



**Scottish  
Water**

Always serving Scotland

Annual Water Quality Report  
2011



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# Foreword

## Scottish Water provides a vital public service, essential to the health of the nation.

We provide good, clean, safe and high quality drinking water to 2.4 million households across Scotland. Every day we deliver 1.3 billion litres of drinking water to households and businesses in our drive to become Scotland's most valued and trusted business.

Water quality in Scotland continues to be of an extremely high level and is rigorously tested to ensure it complies with the strictest standards. We want our customers to enjoy the look and taste of their public water supply.

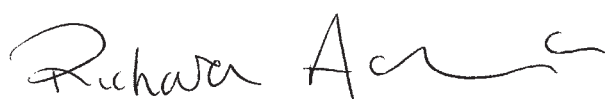
During 2011, we conducted over 300,000 laboratory analyses on regulatory samples taken at treatment works, service reservoirs and customer taps. Of these, 99.86% complied with the regulatory standards. In addition to regulatory monitoring, many more samples were analysed both in the laboratory and on-site for operational reasons providing additional checks and monitoring performance of our assets.

We have now completed the first full year of the 2010-15 capital programme with customers enjoying the benefits of our continued improvement of drinking water quality and security of supply. Significant investment and improvements will continue to be made over the period.

During 2011 we have continued to review our emergency plans, implementing lessons learned from the previous year's extreme weather conditions and water quality incidents. I am very pleased to report that we now have almost 1,200 staff who have volunteered to respond in an emergency. We have ensured that all volunteers are trained for their emergency roles and able to minimise customer issues during future extreme weather periods and water quality incidents.

In October 2011, the new Drinking Water Quality Regulator for Scotland (DWQR), Mrs Sue Petch, was appointed by Scottish Ministers. We look forward to working closely with Mrs Petch and her team to continue to improve the quality of public drinking water supplies in Scotland.

I hope you will find this report interesting and informative. It demonstrates our commitment to deliver clearer, fresher drinking water and an improved service.



**Richard Ackroyd**  
Chief Executive  
Scottish Water

# Introduction

## Scottish Water continues to provide a very high standard of water quality as demonstrated in this report.

The quality of our drinking water supplies is carefully assessed by thorough monitoring of the supply system and using a wide range of analytical techniques. This provides quality assurance from the water source to customers' taps.

Samples taken as part of the mandatory programme were analysed at our in-house laboratories in Edinburgh, Inverness, Stornoway and Orkney. The laboratories in Stornoway and Orkney were closed in December 2011. In 2012 samples from Shetland, Orkney and Western Isles will be transported to the Edinburgh or Inverness laboratories for analysis. The full laboratory and sampling organisation, structure and processes are audited by the United Kingdom Accreditation Service (UKAS) and the DWQR to assess compliance with the ISO 17025 standard and the Drinking Water Testing Specification (DWTS).

We continue to work closely with the DWQR and health professionals to ensure water quality is of the highest possible standard and that public health is maintained.

## Key Facts

- We serve 2.4 million households daily. On average we supply 842 million litres of water per day (MI/d) to household customers and 430MI/d to the non-household sector.
- During 2011 we operated 265 water treatment works (WTW), 1032 service reservoirs and 314 water supply zones.
- We undertook 323,634 scientific tests on water samples from water treatment works, service reservoirs and customers' taps.
- 99.86% of all tests met statutory microbiological and chemical standards.
- There has been another significant improvement in trihalomethanes compliance at customers' taps.

Full details of the quality of water supplied during 2011 are provided in the next section and appendices A and B.

# Water Quality Analysis

**In 2011 we carried out 323,634 scientific tests on water samples from water treatment works, service reservoirs and customers' taps<sup>1</sup>.**

Compliance with the statutory sampling programme fell slightly from 99.40% in 2010 to 99.01% in 2011. This is mainly attributable to the extreme weather seen across Scotland in the first few months of 2011. The extremely cold temperatures and prolonged covering resulted in frozen and damaged sample points and impacted on our ability to rapidly repair any damaged equipment over that period.

In 2011 we embarked on replacement of key sample points aimed at providing additional protection by enclosing them in cabinets where possible. This will continue throughout 2012 to ensure everything possible is done to protect our sample points against the impact of adverse weather and minimise the risk of unrepresentative samples.

The water quality data included in this report represents sampling and analysis carried out under The Water Supply (Water Quality) (Scotland) Regulations 2001 (as amended) ("the Regulations"). These Regulations came in to full effect on 25th December 2003.

## Information Submission

During 2011, we have further improved our process of supplying monthly electronic information submissions to the DWQR which identify water samples taken at our assets, the corresponding sample results, and any public health event notifications. We also provided the DWQR with information on customer contacts, regulatory supply zones, and operational or out of service assets.

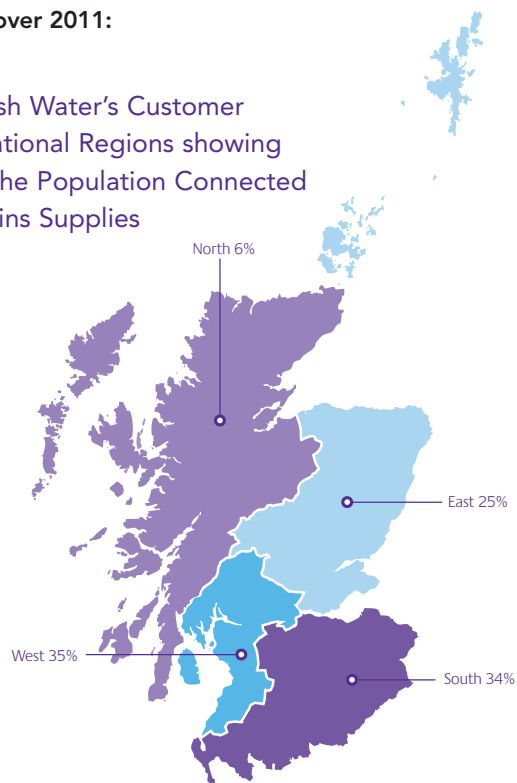
We continued to ensure that the DWQR has always been provided with consistent, timely and reconcilable information which in turn provided customers with access to water quality details in their area. This access to reliable data enabled the DWQR to carry out independent detailed analysis of our performance and to link customer tap sample results with customer contact information.

In 2011 we have again worked closely with the DWQR team to aid our understanding of their requirements and enhance their understanding of the functionality of our systems. We are committed to continuous improvement in this area as demonstrated by ongoing development of our data repository which supports the production of more automated data submissions.

During 2012, we will continue to improve the working processes currently in place and also build on the benefits already gained from previous data improvement initiatives.

**We operated as four operational areas over 2011:**

Scottish Water's Customer Operational Regions showing % of the Population Connected to Mains Supplies



Water assets by area

Operational Area	No. of water treatment works (WTW)	No. of service reservoirs (SR)	No. of water supply zones
East	58	388	66
North	129	265	129
South	39	210	58
West	39	169	61
Total	265	1,032	314

<sup>1</sup> These figures refer only to those regulatory parameters where compliance is calculable i.e. those which have a specific prescribed concentrations or value (PCV). Parameters such as agar plate counts, total organic carbon (TOC) and residual disinfectant are not included.

### Microbiological Parameters

Microbiological standards apply to water leaving treatment works and service reservoirs, and supplied at customers' taps.

Coliform organisms are present in large numbers in the intestine of all warm-blooded animals, but are also widely distributed in the environment. They are used as indicators of the integrity of the water supply system. Coliforms can also be present in domestic plumbing systems, with kitchen taps and sinks recognised as often being contaminated by these organisms. The *Escherichia coli* (*E.coli*) or faecal coliform organism is a coliform bacterium and has historically been regarded as the primary indicator of faecal contamination of both untreated and treated water. *E.coli* is present in the intestine of all warm-blooded animals.

The presence of coliforms or *E.coli* in water supplies can be as a result of sub-optimal operation of water treatment processes or ingress contamination from breaches in the integrity of the distribution system. It is important that the integrity and effectiveness of disinfection systems at our treatment works and within our distribution systems is maintained. To ensure this, the levels of residual disinfectant leaving treatment works and in the distribution system are closely monitored. In total 94,841 samples were taken and analysed.

### Samples Taken for Residual Disinfectant

Sampling Location	Number of Samples Taken for Residual Disinfectant*
Water leaving water treatment works	28,729
Water in service reservoirs	51,888
Water at customers' taps	14,224

\* There is no regulatory standard for residual disinfectant

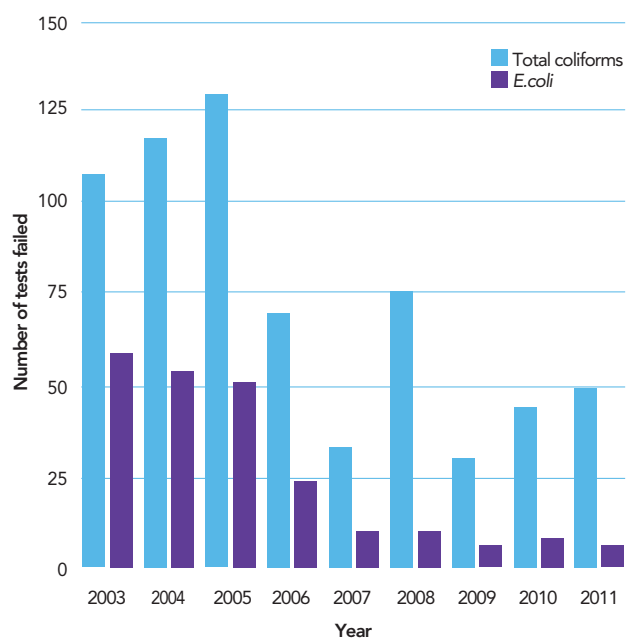
We also test for enterococci & *Clostridium perfringens* at customers' taps. Enterococci are used as secondary indicators of faecal pollution in water. The main use of this indicator organism is to assess the significance of coliform organisms in a sample in the absence of *E.coli*.

Tests for *Clostridium perfringens* are used as an indicator of faecal contamination in situations where other indicator organisms may not have survived. The presence of this organism when other faecal indicator organisms are absent may indicate a remote or intermittent pollution.

## Water Treatment Works

In 2011, 28,792 samples were taken for total coliform and 28,794 samples were taken for *E.coli* coliform analysis. Compliance with the total coliform standard was 99.83% and with the *E.coli* coliform standard was 99.98%.

Chart 1: Microbiological Water Quality  
Number of tests failed at water treatment works



## Coliform failures

The breakdown of failures by operational area is as follows:

49 failures were reported from a total of 28,792 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	12	99.83%
North	15	99.80%
South	13	99.81%
West	9	99.88%
Total	49	99.83%

Over 12% of the coliform failures that occurred in 2011 were from the Alnwickhill treatment works which has now been closed and replaced by the new Glencorse treatment works.

## *E.Coli* failures

5 *E.coli* failures were reported from a total of 28,794 samples.

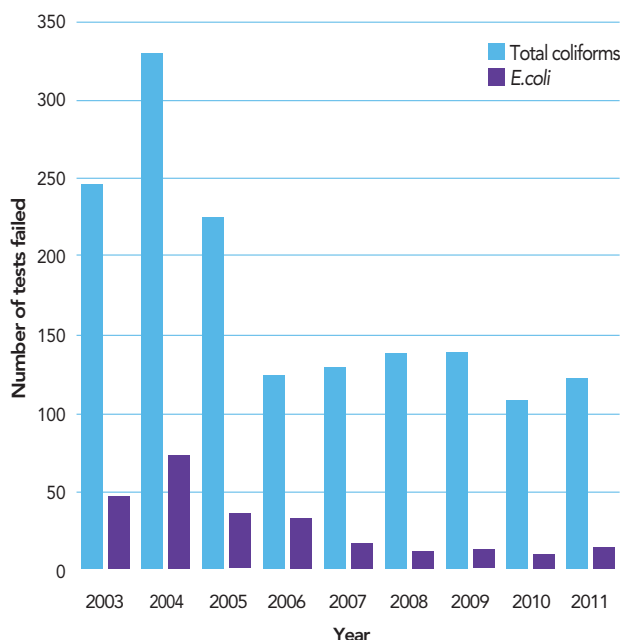
Operational Area	No. of failures	Percentage of tests compliant
East	2	99.97%
North	1	99.99%
South	1	99.99%
West	1	99.99%
Total	5	99.98%

## Water Quality Analysis *continued*

### Service Reservoirs

In 2011, 51,952 samples were taken for total coliform and for *E.coli* coliform analysis. Compliance with the total coliform standard was 99.77% and with the *E.coli* coliform standard was 99.97%.

Chart 2: Microbiological Water Quality  
Number of tests failed at service reservoirs



### Coliform failures

122 coliform failures were reported from a total of 51,952 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	72	99.63%
North	23	99.82%
South	14	99.87%
West	13	99.85%
<b>Total</b>	<b>122</b>	<b>99.77%</b>

### *E.coli* failures

13 *E.coli* failures were reported from a total of 51,952 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	10	99.95%
North	0	100.00%
South	1	99.99%
West	2	99.98%
<b>Total</b>	<b>13</b>	<b>99.97%</b>

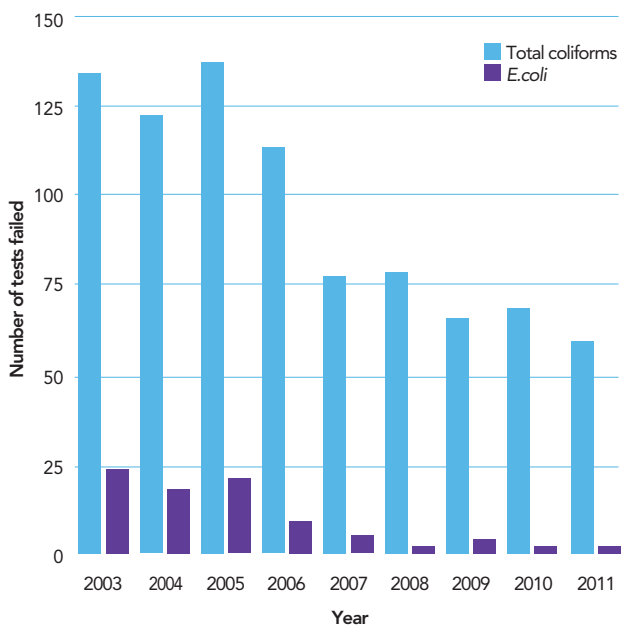
While compliance with the total coliform and *E.coli* standards remain high there has been a small deterioration compared with 2010. A proportion of the investigations into the 2011 service reservoir bacteriological failures identified a link between heavy rainfall events and asset condition. We are currently investigating the required remedial actions.



## Customers' Taps

In 2011, 14,226 samples were taken for total coliform and 14,225 samples were taken for *E.coli* coliform analysis. Compliance with the total coliform standard was 99.58% and with the *E.coli* coliform standard was 99.99%.

Chart 3: Microbiological Water Quality  
Number of tests failed Customers' Taps



## Coliform failures

The number of coliform failures at customers' taps has decreased to just 60 from a total of 14,226 samples in 2011, compared with 69 from 14,305 samples in 2010. The breakdown of failures by operational area is as follows:

Operational Area	No. of failures	Percentage of tests compliant
East	21	99.40%
North	8	99.51%
South	15	99.65%
West	16	99.66%
Total	60	99.58%

## *E.coli* failures

The number of *E.coli* failures at customers' taps has remained the same as 2010 at 2 failures from a total of 14,225 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	2	99.94%
North	0	100.00%
South	0	100.00%
West	0	100.00%
Total	2	99.99%

## Enterococci

1,574 samples were taken for enterococci analysis of which 1 sample failed to comply with the enterococci standard. Compliance in 2011 remains at 99.94% as in 2010.

## *Clostridium perfringens*

5,068 samples were taken for *clostridium perfringens* analysis of which 1 sample failed to comply with the *Clostridium perfringens* standard. Compliance in 2011 was 99.98% which increased from 99.92% in 2010.

## Water Quality Analysis *continued*

### Cryptosporidium

*Cryptosporidium* is a microscopic protozoan parasite which lives in the intestines of animals and people. *Cryptosporidium* oocysts are resistant to chemical disinfectants so need to be removed through fine filtration.

In addition to the Regulations, The *Cryptosporidium* (Scottish Water) Directions 2003 issued by Scottish Ministers outline duties and responsibilities to minimise the risk of *Cryptosporidium* in water supplies. There is no regulatory compliance standard for *Cryptosporidium*. The sampling programme is based on the level of risk at each water treatment works.

In 2011, 8,988 tests were carried out on final water samples at water treatment works, of which there were 378 *Cryptosporidium* positive samples.

Year	Number of samples	Total number of positives
2011	8,988	378 (30*)
2010	9,387	311 (13*)
2009	10,388	418 (23*)

\* Positives greater than or equal to 0.10 oocysts per 10 litres

Sites with high numbers of positive samples have been identified as requiring robust treatment processes and remain susceptible to extreme variations in weather. A number of these sites have seen increases in the level of positive results recorded between 2010 and 2011. These water treatment works are due for improvement during the 2010-2015 investment period.

### Physical and Chemical Quality

Physical and chemical parameters are monitored at customers' taps. In addition, turbidity and nitrite samples are taken at treatment works.

### Water Treatment Works

#### Nitrite failures

Parameter	No. of tests 2011	Compliance 2011	Compliance 2010	Compliance 2009
Nitrite	2,910	99.97%	99.90%	99.83%

Standard for nitrite at treatment works is 0.1mgNO<sub>2</sub>/l as opposed to 0.5mgNO<sub>2</sub>/l at customers' taps.

There was 1 nitrite exceedance out of 2,910 samples in 2011 compared to 3 in 2010 from 2,859 samples.

#### Turbidity failures

Parameter	No. of tests 2011	Compliance 2011	Compliance 2010	Compliance 2009
Turbidity	7,745	99.69%	99.64%	99.68%

Standard of 1 NTU applies at treatment works as opposed to 4 NTU at customers' taps.

24 failures were reported from 7,745 samples, 4 less than in 2010.

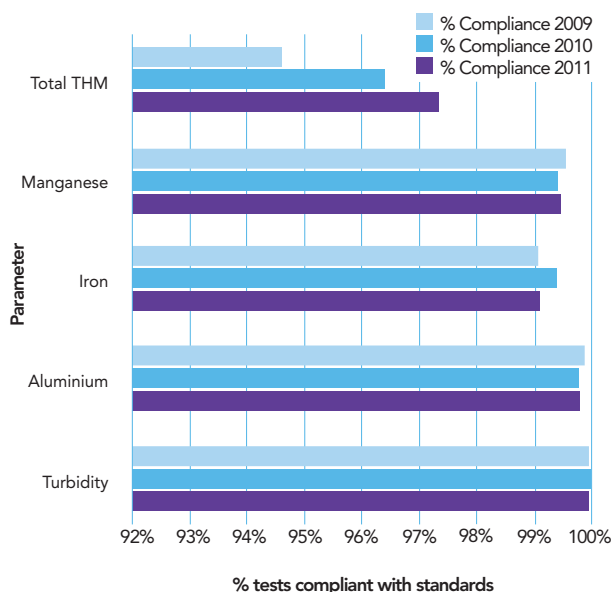
Operational Area	No. of failures	Percentage of tests compliant
East	8	99.62%
North	4	99.57%
South	2	99.90%
West	10	99.63%
Total	24	99.69%

## Customers' Taps

Physical and chemical quality standards apply to water supplied at customers' taps. 116,396 tests were carried out at customers' taps for all parameters during 2011. Of these, 99.84% were compliant with regulatory standards (99.85% in 2010).<sup>2</sup>

Compliance rates for the five key physical and chemical parameters in samples taken at customers' taps in 2011 are shown in the chart below, together with 2009 and 2010 for comparison.

Chart 4: Physical and Chemical Water Quality Compliance with Standards at Customers' Taps



Compliance with three of the five key parameters has improved when compared with 2010 compliance levels.

## Total THM

Trihalomethanes (THM) are formed by the reaction of chlorine with naturally occurring organic compounds in the water. THM formation can be minimised by removing as much of the organic material as possible prior to chlorination. Introduction of chloramination as a means of disinfection also reduces the potential for THM formation.

The most marked improvement in compliance in 2011 has been made against the THM standard. In 2011 there were 42 failures from a total of 1,573 samples compared with 59 failures out of 1,636 samples in 2010. Reduction of THM levels was a major driver for the 2006-10 investment programme. The number of failures had, therefore, been expected to reduce as key projects were completed. In addition we have continued to improve our disinfection control.

Operational Area	No. of failures	Percentage of tests compliant
East	6	98.27%
North	29	93.39%
South	2	99.47%
West	5	98.78%
Total	42	97.33%

A high percentage of our supplies are derived from upland sources containing significant levels of organic compounds and historically THM is a parameter subject to a high number of exceedances. Over half of the failures occurred in small rural supplies in the North region and many of these water treatment works are due for improvement during the 2010-15 investment period.

Overall 287 supply zones (91.40%) were fully compliant with the THM standard (100 µg/l).

<sup>2</sup> These figures exclude TOC and residual disinfectant.

## Water Quality Analysis *continued*

### Manganese

Manganese occurs naturally in many raw waters, and concentrations can vary seasonally. The manganese standard is set for aesthetic reasons and to prevent unpleasant tastes.

28 failures of the manganese standard were reported in 2011, from a total of 5,059 samples. This is an improvement on compliance in 2010 when 31 failures were reported from 5,197 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	4	99.68%
North	1	99.84%
South	2	99.87%
West	21	98.73%
Total	28	99.45%

The presence of manganese in water at customers' taps can be attributed to the accumulation of residual amounts not removed by the water treatment process. These deposits are dealt with by scouring and relining in the distribution system and the introduction of manganese removal stages in water treatment processes aimed at preventing accumulation of deposits in the first place.

Overall 298 supply zones (94.90%) were fully compliant with the manganese standard (50 µg Mn/l).

### Iron

Iron occurs naturally in many raw waters. In addition corrosion of old cast iron mains in the distribution network can contribute to iron in customers' supplies. Like manganese, the iron standard is set for aesthetic reasons, and levels above the standard can give rise to discolouration and particles in the water.

46 failures of the iron standard were reported in 2011, from a total of 5,059 samples compared to 32 failures from 5,197 samples in 2010.

Operational Area	No. of failures	Percentage of tests compliant
East	12	99.05%
North	4	99.36%
South	9	99.41%
West	21	98.73%
Total	46	99.09%

The presence of iron in water at customers' taps can be attributed to the accumulation of residual amounts not removed by the water treatment process or corrosion of old cast iron mains in the distribution network. These deposits are dealt with by scouring and relining in the distribution system.

In 2011 work continued with our infrastructure rehabilitation programme. In agreement with the DWQR this programme has been spread across the current and next investment periods. As a result we would expect to see steady improvements over the longer term of two investment periods.

Overall 283 supply zones (90.13%) were fully compliant with the iron standard (200 µg Fe/l).

## Aluminium

Aluminium compounds occur naturally in soils and are also used as coagulants to remove colour and impurities from the raw water. The coagulated material is subsequently removed prior to the water entering supply. Failures of the aluminium standard are generally due to failures of these processes.

11 failures of the aluminium standard were reported in 2011, from a total of 5,059 samples. This is an improvement on compliance in 2010 when 12 failures were recorded from 5,197 samples.

We continue to maintain optimised processes with the aim of minimising failures.

Operational Area	No. of failures	Percentage of tests compliant
East	3	99.76%
North	3	99.52%
South	1	99.93%
West	4	99.76%
Total	11	99.78%

Overall 303 supply zones (96.50%) were fully compliant with the aluminium standard (200 µg Al/l).

## Turbidity

Turbidity is a measure of "cloudiness" of water and may be caused by treatment problems following heavy rainfall or re-suspension of inorganic particles settled in the network following a burst.

3 failures of the turbidity standard were reported in 2011, from a total of 5,098 samples, compared to 1 failure in 2010 of 5,244 samples.

Operational Area	No. of failures	Percentage of tests compliant
East	1	99.92%
North	0	100.00%
South	2	99.87%
West	0	100.00%
Total	3	99.94%

Overall 311 supply zones (99.04%) were fully compliant with the turbidity standard.

# Capital and Operational Improvements

## Capital Improvements

2011 has been a significant year with regard to investment to improve water quality.

The 2006-10 capital investment programme is now substantially complete. By the end of 2011 we had delivered all but six of the 187 schemes, an investment of £600 million, to improve water quality throughout Scotland. The Glencorse & Blackpark water treatment works schemes which will improve the quality of water supplied to Edinburgh & Aviemore respectively are due for completion in early 2012. During 2011 we completed the construction of a brand new works at Assynt near Inverness.

In 2011, we completed our first full year of work in the 2010-15 capital investment programme. One of the key emphases of the programme is to protect customers from the risks associated with *Cryptosporidium* at 45 small rural sites. Construction has started on many of these sites with completion dates forecast over the next year.

We are also making extensive improvements in the networks to mitigate problems from iron and manganese. By the end of this investment programme network improvement investigations will have been completed for 143 district metered areas (DMAs) and 281 DMAs will have benefited from mains improvements. The performance of 4500km (approximately 10% of our network) of mains will be improved over this period.

## Operational Improvements

We continued to undertake root cause analysis of bacteriological failures at all of our assets and chemical failures at customers' taps.

We continued to review and adjust disinfection levels at all of our water treatment works to ensure that appropriate levels were maintained at all times, safeguarding bacteriological compliance whilst minimising chlorine taste and odour contacts and the formation of disinfection by-products (trihalomethanes). Seasonal water treatment works' operating parameters were implemented based upon water temperatures and network supply specifics. We also continued to review our methodology for disinfection management across the country with a view to upgrading various processes and procedures as we progress through 2012.

Rationalisation and abandonment of service reservoirs continued in 2011 to remove poor condition assets and further reduced the retention time of water within our water supply networks. In addition, we revised the service reservoir cleaning programme, based specifically upon water quality data.

We have renewed and upgraded a number of our key water treatment works and service reservoir sample points throughout 2011 to ensure that the water being tested is representative of that leaving these assets and this work will continue throughout 2012.

In order to support existing business initiatives and further improve water quality compliance we reviewed existing strategies and developed new water quality improvement plans during autumn 2011. These plans pull together current water quality knowledge and will be a driving force behind developing improved processes and procedures to ensure the continued improvement of water quality.

## Sustainable Land Management

We are focusing on eight drinking water catchments which are impacted by a range of diffuse pollutants. The implementation of sustainable land management in these catchments offers the opportunity to enhance and maintain a high quality supply of drinking water at a lower cost than that of a traditional treatment based approach, providing even greater value for money for our customers and delivering real environmental improvements.

The detailed catchment monitoring which we are implementing in these catchments will enable us to better understand the sources and pathways of diffuse pollution. Furthermore, it will provide a benchmark against which we can assess the success of land based measures taken to improve the quality of drinking water sources.

In order to incentivise land managers to implement measures to reduce the level of diffuse pollution we have developed the Scottish Water Best Practice Incentive Scheme. Land managers will be able to apply to the scheme for the financing of best practice measures.

We continue to work in close partnership with a number of agencies to deliver sustainable land management and ensure that drinking water quality is protected, customer charges continue to be low and the status of the environment is enhanced.

## Drinking Water Safety Plans

Drinking Water Safety Plans (DWSP), are an effective way of ensuring that a water supply is safe for human consumption and that it meets the health based standards and other regulatory requirements. A DWSP is based on a site specific risk assessment and management approach to all the steps in the water supply chain, from source to tap. The process facilitates the minimisation of contamination of source waters, the reduction or removal of contamination through treatment processes and the prevention of contamination during storage, distribution and handling of drinking water.

In 2011 we continued to progress with the delivery of the DWSP process and by the end of the year we had successfully completed 262 DWSP covering 100% of the population. DWSP are operational management plans and as such we continue to review and update the plans as required.

# Regulatory Based Commitments

## Enforcement Notices

The DWQR has the power to issue enforcement notices under the Water Industry (Scotland) Act 2002 Section 10.

The DWQR can serve an enforcement notice if believed that Scottish Water has:-

- contravened or is contravening a drinking water quality duty;
- that the contravention is likely to recur or continue; and
- that Scottish Water is not taking appropriate steps to rectify the contravention or prevent it recurring.

The DWQR can, if desired, take advice from the local Health Authority and the local authority.

The notice must contain:

- details of the alleged contravention;
- her reasons for believing it to be a contravention;
- the date by which it is to be rectified;
- the steps she wants Scottish Water to take, including milestone dates; and
- the date on which the notice takes effect. This date must be no earlier than the day following the last day on which an appeal may be brought.

## Loch Eck WTW - Manganese Contravention

Over recent years we have seen an increase in manganese detected in the raw water supplying Loch Eck WTW. As there is presently no manganese removal stage, we have designed a cost effective and robust treatment process for its removal. In accordance with the second DWQR enforcement notice construction started on the new process stage and is due to be completed in early 2012. In parallel work to remove existing manganese deposits in the distribution system is progressing well and is due to be completed by the end of 2012.

## Penwhirn WTW - Total THM and Iron Contraventions

In 2011 we fully discharged the terms of the Enforcement Notice for Penwhirn Water Supply Zone. In 2010 customers supplied by Penwhirn WTW began to benefit from a more robust treatment process which improved water quality with respect to the disinfection by-products, trihalomethanes. As part of the current investment programme work has also now been completed within the distribution system which has significantly improved iron concentrations. This work was completed in November 2011.

## Water Quality Undertakings

Under Section 76 E (4) (b) of the Water (Scotland) Act 1980 Scottish Water are able to give an Undertaking to Scottish Ministers which is a legal commitment to secure compliance with the Regulations. Each Undertaking sets out the steps to be taken, and the timescales for completion of each step, to ensure regulatory compliance.

We inherited water quality Undertakings from the predecessor authorities. Of the 308 Water Quality Undertakings inherited from the predecessor authorities, 298 have been delivered, leaving 10 in 8 separate water supply zones.

In 2011 we gave Undertakings for the Forehill supply system in respect of pesticides and in the Muirdykes supply system in respect of manganese.



### **Forehill WTW - Pesticide Contraventions**

In May 2011 we gave an Undertaking committing to actions aimed at resolving pesticide non-compliance for drinking water supplied by Forehill WTW. The date given for completion of the actions is 31st March 2014.

It is proposed that a combined approach will be pursued comprising the building of a granular activated carbon plant supplemented with sustainable land management within the catchment. The sustainable land management approach will include taking opportunities to address physical non-compliances (with General Binding Rules) through the Scottish Environment Protection Agency (SEPA), as well as longer term best practice to achieve behavioural changes through the Scottish Water Incentive Scheme.

In 2011 the sustainable land management project focused efforts on understanding the sources and pathways of pesticides in the catchment. Monitoring undertaken to date has demonstrated that sources of individual pesticides appear to be very specific. Over the next 12 months we aim to establish the pathways by which these pesticides enter the River Ugie and target measures to prevent this.

### **Muirdykes WTW - Manganese Contraventions**

In August 2011 we gave an Undertaking outlining actions to be taken to address manganese exceedances in the Muirdykes water supply zone. The date given for completion of the actions is 31st March 2017 although this date is currently under review with a view to achieving an earlier date.

As part of the Undertaking steps we have reviewed the catchment and modified our abstraction regime to minimize manganese in the raw water. A strategic study is also underway to determine the optimum solution for supplying the Muirdykes water supply zone from the Glasgow water supply system.

In addition to actions at the water treatment works, network improvements in the Muirdykes water supply zone are included in the investment programme.

Once complete this package of measures should provide significant water quality improvements to customers in the Muirdykes water supply zone.

## **Authorised Departures**

Authorised Departures may be required for any parameters that do not comply with the standards laid down in the Regulations and for water supply zones which have one or more parameters with recurring failures of the standard.

We are required to apply for an Authorised Departure to Scottish Ministers. In support of the application we must submit analytical data to quantify the extent of the problem and provide a detailed outline of the steps to be taken to secure compliance with the Regulations. An important part of the process is that we must give a commitment to a date when compliance will be secured. The maximum time period permitted under the Regulations for an Authorised Departure is three years (although a further departure may be permitted by ministers if the problem cannot be rectified in this period). Authorised Departures will not be granted where there could be a potential danger to public health.

Scottish Water did not have any Authorised Departures in place in 2011.

# Water Quality Incidents

We are required to notify the DWQR of failures to meet the quality standards (an event) laid down in the Regulations. The DWQR then decides whether an event is deemed serious enough to be declared as an incident.

In 2011 the DWQR deemed that 67 water quality events<sup>3</sup> were serious enough to be classified as incidents. They requested further information and actions in the form of an incident report on 15 of these incidents. These are listed in the table opposite.

## Burncrooks WTW Water Quality Incident

On the 17th March 2011 a series of occurrences meant that control of the treatment process was lost at Burncrooks WTW for approximately four hours. Elevated aluminium levels entered the distribution system due to this loss of treatment resulting in a "do not use for drinking or cooking" restriction being issued to affected customers supplied from Burncrooks WTW.

Investigations suggest that the most probable cause of the incident was failure of the lime dosing stage resulting in low pH water passing through the treatment works dissolving any aluminium coagulant or sludge in contact with it through the treatment process and treated water storage tanks. As a result aluminium levels were well above the regulatory standard of 200µg/l for 24 hours.

Scottish Water sought to reduce the size of the affected area by transferring areas to other supplies and to clear high aluminium water from the system by flushing hydrants. A sampling programme was instigated to monitor concentrations at service reservoirs and consumers' taps to and understand the extent of area affected. In addition, approximately 305,000 litres of bottled water were deployed for use by our customers.

A number of Scottish Water actions have been identified to address learning points from the incident and additional recommendations have also been identified by the DWQR. Some of the actions and recommendations will be considered as necessary for water treatment works across Scotland.

## Bayhead WTW Water Quality Incident

In September 2011, following heavy rains and strong winds, a deteriorated raw water quality entered Bayhead WTW. This led to overloading of the treatment process and an increase in final water aluminium levels.

Despite a number of process adjustments the treatment works continued to have issues with high aluminium levels. At the start of October an Incident Management Team was called by NHS Western Isles/Highland. Due to a lack of certainty around an immediate resolution to the issues and to ensure that the risk to customers was minimised it was agreed that a "do not use for drinking or cooking" notice should be issued.

<sup>3</sup>Numbers correct at the time of printing

As well as providing door to door bottled water and written updates to customers, three multi-agency drop-in sessions were held in the village of Bayhead to enable customers to address any concerns they may have had about the notice and their water supply.

We concluded that the root cause of the incident was that the 2 existing filtration treatment units that are currently on site are inadequate to meet peaks in demand during periods of raw water quality. We plan to invest in an additional filtration unit, to be installed during Spring 2012.

### Water Quality Incident Reports Requested\*

Location	Date	Population Affected	Incident Report Reason
Bonchester WTW	25/02/2011	229	Low chlorine levels
Fairburn SR	28/02/2011	121	Bacteriological contamination
Glenfinnan WTW	11/03/2011	80	Low chlorine levels
Burncrooks WTW	17/03/2011	53,417	Elevated aluminium levels
Rosebery WTW	29/05/2011	119,564	Elevated turbidity and aluminium levels
Afton RSZ	05/07/2011	10	Bacteriological contamination
Muirdykes WTW	14/07/2011	83,708	Elevated manganese levels
Amlaird WTW	23/07/2011	34,800	Disinfection compromised
Invercarnie WTW	24/07/2011	243,562	Low chlorine levels
Fair Isle WTW	24/07/2011	69	Disinfection compromised
South Moorehouse RSZ	18/08/2011	26,941	Elevated levels of MCPA (pesticide)
Bayhead WTW	19/09/2011	1,100	Elevated aluminium levels
Tabert Argyll WTW	16/10/2011	3,000	Elevated turbidity and aluminium levels
Tabert Argyll WTW	26/10/2011	3,000	Elevated turbidity and aluminium levels
Camps WTW	13/12/2011	92,828	Elevated turbidity, aluminium levels and low chlorine levels

\*Correct at the time of printing.



# Appendices



## Appendix A

### Microbiological Water Quality

#### Water Leaving Treatment Works

Volume of water distributed from works (m <sup>3</sup> /d)	Total Coliforms			E.coli Coliforms		
	No. of Samples	No. of Fails	Percentage exceeding PCV	No. of Samples	No. of Fails	Percentage exceeding PCV
Less than 3,000 m <sup>3</sup> /d	9,015	13	0.14%	9,015	2	0.02%
3,000 to 12,000 m <sup>3</sup> /d	5,226	13	0.25%	5,226	1	0.02%
More than 12,000 m <sup>3</sup> /d	14,551	23	0.16%	14,553	2	0.01%
Totals	28,792	49	0.17%	28,794	5	0.02%

#### Water at Customers' Taps

Size of Zone (population)	Total Coliforms			E.coli Coliforms		
	No. of Samples	No. of Fails	Percentage exceeding PCV	No. of Samples	No. of Fails	Percentage exceeding PCV
Less than 5,000 people	1,819	10	0.55%	1,819	2	0.11%
5,000 to 20,000 people	1,331	5	0.38%	1,331	0	0.00%
20,001 to 100,000 people	11,076	45	0.41%	11,075	0	0.00%
Totals	14,226	60	0.42%	14,225	2	0.01%

#### Water in Service Reservoirs

Capacity of reservoir (m <sup>3</sup> )	Total Coliforms			E.coli Coliforms		
	No. of Samples	No. of Fails	Percentage exceeding PCV	No. of Samples	No. of Fails	Percentage exceeding PCV
Less than 2,000 m <sup>3</sup>	39,175	96	0.25%	39,175	10	0.03%
2,000 to 10,000 m <sup>3</sup>	9,801	19	0.19%	9,801	3	0.03%
More than 10,000 m <sup>3</sup>	2,976	7	0.24%	2,976	0	0.00%
Totals	51,952	122	0.23%	51,952	13	0.03%

#### Water at Customers' Taps

Size Band	Enterococci			Clostridium perfringens		
	No. of Samples	No. of Fails	Percentage exceeding PCV	No. of Samples	No. of Fails	Percentage exceeding PCV
Less than 5,000 people	589	0	0.00%	645	0	0.00%
5,000 to 20,000 people	344	0	0.00%	728	1	0.14%
20,001 to 100,000 people	641	1	0.16%	3,695	0	0.00%
Totals	1,574	1	0.06%	5,068	1	0.02%

## Appendix B

### Physical and Chemical Water Quality at Customers' Taps

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>1,2 Dichloroethane</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>2,4,-Db</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	0	0.00%	0
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	0	0.00%	0
<b>2,4-D</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	0	0.00%	0
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	0	0.00%	0
<b>Aldrin</b>					
Less than 5,000 people	189	583	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	312	1,567	0	0.00%	0
<b>Aluminium</b>					
Less than 5,000 people	191	645	4	0.62%	4
5,000 to 20,000 people	43	728	0	0.00%	0
20,001 to 100,000 people	80	3,686	7	0.19%	7
Total	314	5,059	11	0.00%	11
<b>Ammonium</b>					
Less than 5,000 people	191	642	2	0.31%	2
5,000 to 20,000 people	43	743	2	0.27%	2
20,001 to 100,000 people	80	3,710	0	0.00%	0
Total	314	5,095	4	0.00%	4
<b>Antimony</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0
<b>Arsenic</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0
<b>Asulam</b>					
Less than 5,000 people	24	85	0	0.00%	0
5,000 to 20,000 people	9	72	0	0.00%	0
20,001 to 100,000 people	22	176	0	0.00%	0
Total	55	333	0	0.00%	0

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Atrazine</b>					
Less than 5,000 people	105	300	0	0.00%	0
5,000 to 20,000 people	9	72	0	0.00%	0
20,001 to 100,000 people	12	95	0	0.00%	0
Total	126	467	0	0.00%	0
<b>Benzene</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Benzo 3,4 Pyrene</b>					
Less than 5,000 people	191	588	0	0.00%	0
5,000 to 20,000 people	43	344	1	0.29%	1
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,573	1	0.00%	1
<b>Boron</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	640	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Bromate</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	639	0	0.00%	0
Total	314	1,572	0	0.00%	0
<b>Cadmium</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0
<b>Chloride</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	639	0	0.00%	0
Total	314	1,567	0	0.00%	0
<b>Chlortoluron</b>					
Less than 5,000 people	4	16	2	12.50%	1
5,000 to 20,000 people	8	63	0	0.00%	0
20,001 to 100,000 people	30	240	5	2.08%	1
Total	42	319	7	0.00%	2
<b>Chromium</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0

## Appendix B

### Physical and Chemical Water Quality at Customers' Taps *continued*

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Colour</b>					
Less than 5,000 people	191	641	3	0.47%	2
5,000 to 20,000 people	43	743	0	0.00%	0
20,001 to 100,000 people	80	3,707	0	0.00%	0
Total	314	5,091	3	0.00%	2
<b>Conductivity</b>					
Less than 5,000 people	191	644	0	0.00%	0
5,000 to 20,000 people	43	743	0	0.00%	0
20,001 to 100,000 people	80	3,711	0	0.00%	0
Total	314	5,098	0	0.00%	0
<b>Copper</b>					
Less than 5,000 people	191	590	1	0.17%	1
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	639	0	0.00%	0
Total	314	1,573	1	0.00%	1
<b>Cyanide</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	639	0	0.00%	0
Total	314	1,572	0	0.00%	0
<b>Cypermethrin</b>					
Less than 5,000 people	18	58	0	0.00%	0
5,000 to 20,000 people	16	125	0	0.00%	0
20,001 to 100,000 people	50	384	0	0.00%	0
Total	84	567	0	0.00%	0
<b>Diazinon</b>					
Less than 5,000 people	144	430	0	0.00%	0
5,000 to 20,000 people	27	215	0	0.00%	0
20,001 to 100,000 people	55	436	0	0.00%	0
Total	226	1,081	0	0.00%	0
<b>Dicamba</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	0	0.00%	0
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	0	0.00%	0
<b>Dieldrin</b>					
Less than 5,000 people	189	583	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	312	1,567	0	0.00%	0
<b>Diuron</b>					
Less than 5,000 people	4	15	0	0.00%	0
5,000 to 20,000 people	8	64	0	0.00%	0
20,001 to 100,000 people	30	239	0	0.00%	0
Total	42	318	0	0.00%	0

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Flumethrin</b>					
Less than 5,000 people	18	61	0	0.00%	0
5,000 to 20,000 people	16	128	0	0.00%	0
20,001 to 100,000 people	50	401	0	0.00%	0
Total	84	590	0	0.00%	0
<b>Fluoride</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,574	0	0.00%	0
<b>Free Chlorine</b>					
Less than 5,000 people	191	1,815	0	0.00%	0
5,000 to 20,000 people	43	1,331	0	0.00%	0
20,001 to 100,000 people	80	11,078	0	0.00%	0
Total	314	14,224	0	0.00%	0
<b>Gamma-HCH (Lindane)</b>					
Less than 5,000 people	147	436	0	0.00%	0
5,000 to 20,000 people	23	183	0	0.00%	0
20,001 to 100,000 people	25	200	0	0.00%	0
Total	195	819	0	0.00%	0
<b>Heptachlor</b>					
Less than 5,000 people	189	583	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	312	1,567	0	0.00%	0
<b>Heptachlor epoxide</b>					
Less than 5,000 people	189	582	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	312	1,566	0	0.00%	0
<b>Hydrogen ion (pH)</b>					
Less than 5,000 people	191	644	4	0.62%	4
5,000 to 20,000 people	43	743	1	0.13%	1
20,001 to 100,000 people	80	3,711	4	0.11%	3
Total	314	5,098	9	0.00%	8
<b>Iron</b>					
Less than 5,000 people	191	645	5	0.78%	5
5,000 to 20,000 people	43	728	3	0.41%	3
20,001 to 100,000 people	80	3,686	38	1.03%	23
Total	314	5,059	46	0.00%	31
<b>Isoproturon</b>					
Less than 5,000 people	4	16	0	0.00%	0
5,000 to 20,000 people	8	63	0	0.00%	0
20,001 to 100,000 people	33	264	0	0.00%	0
Total	45	343	0	0.00%	0



Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Lead</b>					
Less than 5,000 people	191	590	2	0.34%	2
5,000 to 20,000 people	43	344	1	0.29%	1
20,001 to 100,000 people	80	639	6	0.94%	4
Total	314	1,573	9	0.00%	7
<b>Linuron</b>					
Less than 5,000 people	4	15	0	0.00%	0
5,000 to 20,000 people	8	64	0	0.00%	0
20,001 to 100,000 people	30	239	0	0.00%	0
Total	42	318	0	0.00%	0
<b>Manganese</b>					
Less than 5,000 people	191	645	1	0.16%	1
5,000 to 20,000 people	43	728	3	0.41%	2
20,001 to 100,000 people	80	3,686	24	0.65%	13
Total	314	5,059	28	0.00%	16
<b>MCPA</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	2	0.97%	2
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	2	0.00%	2
<b>MCPB</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	0	0.00%	0
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	0	0.00%	0
<b>MCPP(Mecoprop)</b>					
Less than 5,000 people	25	88	0	0.00%	0
5,000 to 20,000 people	26	207	0	0.00%	0
20,001 to 100,000 people	69	553	0	0.00%	0
Total	120	848	0	0.00%	0
<b>Mercury</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0
<b>Metaldehyde</b>					
Less than 5,000 people	4	16	0	0.00%	0
5,000 to 20,000 people	8	63	0	0.00%	0
20,001 to 100,000 people	33	263	0	0.00%	0
Total	45	342	0	0.00%	0
<b>Metazachlor</b>					
Less than 5,000 people	2	8	1	12.50%	1
5,000 to 20,000 people	3	23	0	0.00%	0
20,001 to 100,000 people	16	128	2	1.56%	1
Total	21	159	3	0.00%	2

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Metsulfuron</b>					
Less than 5,000 people	2	7	0	0.00%	0
5,000 to 20,000 people	4	27	0	0.00%	0
20,001 to 100,000 people	16	128	0	0.00%	0
Total	22	162	0	0.00%	0
<b>Nickel</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	637	1	0.16%	1
Total	314	1,565	1	0.00%	1
<b>Nitrate</b>					
Less than 5,000 people	191	586	0	0.00%	0
5,000 to 20,000 people	43	447	0	0.00%	0
20,001 to 100,000 people	80	1,369	0	0.00%	0
Total	314	2,402	0	0.00%	0
<b>Nitrite</b>					
Less than 5,000 people	191	586	2	0.34%	2
5,000 to 20,000 people	43	447	0	0.00%	0
20,001 to 100,000 people	80	1,370	7	0.51%	4
Total	314	2,403	9	0.00%	6
<b>Odour</b>					
Less than 5,000 people	191	643	0	0.00%	0
5,000 to 20,000 people	43	744	0	0.00%	0
20,001 to 100,000 people	80	3,704	0	0.00%	0
Total	314	5,091	0	0.00%	0
<b>PAH - Total</b>					
Less than 5,000 people	191	588	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Permethrin</b>					
Less than 5,000 people	18	58	0	0.00%	0
5,000 to 20,000 people	16	125	0	0.00%	0
20,001 to 100,000 people	50	384	0	0.00%	0
Total	84	567	0	0.00%	0
<b>Pesticides - Total</b>					
Less than 5,000 people	190	701	0	0.00%	0
5,000 to 20,000 people	43	513	0	0.00%	0
20,001 to 100,000 people	80	1,407	0	0.00%	0
Total	313	2,621	0	0.00%	0
<b>Propetamphos</b>					
Less than 5,000 people	144	432	0	0.00%	0
5,000 to 20,000 people	27	217	0	0.00%	0
20,001 to 100,000 people	55	440	0	0.00%	0
Total	226	1,089	0	0.00%	0

## Appendix B

### Physical and Chemical Water Quality at Customers' Taps *continued*

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Selenium</b>					
Less than 5,000 people	191	585	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	638	0	0.00%	0
Total	314	1,566	0	0.00%	0
<b>Simazine</b>					
Less than 5,000 people	105	300	0	0.00%	0
5,000 to 20,000 people	9	72	0	0.00%	0
20,001 to 100,000 people	12	95	0	0.00%	0
Total	126	467	0	0.00%	0
<b>Sodium</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	640	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Sulphate</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	640	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Taste</b>					
Less than 5,000 people	191	643	2	0.31%	2
5,000 to 20,000 people	43	743	0	0.00%	0
20,001 to 100,000 people	80	3,702	0	0.00%	0
Total	314	5,088	2	0.00%	2
<b>Tetrachloroethene &amp; Trichloroethene</b>					
Less than 5,000 people	191	583	0	0.00%	0
5,000 to 20,000 people	43	342	0	0.00%	0
20,001 to 100,000 people	80	639	0	0.00%	0
Total	314	1,564	0	0.00%	0
<b>Tetrachloromethane</b>					
Less than 5,000 people	191	589	0	0.00%	0
5,000 to 20,000 people	43	343	0	0.00%	0
20,001 to 100,000 people	80	641	0	0.00%	0
Total	314	1,573	0	0.00%	0
<b>Thifensulfuron-methyl</b>					
Less than 5,000 people	2	7	0	0.00%	0
5,000 to 20,000 people	4	27	0	0.00%	0
20,001 to 100,000 people	16	128	0	0.00%	0
Total	22	162	0	0.00%	0
<b>TON Ratio</b>					
Less than 5,000 people	191	586	0	0.00%	0
5,000 to 20,000 people	43	447	0	0.00%	0
20,001 to 100,000 people	80	1,368	0	0.00%	0
Total	314	2,401	0	0.00%	0

Population size	Number of Zones	No. of Results	Results Failing PCV	Results Failing PCV (%)	Zones With PCV Failures
<b>Total chlorine</b>					
Less than 5,000 people	191	1,815	0	0.00%	0
5,000 to 20,000 people	43	1,331	0	0.00%	0
20,001 to 100,000 people	80	11,077	0	0.00%	0
Total	314	14,223	0	0.00%	0
<b>Total organic carbon</b>					
Less than 5,000 people	191	588	0	0.00%	0
5,000 to 20,000 people	43	344	0	0.00%	0
20,001 to 100,000 people	80	640	0	0.00%	0
Total	314	1,572	0	0.00%	0
<b>Total Trihalomethanes</b>					
Less than 5,000 people	191	589	29	4.92%	21
5,000 to 20,000 people	43	343	9	2.62%	4
20,001 to 100,000 people	80	641	4	0.62%	2
Total	314	1,573	42	0.00%	27
<b>Tribenuron-methyl</b>					
Less than 5,000 people	2	7	0	0.00%	0
5,000 to 20,000 people	4	27	0	0.00%	0
20,001 to 100,000 people	16	128	0	0.00%	0
Total	22	162	0	0.00%	0
<b>Turbidity</b>					
Less than 5,000 people	191	644	0	0.00%	0
5,000 to 20,000 people	43	743	0	0.00%	0
20,001 to 100,000 people	80	3,711	3	0.08%	3
Total	314	5,098	3	0.00%	3

## Contact Details

For more information on drinking water quality in your area, call our Customer Helpline **0845 601 8855\*** and ask to speak to a member of our Public Health team. Alternatively you can contact us via our website [www.scottishwater.co.uk](http://www.scottishwater.co.uk)

Or you can write to us at:

Scottish Water  
PO Box 8855  
Edinburgh  
EH10 6YQ

\*We record all calls for quality and training purposes.

## Head Office

Castle House, 6 Castle Drive,  
Carnegie Campus, Dunfermline KY11 8GG  
Customer Helpline: 0845 601 8855

[www.scottishwater.co.uk](http://www.scottishwater.co.uk)

