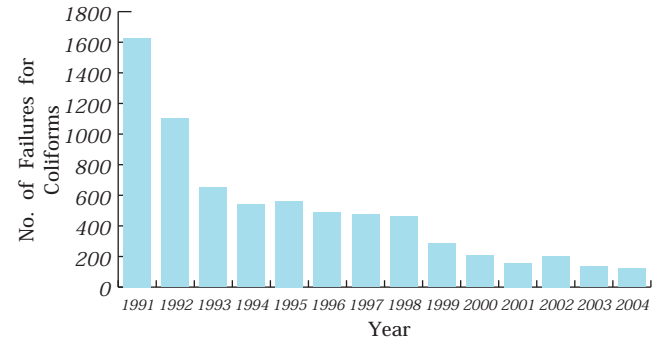
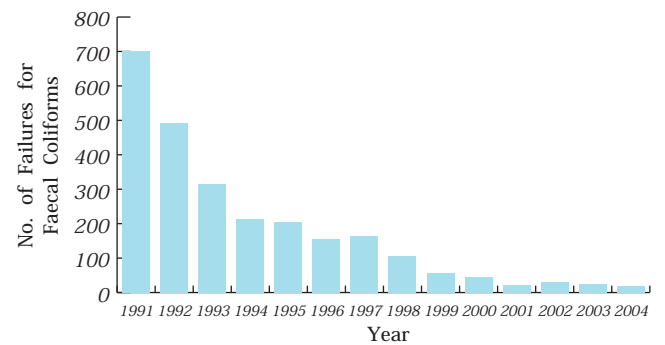


Figure S1 shows that the number of coliform tests not meeting the standards at customers' taps in 2004 was approximately 7.7% of that recorded in 1991, which was the first full year of the 1990 Regulations' operation. This statistic suggests that significant improvements have been made to the quality of drinking water in Scotland through the operation of the 1990 Regulations. It is vital that this trend continues through continued investment and diligence on the part of Scottish Water.

Figure S2 Number of Microbiological Tests on Tap Samples Containing Faecal Coliforms



2. Introduction

Role of the Regulator

The quality of drinking water in Scotland is regulated by the Drinking Water Quality Regulator for Scotland (DWQR). The DWQR is responsible for monitoring and confirming that drinking water supplied by Scottish Water meets the requirements of the Water Supply (Water Quality) (Scotland) Regulations and is safe to drink. Scottish Water is a publicly owned company and is the sole supplier of public drinking water in Scotland. There are also many small private water supplies in Scotland, the quality of which is checked by the Local Authorities. The DWQR has a role in ensuring that these responsibilities are undertaken satisfactorily in accordance with the Private Water Supplies (Scotland) Regulations 1992.

Section 7 of the Water Industry (Scotland) Act 2002 created the post of Drinking Water Quality Regulator for Scotland. This placed the functions of the Regulator on a statutory footing. Although the DWQR has similar functions to those of the Drinking Water Inspectorate (DWI) in England and Wales, the separation between Ministers and the Regulator is greater in Scotland than in England and Wales because Scottish Water is a publicly owned body as opposed to the privately owned companies in the South. In Scotland, the DWQR is responsible for enforcing The Water Supply (Water Quality) (Scotland) Regulations independently of Ministers, whereas the DWI carries out a similar role on behalf of Ministers.

Powers of the Regulator

The DWQR has three main powers. These are in respect of the power to obtain information, the power of entry or inspection and the power of enforcement.

In addition, the DWQR has emergency powers to require a water supplier to carry out works to ensure that the quality of water supplied is safe for public consumption. The DWQR can also vary and/or withdraw notices but he must keep a register of any notices issued. Finally, the DWQR can instruct a local authority to provide information held by it with regard to enforcement undertaken by the local authority.

Activities of the Regulator

At the end of each calendar year the Regulator must submit an annual report to Scottish Ministers. The annual report summarises and comments on the drinking water quality results for the preceding year. It also includes an account of any investigations or enforcement actions carried out by the Regulator during the period covered by the report.

This is the third annual report that has been prepared by the Drinking Water Quality Regulator for Scotland (DWQR) and submitted to Scottish Ministers. It presents and reviews the information provided by Scottish Water under the Water Supply (Water Quality) (Scotland) Regulations 2001 and reflects the dealings that the DWQR had with Scottish Water between 1 January and 31 December 2004.

This report presents a detailed assessment of drinking water quality in Scotland during 2004 in terms of the standards set in the 2001 Regulations. Where appropriate the report also makes comparisons of the performance in 2004 with that in earlier years, although this has not been possible to the same extent as in previous reports because 2004 is the first full year in which the 2001 Regulations have been in force. Further details of the regulatory framework may be found in Annex A.

Throughout the report, reference is made to the need for action where non-trivial breaches of the standards set in the 2001 Regulations have been identified. If Scottish Water is not able to take action quickly to remedy such a breach then Scottish Water will normally apply to Scottish Ministers for an Authorised Departure which will apply whilst steps are taken to secure compliance. If Scottish Ministers do not receive an appropriate application for an Authorised Departure, enforcement action can be taken. Details of Authorised Departures granted by Scottish Ministers in 2004 are listed in Annex F.

The 10 Key Drinking Water Quality Standards in Scotland

Ten key drinking water quality standards have been identified which are of particular significance when considering the quality of drinking water in Scotland. They have been selected because they are of particular relevance to Scotland and provide a useful indication of water quality or because they are parameters which have a higher regulatory frequency of sampling. The 10 Key Drinking Water Quality Standards in Scotland are shown below, together with the Prescribed Concentration or Value (PCV) set out in the regulations:

Parameter	Significance
Total Coliforms PCV 0 per 100ml	The coliform group of bacteria is present in large numbers in the gut of all warm-blooded animals but are also widely distributed in the environment. While their presence in water supplies may indicate a breach in the integrity of the water supply system, it may not be presumed that faecal pollution has occurred. It is generally considered that coliforms themselves do not present a risk to health, however they are a useful indicator in monitoring the quality of water supplies.
Faecal Coliforms PCV 0 per 100ml	Faecal coliforms are present in large numbers in the gut of all warm-blooded animals. Their presence in water supplies indicates a breach in the integrity of the water supply system and that faecal pollution may have occurred. The detection of faecal coliforms in a water supply is taken very seriously.
Colour PCV 20 mg/L Pt/Co	Colour in water comes from naturally occurring humic substances, particularly in acidic water sources derived from peaty moorland catchment areas. High colour may be unacceptable to consumers on aesthetic grounds and the humic substances responsible for colour may form other compounds when the water is disinfected. Colour may be removed by appropriate treatment.
Turbidity PCV 4 NTU at consumer taps	Turbidity is a measure of the “cloudiness” of the water. Naturally occurring turbidity is usually caused by the suspension of tiny particles of predominantly inorganic origin. Turbidity may also be caused by poor control of the treatment process, particularly the coagulation and filtration stage. High turbidity is unacceptable to consumers on aesthetic grounds and may also compromise disinfection.

2. Introduction

Parameter

Hydrogen Ion (pH)

PCV

6.5-9.5

Significance

Most surface waters and many groundwaters in Scotland are slightly corrosive towards the materials used in water treatment systems and consumers' installations. This effect persists even when the pH exceeds the neutral point (pH7) and is countered by adding an alkali during treatment to raise the pH. As chlorine disinfection is more effective at low pH addition of alkali is normally made after the disinfection stage. Extreme pH values may present a risk to the health of consumers.

Aluminium

PCV

200 µg/l

Aluminium occurs in acidic waters derived from moorland catchments and is removed in water treatment by coagulation and filtration. Aluminium sulphate is used as a coagulant in water treatment. High concentrations are unacceptable to consumers on aesthetic grounds. Claims of an association between low concentrations of aluminium in water supplies and the incidence of Alzheimer's disease have not been substantiated.

Iron

PCV

200 µg/l

Iron is present naturally in many water sources and is removed by conventional water treatment processes. Iron in water supplies may also be derived from corrosion of iron mains and poor control of water treatment processes. High iron concentrations are unacceptable to consumers on aesthetic grounds as they may cause discoloured supplies.

Manganese

PCV

50 µg/l

Manganese occurs naturally in many water sources. It may be removed from water by using an appropriate treatment process. Elevated manganese concentrations are unacceptable to consumers on aesthetic grounds as they may cause discoloured supplies.

Lead

PCV

25 µg/l (reduces to 10 µg/l in 2013)

Lead is not normally naturally present in water sources but significant concentrations may be present at consumers' taps if lead pipes are present and the water supply is plumbo-solvent. Many waters in Scotland do have a tendency to dissolve lead, and phosphate compounds may be dosed at the treatment works in order to reduce this tendency.

Trihalomethanes

PCV

100 µg/l for total of four of the compounds

Trihalomethanes (THMs) are a range of compounds which occur in drinking water, principally as a product of the reaction of chlorine with naturally occurring organic materials. Treatment processes can be adapted to minimise the formation of THMs or to remove the precursor compounds. Many Scottish water supplies contain significant quantities of the precursor compounds which can form THMs, making control of the treatment process especially important.

Contacting the Regulator

I am concerned about the quality of my drinking water in my home or place of work. What can I do?

In the first instance you should contact Scottish Water and ask them to investigate.

Scottish Water

PO Box 8855

EDINBURGH

EH10 6YQ

Tel 0845 601 8855

If, having discussed the matter with Scottish Water, you do not feel that the issue has been resolved satisfactorily, you may contact the Drinking Water Quality Regulator for Scotland. The DWQR will investigate on your behalf and act as appropriate, informing you of the outcome.

The DWQR may be contacted either by writing to:

Drinking Water Quality

Regulator for Scotland

PO Box 23598

EDINBURGH

EH6 6WW

Or emailing:

regulator@dwqr.org.uk

Please include as many details of your complaint as possible, including the address of the property where the problem has occurred, the nature and duration of your concerns and details of any contact you have had with Scottish Water on this matter.

Please note that the DWQR can only investigate concerns relating to drinking water quality of public supplies in Scotland.

For matters concerning private supplies in Scotland you should contact your local Environmental Health Department.

For matters concerning the service provided by Scottish Water other than the quality of the water itself you should contact the Water Industry Commissioner for Scotland.

For matters concerning the quality of public supplies in England and Wales you should contact the Drinking Water Inspectorate (DWI).

2. Introduction





3. Overview of Water Quality in Scotland

Key Facts

Developed Sources	Lochs, Reservoirs and River Intakes	Springs and Boreholes		TOTAL
Number	565	98		663
Yield (Ml/d)	2,315	72		2,387
	<i>Volume of Water Distributed (Ml/d)</i>			
Treatment Works	<2.5	2.5 to 10	>10	TOTAL
Number	271	51	38	360
Daily Supply (Ml/d)	72	176	2,138	2,386
	<i>Capacity of Reservoir (Ml)</i>			
Service Reservoirs	<2	2 to 10	>10	TOTAL
Number	884	175	52	1,111
Capacity (Ml)*	3,303	653	194	4,150
	<i>Length of Mains (km)</i>			
Distribution Network Diameter of pipe	<150mm	150-300mm	>300mm	TOTAL
Length (km)	29,757	11,547	5,205	46,509
	<i>Size of Zone (Population)</i>			
Supply Zones	<5,000	5,000 to 20,000	>20,000	TOTAL
Number	266	48	80	394
Population	178,246	501,113	4,254,072	4,933,431

*Note that capacities are given for all 'service reservoirs' which includes Break Pressure Tanks, Water Towers and Clear Water Tanks

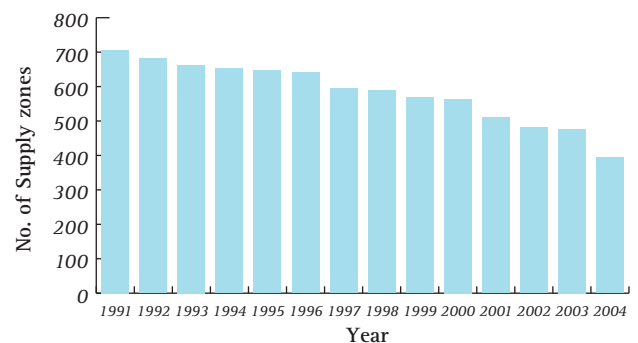
Water supplies in Scotland

In Scotland 93% of water supplies are derived from surface water sources with the remainder being derived from groundwater sources. Water from all of these sources is treated at 360 treatment works before distribution through 1,111 service reservoirs and over 46,509 km of mains. On average, about 2,386 Megalitres (Ml) of potable water is supplied each day to about 99% of the resident population.

In 2004 there were 394 water supply zones in Scotland. *Figure 3.1* shows the reduction in the number of zones since 1991 to the current number of 394. This reduction is a result of Scottish Water and its predecessors developing regional schemes to replace many of the smaller supplies, improving efficiency and the quality of water supplied. In addition, the introduction

of the Water Supply (Water Quality) (Scotland) Regulations 2001 increased the maximum population allowed in a water supply zone from 50,000 to 100,000. This enabled Scottish Water to rationalise some of its supply zones in urban areas.

Figure 3.1 Number of Supply Zones (all sizes) in Scotland 1991-2004



Assessment of compliance (general points)

Schedule 3 of the Water Supply (Water Quality) (Scotland) Regulations 2001 sets out the number of samples that have to be taken for each parameter in each supply zone. In practice, each sample is tested for several parameters so the text and the tables relate to the number of determinations (tests) made for each individual parameter rather than to the number of samples taken. Also, if Scottish Ministers have authorised supply point sampling for certain parameters, the results for these parameters are recorded for each zone supplied from the point the sample was taken. A single result could therefore be recorded against 2 or more zones.

The number of samples specified in Schedule 3 is the minimum required to be taken per annum. The Drinking Water Quality Regulator expects full compliance with the required sampling frequencies.

The term “total coliforms” refers to the parameter listed in Table A of Schedule 1 and in Schedule 2 of the Regulations. It includes all coliform organisms whether faecal in origin or not. In the following sections, the term “coliforms” has been used for the total coliform parameter to simplify the text. The detection of coliforms in a sample is indicative of potential contamination that must be investigated. The presence of faecal coliforms (*E.coli*) in the same sample would indicate that the contamination was of faecal origin. It should be noted that while the Regulations require that faecal coliforms should be absent in all samples, they permit up to 5% of samples taken from the distribution system to contain coliforms.

The 2001 Regulations set a prescribed concentration or value (PCV) for 40 “mandatory” parameters in Schedule 1 of the Regulations.

In general, to be wholesome, water must not contain a parameter in excess of a PCV; in the case of the hydrogen ion parameter (pH) the value must lie in a range defined by a maximum and minimum prescribed value. Schedule 2 of the Regulations sets values for a further 11 “indicator” parameters. These are not part of the definition of wholesomeness unless a breach of the standard constitutes a risk to health, however Scottish Water is expected to investigate any non-compliances which occur.

In contrast to the 1990 Regulations, the 2001 Regulations do not enable Scottish Ministers to authorise the local relaxation of a PCV. Where a non-trivial breach of a standard for a Schedule 1 parameter occurs, Scottish Water is required to apply for an Authorised Departure whilst work is undertaken to secure compliance with the Regulations. This process is described in Annex F.

It is important to note that the PCV for each parameter that is of health significance, is set with a wide margin of safety. For parameters that are of aesthetic significance, the standards are generally set well below the level at which water would become unacceptable to consumers. A contravention of a standard is not necessarily indicative that the water is unfit to drink or represents a risk to health.

A contravention of a PCV is of significance, however, because it means that the water supplied at the time the sample was taken cannot be regarded as wholesome as defined in the Regulations. When the result is considered along with other monitoring results, it may indicate that work is necessary in order to meet the high standards set in the Regulations. When considering microbiological results it is important to remember that samples that are taken at consumers’ taps are susceptible to microbiological contamination due to the sanitary condition of the tap and associated plumbing.

3. Overview of Water Quality in Scotland

The general rule that any individual contravention of a PCV constitutes a breach of the Regulations and thus causes the water to be regarded as unwholesome, does not apply to the coliform standard at service reservoirs. This standard is only breached if 5% or more of the determinations carried out over the preceding year contain coliforms.

In addition to the absolute standards for nitrite and nitrate, regulation 4(d) specifies an additional requirement reflecting the combined concentration of the two parameters. The water should satisfy the formula $([\text{nitrate}]/3 + [\text{nitrite}]/0.3 \leq 1)$ where the square brackets refer to the concentration of the compounds in mg/l. An assessment of compliance with this formula has not been included in Scottish Water's data, although calculations show that this standard was not breached in 2004.

Sampling in 2004

In 2003 a serious shortfall was discovered in the number of samples taken by Scottish Water when compared against the frequencies required in the Water Supply (Water Quality) (Scotland) Regulations 1990. This was discussed in Section 6 of the DWQR's Drinking Water Quality in Scotland 2003 report.

Following discussions with DWQR, Scottish Water has implemented some important changes to the way it plans and undertakes the sampling programme and there is no doubt that significant progress has been made, although in some cases full implementation of these changes is yet to be completed.

In 2004 around 99% of scheduled samples were taken, once factors such as assets being temporarily out of service and extreme weather are taken into account. This is an obvious improvement on the previous year, although DWQR expects full compliance with the regulatory sampling frequencies and will be watching closely as the full benefits of the improvements to Scottish Water's sampling systems are realised.

Overall Compliance in 2004

The drinking water quality results reported by Scottish Water for 2004 show that 334,046 tests were carried out on over 152,000 samples taken from water treatment works, service reservoirs and consumer taps. Of these samples, 99.57% complied with the standards. Of the 90,406 samples taken from consumer taps, 99.42% met the required standard. This compares favourably with results in 2003, however a direct comparison is not possible due the introduction of the Water Supply (Water Quality) (Scotland) Regulations 2001 which came into force at the end of 2003.

Microbiological quality of water leaving treatment works

Summary results from treatment works in 2004 are given in table 3.1 below; figures for the previous 4 years are given for comparison as the validity of these is unaffected by the introduction of the 2001 Regulations. The results for 2004 (*Table 3.1*) indicate a slight increase in the percentage of all samples which contained coliforms. The corresponding figure for faecal coliforms shows a slight decrease on 2003.

Table 3.1 Summary results from treatment works with comparison for previous years

	2004	2003	2002	2001	2000
Coliforms					
Number of determinations	34,524	35,325	39,584	39,230	42,288
Number containing coliforms	118	108	131	111	213
Percentage containing coliforms	0.34	0.3	0.33	0.28	0.5
Faecal coliforms					
Number of determinations	34,524	35,325	39,584	39,230	42,267
Number containing faecal coliforms	54	59	75	63	118
Percentage containing faecal coliforms	0.16	0.17	0.19	0.16	0.28

As in previous years, a detailed examination of the data (*Table 3.2*) shows that the majority of these failures occurred at small water treatment works. Small works generally only have basic water treatment that is particularly vulnerable to changes in raw water quality. Seasonal effects, especially high levels of precipitation, can overwhelm the works' ability to maintain microbiological integrity of the treated water. 2004 has seen the percentage of samples containing coliforms or faecal coliforms increase significantly at larger water treatment works. It is thought that this is due to a deterioration in

raw water quality caused by extreme weather over the summer period, notably August 2004.

Microbiological quality of water in service reservoirs

The sampling regime prescribed in the Regulations has over the years, revealed service reservoirs to be a particularly common source of contamination. Historically, many service reservoirs were built underground and grassed over. Consequently, they can be prone to inward leakage from contaminated surface water. Scottish Water undertakes a risk analysis

Table 3.2 Microbiological quality of water leaving treatment works in Scotland for 2004

	volume of water distributed from works (Ml/d)			
	<3	3 to 12	>12	total
Approximate percentage of works	75%	14%	11%	360
Number of samples taken for coliforms	12,630	5,645	16,249	34,524
Total coliform failures	64	12	42	118
Percentage of failures	0.51	0.21	0.25	0.34
Number of samples taken for faecal coliforms	12,630	5,645	16,249	34,524
Total faecal coliform failures	45	3	6	54
Percentage of faecal failures	0.36	0.05	0.4	0.16

3. Overview of Water Quality in Scotland

approach to this problem and at high risk sites is addressing this problem by carrying out service reservoir refurbishment programmes. This usually involves excavation to expose and re-seal tank walls and roofs, replacement of covers and ventilators. Secondary disinfection is also installed at some service reservoirs but this should only be used where chlorine residuals

diminish because the reservoirs are part of long distribution networks. In such cases there may be a need to boost disinfection levels to achieve a disinfection residual at the end of the network. However, it is important that secondary disinfection does not disguise a more fundamental problem with a service reservoir such as compromised structural integrity.

Table 3.3 Summary results for service reservoirs in Scotland with comparison for previous years

	2004	2003	2002	2001	2000
Coliforms					
Number of determinations	56,340	56,582	58,445	56,542	61,343
Number containing coliforms	328	245	403	298	489
Percentage containing coliforms	0.58	0.43	0.69	0.53	0.8
Faecal coliforms					
Number of determinations	56,340	56,582	58,445	56,542	61,307
Number containing faecal coliforms	72	46	93	88	160
Percentage containing faecal coliforms	0.13	0.08	0.16	0.16	0.26

The Regulations require that there are no faecal coliforms present in any sample and for total coliforms the requirement for service reservoirs is that 95% of samples are free of contamination. Summary results for service reservoirs for 2004 compared to those for previous years are shown in [Table 3.3](#) below. This shows an increase in the percentage of samples containing coliforms and faecal coliforms, and highlights the need for

continued efforts by Scottish Water in ensuring the condition of service reservoirs is maintained and that sampling arrangements are satisfactory.

[Table 3.4](#) shows that, as in previous years, the smallest service reservoirs are failing at a higher rate than the larger service reservoirs. This distinction is not, however, as pronounced as previously. This is probably a reflection of the same trend seen at treatment works.

Table 3.4 Microbiological quality of water in service reservoirs in Scotland for 2004

	Capacity of service reservoirs (including water towers) (Ml)			
	<2	2 to 10	>10	total
Approximate percentage of service reservoirs	80%	16%	4%	1,111
Number of samples taken for coliforms	43,811	9,589	2,940	56,340
Total coliform failures	263	48	17	328
Percentage of failures	0.6	0.5	0.51	0.58
Number of samples taken for faecal coliforms	43,811	9,589	2,940	56,340
Total faecal coliform failures	57	7	8	72
Percentage of faecal failures	0.13	0.07	0.2	0.13

Microbiological quality of water in water supply zones

Summary results for the microbiological quality of water in supply zones in 2004 are given below; figures for previous years are given for comparison. Results for 2004 for samples taken from consumer taps show a similar level of

compliance to 2003, which itself was a significant improvement on previous years. The maintenance of this improved degree of compliance is to be commended, however it is hoped that further improvement will be seen in future years.

Table 3.5 Summary results for supply zones with comparison for previous years

	2004	2003	2002	2001	2000
Coliforms					
Number of determinations	13,988	15,625	16,299	17,180	18,545
Number containing coliforms	123	135	204	158	207
Percentage containing coliforms	0.88	0.86	1.25	0.92	1.12
Faecal coliforms					
Number of determinations	13,988	15,625	16,299	17,180	18,534
Number containing faecal coliforms	18	24	30	23	45
Percentage containing faecal coliforms	0.13	0.15	0.18	0.13	0.24

Table 3.6 provides a more detailed examination of the data by zone size and confirms that the

risk of non-compliance remains greatest in those supply zones serving small populations.

Table 3.6 Microbiological quality of water at consumers' taps in Scotland for 2004

	Size of zone (Population x 1000)			
	<5	5 to 20	20 to 100	total
Number of zones	266	48	20	394
Population of zones (x 1000)	178	501	4,254	4,933
Number of samples taken for coliforms from zones	2,646	1,501	9,841	13,988
Total coliform failures	30	6	87	123
Percentage of failures	1.13	0.33	0.89	0.88
Number of samples taken for faecal coliforms from zones	2,646	1,501	9,841	13,988
Total faecal coliform failures	10	0	8	18
Percentage of faecal failures	0.38	0	0.08	0.13

3. Overview of Water Quality in Scotland

Table 3.7 Key drinking water quality parameters at consumers' taps for 2004 in Scotland

Scotland 2004 Parameter	Determinations exceeding PCV*			Water Supply Zones (Total no. 394)		
	Total No.	No. of fails	% of fails	No. failing	% failing	No. with A.D.
Total coliforms	13,988	123	0.88	74	18.8	0
Faecal coliforms	13,988	18	0.13	17	4.3	0
Colour	5,068	165	3.26	76	19.3	17
Turbidity	5,067	10	0.20	9	2.3	0
Hydrogen ion (pH)	5,065	80	1.58	51	12.9	3
Aluminium	5,045	27	0.54	23	0.2	0
Iron	5,053	127	2.51	73	18.5	17
Manganese	5,050	62	1.23	34	8.6	1
Lead	1,810	20	1.10	19	4.8	0
Total Trihalomethanes	1,778	132	7.42	71	18.0	18
All others*	90,406	115	0.13			
Total	152,318	879	0.58			

Notes *means all other parameters reported on for which a numerical standard exists

Table 3.7 gives a summary of water quality in 2004 in supply zones across Scotland for the 10 key parameters (including the microbiological results discussed above). In addition, other parameters that have numerical standards are reported in the "All Others" count in the last item of *Table 3.7*.

The physico-chemical parameters listed in *Table 3.7* are discussed below. Summary results for previous years have not been included because these were derived from samples taken under the 1990 Regulations and in some cases different standards applied so that a meaningful comparison is not possible.

Colour: Colour is an aesthetic parameter and treatment is given to remove or reduce it to produce water that will have an acceptable appearance to customers. The colour of raw water may vary considerably according to seasonal and weather conditions. Variations in the raw water mean that many supplies, especially the smaller ones, exceed the standard for colour. Authorised Departures for colour were granted in seventeen supply zones in 2004 in order to enable Scottish Water to make improvements to ensure compliance with the standard.

The extreme weather of August 2004 resulted in a significant deterioration in the quality of raw water at several works supplying the Edinburgh area, particularly with respect to the colour parameter. The works were unable to cope with these elevated levels, and colour in the final water entering distribution increased noticeably, resulting in a deterioration in sample compliance and an increase in complaints from consumers. To date these levels have not returned to normal, and in April 2005 Scottish Water gave Scottish Ministers an undertaking to implement an interim solution at Alnwickhill WTW in order to secure compliance with the standard.

Turbidity: Turbidity is used as an assessment of the fine particles suspended in water. This parameter is often, but not always, associated with colour and has many of the same unacceptable characteristics. A breach of the turbidity standard may also indicate that the treatment process is not operating effectively, and increased turbidity may be associated with the organism *Cryptosporidium*.

Table 3.8 Colour results for 2004 at consumer taps

Colour	2004
PCV = 20 mg/l Pt/Co scale	
Number of determinations exceeding PCV	165
Percentage of determinations exceeding PCV	3.26
Number of Zones not meeting regulatory requirements	76
Percentage of Zones not meeting regulatory requirements	19.3

Table 3.9 Turbidity results for 2004 at consumer taps

Turbidity	2004
PCV = 4 NTU	
Number of determinations exceeding PCV	10
Percentage of determinations exceeding PCV	0.2
Number of Zones not meeting regulatory requirements	9
Percentage of Zones not meeting regulatory requirements	2.3

3. Overview of Water Quality in Scotland

Hydrogen ion (pH) is a measure of the acidity of a water and the Regulations set limits for pH outside which the water is deemed unwholesome. The Regulations prescribe that pH should lie between 6.5 and 9.5. There are a number of reasons for the natural pH of many Scottish waters being outwith the regulatory limit. These include:

- upland waters used for water supply generally contain acidic organic material derived from peat.
- hard rock areas in the south-west and north of Scotland suffer as a result of acid rain. Excessive acidity occurs because the runoff has very low levels of dissolved solids and consequently poor buffering capacity.
- deposition of marine salt in water catchments following severe storms at sea can cause rapid fluctuation in raw water pH.

The natural pH of most Scottish raw waters is altered during treatment by the addition of chemicals to aid coagulation and filtration and is finally corrected to control the corrosion of water mains and the uptake of lead, copper and zinc in household plumbing. Failures of the pH standard in treated water are therefore most often related to a failure of the treatment plant and can be high or low pH failures depending on the fault. Cement-lined water mains may also affect the pH of certain waters.

With the increase in the minimum standard for pH from 5.5 to 6.5 following the introduction of the 2001 regulations, Authorised Departures for pH have been granted in seventeen supply zones to enable Scottish Water to make improvements in order to ensure compliance with the standard.

Table 3.10 Hydrogen ion results for 2004 at consumer taps

Hydrogen ion	2004
PCV = 9.5 pH units	
Number of determinations exceeding PCV	80
Percentage of determinations exceeding PCV	1.58
Number of Zones not meeting regulatory requirements	51
Percentage of Zones not meeting regulatory requirements	12.9

Aluminium: Aluminium is a natural constituent of many water sources, particularly upland surface waters. Aluminium compounds also play an important part in water treatment as coagulants to remove suspended matter and impurities, including pathogenic organisms. The Regulations set a standard for aluminium of

200 micrograms (μg) per litre. This is based on aesthetic considerations since high concentrations may cause unacceptable discoloration of the water. Instances where water supplies exceed the standard for aluminium can occur due to changes in source water quality or where the treatment process is not optimised.

Table 3.11 Aluminium results for 2004 at consumer taps

Aluminium	2004
PCV = 200 $\mu\text{g Al/l}$	
Number of determinations exceeding PCV	27
Percentage of determinations exceeding PCV	0.54
Number of Zones not meeting regulatory requirements	23
Percentage of Zones not meeting regulatory requirements	0.2

Iron and Manganese: Iron and manganese are the primary causes of discoloured water supplies. The standards for iron and manganese are set at levels that ensure they will not be responsible for unpleasant tastes, dirty water or staining. Iron and manganese are not health-related parameters.

Upland surface waters which are naturally acidic tend to dissolve iron and manganese from the soils and minerals in the catchment. Significant seasonal variations in concentrations of iron and manganese can occur but there can also be variations in manganese concentrations due to disturbance of accumulated deposits on the beds of reservoirs when the water is drawn down or when it circulates.

Historical deposits of both substances can remain in water mains for long periods of time, giving rise to problems long after treatment processes have been improved. They may be removed by

flushing and other techniques. Old cast-iron mains also contribute iron to the water as a corrosion product. In some areas this may be a significant cause of discoloured supplies. Scottish Water has a mains rehabilitation programme in place that will help to reduce the number of iron failures resulting from this source and deliver other benefits such as reduced leakage.

The standards for iron and manganese were unchanged with the introduction of the new regulations. Compliance in terms of the percentage of samples exceeding the standard improved for both parameters in 2004, although the percentage of supply zones with failures increased slightly. Seventeen Authorised Departures have been granted for iron and one for manganese in order to enable Scottish Water to achieve compliance with the standard and improve the quality of water supplied to consumers.

3. Overview of Water Quality in Scotland

Table 3.12 Iron results for 2004 at consumer taps

Iron	2004
PCV = 200 µg Fe/l	
Number of determinations exceeding PCV	127
Percentage of determinations exceeding PCV	2.51
Number of Zones not meeting regulatory requirements	73
Percentage of Zones not meeting regulatory requirements	18.5

Table 3.13 Manganese results for 2004 at consumer taps

Manganese	2004
PCV = 50 µg Mn/l	
Number of determinations exceeding PCV	62
Percentage of determinations exceeding PCV	1.23
Number of Zones not meeting regulatory requirements	34
Percentage of Zones not meeting regulatory requirements	8.6

Lead: Water supplied from the mains does not contain a significant amount of lead. Any lead recorded in analysis carried out on samples of water taken from consumers' taps is usually derived from the action of the water on lead piping found in many older properties between the main and the tap. The soft acidic water typical of many Scottish upland sources is particularly likely to have this effect.

Water can be treated to reduce the tendency for lead to be dissolved from plumbing. Where there is a risk of the lead standard being exceeded at the consumers' tap, the Regulations require that the water be treated if a significant reduction in lead concentrations can be achieved and treatment is reasonably practicable. Due to the

property-specific nature of lead failures, the percentage of determinations failing year on year can vary considerably.

Following publication of the World Health Organisation (WHO) guidelines for drinking water quality in 1993 which included a guideline value for lead of 10 micrograms (µg) per litre, the European Commission published a revised Drinking Water Directive which reflected this guideline value with an interim standard of 25 µg/l to be achieved by 2003, and full compliance with 10 µg/l by 2013. This requirement has been transposed into the 2001 Regulations and DWQR is working with Scottish Water to ensure compliance is achieved.

Table 3.14 Lead results for 2004 at consumer taps

Lead	2004
PCV = 25 µg Pb/l	
Number of determinations exceeding PCV	20
Percentage of determinations exceeding PCV	1.1
Number of Zones not meeting regulatory requirements	19
Percentage of Zones not meeting regulatory requirements	4.8

Total Trihalomethanes: Upland surface waters, from which most Scottish supplies are drawn, are likely to contain significant quantities of natural organic substances. When the water is disinfected using chlorine these can react with the chlorine to form by-products. The group of substances known as trihalomethanes (THM) is used to monitor this process. The 2001 Regulations set a UK standard for total THM of 100 µg/l, where this is made up of the sum of four compounds. These are chloroform, bromoform, dibromochloromethane and bromodichloromethane.

Although there is no strong evidence of any health risk from chlorination by-products in water supplies, medical advisers have recommended that action should be taken to reduce THM concentrations where they persistently exceed the standard. However, action should only be taken where it can be carried out without compromising disinfection. Many of the zones where failures occur are small rural supplies, having at best only simple treatment prior to chlorination. Scottish Water recognises that as well as taking measures to improve the microbiological quality of water supplies, it must also take steps to bring about compliance with the THM standard.

3. Overview of Water Quality in Scotland

In 2004 Scottish Ministers granted Authorised Departures at eighteen water supply zones to enable Scottish Water to undertake improvement work at water treatment works to reduce

concentrations of THMs. Details of these Authorised Departures may be found in Appendix F.

Table 3.15 Total THM's results for 2004 at consumer taps

THM's	2004
PCV = 100 ug/l	
Number of determinations exceeding PCV	132
Percentage of determinations exceeding PCV	7.42
Number of Zones not meeting regulatory requirements	71
Percentage of Zones not meeting regulatory requirements	18.0

All Other Parameters: The final item on *Table 3.7* shows that in 2004 over 90,000 samples were taken for a wide range of other parameters in the Regulations. Out of this number there were 115 failures. The largest proportion of these

were for bromate (64 failures), and nitrite, ammonia and antimony (13 failures each). As with all such non-compliances of the standard, these were investigated and the majority were deemed to be trivial and unlikely to recur.

4. Scottish Water Results (by Local Authority)

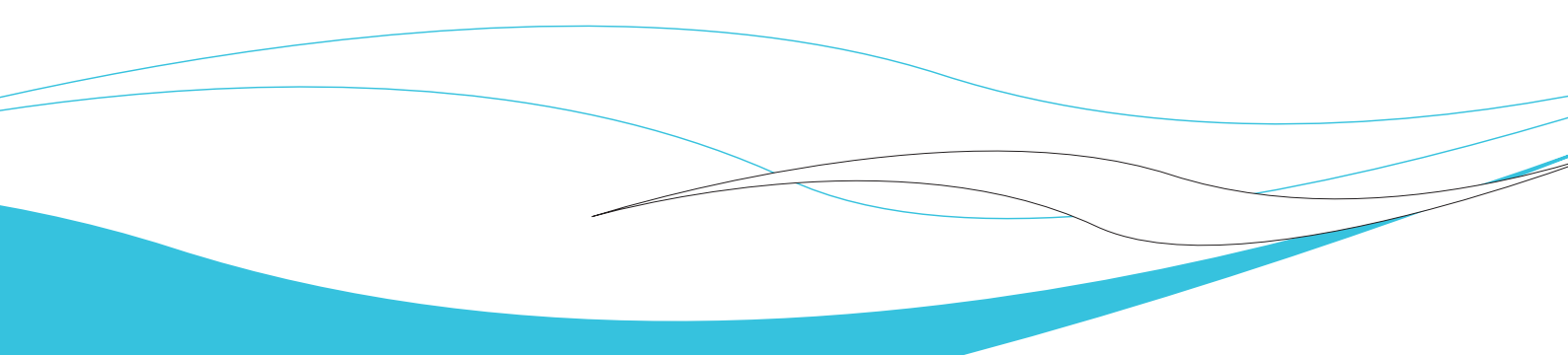
This chapter provides detailed information in respect of the water quality in supply zones located within each of the 32 local authorities which are supplied by Scottish Water. Some of the zones will appear in two or more local authority reports because they cross local authority boundaries. The zone names and sizes have been changed since the publication of the 2003 report so comparisons with the 2003 results cannot be accurately made.

A map with a key, which indicates each local authority, appears on the next page.

Each local authority page provides information on the names of the zones used by Scottish Water located within the local authority boundary. The pages also provide details of any incidents, which took place during 2004 in which either bottled water was made available or a boil water notice issued.

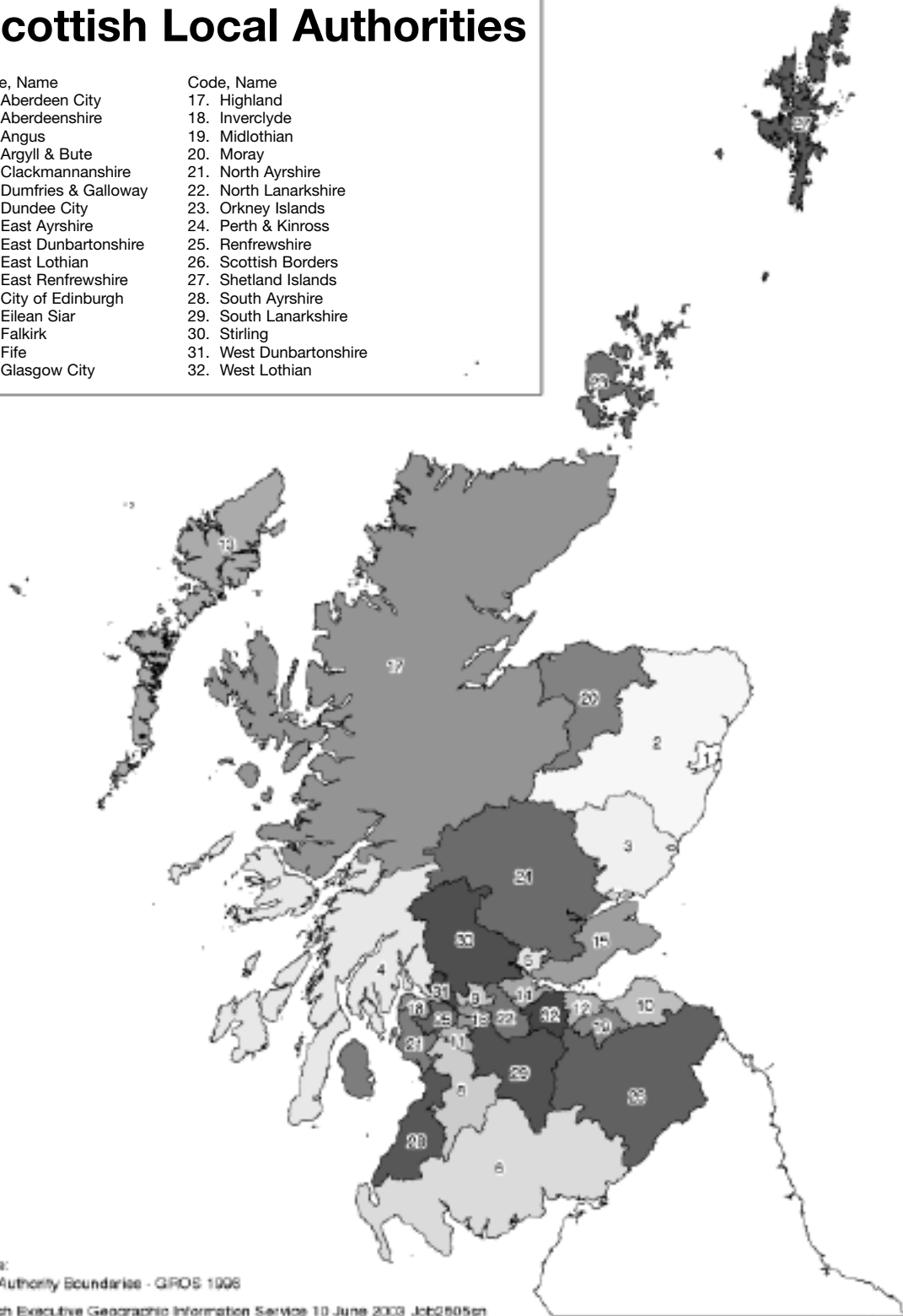
Finally, the local authorities comments on its dealings with Scottish Water during 2004 are also provided.

For ease of reference the local authorities are dealt with in alphabetical order.



Scottish Local Authorities

Code, Name	Code, Name
1. Aberdeen City	17. Highland
2. Aberdeenshire	18. Inverclyde
3. Angus	19. Midlothian
4. Argyll & Bute	20. Moray
5. Clackmannanshire	21. North Ayrshire
6. Dumfries & Galloway	22. North Lanarkshire
7. Dundee City	23. Orkney Islands
8. East Ayrshire	24. Perth & Kinross
9. East Dunbartonshire	25. Renfrewshire
10. East Lothian	26. Scottish Borders
11. East Renfrewshire	27. Shetland Islands
12. City of Edinburgh	28. South Ayrshire
13. Eilean Siar	29. South Lanarkshire
14. Falkirk	30. Stirling
15. Fife	31. West Dunbartonshire
16. Glasgow City	32. West Lothian



4. Scottish Water Results (by Local Authority)

ABERDEEN CITY COUNCIL



Supply zones in Aberdeen City

Craigie
 Invercannie
 Mannofield East
 Mannofield North
 Mannofield South
 Mannofield West/Pitfodels

Water Quality in Supply Zones

Scottish Water carried out a total of 2,989 tests on tap samples taken in the 6 water supply zones within Aberdeen City boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	731	7	0.96
Faecal coliforms	731	0	0
Colour	239	0	0
Turbidity	239	1	0.42
Hydrogen ion (pH)	239	0	0
Aluminium	238	1	0.42
Iron	238	3	1.26
Manganese	238	16	6.72
Lead	48	1	2.08
Trihalomethanes	48	0	0

Incidents

There were no drinking water quality incidents reported within the Aberdeen city area during 2004.

Local Authority Comments

Aberdeen City Council advise that they receive approximately 8 to 10 complaints annually from consumers directly referring to the quality of water supplied by Scottish Water. These typically comprise concerns over the taste or discoloured appearance of the water, and are often associated with work in the area by Scottish Water. Whilst acknowledging that emergencies do arise, it is suggested that Scottish Water could do more to provide effective and timeous information concerning such work to both customers and the local authority.

ABERDEENSHIRE COUNCIL



Supply zones in Aberdeenshire
Aboyne, Ballater, Braemar, Craighead, Craigie, Crathie, Forehill, Gallowhill Banff, Glendye, Invercannie, Lumsden, Mannofield South, Mannofield West, Rhynie, Terpersie Alford, Turriff, Whitehillocks

Water Quality in Supply Zones

Scottish Water carried out a total of 3,801 tests on tap samples taken in the 17 water supply zones within Aberdeenshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	842	8	0.95
Faecal coliforms	842	0	0
Colour	319	0	0
Turbidity	319	0	0
Hydrogen ion (pH)	320	4	1.25
Aluminium	318	2	0.63
Iron	318	4	1.26
Manganese	318	8	2.52
Lead	103	1	0.97
Trihalomethanes	102	2	1.96

Incidents

Date	Location	Type	Population	Outcome
Jan 04	Sandhaven S.R.	Microbiological failure	896	Boil notice for three days
Feb 04	Braemorlich S.R.	Microbiological failure	24	Bottled water for six days
Jun 04	Whitehillocks WTW	Microbiological failure	2000	Boil notice
Jun 04	Alford S.R.	Microbiological failure	1122	Boil notice

Local Authority Comments

No comments were received from Aberdeenshire Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

ANGUS COUNCIL



Supply Zones in Angus Council

Clatto East
 Clatto West
 Glenogil
 Lintrathen
 Whitehillocks

Water Quality in Supply Zones

Scottish Water carried out a total of 2,794 tests on tap samples taken in the 5 water supply zones within Angus Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	683	7	1.02
Faecal coliforms	683	1	0.15
Colour	228	0	0
Turbidity	228	1	0.44
Hydrogen ion (pH)	229	2	0.87
Aluminium	226	1	0.44
Iron	227	5	2.20
Manganese	226	1	0.44
Lead	32	0	0
Trihalomethanes	32	0	0

Incidents

Date	Location	Type	Population	Outcome
May 04	Blairstown S.R.	Microbiological failure	2	Boil notice for 14 days
Jun 04	Glenogil S.R.	Microbiological failure	12	Bottled water supplied
Jun 04	Whitehillocks WTW	Microbiological failure	2000	Boil notice

Local Authority Comments

No comments were received from Angus Council on the quality of water supplied by Scottish Water.

ARGYLL AND BUTE COUNCIL



Supply Zones in Argyll and Bute

Alexandria, Ardfern, Ardrishaig, Arinagour Coull, Ascog, Ballygrant Islay, Belmore, Blairlinnans North, Bunessan Mull, Campbeltown, Carradale, Carrick Castle, Claddich, Colonsay, Craighouse Jura, Craignure Mull, Dalmally, Dervaig Mull, Dhu Loch Bute, Eredine, Finlas, Gigha, Inverary, Kilchrennan, Kilmelford, Loch Eck, Lochgoilhead, Peninver, Port Charlotte Islay, Saddell, Tarbert, Tighnabruaich, Tiree, Tobermory Mull, Torra Islay, Tullich

Water Quality in Supply Zones

Scottish Water carried out a total of 2,944 tests on tap samples taken in the 36 water supply zones within Argyll and Bute Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	600	3	0.5
Faecal coliforms	600	0	0
Colour	242	0	0
Turbidity	242	0	0
Hydrogen ion (pH)	242	1	0.41
Aluminium	243	0	0
Iron	244	9	3.69
Manganese	244	1	0.41
Lead	148	0	0
Trihalomethanes	139	9	6.47

Incidents

Date	Location	Type	Population	Outcome
Jul 04	Luining WTW	Microbiological failure	150	Boil notice for 5 days
Jul 04	Islay Supply Zone	Microbiological failure	9	Boil notice for 4 days
Jul 04	Saddell WTW	Treatment failure	2000	'Do not use' notice for 4 days

Local Authority Comments

Argyll and Bute Council advise that they note the high standards of compliance of public water supplies within the area and the improvements being made by Scottish Water. This has been achieved in many cases through the connection of smaller public supplies into the network of larger, improved public supplies by the extension of public mains. The Council states that it is important that investment is continued in order to improve the more remote public supplies, many of which have difficulty in meeting the standard for trihalomethanes.

4. Scottish Water Results (by Local Authority)

CLACKMANNANSHIRE COUNCIL



Supply Zones in Clackmannanshire

Turret A

Glendevon A

Water Quality in Supply Zones

Scottish Water carried out a total of 1,798 tests on tap samples taken in the 2 water supply zones within Clackmannanshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	436	3	0.69
Faecal coliforms	436	0	0
Colour	149	0	0
Turbidity	149	1	0.67
Hydrogen ion (pH)	149	0	0
Aluminium	149	0	0
Iron	149	1	0.67
Manganese	149	0	0
Lead	16	0	0
Trihalomethanes	16	0	0

Incidents

There were no drinking water quality incidents reported within the Clackmannanshire area during 2004.

Local Authority Comments

Clackmannanshire Council advise that they are generally content with the way in which Scottish Water provides drinking water within the Council area.

DUMFRIES AND GALLOWAY COUNCIL



Supply Zones in Dumfries and Galloway
 Afton, Auchneel, Barclye, Black Esk, Black Esk Winterhope, Cargen, Carsphairn, Glengap, Kettleton, Killyour, Langholm, Larchfield, Lochenkit, Lochinver, Moffat, Palnure, Penwhirn, Penwhirn Barclye, Penwhirn Palnure, Ringford, Terregles, Winterhope

Water Quality in Supply Zones

Scottish Water carried out a total of 2,568 tests on tap samples taken in the 22 water supply zones within Dumfries and Galloway Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	519	7	1.35
Faecal coliforms	519	1	0.19
Colour	219	2	0.91
Turbidity	219	0	0
Hydrogen ion (pH)	219	0	0
Aluminium	220	1	0.45
Iron	219	15	6.85
Manganese	220	7	3.18
Lead	108	1	0.93
Trihalomethanes	106	9	8.49

Incidents

There were no incidents in 2004 in the Dumfries and Galloway area.

Local Authority Comments

Dumfries and Galloway Council advise that the quality of water supplied to Dumfries and Galloway is generally good, and although some chemical parameters have failed the requisite standard, these are not of any great public health significance. The Council states that its relationship with Scottish Water has been very good in the past, however it is becoming more difficult to contact and communicate with staff when problems arise. Concerns were raised that the current level of resources and local knowledge of systems would no longer be sufficient to deal effectively with a serious incident should one arise.

4. Scottish Water Results (by Local Authority)

DUNDEE CITY



Supply Zones in Dundee City

Clatto East

Clatto West

Water Quality in Supply Zones

Scottish Water carried out a total of 1,588 tests on tap samples taken in the 2 water supply zones within Dundee City boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	395	3	0.75
Faecal coliforms	395	1	0.25
Colour	128	0	0
Turbidity	128	1	0.78
Hydrogen ion (pH)	128	0	0
Aluminium	127	0	0
Iron	128	2	1.56
Manganese	127	1	0.79
Lead	16	0	0
Trihalomethanes	16	0	0

Incidents

There were no drinking water quality incidents reported within the Dundee City area during 2004.

Local Authority Comments

No comments were received from Dundee City Council on the quality of water supplied by Scottish Water.

EAST AYRSHIRE COUNCIL



Supply Zones in East Ayrshire

Afton
Amlaird
Bradán A
Bradán B
Corsehouse
Daer A

Water Quality in Supply Zones

Scottish Water carried out a total of 3,394 tests on tap samples taken in the 6 water supply zones within East Ayrshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	784	1	0.13
Faecal coliforms	784	0	0
Colour	290	0	0
Turbidity	290	0	0
Hydrogen ion (pH)	290	0	0
Aluminium	290	0	0
Iron	290	5	1.72
Manganese	291	13	4.47
Lead	43	0	0
Trihalomethanes	42	0	0

Incidents

There were no drinking water quality incidents reported within the East Ayrshire area during 2004.

Local Authority Comments

No comments were received from East Ayrshire Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

EAST DUNBARTONSHIRE COUNCIL



Supply Zones in East Dunbartonshire

Balmore A
 Balmore C5 North
 Balmore D
 Burncrooks
 Carron Valley B
 Gartcarron
 Milngavie C1
 Milngavie M1

Water Quality in Supply Zones

Scottish Water carried out a total of 3,376 tests on tap samples taken in the 8 water supply zones within East Dunbartonshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	798	10	1.25
Faecal coliforms	798	2	0.25
Colour	277	0	0
Turbidity	277	0	0
Hydrogen ion (pH)	275	0	0
Aluminium	275	0	0
Iron	277	4	1.44
Manganese	276	2	0.72
Lead	62	1	1.61
Trihalomethanes	61	5	8.20

Incidents

There were no drinking water quality incidents reported within the East Dunbartonshire area during 2004.

Local Authority Comments

No comments were received from East Dunbartonshire Council on the quality of water supplied by Scottish Water.

EAST LoTHIAN COUNCIL



Supply Zones in East Lothian

Castle Moffat

Chalkieside

Hopes

Rosebery

Water Quality in Supply Zones

Scottish Water carried out a total of 1,538 tests on tap samples taken in the 4 water supply zones within East Lothian Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	359	3	0.84
Faecal coliforms	359	2	0.56
Colour	128	1	0.78
Turbidity	128	0	0
Hydrogen ion (pH)	128	1	0.78
Aluminium	128	0	0
Iron	128	2	1.56
Manganese	127	1	0.79
Lead	27	0	0
Trihalomethanes	26	0	0

Incidents

There were no drinking water quality incidents reported within the East Lothian area during 2004.

Local Authority Comments

East Lothian Council advise that they took over 70 water quality monitoring samples during the course of 2004, including samples following complaints from members of the public. The majority of samples were deemed to be satisfactory for the parameters tested, although a few were unsatisfactory for total coliforms; these failures were however due to dirty taps. A further sample, taken following a consumer complaint, exceeded the maximum prescribed value for colour. Scottish Water thereafter advised the Council that there was a problem with the Alnwickhill Water Treatment Works, which supplies part of Musselburgh, being unable to entirely remove water colour. It is understood that this problem with excessive colour is ongoing.

4. Scottish Water Results (by Local Authority)

EAST RENFREWSHIRE COUNCIL



Supply Zones in East Renfrewshire

Milngavie C1
 Milngavie South Moorehouse
 Neilston
 Picketlaw
 South Moorehouse

Water Quality in Supply Zones

Scottish Water carried out a total of 1,342 tests on tap samples taken in the 5 water supply zones within East Renfrewshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	286	4	1.40
Faecal coliforms	286	2	0.70
Colour	117	0	0
Turbidity	117	0	0
Hydrogen ion (pH)	116	0	0
Aluminium	115	1	0.87
Iron	117	0	0
Manganese	116	0	0
Lead	36	3	8.33
Trihalomethanes	36	5	13.89

Incidents

Date	Location	Type	Population	Outcome
Aug 04	Corrie SR	Microbiological failure	28	Boil notice for 8 days

Local Authority Comments

No comments were received from East Renfrewshire Council on the quality of water supplied by Scottish Water.

CITY OF EDINBURGH COUNCIL



Supply Zones in City of Edinburgh
 Alnwickhill A, Alnwickhill B, Balmore E,
 Balmore F, Fairmilehead A,
 Fairmilehead B, Fairmilehead C, Hillend,
 Marchbank A, Marchbank B

Water Quality in Supply Zones

Scottish Water carried out a total of 5,056 tests on tap samples taken in the 10 water supply zones within Edinburgh Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	1278	7	0.55
Faecal coliforms	1278	0	0
Colour	390	34	8.72
Turbidity	390	0	0
Hydrogen ion (pH)	390	0	0
Aluminium	389	1	0.26
Iron	390	1	0.26
Manganese	389	0	0
Lead	82	0	0
Trihalomethanes	80	1	1.25

Incidents

Date	Location	Type	Population	Outcome
Jan 04	Fairmilehead A Supply Zone	Potential mains ingress	45	Boil notice for 3 days
Dec 04	Marchbank B Supply Zone	Microbiological failure (Details in Annex C)	500	Boil notice

Local Authority Comments

No comments were received from City of Edinburgh Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

COMHAIRLE NAN EILEAN SIAR



Supply Zones in Na h-Eileanan Siar
 Ardvourlie, Barra, Bayhead, Benbecula,
 Berneray, Cliasmol, Eriskay, Geocrab, Govig,
 Gravir, Hoy, Hushinish, Lemreway, Lochmaddy,
 Maaruig, Meavaig, Ness, Orasay, Rhenigidale,
 South Uist, Stornoway, Suainaval, Tarbert,
 Tolsta, West Lewis

Water Quality in Supply Zones

Scottish Water carried out a total of 1,330 tests on tap samples taken in the 25 water supply zones within Na h-Eileanan Siar boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	261	3	1.15
Faecal coliforms	261	1	0.38
Colour	107	18	16.82
Turbidity	107	4	3.74
Hydrogen ion (pH)	106	15	14.15
Aluminium	107	1	0.93
Iron	107	19	17.76
Manganese	107	4	3.74
Lead	84	0	0
Trihalomethanes	83	12	14.46

Incidents

Date	Location	Type	Population	Outcome
Nov 04	Rhenigidale WTW	Microbiological failure	19	Boil notice

Local Authority Comments

Na h-Eileanan Siar Council advise that they acknowledge the large improvements in drinking water quality within the Western Isles in recent years. Concerns were raised over the way in which Scottish Water notify the council on matters concerning water quality events as it was felt that this was, at times, over-complicated and could lead to delay or confusion. The need for Scottish Water to consider the taste and odour of water supplied was also expressed, particularly in terms of the use of chlorine.

FALKIRK COUNCIL



Supply Zones in Falkirk Council

Balmore E
 Balmore G
 Carron Valley A
 Turret A
 Turret/Balmore/Carron Valley

Water Quality in Supply Zones

Scottish Water carried out a total of 2,356 tests on tap samples taken in the 5 water supply zones within Falkirk Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	567	6	1.06
Faecal coliforms	567	0	0
Colour	191	0	0
Turbidity	191	0	0
Hydrogen ion (pH)	191	0	0
Aluminium	190	0	0
Iron	190	2	1.05
Manganese	190	0	0
Lead	40	0	0
Trihalomethanes	39	0	0

Incidents

There were no drinking water quality incidents reported within the Falkirk area during 2004.

Local Authority Comments

Falkirk Council advise that they are satisfied with the way in which Scottish Water provides drinking water within the Council area.

4. Scottish Water Results (by Local Authority)

FIFE COUNCIL



Supply Zones in Fife

Falkland
 Glendevon A
 Glendevon B
 Glendevon/Glenfarg
 Glenfarg
 Lomond Hills
 Newburgh

Water Quality in Supply Zones

Scottish Water carried out a total of 3,786 tests on tap samples taken in the 7 water supply zones within Fife Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	917	4	0.43
Faecal coliforms	917	0	0
Colour	308	0	0
Turbidity	308	1	0.32
Hydrogen ion (pH)	308	0	0
Aluminium	308	0	0
Iron	308	0	0
Manganese	308	0	0
Lead	52	1	1.92
Trihalomethanes	52	0	0

Incidents

There were no drinking water quality incidents reported within the Fife area during 2004.

Local Authority Comments

Fife Council advise that they are satisfied with the way in which Scottish Water provides drinking water within the Council area.

GLASGOW CITY COUNCIL



Supply Zones in Glasgow

Balmore B, Balmore C5 North, Balmore C5 South, Burncrooks, Daer B, Milngavie C1, Milngavie C3, Milngavie C4, Milngavie M1, Milngavie M2, Milngavie M3, Milngavie M4A, Milngavie M4C, Milngavie M5 Drumchapel, Milngavie M5 Renfrew

Water Quality in Supply Zones

Scottish Water carried out a total of 8,128 tests on tap samples taken in the 15 water supply zones within Glasgow City Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	1953	31	1.59
Faecal coliforms	1953	4	0.20
Colour	670	0	0
Turbidity	669	0	0
Hydrogen ion (pH)	668	2	0.30
Aluminium	666	0	0
Iron	667	5	0.75
Manganese	667	2	0.30
Lead	109	1	0.92
Trihalomethanes	106	8	7.55

Incidents

There were no drinking water quality incidents reported within the Glasgow City area during 2004.

Local Authority Comments

Glasgow City Council advise that they investigated a number of complaints from the public about water quality, but that their overall impression was that the standard of the water supplied by Scottish Water was satisfactory. Environmental Protection Services within the Council undertakes its own programme of sampling as a means of being informed about the water quality supplied within Glasgow and, again, laboratory reports indicate that the water quality is of a satisfactory standard.

4. Scottish Water Results (by Local Authority)

HIGHLAND COUNCIL



A list of all the zones in Highland Council appears on the next page.

Water Quality in Supply Zones

Scottish Water carried out a total of 7,725 tests on tap samples taken in the 134 water supply zones within Highland Council. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	1600	12	0.75
Faecal coliforms	1600	6	0.38
Colour	605	103	17.02
Turbidity	605	2	0.33
Hydrogen ion (pH)	605	48	7.93
Aluminium	605	9	1.49
Iron	605	44	7.27
Manganese	605	6	0.99
Lead	447	3	0.67
Trihalomethanes	448	72	16.07

Incidents

Date	Location	Type	Population	Outcome
Feb 04	Achnasheen WTW	Microbiological failure	56	Boil notice for three days
Apr 04	Drimnin WTW	Microbiological failure	35	Boil notice
Apr 04	Sconser WTW	Microbiological failure	35	Boil notice
Jun 04	Badcaul S.R.	Microbiological failure	70	Boil notice
Jun 04	Glenuig WTW	Microbiological failure (2 occasions)	47	Bottled water
Jul 04	Ballachulish WTW	Microbiological failure (Details in Annex C)	671	Boil notice
Jul 04	Invermoriston WTW	Microbiological failure (Details in Annex C)	300	Boil notice
Aug 04	Altnaharra S.R.	Microbiological failure	35	Boil notice

Local Authority Comments

Highland Council advise that they are content with the way in which Scottish Water provides drinking water in its area. Highland Council, Moray Council and the Consultant in Public Health Medicine meet on a quarterly basis to discuss any problems associated with the provision of water. Scottish Water keeps the Council aware of any incidents such as where boil notices have to be issued. No large incidents which involved Environmental Health occurred during 2004.

HIGHLAND COUNCIL



Zones in Highland Council Area

Achiltibuie, Achmelvich, Acharacle,
Achaphubuil, Achmore, Achnasheen, Alligin,
Altnaharra, Applecross, Ardgour, Ardsneaskin,
Armadale, Arnisdale, Assynt, Aultbea,

Backies, Badachro, Badcaul, Ballachulish,
Balmacara, Balnain, Beasdale, Bettyhill (Mor),
Blackpark, Blaich, Bohuntin, Bonar Bridge,
Bracadale, Braes, Broadford,

Cannich, Carbost, Clunas, Coiltie, Cromarty,

Dalcreichart, Dalwhinnie, Diabeg, Does,
Dornie, Dornoch, Drimmin, Drumbeg,
Drumfearn, Durness,

Earlish Skye, Elgol Skye, Elphin Knochan,

Fort Augustus, Fort William,

Gairloch, Garve, Glenachulish, Glencoe,
Glenconvinth, Glendale Skye, Glenelg,
Glenfinnan, Glenuig, Gorthleck,

Hoy Calder,

Inchlaggan, Inverasdale, Invergarry, Inverinate,
Invermoriston, Inverness, Isle Ornsay,

Kilchoan, Kilmaluag Skye, Kilmuir Skye,
Kinlochbervie, Kinlochewe, Kinlochleven,
Kishorn, Kyle of Lochalsh, Kylesku,

Laggan Bridge, Laid, Laide, Letterfearn,
Lochaline, Lochcarron, Lochend, Lochinver,
Loth & Portgower, Loy,

Mallaig, Marrel, Meadie, Mellon Udrigle,
Melvaig North Erradale, Melvich Strathy,

Nam Bat, Navidale, Nedd, Newmore,

Onich, Osedale Skye, Oykel Bridge,

Penifiler Skye,

Raasay Skye, Ratagan, Rosemarkie, Roybridge,

Salen, Sallachy, Sanna, Savalbeg, Sconser Skye,
Scourie, Shiel Bridge, Sheildaig, Skerray, Spean
Bridge, Staffin Skye, Stoer, Storr Forest Skye,
Strath Halladale, Strath Naver, Strathcarron,
Stromallus, Strontian,

Tarskavaig Skye, Teangue Skye, Tomatin,
Tomich, Tongue, Torridon, Torrin Skye, Trislaig,
Ullapool, Waternish Skye, Waterstein Skye.

4. Scottish Water Results (by Local Authority)

INVERCLYDE COUNCIL



Supply Zones in Inverclyde

Blairlinnans South
 Dougliehill
 Greenock
 Kaim Lochwinnoch

Water Quality in Supply Zones

Scottish Water carried out a total of 1,473 tests on tap samples taken in the 4 water supply zones within Inverclyde Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	336	0	0
Faecal coliforms	336	0	0
Colour	123	0	0
Turbidity	123	1	0.81
Hydrogen ion (pH)	123	0	0
Aluminium	123	0	0
Iron	123	1	0.81
Manganese	123	0	0
Lead	32	1	3.12
Trihalomethanes	31	1	3.22

Incidents

Date	Location	Type	Population	Outcome
Jun 04	Kaim WTW	Aluminium failure	6850	Investigation by DWQR, resulting in recommendations
Oct 04	Kaim WTW	Aluminium failure	2600	Additional recommendations

Local Authority Comments

Inverclyde Council advise that in general there are very few failing samples in the area. However, concern was expressed regarding high iron concentrations causing discoloured supplies in certain parts of the District, and the timescales proposed by Scottish Water to remedy the situation by replacement of the main.

MIDLOTHIAN COUNCIL



Supply Zones in Midlothian

Chalkieside
 Fairmilehead A
 Hillend
 Rosebery
 Rosebery/Gourlaw

Water Quality in Supply Zones

Scottish Water carried out a total of 1,976 tests on tap samples taken in the 5 water supply zones within Midlothian Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	462	2	0.43
Faecal coliforms	462	1	0.22
Colour	162	1	0.62
Turbidity	162	0	0
Hydrogen ion (pH)	162	1	0.62
Aluminium	163	0	0
Iron	163	0	0
Manganese	162	0	0
Lead	40	0	0
Trihalomethanes	38	0	0

Incidents

Date	Location	Type	Population	Outcome
Jan 04	Fairmilehead A Supply Zone	Potential mains ingress	45	Boil notice for 3 days

Local Authority Comments

Midlothian Council advise that they are satisfied with the way in which Scottish Water provides drinking water within the Council area.

4. Scottish Water Results (by Local Authority)

MORAY COUNCIL



Supply Zones in Moray Council

Badentian, Blairnamarrow, Clerkly Hill, Glenlatterach, Herricks, Rochomie, Spynie, Tomnavoulin, Turriff

Water Quality in Supply Zones

Scottish Water carried out a total of 1,622 tests on tap samples taken in the 9 water supply zones within Moray Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	349	0	0
Faecal coliforms	349	0	0
Colour	136	0	0
Turbidity	136	0	0
Hydrogen ion (pH)	136	0	0
Aluminium	135	2	1.48
Iron	135	0	0
Manganese	135	1	0.74
Lead	56	2	3.57
Trihalomethanes	55	3	5.45

Incidents

There were no drinking water quality incidents reported within the Moray area during 2004.

Local Authority Comments

The Moray Council advise that the quality of water supplied is considered to be good. The Council received 9 complaints relating to water quality in 2004. Of these, 4 were concerning the taste of chlorine, 1 was due to dirty water following a burst main and 4 were caused by the internal plumbing of the property. The response of Scottish Water staff in dealing with complaints is generally helpful and efficient. There were some areas in which the Council felt the service could be improved. These were mainly concerned with communication with the Council, particularly in the notification of satisfactory repeat samples following a failure and in connection with the provision of "first time" connections to consumers previously on a private supply.

NORTH AYRSHIRE COUNCIL



Supply Zones in North Ayrshire

Ashgrove, Balmichael Arran, Bradan B, Camphill, Castlehill, Corrie Arran, Corsehouse, Greenock, Lochranza Arran

Water Quality in Supply Zones

Scottish Water carried out a total of 2,918 tests on tap samples taken in the 9 water supply zones within North Ayrshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	659	4	0.60
Faecal coliforms	659	1	0.15
Colour	248	0	0
Turbidity	248	1	0.40
Hydrogen ion (pH)	248	0	0
Aluminium	248	0	0
Iron	248	2	0.80
Manganese	249	12	4.82
Lead	56	2	3.57
Trihalomethanes	55	0	0

Incidents

Date	Location	Type	Population	Outcome
Jul 04	Castlehill and Camphill Supply Zones	Discoloured supplies caused by manganese (Details in Annex C)	58000	DWQR investigation resulting in recommendations
Aug 04	Greenhead SR	Microbiological failures	300	Boil notice

Local Authority Comments

North Ayrshire Council advise that they sampled the public water supplies regularly throughout 2004 for routine public health screening, and most samples were of satisfactory bacteriological quality. Some quality problems were found, notably due to manganese. During 2004, 11 complaints were received from consumers, mostly about brown water or the taste of the water. Concern was expressed by the Council over Scottish Water's policy of not intervening with bursts on private water mains and overflows running to waste.

4. Scottish Water Results (by Local Authority)

NORTH LANARKSHIRE COUNCIL



Supply Zones in North Lanarkshire

Balmore A, Balmore B, Balmore C5 North, Balmore C5 South, Balmore E, Balmore F, Camps, Carron Valley A, Carron Valley B, Daer A, Daer Camps, Daer Coulter, Daer Glassford

Water Quality in Supply Zones

Scottish Water carried out a total of 7,047 tests on tap samples taken in the 13 water supply zones within North Lanarkshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	1701	13	0.76
Faecal coliforms	1701	0	0
Colour	575	0	0
Turbidity	575	0	0
Hydrogen ion (pH)	574	0	0
Aluminium	575	0	0
Iron	577	6	1.04
Manganese	576	1	0.17
Lead	98	1	1.02
Trihalomethanes	95	0	0

Incidents

There were no drinking water quality incidents reported within the North Lanarkshire area during 2004.

Local Authority Comments

No comments were received from North Lanarkshire Council on the quality of water supplied by Scottish Water.

ORKNEY ISLANDS COUNCIL



Supply Zones in Orkney Islands

Boardhouse, Eday, Kirkbister, North Hoy, North Ronaldsay, Rousay, Sanday, Shapinsay, South Hoy, Stromness, Stronsay, Westray, Wideford

Water Quality in Supply Zones

Scottish Water carried out a total of 771 tests on tap samples taken in the 13 water supply zones within Orkney Islands Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	159	3	1.89
Faecal coliforms	159	0	0
Colour	58	5	8.62
Turbidity	58	0	0
Hydrogen ion (pH)	58	3	5.17
Aluminium	58	3	5.17
Iron	59	6	10.17
Manganese	58	1	1.72
Lead	53	0	0
Trihalomethanes	51	4	7.84

Incidents

There were no drinking water quality incidents reported within the Orkney area during 2004.

Local Authority Comments

No comments were received from Orkney Islands Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

PERTH AND KINROSS COUNCIL



Supply Zones in Perth and Kinross

Clatto West, Dunkeld, Glendevon A, Glenfarg, Kenmore, Killiecrankie, Kinloch Rannoch, Kirkmichael, Rhynie, Turret B

Water Quality in Supply Zones

Scottish Water carried out a total of 3,838 tests on tap samples taken in the 10 water supply zones within Perth and Kinross Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	915	8	0.87
Faecal coliforms	915	0	0
Colour	313	0	0
Turbidity	313	2	0.64
Hydrogen ion (pH)	313	1	0.32
Aluminium	311	3	0.96
Iron	312	1	0.32
Manganese	311	1	0.32
Lead	68	2	2.94
Trihalomethanes	67	3	4.48

Incidents

Date	Location	Type	Population	Outcome
Aug 04	Deuchney S.R.	Microbiological failure	205	Boil notice
Oct 04	Dunkeld WTW	Multiple aluminium failures (Details in Annex C)	6194	Investigation by DWQR resulting in recommendations on operational practice

Local Authority Comments

Perth and Kinross Council advise that they have no comment to make, other than that there were a number of *Cryptosporidium* incidents during 2004 in the Council's area.

RENFREWSHIRE COUNCIL



Supply Zones in Renfrewshire

Blairlinnans South
Kaim Lochwinnoch
Milngavie M5 Drumchapel
Muirdykes

Water Quality in Supply Zones

Scottish Water carried out a total of 2,019 tests on tap samples taken in the 4 water supply zones within Renfrewshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	473	3	0.63
Faecal coliforms	473	0	0
Colour	169	0	0
Turbidity	169	0	0
Hydrogen ion (pH)	169	0	0
Aluminium	169	0	0
Iron	169	0	0
Manganese	169	1	0.59
Lead	30	0	0
Trihalomethanes	29	1	3.45

Incidents

Date	Location	Type	Population	Outcome
Jun 04	Kaim WTW	Aluminium failure	6850	Investigation by DWQR, resulting in recommendations
Oct 04	Kaim WTW	Aluminium failure	2600	Additional recommendations

Local Authority Comments

Renfrewshire Council advise that, although the total number of monitoring samples taken by Scottish Water in 2004 in the area is down from 2003, the quality of public drinking water supplied in Renfrewshire Council's area in 2004 continued to be of a reasonably high standard, with only a few isolated failures due mainly to the presence of coliform organisms. The number of monitoring samples taken during 2004 was particularly down for trihalomethanes, which had the highest percentage sample failure rate in 2003. The Council's Environmental Services department also have a routine sampling programme in place to monitor the quality of public water at the dietetic tap in people's homes and they attend regular local liaison meetings with Scottish Water.

4. Scottish Water Results (by Local Authority)

SCOTTISH BORDERS COUNCIL



Supply Zones in Scottish Borders

Acreknowe, Bonchester, Bonnycraig, Broughton, Dodburn, Drumelzier, Ettrickbridge, Heriot, Howden, Innerleithen, Manse Street, Newcastleton, Rawburn, Roberton, Rosebery, South Dean, Tweedsmuir, Yarrowfeus, Yarrowford,

Water Quality in Supply Zones

Scottish Water carried out a total of 2,421 tests on tap samples taken in the 19 water supply zones within Scottish Borders Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	499	6	1.20
Faecal coliforms	499	2	0.40
Colour	212	1	0.47
Turbidity	212	0	0
Hydrogen ion (pH)	212	1	0.47
Aluminium	198	0	0
Iron	200	1	0.50
Manganese	199	0	0
Lead	96	3	3.12
Trihalomethanes	94	0	0

Incidents

There were no drinking water quality incidents reported within the Scottish Borders area in 2004.

Local Authority Comments

Scottish Borders Council advise that they are satisfied with the way in which Scottish Water provides drinking water within the Council area.

SHETLAND ISLANDS COUNCIL



Supply Zones in Shetland Islands

Bigton, Cullivoe, Eela Water, Fair Isle, Fetlar, Foula, Lerwick, Mid Yell, Papa Stour, Skerries, South Yell, Sumburgh, Unst, West Burrafirth, Whalsay

Water Quality in Supply Zones

Scottish Water carried out a total of 714 tests on tap samples taken in the 15 water supply zones within Shetland Islands Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	141	2	1.42
Faecal coliforms	141	1	0.71
Colour	55	1	1.82
Turbidity	55	0	0
Hydrogen ion (pH)	55	4	7.27
Aluminium	57	3	5.26
Iron	57	3	5.26
Manganese	57	0	0
Lead	49	0	0
Trihalomethanes	47	6	12.77

Incidents

There were no drinking water quality incidents reported within the Shetland Islands area during 2004.

Local Authority Comments

No comments were received from Shetland Islands Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

SOUTH AYRSHIRE COUNCIL



Supply Zones in South Ayrshire

Afton
 Bradan A
 Bradan B
 Penwhapple

Water Quality in Supply Zones

Scottish Water carried out a total of 2,210 tests on tap samples taken in the 4 water supply zones within South Ayrshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	526	0	0
Faecal coliforms	526	0	0
Colour	183	0	0
Turbidity	183	0	0
Hydrogen ion (pH)	183	0	0
Aluminium	183	0	0
Iron	183	0	0
Manganese	184	12	6.52
Lead	30	0	0
Trihalomethanes	29	1	3.45

Incidents

There were no drinking water quality incidents reported within the South Ayrshire area during 2004.

Local Authority Comments

No comments were received from South Ayrshire Council on the quality of water supplied by Scottish Water.

SOUTH LANARKSHIRE COUNCIL



Supply Zones in South Lanarkshire

Camps
 Coulter
 Daer A
 Daer B
 Daer Camps
 Daer Glassford
 Dunside
 Glassford
 Milngavie C2

Water Quality in Supply Zones

Scottish Water carried out a total of 3,748 tests on tap samples taken in the 9 water supply zones within South Lanarkshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	899	10	1.11
Faecal coliforms	899	0	0
Colour	305	0	0
Turbidity	305	0	0
Hydrogen ion (pH)	304	0	0
Aluminium	305	0	0
Iron	306	3	0.98
Manganese	305	0	0
Lead	61	2	3.28
Trihalomethanes	59	0	0

Incidents

There were no drinking water quality incidents reported within the South Lanarkshire area during 2004.

Local Authority Comments

South Lanarkshire Council advise that they are generally satisfied with the way in which Scottish Water provides drinking water within the Council area. It notes that improved communication to customers may be beneficial in areas where planned work and repairs to the distribution system are taking place, as the Council's Environmental and Strategic Services section occasionally receives complaints from consumers regarding disruption or discoloured supplies arising from such work.

4. Scottish Water Results (by Local Authority)

STIRLING COUNCIL



Supply Zones in Stirling

Ardeonaig, Balquhidder, Belmore, Brig o'Turk, Carron Valley Houses, Crainlarich, Gartcarron, Killin, Lochearnhead, Muirlands School, Strathyre, Touch, Turret A, Tyndrum

Water Quality in Supply Zones

Scottish Water carried out a total of 2,001 tests on tap samples taken in the 14 water supply zones within Stirling Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	442	3	0.68
Faecal coliforms	442	0	0
Colour	166	0	0
Turbidity	166	0	0
Hydrogen ion (pH)	166	1	0.60
Aluminium	166	0	0
Iron	166	3	1.80
Manganese	166	1	0.60
Lead	61	0	0
Trihalomethanes	60	0	0

Incidents

Date	Location	Type	Population	Outcome
Jan 04	Strathyre WTW	Treatment failure	110	Boil notice for 11 days
Jan 04	Killin WTW	Treatment failure	380	Boil notice and bottled water

Local Authority Comments

Stirling Council advise that they are generally satisfied with the way in which Scottish Water provides drinking water within the Council area. The council notes that notification of sample failures and incidents is prompt and efficient and that the Council participates in Waterborne Hazard Plan exercises with Scottish Water.

WEST DUNBARTONSHIRE COUNCIL



Supply Zones in West Dunbartonshire

Alexandria
Blairlinnans North
Blairlinnans South
Burncrooks
Finlas

Water Quality in Supply Zones

Scottish Water carried out a total of 1,779 tests on tap samples taken in the 5 water supply zones within West Dunbartonshire Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	420	2	0.48
Faecal coliforms	420	0	0
Colour	145	0	0
Turbidity	145	0	0
Hydrogen ion (pH)	145	0	0
Aluminium	144	0	0
Iron	145	3	2.07
Manganese	145	1	0.69
Lead	35	0	0
Trihalomethanes	35	0	0

Incidents

There were no drinking water quality incidents reported within the West Dunbartonshire area during 2004.

Local Authority Comments

No comments were received from West Dunbartonshire Council on the quality of water supplied by Scottish Water.

4. Scottish Water Results (by Local Authority)

WEST LOTHIAN COUNCIL



Supply Zones in West Lothian

Balmore E
 Balmore F
 Marchbank A
 Pateshill
 Pateshill/Marchbank

Water Quality in Supply Zones

Scottish Water carried out a total of 2,026 tests on tap samples taken in the 5 water supply zones within West Lothian Council boundary. The table below provides details of the main parameters tested.

Parameter	Total no. of tests	Total no. of fails	% of fails
Total coliforms	509	1	0.19
Faecal coliforms	509	0	0
Colour	156	0	0
Turbidity	156	0	0
Hydrogen ion (pH)	156	0	0
Aluminium	156	0	0
Iron	157	0	0
Manganese	156	1	0.64
Lead	37	0	0
Trihalomethanes	34	1	2.94

Incidents

There were no drinking water quality incidents reported within the West Lothian area during 2004.

Local Authority Comments

No comments were received from West Lothian Council on the quality of water supplied by Scottish Water.

5. Private Water Supplies

Introduction

In the UK private water supplies are defined as any water supply that is not provided by a statutory water undertaker and in which the responsibility for its maintenance lies with the owner or person who uses the supply. Private water supplies may be drawn from a variety of surface and groundwater sources. Surface sources will include streams and rivers as well as private impoundment reservoirs. Groundwater sources include wells and boreholes (where an aquifer is penetrated by a shaft originating on the surface and the groundwater is then pumped via the shaft) or springs where groundwater issues naturally at the surface from the aquifer.

Local Authority Responsibilities

Local Authorities should have procedures in place for ensuring that they are meeting the requirements of the Private Water Supply (Scotland) Regulations 1992. The 1992 Regulations place a considerable workload on those Authorities serving the more rural areas. These areas often include a large number of private water supplies. More details of the regulatory framework are given below.

Current Regulatory Framework

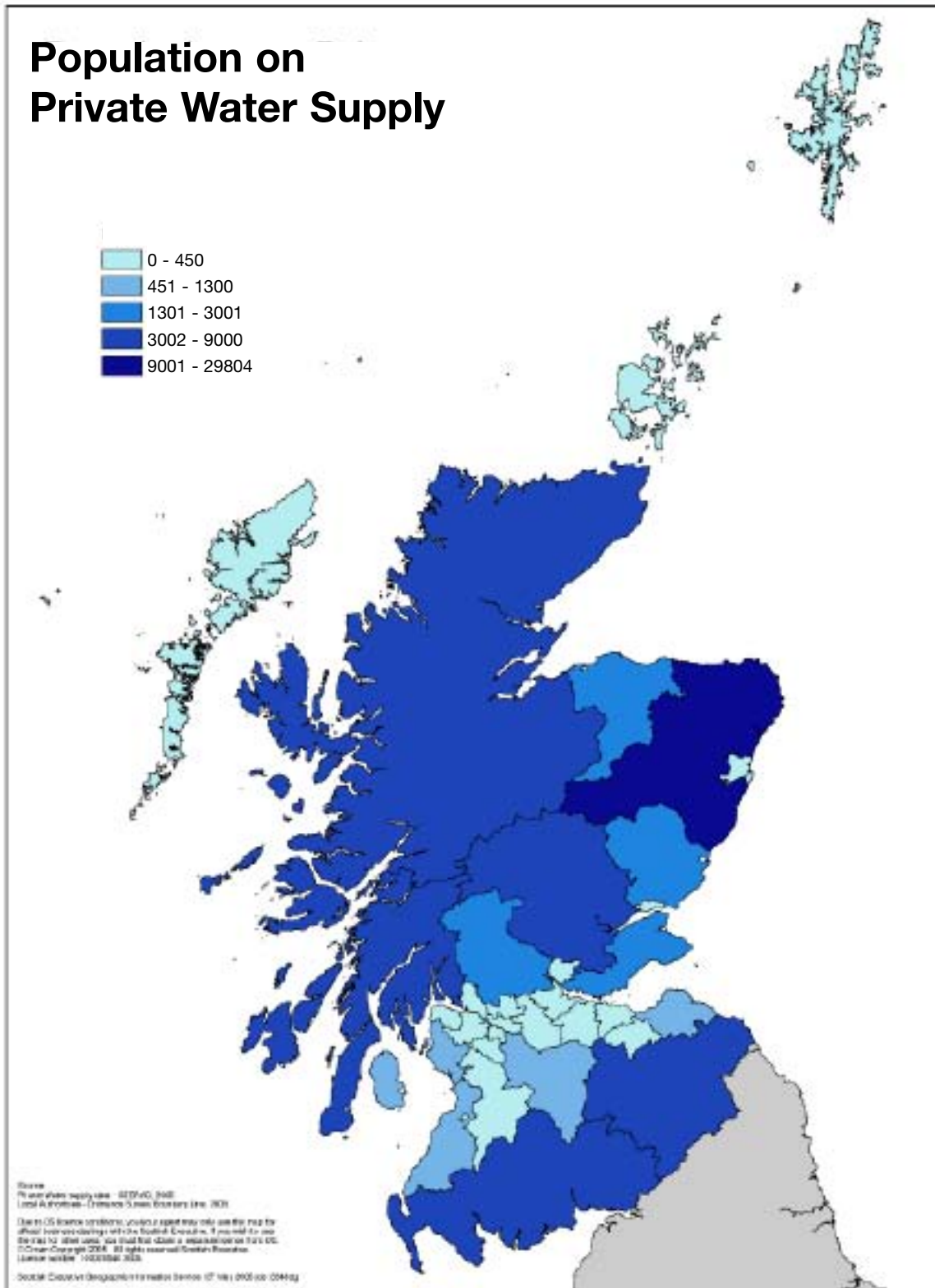
Private water supplies are currently governed by the Private Water Supply (Scotland) Regulations 1992, which transpose the 1980 European Drinking Water Directive (80/779/EEC) in relation to private water supplies. In general terms, the 1992 Regulations and the Directive seek to safeguard the health of users of private water supplies. The legislation places responsibilities on Local Authorities to monitor and improve private supplies. It also provides a framework within which Local Authorities can develop policies although these will vary in accordance

with the number of private water supplies in a particular area and the specific priorities of the Local Authority. Private water supplies can be very varied in nature and the legislation has been designed to enable Local Authorities to tailor their actions to their particular circumstances. Further details on the current regulatory framework for private water supplies is provided in Annex A.

Consultation is underway on revised regulations for private water supplies in Scotland. The proposed Private Water Supplies (Scotland) Regulations 2005 will implement the revised EC Drinking Water Directive as well as other recommendations on the delivery of safe drinking water, contained in World Health Organisation Guidelines and Scotland's *E.coli* Task Force Report.

The proposed Regulations will have a significant impact on supplies which fall within the provisions of the Directive, including all commercial properties such as rented accommodation and guesthouses. These will be required to meet the drinking water quality standards set by the Directive, and a duty will be placed on local authorities to monitor the quality of these supplies. There is provision for a supply to be given a derogation from full compliance with the Regulations until it is fully compliant and there are proposals for a grant scheme to assist with any necessary improvements.

Figure 1 Distribution of private water supplies in Scotland



5. Private Water Supplies

Private Water Supplies in Scotland 2004

In Scotland there are approximately 19,260 category one private water supplies serving just over 1.7% of the population (approximately 87,830 people). A further 57,770 estimated to use private water supplies either through use of food production facilities or as visitors to hotels, campsites etc. (category two supplies).

Approximately 14,550 of the supplies in category one serve single dwellings (category one).

In Annex D, *Table D.1* shows the breakdown of the data for category one supplies by Local Authority and *Table D.2* shows the same for category two.

Figure 1 shows the percentage of the population served by private water supplies in each Local Authority area.

The results of monitoring to the end of 2004 show that in category one, 3,196 of the supplies tested failed to meet requirements of the Regulations. Many of these category one failures (2164 in total) related to class F supplies, which Local Authorities have no direct obligation to test under the Regulations. Tests on class F supplies are carried out for many reasons. Some Local Authorities have had a long-standing policy of checking all private supplies. Others have found that they receive a significant number of requests to carry out tests. These requests can arise directly from the householder or as a result of enquiries from solicitors involved in the sale or purchase of houses with private supplies. In category two, 528 supplies tested failed to meet the requirements of the Regulations. Local Authorities reported a total of 9,503 supplies in category one and 114 supplies in category two across Scotland had yet to be assessed as to whether they complied with the Regulations.

Note In 2004 there were no category one class A or B supplies located in Scotland.

Following the failure of a supply the Local Authority may ask the householders or owners to improve the supply. Section 76G of the Water (Scotland) Act 1980 gives the Local Authorities powers to serve a notice requiring an improvement. Such a notice must specify the steps to be taken to improve the supply and the timescale. In addition, the notice must give details of the householder's rights to object and explain the procedure for referring the matter to Scottish Ministers for confirmation or otherwise. In practice, the formal procedure of serving a notice has not been widely adopted by Local Authorities with the Authorities generally preferring an informal approach where the householder is notified of the failure and persuaded that they should undertake an improvement. While this informal approach has advantages it also has the major drawback in that the householders may not be aware of their rights to object. In addition, where households seek grant aid for house improvements, the existence of a formal notice to improve water supplies may facilitate the availability of grants for this purpose.

The Local Authority reports to the end of 2003 show that in category two supplies improvement programmes were arranged for 478 supplies, just under 15% of those that failed. In category two 225 supplies or 42% of those failing also had improvement programmes arranged.

The regulatory standards for drinking water quality in Scotland largely stem from European Directives. On 5 December 1998 a revised Drinking Water Directive (98/83/EC) was published in the 'Official Journal of the European Communities'. Member States of the European Union were given five years to meet the standards set in the revised Directive. Exceptions to this timescale are the final standards for trihalomethanes (8 years) and lead (15 years). The original Drinking Water Directive of 15 July 1980 (80/778/EEC) was in force prior to this and was reflected in the Water Supply (Water Quality) (Scotland) Regulations 1990. Scotland and the rest of the UK implemented the revised Directive before the end of 2003 as required by the EC.

The key regulations are:

The Water (Scotland) Act 1980

- *Scottish Water must supply wholesome water for domestic purposes. It is a criminal offence to supply water unfit for human consumption;*
 - *Scottish Ministers must take enforcement action against Scottish Water if it fails in its duty to supply wholesome water unless the failure is trivial or Scottish Water is complying with a legally binding undertaking to remedy the matter;*
 - *local authorities must take appropriate steps to keep themselves informed about the wholesomeness of public and private water supplies in their area and notify Scottish Water if not satisfied;*
 - *local authorities are required to secure improvements to private water supplies if they consider them necessary; and*
- *wholesomeness is defined for public supplies in the Water Supply (Water Quality) (Scotland) Regulations 2001 and for private supplies in the Private Water Supplies (Scotland) Regulations 1992.*

The Water Supply (Water Quality) (Scotland) Regulations 2001

- *came into force on 25 December 2003;*
- *transpose the requirements of Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption into Scottish legislation;*
- *define wholesomeness by setting standards;*
- *set and define, the supply zone as the basic unit for quality monitoring;*
- *require Scottish Water to monitor the quality of its supplies;*
- *specify detailed sampling requirements for samples taken at taps within zones, at service reservoirs and at water treatment works;*
- *make provision whereby, taking account of public health risk, authorised directives may be issued where the water is not of the required quality; and*
- *require Scottish Water to publish an annual report and keep a public register of water quality in its area.*

The Water Industry (Scotland) Act 2002

- *Created the post of Drinking Water Quality Regulator for Scotland (DWQR).*
- *DWQR is responsible for enforcing the Water Supply (Water Quality) (Scotland) Regulations 2001.*
- *DWQR is independent of Ministers.*

Annex A – The Regulatory Framework

- DWQR has powers to obtain information, power of entry or inspection and power of enforcement.
- DWQR also has emergency powers to require a water supplier to carry out works to ensure quality of water supplied is safe for public consumption.

The Surface Waters (Abstraction for Drinking Water) (Classification) (Scotland) Regulations 1996

- sets standards for the quality of surface water to be used as sources of public water supply;
- permits waivers for certain parameters where these have a natural origin; and
- requires Scottish Water to classify all its sources of water in accordance with prescribed quality criteria subject to authorised waivers.
- requires continuous monitoring of high-risk supplies for *Cryptosporidium*.

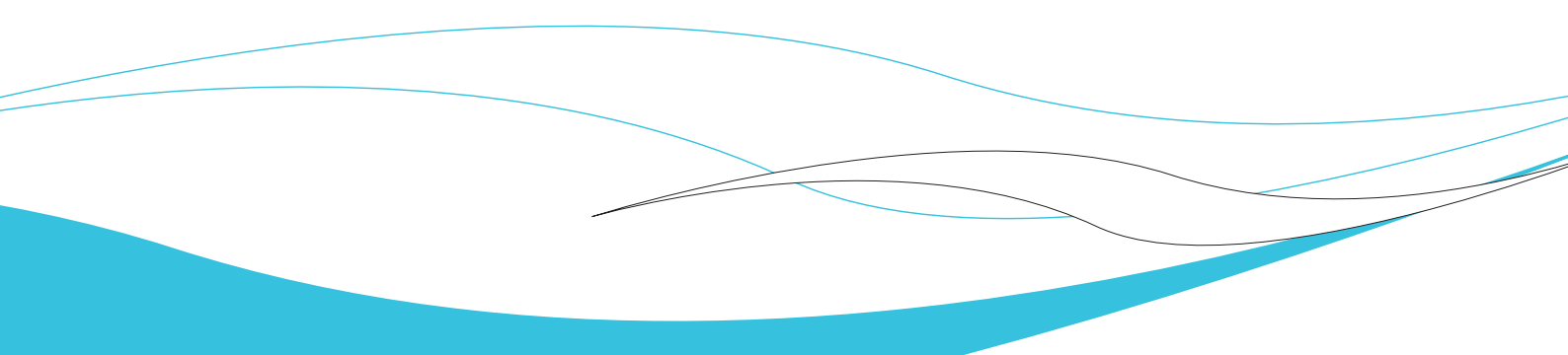
The Cryptosporidium (Scottish Water) Directions 2003

- came into force on 1 January 2004;
- require Scottish Water to implement the recommendations contained in the Third Report of the 'Group of Experts on *Cryptosporidium* in Water Supplies';
- set out a framework for assessing the risk of *Cryptosporidium* in public water supplies in Scotland and requires Scottish Water to assign a score to each of their supplies depending on the assessed risk;
- provide for more widespread testing for *Cryptosporidium* to provide data about background levels in water supplies; and

- from June 2004, every supply in Scotland will be tested at least once a month with the frequency of testing being based on the assessed risk and the flow through the works.

The Private Water Supplies (Scotland) Regulations 1992

- define wholesomeness in the same manner and prescribe the same standards as for public supplies;
- require local authorities to classify private supplies according to size and use:
- require local authorities to monitor private supplies in their area according to classification; and
- requires local authorities to secure improvements to private supplies if they consider them necessary.



Information Letter number	TITLE
1/2004	Guidance on reporting significant failures of drinking water quality
2/2004	The Water Supply (Water Quality) (Scotland) Regulations 2001: Report on the results of the survey of analytical performance for the measurement of lead
3/2004	Microbiological quality of water leaving treatment works and in service reservoirs: Drinking Water Safety Plans and regulation

Regulation 27

Letter number	TITLE
1/2004	Lead based compounds in PVC-U water pipes
2/2004	New national condition of use for hydrogen peroxide
3/2004	Supply of water, other than through pipes, during emergencies and routine maintenance
4/2004	Annual list of approved products and processes – December 2003
5/2004	Analysis of acrylamide monomer in drinking water
6/2004	New condition of approval for factory applied cement mortar lined pipes
7/2004	Modification to conditions of approval for in-situ applied polymeric coatings – consultation on new operational requirements and code of practice documents
8/2004	Use of existing equipment to supply water, other than through pipes, during emergencies and routine maintenance

Copies of these letters are available on the DWQR website: www.dwqr.org.uk/technical.html

Annex B – Index of Information Letters/Guidance Letters issued during 2004



Scottish Water is required to provide drinking water which is wholesome. Where the quality of drinking water supplied is not of a satisfactory standard (does not comply with the Regulations) they are under an obligation to advise Scottish Ministers of these instances. Such occurrences are classified as events. Where an event is considered particularly serious in nature or where bottled water and/or a boil notice have been issued, the event will be classified as an incident. The DWQR will investigate incidents as appropriate in order to determine the likely causes and to understand the actions taken by Scottish Water in managing and resolving the incident. Dependent upon the outcome of such investigations, actions may be taken which range from the issue of recommendations to prevent a recurrence, to the use of the Regulator's powers of enforcement.

Details of selected incidents, which occurred during 2004, are detailed below. There were a total of 28 incidents reported during 2004, 22 of which resulted in bottled water and/or a boil notice being issued. Each local authority page in chapter 4 provides information in respect of those not highlighted below:

Ballachulish, Argyll July 2004:

On Wednesday 7 July 2004 a microbiology sample taken the previous day from the final water sample tap of Ballachulish Water Treatment Works was found to have exceeded the regulatory standard with counts of 18 coliforms and 22 *E.Coli*. In addition, a sample taken from a consumer tap in Ballachulish contained 20 coliforms. Chlorine residuals measured at the time of sampling were extremely low, although this had not been reported to Scottish Water operational staff. A boil notice

was issued for the area supplied by the treatment works on the evening of 7 July. This was lifted on Friday 9 July following two consecutive sets of satisfactory samples.

Upon investigation it was discovered that there had been a loss of chlorine dosing at the treatment works over the previous 48 hours due to a battery failure. There is no mains power or telemetry at the works, although connection is planned during 2005. Low chlorine residuals observed during sampling should have been reported to operational staff. Scottish Water has reviewed staff communication procedures to ensure that this is done in future.

Invermoriston, Highland July 2004:

On Thursday 15 July 2004 a regulatory microbiology sample taken the previous day from the final water sample tap of the Wood Service reservoir at Invermoriston was found to have exceeded the regulatory standard with counts of greater than 100 coliforms and 55 *E.Coli*. Following discussions with the Consultant in Public Health Medicine (CPHM) for the area it was agreed that a boil notice should be issued for the area supplied by the treatment works.

Upon investigation of the failing sample by Scottish Water, the free chlorine residual in the water leaving Invermoriston treatment works was found to be in excess of 2.2mg/l, greatly above expected normal concentrations. The system was flushed in order to remove the highly chlorinated water, however the following day concentrations were again found to be high. The pump dosing sodium hypochlorite at the treatment works was found to have been replaced with one of greater capacity, without any compensation having been made to the

Annex C – Selected Drinking Water Quality Incidents

dose rate. The dose rate was reduced significantly and by the morning of 17 July chlorine residuals had returned to normal levels. Following satisfactory microbiological samples taken on the Thursday and Friday, the boil notice was lifted on the Saturday afternoon.

As a result of the incident, a chlorine monitor has been installed at the site and improvements have been made to Scottish Water's operational practices in the area. The cause of the failing microbiology sample is not known. DWQR staff undertook a follow-up audit at the site on 26 August 2004.

Largs and surrounding areas, North Ayrshire July/August 2004:

This incident commenced on 30 July when a planned valve operation by Scottish Water earlier in the day resulted in the disturbance of deposits of manganese in the distribution systems of the Camphill and Castlehill water supply zones, giving rise to water dark brown in colour. That evening Scottish Water began receiving a large number of calls concerning discoloured water at consumer taps. The main areas affected were Largs, Millport and West Kilbride. Information was provided to the public via local media. Complaints of discoloured water continued over the next few days, although the focus of the calls shifted towards the Ardrossan and Dalry areas.

Sampling undertaken by Scottish Water during the incident showed manganese concentrations up to 1409 µg/l. The maximum concentration for manganese prescribed in the relevant Regulations is 50 µg/l.

Due to the widespread nature of this incident, its cause and the fact that a similar incident had occurred two years previously in the same area, the DWQR took the decision to investigate with a view to preparing a report for the Procurator Fiscal recommending prosecution of Scottish Water for supplying water unfit for human consumption. A full investigation was completed, including the interview under caution of Scottish Water staff involved and the collection of witness statements from consumers. The final decision as to whether or not to proceed with a case rests with the Procurator Fiscal and he decided not to proceed in this instance.

In order to prevent a recurrence of such an incident in the area, Scottish Water has proposed a number of improvement measures both at the treatment works and in the distribution system. The DWQR will be monitoring such measures closely to ensure they are both timely and effective.

Dunkeld, Perth and Kinross October 2004:

Following customer complaints relating to taste and odour and illness in September and October 2004, samples were taken in the town of Bankfoot, which is served by Dunkeld Water Treatment Works (WTW). Both samples showed concentrations of aluminium in excess of the regulatory standard (PCV). These failures were not investigated by Scottish Water until 12 November 2004.

Annex C – Selected Drinking Water Quality Incidents

Elevated levels of aluminium in excess of the PCV were reported in the final water of Dunkeld WTW during October. Despite efforts to optimise the treatment process, high concentrations continued into November, mainly due to the inability of the works to deal with fluctuations in raw water quality. Three failures are recorded at the works, with a maximum of 466 µg/l aluminium detected in a sample taken on 17 November. Failures also occurred in samples taken from consumer taps throughout this period.

Ultimately it is proposed to supply the Dunkeld area with water from Perth WTW and for Dunkeld WTW to be decommissioned. In the interim, Scottish Water is taking steps to reduce the demand on the treatment works.

Craighall Road, Edinburgh December 2004:

Bacteriological sampling on 30 December following a valve repair on the 10" main in Craighall Road, Edinburgh detected the presence of coliforms. Subsequent resamples also failed, with >201 coliforms being detected at several locations downstream of the work. Flushing was undertaken over the next four days in an attempt to raise chlorine residuals, however this was not successful and mains chlorination took place on 5 January which was successful in restoring water quality.

This incident raised a number of issues surrounding the response to microbiological failures in the distribution system and the adequacy of training and equipment for emergency chlorination work. Scottish Water has proposed a number of measures to ensure any future similar incidents are dealt with swiftly.



Table D.1 Category One Supplies – Statistics reported by Local Authorities for 2004

Authority	Total, Private Water Supplies	Total Population	Population on PWS	% Total Population on PWS	1A	1B	1C	1D	1E	1F	Number failed	Number Improved	Improvement Programmes	Number to be tested
Aberdeen City	105	212,125	319	0.15	0	0	0	0	88	17	53	0	0	0
Aberdeenshire	8,187	226,871	29,335	12.93	0	0	1	54	1,259	6,873	1,204	0	0	5,575
Angus	349	108,400	2022	1.87	0	0	1	7	97	244	49	0	16	164
Argyll & Bute	1,800	91,306	12,175	13.33	0	0	2	9	527	1,262	413	0	102	351
Clackmannanshire	23	48,077	289	0.60	0	0	0	2	8	2	0	0	9	0
Dumfries and Galloway	1,323	147,765	6,398	4.33	0	0	0	4	10	9	170	0	22	333
Dundee City	1	145,663	19	0.01	0	0	0	15	387	921	0	0	0	0
East Ayrshire	139	120,235	0	0.00	0	0	0	0	1	0	19	0	0	0
East Dumbartonshire	0	108,243	102	0.09	0	0	0	0	46	93	0	0	0	0
East Lothian	33	90,088	655	0.73	0	0	0	0	0	0	8	0	0	0
East Renfrewshire	166	89,311	367	0.41	0	0	0	3	15	15	35	0	35	0
Edinburgh City	12	448,624	128	0.03	0	0	0	0	44	122	0	0	0	0
Eilean Siar	42	26,502	180	0.68	0	0	0	1	8	33	0	0	3	0
Falkirk District	8	145,191	23	0.02	0	0	0	0	4	4	2	0	0	3
Fife	293	349,429	2,004	0.57	0	0	0	5	153	135	111	0	16	12
Glasgow City	0	577,869	0	0.00	0	0	0	0	0	0	0	0	0	0
Highland	2,136	208,914	8,065	3.86	0	0	0	9	411	1,716	371	0	123	1,339
Inverclyde	46	84,203	193	0.23	0	0	0	1	17	28	15	0	12	2
Midlothian	66	80,941	443	0.55	0	0	0	1	29	36	0	0	0	0
Moray	552	86,940	2,868	3.30	0	0	2	16	167	367	79	0	0	249
North Ayrshire	289	135,817	1,151	0.85	0	0	0	2	67	220	24	0	0	43
North Lanarkshire	14	321,067	55	0.02	0	0	0	0	0	14	7	0	0	0
Orkney	221	19,245	460	2.39	0	0	0	0	9	212	14	0	14	95
Perth and Kinross	981	134,949	6,876	5.10	0	0	0	22	396	563	54	0	54	904
Renfrewshire	93	172,867	390	0.23	0	0	0	0	20	73	56	0	56	19

Annex D – Detail of Local Authority private water supplies returns

(continued)

Authority	Total, Private Water Supplies	Total Population	Population on PWS	% Total Population on PWS	1A	1B	1C	1D	1E	1F	Number failed	Number Improved	Improve-ment Notices	Number to be tested
Scottish Borders	1,246	106,764	8,383	7.85	0	0	0	21	576	649	192	0	6	163
Shetland Islands	75	21,988	198	0.90	0	0	0	0	16	59	46	0	9	16
South Ayrshire	221	112,097	1,181	1.05	0	0	0	4	65	152	157	0	0	89
South Lanarkshire	259	302,216	995	0.33	0	0	0	1	53	205	85	0	0	146
Stirling	520	86,212	2,180	2.53	0	0	0	3	29	488	0	0	0	0
West Dumbartonshire	17	93,378	96	0.10	0	0	0	0	7	10	10	0	0	0
West Lothian	44	158,714	280	0.18	0	0	0	1	15	28	22	0	1	0
SCOTLAND	19,261	506,2011	87,830	1.74	0	0	6	181	4,524	14,550	3,196	0	478	9,503

Category One Supplies (for domestic purposes) – definitions

Class	Number of person supplies	Consumption (m3d – sup 1)	Sampling Frequency (per annum)
A	>5,000	>1,000	24
B	501 – 5,000	101 – 1,000	12
C	101 – 500	21 – 100	2
D	25 – 100	5 to 20	1
E	<25	<5	0.2
F	1 dwelling		

Table D.2 Category Two Supplies – Statistics reported by Local Authorities for 2004

Authority	2001	2002	2003	2004	2005	Total 2(0)	2(ii)1	2(ii)2	2(ii)3	2(ii)4	2(ii)5	Total 2(ii)	Total people served 2(ii)	Total people served 2(ii)	TOTAL people served Cat 2
Aberdeen City	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Aberdeenshire	65	0	47	78	6	196	0	0	0	2	2	4	200	5,670	43
Angus	3	0	3	7	0	13	0	0	0	6	21	27	40	0	0
Argyll & Bute	27	0	52	137	2	218	0	1	20	52	85	158	376	9,000	10,455
Clackmannanshire	0	0	3	0	1	4	0	0	0	1	0	1	5	100	200
Dumfries and Galloway	157	0	13	5	3	178	1	0	9	15	25	50	228	3,926	6,684
Dundee City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Ayrshire	10	0	5	0	0	15	0	0	0	6	7	13	28	410	80
East Dumbartonshire	1	0	1	0	0	2	0	0	0	0	0	0	2	0	0
East Lothian	0	0	3	0	0	3	0	0	0	0	3	3	6	0	15
East Renfrewshire	7	0	0	0	0	7	0	0	0	1	2	3	10	30	66
Edinburgh City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eilean Siar	0	0	1	5	0	6	0	0	0	0	0	0	6	90	0
Falkirk District	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fife	0	0	7	1	4	12	0	0	3	4	7	14	26	678	160
Glasgow City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Highland	2	0	134	171	0	307	0	1	3	67	329	400	707	3,639	3,031
Inverclyde	5	0	1	2	3	11	0	0	0	0	0	0	11	31	0
Midlothian	1	0	1	0	0	2	0	0	0	0	0	0	2	14	0
Moray	9	0	31	11	1	52	0	0	0	0	0	0	52	600	0
North Ayrshire	11	0	4	0	4	19	0	0	0	7	4	11	30	212	218
North Lanarkshire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orkney	8	0	2	3	0	13	0	0	0	0	0	0	13	100	0
Perth and Kinross	7	0	10	54	0	71	0	0	1	56	44	101	3,482	1,423	4,962
Renfrewshire	4	0	1	3	0	8	0	0	0	0	0	0	8	226	0

Annex D – Detail of Local Authority private water supplies returns

(continued)

Authority	2(0)1	2(0)2	2(0)3	2(0)4	2(0)5	Total 2(0)	2(ii)1	2(ii)2	2(ii)3	2(ii)4	2(ii)5	Total 2(ii)	Total Cat 2	Total people served 2(i)	Total people served 2(ii)	TOTAL people served Cat 2
Scottish Borders	4	0	16	29	17	66	0	3	5	22	33	63	129	505	720	1,225
Shetland Islands	0	0	0	0	0	0	0	0	0	2	0	2	2	0	8	8
South Ayrshire	12	0	5	1	0	18	0	0	0	3	9	12	30	570	113	683
South Lanarkshire	17	0	0	1	1	19	0	0	0	0	0	3	22	106	50	156
Stirling	5	0	17	34	0	56	0	0	5	6	0	11	67	2,245	1,415	3,660
West Dumbartonshire	2	0	0	2	0	4	0	0	0	0	0	0	4	36	0	36
West Lothian	2	0	1	2	0	5	0	0	0	0	2	2	7	40	0	40
SCOTLAND	360	0	358	546	42	1,306	1	5	46	250	573	878	5,494	29,651	28,120	57,771

Category Two Supplies – Definitions

Class	Consumption (m3d – sup1)	Sampling Frequency (per annum)
1	>1,000	24
2	101-1,000	12
3	21-100	6
4	2 to 20	2
5	<2	1

Table E1 *Cryptosporidium* monitoring results of final water from high risk sites

Treatment Works	Number of samples	Number of positive samples	Number of oocysts per 10 litres		
			Minimum	Mean	Maximum
Balmichael	67	3	0.006	0.009	0.014
Bigton	29	10	0.006	0.008	0.019
Boardhouse	93	0	0	0	0
Craighead	74	0	0	0	0
Dornie	21	7	0.015	0.136	0.372
Forehill	368	25	0.009	0.009	0.009
Gallowhill	6	1	0.036	0.036	0.036
Glenconvinth	9	0	0	0	0
Howden	244	4	0.006	0.009	0.013
Innerleithen	9	0	0	0	0
Invercarnie	367	47	0.005	0.011	0.031
Kenmore BH	9	0	0	0	0
Kirkbister	75	0	0	0	0
Knowehead	4	0	0	0	0
Lintrathen	249	5	0.006	0.009	0.013
Loy	0	0	0	0	0
Lumsden	40	1	0.013	0.013	0.013
Milngavie	365	137	0.007	0.003	0.03
Newmore	35	0	0	0	0
Newton of Lathrisk	0	0	0	0	0
Perth	272	12	0.007	0.026	0.113
Rochomie	365	3	0.008	0.036	0.092
South Hoy	24	7	0.011	0.045	0.103
Spey Scheme	315	0	0	0	0
Staffin	33	3	0.007	0.007	0.007
Storr Forest	49	22	0.002	0.066	0.252
Stromness	0	0	0	0	0
Sumburgh	0	0	0	0	0
Tanarside	82	10	0.001	0.012	0.058
Terregles	67	0	0	0	0
Turriff	346	15	0.007	0.092	0.017
Wideford	44	0	0	0	0

Table E2 Summary of total samples and total positives for final water for medium/low risk

Number of sources	Total number of samples collected during 2004	Number of positive results during 2004
205	2,655	496

Table E3 Summary of total samples and total positives for raw water

Raw water sources	Total number of raw water samples collected during 2004	Number of positive results during 2004
High Risk	1,458	732
Medium/low risk	735	376

Annex E *Cryptosporidium* Sampling Results for 2004

There are currently some public water supplies in Scotland that do not consistently meet the prescribed standard for one or more parameters. Under regulations 20 and 21 of the 2001 Regulations, Scottish Water may apply to the Scottish Ministers for an Authorised Departure from one or more of the prescribed standard(s) in respect of a specified water supply. Authorised Departures may not be granted for a period in excess of three years, nor where a breach of the prescribed standard could present a risk to human health. When Scottish Ministers authorise a Departure, a revised limit is set for the parameter(s) in question, and Scottish Water is under an obligation to secure compliance with the standard prescribed in the Regulations by the date specified in the Authorised Departure. Additional monitoring for those revised parameters, at frequencies in excess of those provided for in the Regulations, may also be agreed.

When applying for an Authorised Departure, Scottish Water must copy their application to every appropriate local authority, NHS board and the Water Industry Commissioner, all of whom have an opportunity to make representations on the Authorised Departure application. Once an application is granted, Scottish Water must publicise the Authorised Departure either by placing an advertisement in an appropriate local newspaper, or, in smaller supply zones, by notifying individual customers by post.

The DWQR monitors progress with the work undertaken by Scottish Water in order to comply with the terms of the Authorised Departure to ensure that it is on track to achieve compliance by the date specified. Should progress on the work give cause for concern, the DWQR may initiate enforcement action against Scottish Water.

In 2004 Authorised Departures were granted by Scottish Ministers in 22 Water Supply Zones in Scotland. Most of these supply zones are in the North West of Scotland and have relatively small populations, in many cases less than 20 people. The parameters for which Authorised Departures have been granted are shown in the table below. Most zones with Authorised Departures have them for more than one parameter.

Parameter	No. of Zones with Authorised Departure for Parameter
THM	18
Colour	17
Iron	17
pH	3
Manganese	1

Many of these supplies are small upland sources which currently have no treatment other than chlorination. The solutions proposed include construction of the relevant treatment processes, or, where practical, supplying the area from a neighbouring supply which is compliant with the Regulations.

Annex F Authorised Departures

Authorised Departures granted in 2004 are listed below.

Water Supply Zone	Communities within Water Supply Zone	Authorised Departure Parameters	Authorised Departure End Date
Ardvourlie Western Isles	Parts of Isle of Harris	Trihalomethanes (THM) Colour Iron	23/11/2005
Aultbea	Parts of Tighnafiline, Bualnaluib, Ormiscraig and Mellon Charles	Trihalomethanes (THM) Colour	30/07/2005
Balnain	Parts of Balnain and Glen Urquhart	Trihalomethanes (THM) Colour Iron	31/12/2005
Barclye	Newton Stewart including: Bargrennan, Glentrool, Minnigaff, Old Minnigaff, Penninghame	Trihalomethanes (THM) Colour Iron	30/09/2007
Beasdale	Parts of Arisaig	Trihalomethanes (THM) Colour Iron	31/03/2005
Cannich	Cannich	Trihalomethanes (THM) Colour Iron Hydrogen ions (pH)	01/07/2006
Cliasmol Western Isles	Parts of Cliasmol	Trihalomethanes (THM) Iron	23/12/2005
Diabeg	Parts of Torridon	Trihalomethanes (THM) Colour Iron	10/01/2005
Drimnin	Parts of Drimnin	Trihalomethanes (THM) Colour Iron	31/03/2005
Glenconvinth	Beauly and surrounding area including Abriachan, Aigas, Balnacraig, Barnyards, Blackpark, Broallan, Bunchrew, Craig Dunain, Delmore, Dochfour, Dochgarroch, Dunain, Kilmorack, Kiltarlity, Kilianan, Kirkhill, Leachkin, Lentrán, Muirtown, Nevis Park Inverness, Ruisaurie, Struy, Torgormack and Wester Balblair	Trihalomethanes (THM)	31/03/2006

Annex F Authorised Departures

Authorised Departures granted in 2004 *(continued)*

Water Supply Zone	Communities within Water Supply Zone	Authorised Departure Parameters	Authorised Departure End Date
Govig	Parts of Isle of Harris	Hydrogen ions (pH) Iron Colour	23/12/2005
Invermoriston	Invermoriston	Trihalomethane (THM)	31/12/2006
Hushinish Western Isles	Parts of Hushinish	Trihalomethanes (THM) Colour Iron	23/12/2005
Laid	Laid	Trihalomethanes (THM) Hydrogen ions (pH) Colour	31/08/2005
Laide	Parts of Achnasheen	Trihalomethanes (THM) Colour Iron	30/07/2005
Loch Eck	Ardentinny, Benmore, Blairmore, Cairndow, Dunoon, Glenmassan, Hunter's Quay, Innellan, Kilmun, Kirn, Loch Eck, Rashfield, Sandbank, St Catherines, Strachur, Strathlachlan, Strone and Toward	Trihalomethanes (THM) Colour Iron	30/09/2006
Meavaig Western Isles	Parts of Isle of Harris	Iron	23/12/2005
Oykel Bridge	Parts of Lairg	Trihalomethanes (THM) Colour Iron	10/01/2005
Penwhirn Barclye	Newton Stewart including: Creebridge, Kirkcowan, Minnigaff, Old Minnigaff, Whithorn, Wigtown	Trihalomethanes (THM) Colour Iron	30/09/2007
Rhenigidale Western Isles	Parts of Isle of Harris	Iron	23/12/2005
South Hoy Orkney	Flotta, Longhope and Lyness	Colour Iron Manganese	31/07/2005
Stoer	Lochinver	Trihalomethanes (THM) Colour	31/07/2005

Audit of Scottish Water Treatment Works

The DWQR's team undertakes an annual programme of audits at water treatment works in order to ensure the sites are operated in accordance with the Water Supply (Water Quality) (Scotland) Regulations 2001. Some of these audits were undertaken in conjunction with the other UK water quality regulators. Such benchmarking is valuable in ensuring a consistent approach to water quality regulation across the UK.

In 2004, 12 water treatment works and 8 service reservoirs were audited in Scotland. The audit process normally results in a number of recommendations being made. These are followed up with Scottish Water management to ensure that they are implemented.

Audit of Scottish Water Laboratories

Every major laboratory utilised by Scottish Water for the testing of drinking water samples was audited by DWQR in 2004 including one subcontracting facility. The process included a series of vertical audits whereby individual samples were trailed through the sampling, transportation and analysis stages to ensure satisfactory performance. Individual analytical methods were also witnessed.

A separate audit exercise was also undertaken with respect to the analysis of *Cryptosporidium* which was additional to the audit of compliance with the *Cryptosporidium* Directions discussed below.

Part of the laboratory audit programme included "benchmarking" with Drinking Water

Inspectorate staff who assisted with some of the audit activity. This is undertaken to ensure there is uniformity of approach throughout the UK with respect to the standards being enforced for the sampling and analysis of drinking water.

In 2004 serious deficiencies were identified at one of Scottish Water's laboratories resulting in enforcement action being instigated by the DWQR. An extensive improvement programme was put in place by Scottish Water, but after follow-up audits and dialogue with DWQR, the threat of enforcement action was lifted.

Audit of Compliance with the *Cryptosporidium* (Scottish Water) Directions 2003

These Directions came into force on 1 January 2004. An audit of Scottish Water's compliance with the Directions was undertaken in November and December 2004. The audits were specifically tailored to the Directions, and considered aspects such as the provision of suitable process monitoring equipment at treatment works, *Cryptosporidium* sampling arrangements and the availability of appropriate quality assurance documentation. Sixteen sites were audited, all of which were categorised as high risk for *Cryptosporidium* by the risk assessment process. A subsequent office audit covered such areas as company procedures, staff training and emergency arrangements. Although a total of 86 recommendations were raised, much progress had been made since the previous audit and, in general, it was considered that Scottish Water was compliant with the Directions for those sites audited. It is anticipated that the audit will be extended to medium and low risk sites in 2005.

Annex G Other Key Activities Undertaken on Behalf of the DWQR in 2004

Drinking Water Quality Research

The Drinking Water Quality Division of the Scottish Executive contributes to and commissions research work on drinking water quality issues of particular relevance to Scotland. The DWQR offers advice and guidance on aspects of this research. Research topics for 2004/5 with DWQR involvement included:

Campylobacter in Private Water Supplies

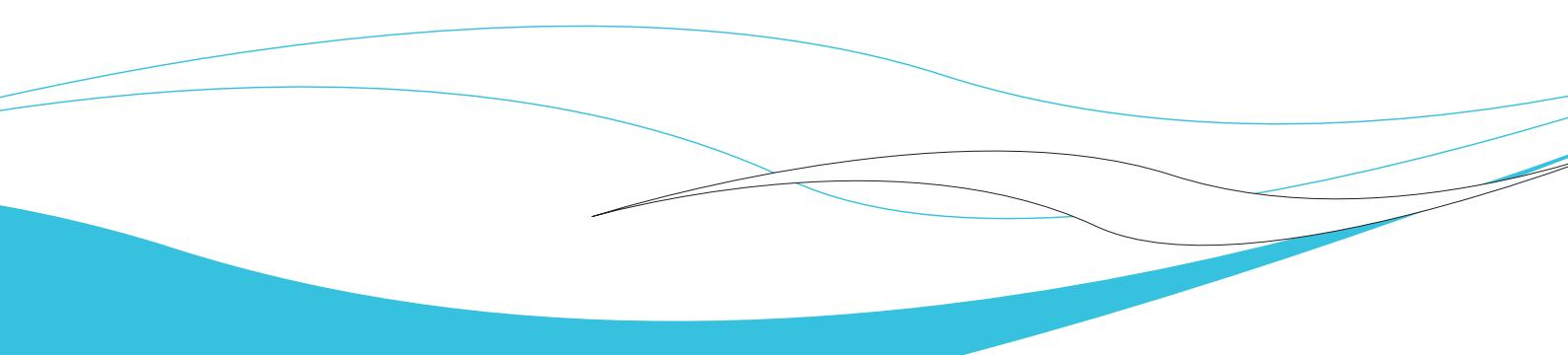
Development of Drinking Water Safety Plans in Scotland

Distribution Operation and Maintenance Strategy

Ecological study of *Cryptosporidiosis* in Central Scotland

Quality and Standards Investment Process

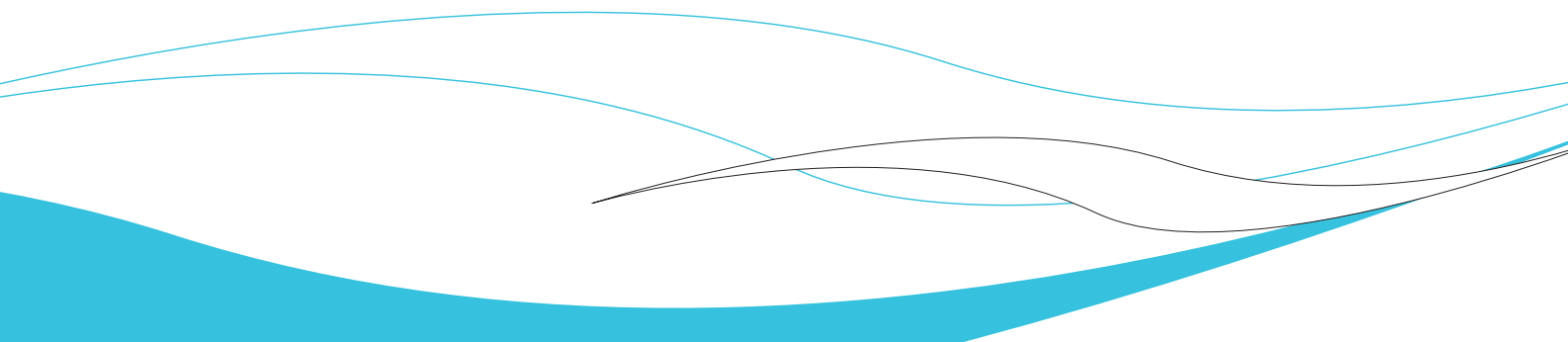
The Quality and Standards process identifies the capital investment required by Scottish Water. The next investment period commences in 2006, and although the process is managed by the Scottish Executive, the DWQR plays an important role in working with the Scottish Executive and Scottish Water to identify the investment needed to ensure drinking water quality will meet future standards and continues to comply with existing ones. Major areas of investment for the next regulatory period are likely to include work to ensure compliance for trihalomethanes, colour, iron and manganese standards.



Acknowledgements

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ISBN 0-7559-4509-3



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